Profesionālā valoda inženieru izglītībā

Professional Language in Engineering Education

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Anotācija

Ievads. *3-5 valodu lietojums ir svarīgs, lai apvienoties sadarbības tīklos jauno zināšanu izveidei.* ***Raksta mērkis.*** *Diskusijai tiek piedāvāti jēdziens „profesionālā valoda" un profesionālās valodas inženieru izglītībā analīze.* ***Materiāli un metodes****. Pētījumā metodoloģiskais pamatojums ir ar „profesionālo valodu" saistīto jēdzienu teoretiskā un empirīskā analīze.* ***Rezultāti.*** *Tiek izskatīta loģiska ķede: profesionālā valoda valodu vidē inženieru izglītībā → profesionālās valodas vēsturiskais aspekts → profesionālā valods valodu mācībās → profesionālās valodas definīcija → empirīskā analīze.* ***Secinājumi.*** *Profesionālā valoda atklāj daudzas iespējas inženieru izglītībai mūžizglītībā.*

INTRODUCTION

The use of 3-5 languages that involves professional language to form varied cooperative networks for the creation of new knowledge is of the greatest importance for the development of humans, institutions and society (Maslo, 2006).

AIM OF THE STUDY

To identify and analyze professional language in engineering education on the pedagogical discourse.

STATE-OF-THE-ART

The modern issues of global developmental trends emphasize "a prime importance in sustainable development that is to meet the needs of the present without compromising the ability of future generations to meet their own needs" (Zimmermann, 2003). Hence, sustainable personality is a person who sees relationships and inter-relationships between nature, society and the economy (Rohweder, 2007). In other words, this is a person who is able to develop the system of external and internal perspectives, and in turn this developing the system of external and internal perspectives becomes a main condition for the sustainable personality to develop. For instance, the concern of the European Union, namely, to become "the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion" (European Commission, 2004) demonstrates the

significance of developing the system of external and internal perspectives for the development of humans, institutions and society. Thus, the life necessity to develop the system of two perspectives, namely, external and internal, determines the research methodology on the analysis of professional language in engineering education on the pedagogical discourse (See Figure 1):

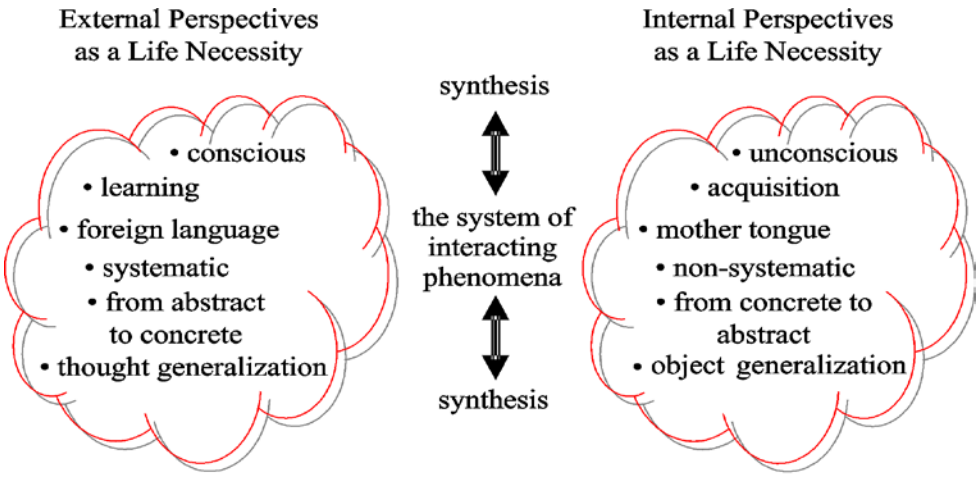

Figure 1: Developing the system of external and internal perspectives as a life necessity

However, in real life sustainable personality is often realized from one of the perspectives: from the internal perspective accentuating cognition, from the external perspective accentuating social interaction and finding a balance between the external and internal perspectives (Surikova, 2007).

The methodological foundation of the present research to analyze professional language in engineering education on the pedagogical discourse is formed by the System-Constructivist Theory that is based on (Maslo, 2006) Parson's system theory (Parson, 1976) where any activity is considered as a system, Luhmann's theory (Luhmann, 1988) which emphasizes communication as a system, the theory of symbolic interactionalism (Mead, 1973; Goffman, 2008) and the theory of subjectivism (Groeben, 1986).

The System-Constructivist Theory emphasizes that human being's point of view depends on the subjective aspect: everyone has his/her own system of external and internal perspectives (See Figure 1) that is a complex open system (Rudzinska, 2008) and experience plays the central role in a construction process (Maslo, 2007).

Thus, four approaches to realizing professional language in engineering education on the pedagogical discourse are revealed. The fourth approach, namely, developing the system of the external and internal perspectives, is considered to be applicable to the present research on the analysis of professional language in engineering education on the pedagogical discourse.

The search for the "professional language" presents a potential model for development indicating how the steps of the process are related following a logical chain: professional language in languages of engineering education → a historical perspective on professional language→

characteristics of professional language in language teaching/learning → definition of professional language → empirical study.

Professional Language in Languages of Engineering Education

The languages of education is an overarching concept for language as a subject, language across the curriculum and foreign languages (Aase, 2006).

Engineering education contributes to developing "national" language competence, to the learner's understanding and thinking within the language across the curriculum by introducing concepts and genres specific to its area of scientific knowledge (Aase, 2006) and uses "national" language for learning and presenting knowledge (Aase, 2006). Hence, all teachers are language teachers (Aase, 2006).

"National" language(s) used in universities are different from the language of the home: "such students are not learning their "mother" tongue" (Byram, 2006). Learning is realized as professional activity (Maslo, 2006) and, consequently, "national" language for learning is considered as "national" language for professional activity.

Thus, professional language is initially seen as a "national" language for professional activity.

A Historical Perspective on Professional Language

Lubīna (2002) reveals that professional language appeared initially as the result of the division of work, when science and trade developed. Professional language consists of certain methods of science and notions. This language is a universal means of communication in a certain sphere of work. Hence, professional language is an integral part of communication in a certain professional sphere.

Characteristics of Professional Language

Vygotsky's semiotics of language development are to be found within concept formation (Robbins, 2007), namely, spontaneous and scientific concepts.

Brain activity as an intrapersonal process reveals cyclic nature of development (Maslo, 2006) that emphasizes that theoretical findings focused on children are equally applicable to adult development: "Vygotsky's work focused on children, yet, his instructional insights (teaching in the frame of the present research) are equally applicable to adult learning" (Benson, 1995).

Vygotsky (2002) points out some factors of forming spontaneous and scientific concepts where inner and outer conditions of forming spontaneous concept are different from inner and outer conditions of developing scientific concept: the two processes – the development of spontaneous and of non-spontaneous concepts – are parts of a single process (Vygostky, 1934/1962) (See Table 1) where the rudiments of systematization first enter the individual's mind by way of his contact with scientific concepts and are then transferred to everyday concepts, changing their psychological structure from the top down (Vygostky, 1934/1962).

Table 1: Theses of Vygotsky's theory on the development of spontaneous and scientific concepts

Spontaneous Concepts	Scientific Concepts
- developed through individual's mental efforts;	- can be created only if individual's spontaneous concepts reach a definite level;
- individual's lack of conscious awareness of relationships;	- characterized by individual's reflective awareness and deliberate control;
- part of a single process;	- decisively influenced by adults;
- direction of development is from the bottom up from elementary and low features to high type's features;	- part of a single process;
	- scientific concepts develop from the top down, from a higher type's feature to a low one

A total system of concepts is of great importance in the course of development: "scientific and spontaneous concepts start from different points but eventually meet" (Vygotsky, 1934/1962). Vygotsky highlights that from the point of view of psychology the development of concepts and the development of word meaning are one and the same process (Vigotskis, 2002).

Vygotsky (Vigotskis, 2002) outlines that scientific concept and professional concept (Mylett, Gluck, 2005) learning differs from spontaneous concept acquiring as foreign and professional (Mylett, Gluck, 2005) language learning differs from native language acquiring that is why Vygotsky points out (Vigotskis, 2002) the types of relationships between spontaneous concept and mother tongue; between scientific concept and foreign language; between spontaneous and scientific concepts and/or mother tongue and foreign language that are determined as follows: inner and outer conditions of forming spontaneous concept coincide with inner and outer conditions of acquiring mother tongue; inner and outer conditions of developing scientific concept coincide with inner and outer conditions of learning foreign language; inner and outer conditions of forming spontaneous concept and of acquiring mother tongue are different from inner and outer conditions of developing scientific concept and of learning foreign language: "If the development of the native language begins with free, spontaneous use of speech and is culminated in the conscious realization of linguistic forms and their mastery, then development of a foreign language begins with conscious realization of language and arbitrary command of it and culminates in spontaneous, free speech. But, between those opposing paths of development, there exists a mutual dependency just as between the development of scientific and spontaneous concepts" (John-Steiner by Robbins, 2007). That is why to consider the spontaneous, scientific and professional concepts means to discuss the mother and foreign and professional language.

Moreover, the significance of concept development from the psychological point of view is revealed as follows: the level of individual's actual development (Леонтьев, 1982) is determined by the level of spontaneous concept acquiring, meanwhile the level of scientific concept gaining reveals the zone of individual's proximal development (Леонтьев, 1982).

Hence, professional language is placed within the stable understanding of the unity of all language (Robbins, 2007) where professional language is realized as an integral part of all language.

Professional Language in Language Teaching/Learning

The interconnection between professional language and language teaching/learning can be illustrated by the model of English language teaching/learning.

Hutchinson and Waters (Hutchinson and Waters, 1994) represent English language teaching/learning in the form of a tree: the tree of English language teaching/learning is nourished by its roots which are learning and communication. There are three branches of English language teaching/learning, namely, English as a mother tongue, English as a foreign language and English as a second language. Then, English as a second language and English as a foreign language and, consequently, professional language, include the similar branches: General English (GE) and English for Specific Purposes (ESP) (Hutchinson and Waters, 1994). The branch of English for Specific Purposes (ESP) involves three branches, too (Hutchinson and Waters, 1994). This division depends on the purpose of studying English: English for Science and Technology (EST); English for Business and Economics (EBE); English for Social Science (ESS). Every of these branches is divided into two: for work and for academic study which have their own branches and show the level that is needed by learners.

Thus, purpose of studying language is emphasized within language teaching/learning.

Defining Professional Language

The *professional language* definition in the frame of the present research based on understanding what English for Specific Purposes is (Hutchinson and Waters, 1994; etc.), on understanding of a variety of a language (home, national, mother, native, etc) (Byram, 2006) and on realizing learning as professional activity (Maslo, 2006) is determined as native language for specific purposes.

Empirical study

The target population of the present empirical study involves 5 students of Fourth Baltic Summer School *Technical Informatics and Information Technology* at the Institute of Computer Science of the Tartu University, August 8-23, 2008, Tartu, Estonia.

All 5 students have got Bachelor or Master Degree in different fields of Computer Sciences and working experience in different fields. English is a foreign language for all the students in the group.

The International Summer School offers special courses in English to support the internationalization of education and the cooperation among the universities of the Baltic Sea Region.

The aims of the Baltic Summer Schools *Technical Informatics and Information Technology* are determined as preparation for international Master and Ph.D. programs in Germany, further specialization in computer science and information technology and learning in a simulated environment.

Student social experience in Professional Language as a criterion of student communicative competence was evaluated by the student him/herself on the first day of the Baltic Summer School 2008, namely, August 8, 2008 and on the seventh day, namely, August 15, 2008.

The list of the student social experience in Professional Language self-evaluation was offered to the students that involved 12 constructs, i. e. 6 constructs of social interaction experience in Professional Language and 6 constructs of cognitive activity experience in Professional Language for each student social experience self-evaluation: social interaction means that students (Žogla, 2007) participate in the activity, exchange ideas with others, co-operate with others, analyze a problem, are in the dialogue and search for problem solving tools together with others; cognitive activity is seen while students (Maslo, 2007) regulate his/her own learning process, set his/her own goals, take responsibility for his/her own learning, work independently, evaluate his/her own learning process and continue to improve his/her own skills.

The evaluation scale of five levels for each question is given where “1” means low level of communicative competence and “6” points out high level of communicative competence.

The summary of Survey 1 results of the students’ communicative competence within the English for Academic Purposes activity in the frame of the Baltic Summer School 2008 allows drawing a conclusion that the critical level of communicative competence dominates in the English group.

Between Survey 1 and 2 of the students’ communicative competence English for Academic Purposes activity was applied within the courses in Technical Informatics and Information Technology, preconference tutorials for introduction into advanced research topics, attendance of conference *Advanced Topics in Telecommunication*, tutorials and practical tasks, language training for talk and presentation, leisure activities and social contacts, practical work at IT Company Webmedia.

The result summary of Survey 2 of the students' social experience in Professional Language within the Baltic Summer School 2008 allows drawing a conclusion that the average level of student social experience in Professional Language dominates in the group.

The result summary of two surveys of the students' social experience in Professional Language within the Baltic Summer School 2008 demonstrates the positive changes in comparison with Survey 1 (See Figure 2): the level of social experience in Professional Language of two students has been developed. Thus, in all the phases of implementing English for Academic Purposes activity essentially influenced the students' social experience in Professional Language.

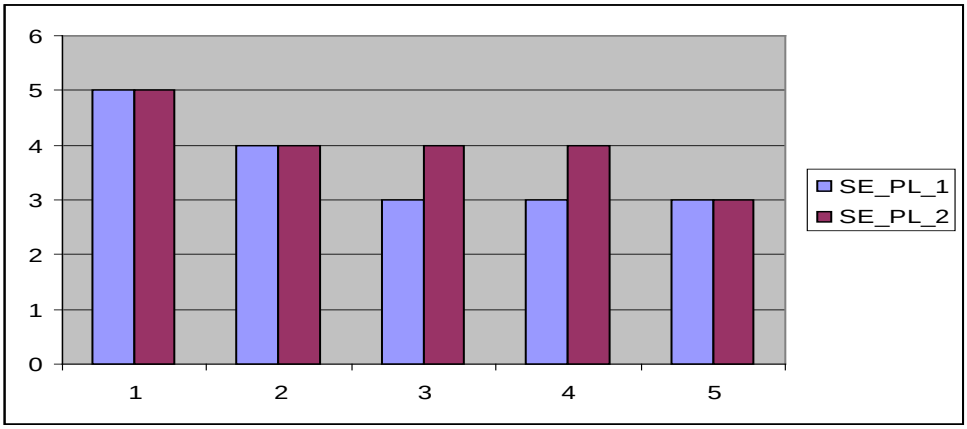

Figure 2 The result comparison of Survey 1 and 2 of the students' social experience in Professional Language average coefficient

CONCLUSION

The issue here is that the emphasis of the System-Constructivist Theory on the subjective aspect of human being's point of view and experience that plays the central role in a construction process makes the search for a definition of professional language difficult.

Professional language offers many interesting opportunities for engineering education lifelong, life-near and lifewide.

Further research on professional language includes subject-content structure of professional language, activity modelling for developing professional language within a multicultural environment, factor analysis, determination of criteria, indicators and levels of professional language, and empirical studies.

REFERENCES

1. Aase, L. (2006) *Aims in the Teaching/Learning of Language(s) of Education (LE).* Intergovernmental Conference *Languages of Schooling: towards a Framework for Europe.* Language Policy Division, Strasbourg 16-18 October 2006, pp 1-12.
2. Benson, A. (1995) *Review and Analysis of Vygotsky's Thought and Language.* University of Houston in Clear Lake. Retrieved 21/06/2008 from http://web.archive.org/web/20010414083709/http://129.7.160.115/INST5931/Vygotsky.html.

3. Byram, M. (2006). *Language and Identities*. Intergovernmental Conference *Languages of Schooling: towards a Framework for Europe.* Language Policy Division, Strasbourg 16-18 October 2006, pp 1-12.
4. European Commission Directorate-General for Education and Culture. (2004b) *Implementation of "Education and Training 2010" Work Programme. Working Group B "Key Competences". Key Competences for Lifelong Learning.* A European Reference Framework November 2004.
5. Goffman, E. (2008) *Rahmen-Analyse: Ein Versuch über die Organisation von Alltagserfahrungen.* Frankfurt: Suhrkamp.
6. Groeben, N. (1986) *Handeln, Tun, Verhalten als Einheiten einer verstehend-erklärenden Psychologie.* Tübingen: Francke.
7. Hutchinson, T. and Waters, A. (1987) *English for Specific Purposes.* Cambridge University Press.
8. Lubīna, A. A. (2002) *Fachspracheals Teil Der Sprachkultur.* 2. daļa „Valodas lingvistiskie aspekti". Humanitārā fakultate. Valoda-2002 "Valoda dažadu kultūru kontekstā". Humanitārās fakultātes 12. zinātniskie lasījumi. 2. daļa "Valodas lingvistiskie aspekti". DU Saule 2002, pp. 135-140.
9. Luhman, N. (1988) *Erkenntnis als Konstruktion.* Bern: Benteli, 1988, pp. 1-14
10. Maslo, E. (2006) *No zināšanām uz kompetentu darbību.* Latvijas Universitātes Akadēmiskais apgāds, pp., 13-19, 20-26, 27-30, 35-44, 57-59.
11. Maslo, E. (2007) Transformative Learning Space for Life-Long Foreign Languages Learning. International Nordic-Baltic Region Conference of FIPLV Innovations in Language Teaching and Learning in the Multicultural Context. Riga, Latvia, 2007, pp. 38-46
12. Mead, G. H. (1973) *Geist, Identität, und Gesellschaft.* Frankfurt: Suhrkamp.
13. Mylett, T., Gluck, R. (2004) *Learning and Language: Supporting Group Work. So Group Work Supports Learning.* Paper presented at the 18th Association of Industrial Relations Academics Australia and New Zealand Conference, Griffith University, 3-6 February 2004. Retrieved 13/05/2008 from http://jutlp.uow.edu.au/2005_v02_i02/mylett004.html.
14. Parson, T. (1976) *Theorie sozialer Systeme.* Opladen: Westdeutscher Verlag, 1976.
15. Robbins, D. (2007) *Vygotsky's and Leontiev's Non-classical Psychology Related to Second Language Acquisition.* International Nordic-Baltic Region Conference of FIPLV Innovations in Language Teaching and Learning in the Multicultural Context 15-16th June, 2007, Riga, Latvia, pp. 47-57.
16. Rohweder, L.: What kind of Sustainable Development do we talk about? In: Kaivola, T. and Rohweder, L. (Ed.), *Towards Sustainable Development in Higher Education – Reflections.* Helsinki University Press, Finland, 2007, pp. 22-27
17. Rudzinska, I. (2008) *The Quality of Aim Setting and Achieved Results in English for Specific Purposes Study Course in Lecturers and Students' Opinion*. ATEE Spring University Conference *Teacher of the 21st Century: Quality Education for Quality Teaching.* University of Latvia, May 2-3, 2008, Riga, Latvia. Retrieved 30/04/2008 from http://www.ppf.lu.lv/pn/dalibnieki-results_ab.php.
18. Surikova, S. (2007) *Model of Developing Pupils' Social Competence and Its Algorithm of Introducing in the Primary School Teaching/Leraning Process.* ATEE Spring University 2007, 2. Changing Education in a Changing Society. May 3-6, 2007, Klaipeda University, Lithuania, pp.253-263.
19. Vigotskis, Ļ. (2002) *Domāšana un runa*. Izdevniecība „EVE" Rīga. P. 1-338.
20. Vygotsky, L. (1934/1962) *Thought and Language. The Development of Scientific Concepts in Childhood* Cambridge, MS: MIT

21. Zimmermann, B (2003) Education for Sustainable Development – Baltic 21. An Agenda 21 for the Baltic Sea Region. Danish Ministry of Education. 2003, pp. 1-147.
22. Žogla, I. (2007) *Didaktika humānpedagoģijā*. Latvijas Universitātes Pedagoģijas un psiholoģijas fakultātes „Augstskolu didaktika: mūsdienu teorija un prakse" kursa lekcija 2007. gada 12. februārī, Rīga, Latvijā.
23. Леонтьев А. Н. (1982) *Вступительная статья.* In: Выготский Л. Собрание сочинений. Москва "Педагогика", pp. 3-41.