English for Science and Technology (EST) at the Level of Master Studies

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Abstract. The article deals with EST course design processes: objectives, content evaluation, learning strategies and assessment techniques. The significance of EST course has been very important for technologal educational institutions for many years. Its importance is not reduced at the present stage of the university change, when the system "university ←→ enterprise" is again gaining its way into educational processes. Barnett (2000) in his book "Realizing the University in an Age of Super complexity" asks and tries to answer the following questions: Paradise lost or paradise regained? Old ruins or new foundations? The university change is a very complicated issue, and it needs a lot of effort to overcome these difficulties. "The University is a ruined institution, but we do not have to dwell in its ruins. We can construct a new University... However, it just may be that the construction of the very kind of University that is fitting for the contemporary world might have to draw to some extent on earlier ideas of the University" (Barnett, 2000).

Introduction

EST in the context of ESP. EST belongs to ESP approach, which started soon after the Second World War when a large expansion in scientific, technical and economic activity began. The world was dominated by technology and commerce. The aim of states and educational institutions was to develop people who wanted to learn English. They knew what they would use the knowledge of special English for

> "Learners were seen to have different needs and interests, which would have an important influence on their motivation to learn and therefore on the effectiveness of their learning" (Hutchinson and Waters, 1992).

The area of EST

> "is known to have been developed especially rapidly. English for Science and Technology has always set and continues to set the trend in theoretical discussion, in ways analysing language and the variety of actual teaching materials" (Swales, 1985).

Many practicians and theorists started producing EST courses and syllabuses, which would give priority to the language, students might meet in their research and future work and which would be more relevant to learners' needs. Thus ESP, and its branch EST are the approaches to language learning/ teaching in which the choice of the content and techniques are based on the learner's reasons to study.

> "Much of the demand for ESP has come from scientists and technologists who need to learn English for a number of purposes connected with their specialisations. It is natural, therefore, that English for Science and Technology (EST) should be an important aspect of ESP programmes" (Kennedy and Bolitho, 1990).

Research object: the course of English for Science (ES) at the level of Master Studies at Kaunas University of Technology (KTU).

Research aim: to reveal the significance of the ES course as an efficient instrument in facilitating the students of Master Studies in their research and work.

Research objectives: to overview the distinctions of the ES course design in the changing university; to present the students' approach to the course; to reveal the motivating forces of the course; to present the selection and organization of ES content and learning strategies.

ES course design

ES course, which we consider should be called EST, has been designed for the level of Master at the Centre of Foreign Languages Studies, Kaunas University of Technology (KTU). The design of the course has been carried out following Widdowson's (1975) definition of scientific discourse as "the verbal and nonverbal realization of the communicative system of science".

Widdowson presented three assumptions for ESP practice in academic terrain:

- The learners' knowledge of the specific subject;
- The learners' awareness of the functioning of their own language;
- The present state of the learners' knowledge of their language use in the second – language situation.

The design of the course has undergone all the "curriculum processes" offered by Jaba (1962):

- Diagnosis of needs
- Formulation of objectives
- Selection of content
- Organization of content
- Selection of learning experiences
- Organization of learning experiences
- Determination of what to evaluate and the means to evaluate.

It is obvious that the notion "English for Science" is too general if the students' needs at the level of Master Studies are to be taken fully into account. As regards KTU, we should speak about English for Mechanics, English for Chemistry, English for Design, etc. Besides, English for Mechanics might be branched into: English for Heat Mechanics, English for Mechanical Technologies, English

for Mechanisms and so on. These classifications illustrate the differences between various situations, which should be reflected in the level, and content of programmes and materials.

The opportunity to choose selective courses determines students' discussion and their needs to study ES. Further student – teacher cooperative analysis of the learners' needs and wants helps to formulate the main objectives of ES course:

- To give students opportunities to identify the language they need to learn;
- To teach students learning strategies to develop different language skills;
- To integrate content, language and learning strategies, and to specify the goals for each of these components.

The content selection of the ES programme is the most important problem for this level of studies. It is the primary focus of instruction, "as content, rather than language, drives the curriculum" (Chamot and O'Malley, 1994). The content is a motivating and stimulating factor, which determines the development of all the language skills and which is inherently more interesting as it is related to a variety of personal interests. In this sense, content selection is closely connected with developing reading skills. As far as this activity is concerned, students are taught to develop strategies for reading rather than reading technique itself. Skimming and scanning a text and reading for extracting particular information become the main activities.

Language practice is viewed "as not only a set of grammatical structures but also as a set of functions" (Kennedy and Bolitho, 1990). Grammar is presented as an activity

"how language is used to give expression to certain reasoning processes, how it is used to define, classify, generalise, to make hypotheses, draw conclusions and so on" (Allen and Widdowson, 1974).

The whole process of ESP and EST content selection has been clearly defined by Kennedy and Bolitho (1990):

"it is based on a functional analysis of the language a learner needs and the development of related communicative abilities (reading, writing, listening, speaking in an appropriate balance and in suitable contexts)".

The cooperative student-teacher activity leads to adjusting special literature, textbooks, professional interaction materials and special video, audio and computer programs. The evaluation of all these facilities undergoes the following three steps:

- Subjective analysis
- Objective analysis
- Matching.

The selection and evaluation of the ES content is usually carried out at the beginning of an academic year. This process usually receives a considerable amount of attention on the part of students, and is performed in terms of opinions, inquiries, appreciations of attitudes, generalizations, etc.

Such activity usually results in a cooperatively designed programme, the outline of which is presented in the table. The main topics and various activities have been selected with the aim that they would foster higher-order thinking, which involves analysis, synthesis and evaluation.

Table 1. The ES course at the Level of Master Studies (a shortened scheme)

TOPIC	1. Observing and describing 2. Data collecting and classifying 3. Predicting and hypothesing 4. Testing and Experimenting 5. Defining and Classifying 6. Measuring and Calculating 7. Concluding and Summarising 8. Using visual Aids
DISCUSSIONS AND PROFESSIONAL INTERACTIONS	Discussion of the main topics and professional interaction themes, such as: presentation of research, exchanging opinions examining ideas,
READING AND VOCABULARY BUILDING	Dealing with facts, analysing solutions, considering consequences. Reading materials: course texts and original scientific literature. Reading skills: finding the main idea, skimming, scanning. Vocabulary building through topics, texts, reports.
LANGUAGE PATTERNS	Using passive voice; long noun phrases serving as subjects or objects in a sentence; "if... then" constructions, expressions indicating causalities, relative clauses, which begin with *which, that, where, who*; conditionals; word building (synchronize, thermodynamics, managerialism, predetermine), adverbs of frequency, etc.
LISTENING AND NOTE-TAKING	Understanding a lecture or report. Decide about the main principles and agreed symbols of note-taking, practise.
WRITING	Different writing practises concerning the main topics: write an extended definition, a paragraph with examples, conclusions, comprise a table, chart; a summary, a report, etc.

The stage "organization of learning experiences" in the course design process emphasizes learning strategies. Chamot and O'Malley (1994) distinguish the following types of learning strategies:

- Metacognitive Strategies: used in planning for learning, self-monitoring, and evaluating achievement.

- Metacognitive Knowledge: understanding one's own learning processes, the nature of the learning task, and the strategies that should be effective.
- Cognitive Strategies: manipulating the material to be learned through rehearsal, organization or colaboration.
- Social / Affective Strategies: interacting with others for learning or using affective control for learning.

Having defined the classes of strategies, the problem arises how one or two strategies should be chosen. Usually the curriculum determines the necessary strategy, but there are some points to be mentioned in the strategy selection:

- Strategies are determined by the aim of the instructional task;
- Students should start with one strategy and then choose some other;
- Select a strategy that applies to different content domains;
- Choose the strategy in the cooperative student-teacher activity.

> "One of the goals of strategy instruction is to alter students' beliefs about themselves by teaching them that failures can be attributed to lack of effective strategies rather than lack of ability" (Chamot and O'Malley, 1994).

The ES course is considered to be the implementation of students' needs, their independent and autonomous learning under a rather liberal guidance of the teacher acting as a consultant. Therefore the problem of strategy selection plays a very important role.

Speaking about the evaluation issue, emphasis is put on the main points in this succession: course evaluation, students' self-evaluation and learner's assessment. Evaluation in the ES course fulfils two functions-assessment and feedback". Assessment is a matter of measuring what the learners already know. But any assessment should also provide positive feedback to inform teachers and learners about what is still not known, thus providing important input to the content and methods of future work" (Hutchinson and Waters, 1992). So, the value of evaluation and assessment depends on the way they are used as well as a learner's and the teacher's abilities to get the most out of this procedure.

> "We need to see test results less as an end in themselves and more as the starting point for genuine negotiation and interaction between the teacher and learners and among the learners themselves" (Hutchinson and Waters, 1992).

Conclusions

In this article we have dealt with the main features distinguishing ES or EST course in the University terrain. We have tried to emphasize how in a learning-centred approach is important to balance all the factors stimulating ES learning/teaching process.

Finally, we would like to present some ideas about the significance of such courses in the changing university.

"The 1990s and the approaching Millennium make bold headlines with slogans about Access and Accountability, Adaptability and Appraisal, and so on through the alphabet. Is this a new era in higher education?" (Duke, 1995).

Speaking about changing environments and global development Duke writes:

> "Changes in the world at large, particularly in high technology, information-rich, post-industrial societies, constitute an environmental common to all universities... I conclude this short discussion of new discourse by looking at four key words, and the agencies, or external change agentism, which are promoting them. The words are enterprise, capability and partnership". The university researchers speak about entrepreneur universities, educational programs run by employers, and other university-enterprise developments which "would remove boundaries between them or they would become 'porous' - learners would transfer back and forth between settings, or select various mixtures of settings..." (Knapper and Cropley, 1985).

All these considerations call for some about EST courses in a changing surrounding:

- The importance of ES or EST courses should be viewed in the context of the university change;
- The course should build up professional skills by science and technology content;
- A course design should become a cooperative student-teacher activity;
- A subject-specific ES course can be made more successful making the methodology more interactive and appropriate.

References

1. Allen, J.P.B. and Widdowson, H.G. (1974) Teaching the Communicative Use of English in International Review of Applied Linguistics XII.

2. Barnett, R. (2000) Realizing the University. The Society for Research into Higher Education and Open University Press.

3. Chamot, A.U. and O'Malley, J.M. (1994) The CALLA Handbook. Addison – Wesley Publishing Company.

4. Dubin, F. and Olshtain, E. (1991) Course Design, Developing Programs and Materials for Language Learning. Cambridge University Press.

5. Duke, Ch. (1992) The Learning University. The Society for Research into Higher Education and Open University Press.

6. Hutchinson, T. and Waters, A. (1992) English for Specific Purposes: A Learning-Centred Approach. Cambridge University Press.

7. Kennedy, Ch and Bolitho, R. (1990) English for Specific Purposes. Modern English Publications, McMillan Publishers Ltd.

8. Knapper, C. and Cropley, A. (1985) Lifelong Learning and Higher Education. London: Crown Helm.

9. Swales, J. (ed.) (1985) Episodes in ESP. Pergamon Press.

10. Jaba, H. (1962) Curriculum Development: Theory and Practice. New York: Harcourt, Cambridge University Press.

11. Widdowson, H.G. (1975) EST in Theory and Practice. An ETIC Occasional Paper. London: The English Teaching Information Centre.

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Mokslo anglų kalbos kursas magistro studijų lygyje

Santrauka

Straipsnyje nagrinėjamas "mokslo anglų kalbos" kursas, kurio pasirenkamas modulis yra skirtas magistro studijoms. Straipsnyje pateikiami kurso tikslai, turinio analizė ir įvertinimas, mokymosi strategijos bei įvertinimo metodai. Dabartiniame universitetų kaitos etape specialiosios paskirties kursai vėl įgauna svarbą, nes universiteto veiklos tyrėjai kalba apie sistemos "universitetas←→ įmonė" sąveiką.

Šis specialios paskirties kursas yra planuojamas laikantis pagrindinių kurso planavimo reikalavimų (tikslų formulavimas, turinio atranka, turinio sutvarkymas, mokymosi strategijų parinkimas, mokymosi organizavimas, vertinimo sistemos sudarymas). Planavimo sėkmė priklauso nuo dėstytojo ir studentų bendradarbiavimo, kurio metu atliekama subjektyvi ir objektyvi analizės bei derinimas. Magistro studijų lygyje labia svvarbus mokymosi strategijos pasirinkimas, todėl šis procesas vyksta glaudžia bendradarbiaujant studntui ir dėstytojui. Visas programos kūrimo procesas yra kolektyvinio darbo išdava, nes jame be studentų ir užsienio kalbos dėstytojo dar dalyvauja ir specialybės dėstytojas, kuris padeda suderinti mokymosi turinį.

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