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**INNOVATION STRATEGIES OF PROFESSION-ORIENTED
FOREIGN LANGUAGE EDUCATION**

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Abstract

The paper deals with the major changes in the professional activities of technical specialists caused by the development of information society, which makes new demands for their professional competences and particularly for their foreign language communicative skills. The new aims of foreign language education require new approaches to all aspects of the language teaching and learning process, including its methodology and instruments. As professional communication between the members of the professional societies generally occurs in the English language, in order to be active participants of this communication, engineers must possess communicative skills allowing them to be engaged to the socio-cultural context of their profession. The author argues that this context should be used as a resource for the English language learning curriculum and considers virtual professional communities as an element of professional socio-cultural environment. The concept of “a virtual socio-cultural professional context” is introduced which gives grounds to the concept of “a foreign language professional socio-cultural competence”. Foreign language skills of technical students in information society are revealed. Learner autonomy and autonomy development are viewed as a permanent and dynamic process. Particular attention is given to the methodology and strategies of the ICT-based foreign language education. The most appropriate strategies for developing learner autonomy in ICT-based language teaching and learning environment are proposed. Three strategies of applying ICT in profession-oriented foreign language teaching and learning are introduced, each of them corresponding to different ICT-based language teaching and learning materials and different levels of learner autonomy.

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1. Introduction

Modern society radically changes demands for the education of contemporary engineering professionals. Engineering is thought of as comprising four major dimensions: the dimensions of the basic sciences, of the social sciences, of design, and of practical accomplishment. Thus, the engineer is a professional who combines, in variable proportions, the qualities of a scientist, a sociologist, a designer, and a doer. “The social dimension of engineering sees engineers not just as technologists, but also as social experts, in their ability to recognize the eminently social nature of the world they act upon and the social complexity of the teams they belong to. The creation of social and economic value and the belief in the satisfaction of end users emerge as central values in this dimension of engineering” (Figueiredo, 2008, p. 94).

Today engineers have to design complex systems containing not only technical subsystems, but non-technical ones as well. As engineering as a social science is becoming increasingly significant, professional skills of engineers should incorporate economic and ecological aspects. This creates new requirements for engineering mentality, which should be based on highly-developed general culture and reflective skills allowing engineers to critically perceive their own activities. As a consequence, engineering education must provide the students with creativity, ability to confidently orientate themselves in the information space, to do independent research, and effectively communicate with representatives of other languages and cultures, perceiving themselves as subjects of culture and intercultural professional communication.

2. Problem Statement

Changing its aims, engineering education inevitably changes its content. The so-called “subject-ontological” pattern of engineering education is being replaced for the “gnoseological” one, with the focus on methodological aspects, cognitive instruments, and technologies of instruction that shape students’ ability to confidently and independently solve professional tasks on an integrative basis. To accomplish these tasks, university education should provide students with reflective skills allowing them first to become autonomous learners and then autonomous subjects of engineering activities. The major changes in the professional activities of technical specialists imply new demands for their professional competences and, particularly, for their foreign language communicative skills. Over the past few years, there have been a number of publications dedicated to this phenomenon. The problem of teaching English for professional purposes to future engineers in Russia was considered in (Millrood, 2014). Some new genres for teaching communicative skills to students of non-linguistic universities were proposed in (Evdokimova, 2013).

At the same time, various aspects of using information and communication technologies (ICT) in foreign language teaching or computer-assisted language learning (CALL) at different levels of language education were discussed in a number of publications (Nazarenko, 2014; Simpson & Obdalova, 2014). Despite a lot of research efforts in this field, methodology and strategies of the ICT-based foreign language education, especially at a university level, still require thorough theoretical and practical studies.

3. Research Questions

3.1. Foreign language skills of technical students in information society

Foreign languages are a necessary component of engineering education because foreign language skills help future specialists to develop their communicative readiness, abilities for self-education, orientation in the information space and membership in professional communities. Providing all this, foreign languages ensure professional competence of technical university students, their professional and general culture. That is the reason why professionally relevant intercultural communicative skills are considered to be an integral part of the professional competence of engineers of various specializations.

Nowadays, in the information society, virtual environment is playing an increasingly important role in the professional activities and communication of modern engineers. Together with technical and technological aspects of information society studies, researchers investigate social aspects as well. Information society is examined as a complex of closely interconnected technical, economic, social, political and cultural factors incorporating all spheres of human activities and influencing the humans themselves – their knowledge, morality, values, interests, and personality development. Thus, information society is becoming an increasingly distinguished feature of modern culture.

The new ways of transmitting information result in the new forms of written documents and new forms of literacy. Within the theory of communication media researchers outline three types of culture: oral, written, and electronic, and three types of discourse, correspondingly. Unique properties of electronic discourse allow it to overcome spatial boundaries of oral discourse and time boundaries of the written one and become a potential means of effective professional and educational interactions.

3.2. Virtual professional communities as an element of professional socio-cultural environment

The Internet creates a virtual representation of numerous professional societies/associations. It means that information society complies with the activities of virtual professional communities. For technical specialists, the most famous professional communities are IEEE (eye triple E) (The Institute of Electrical and Electronics Engineers) (<http://www.ieee.org>) and IEC (The International Engineering Consortium), uniting experts in various fields of science and engineering. Along with this, there are some more specifically-oriented professional societies, such as IMAPS (International Microelectronics Assembly and Packaging Society) (<http://www.imaps.org>), etc.

The major functions of the professional societies consist in promoting professional competences, increasing the quality of technical education, publishing newspapers and journals, holding conferences, etc. As the activities of the professional societies are becoming increasingly global, their profile is changing to the international one. Thus they can be considered an important element of the socio-cultural environment in which professional activities and communication take place. The rules and regulations governing their activities can be regarded as a constituent part of the virtual socio-cultural context of profession.

A modern specialist in any field of knowledge should be acquainted with these societies, their publishing activities, communication style, application rules, etc. In relation with this, it is worth mentioning that Jean Lave and Etienne Wenger coined the phrases “situated learning” and “community of

practice” (Lave & Wenger, 1991; Wenger, 1998). Situated learning is learning that takes place in the same context in which it is applied. Lave and Wenger (1991) argue that learning should not be viewed as simply the transmission of abstract and decontextualised knowledge from one individual to another, but a social process whereby knowledge is co-constructed; they suggest that such learning is situated in a specific context and embedded within a particular social and physical environment. They consider a community of practice to be a group of people who share a craft or a profession. As members of a community of practice do not necessarily have to be co-located, they often form a “virtual community of practice” (e.g. Dubé et al., 2005) when they collaborate online, such as within discussion boards and newsgroups, or a “mobile community of practice” (Kietzmann et al., 2013).

Lave argues that learning is a function of the activity, context and culture in which it occurs. Social interaction is a critical component of situated learning – learners become involved in a “community of practice” which embodies certain beliefs and behaviors to be acquired. As the beginners or newcomers move from the periphery of this community to its center, they become more active and engaged within the culture and, hence, assume the role of an expert or oldtimer. Furthermore, situated learning is usually unintentional rather than deliberate. These ideas are what Lave & Wenger (1991) call the process of “legitimate peripheral participation”.

Johri & Olds (2011) refer situativity to the central role of context, outlining social and material context, activities and interactions, and participation and identity. Johri (2011) explicates the relationship between technology and learning practices by advancing the concepts of “socio-materiality” and “socio-material bricolage”. He argues that all learning practices are both inherently material and social or socio-material and all entities (whether social or technological, human or material) are inseparable. His approach is related to the theory of “sociomateriality”, which focuses on the inherent inseparability of people, systems and technology (Orlikowski & Scott, 2008).

It should be noted that these ideas are based on the famous socio-cultural perspective on learning, or learning through social development, founded by Lev S. Vygotsky as early as 1930s (Vygotsky, 1978). Basically Vygotsky's theory suggests that development depends on interaction with people and the tools that the culture provides to help form their own view of the world.

As professional communication between the members of the professional societies generally occurs in the English language, in order to be active participants of this communication, engineers must possess communicative skills allowing them to be engaged to the socio-cultural context of their profession. Consequently, this context should be used as a resource for the English language learning curriculum.

All this gives ground to the concept of “a foreign language professional socio-cultural competence” which implies awareness of the rules and regulations governing communication within linguistic and cultural communities formed by the activities of the international professional societies. The concept of “a foreign language professional socio-cultural competence” emphasizes the communicative aspects of professional practices and the fact that communication in virtual professional communities (or “virtual communities of practice”) occurs in most cases in English which is not a native language for most members of the virtual professional communities. These members face additional

difficulties because they have to acquire not only the details of their professional activity, but foreign language communicative skills involved in professional practices as well.

Thus, the suggested concept of “a foreign language professional socio-cultural competence” can help educators and researchers understand those aspects of professional activity and communication that remained hidden so far.

3.3. Developing learner autonomy in ICT-based profession-oriented foreign language education

For nearly forty years, as a result of the learner-centered paradigm in education, the development of learner autonomy has been one of the major aims of language learning and teaching. The problem of developing learner autonomy has been the subject of intensive studies worldwide (Holec, 1981; Blin, 1999; Bordonaro, 2003; Little, 1991, 2003; Benson, 1997; Reinders & White, 2011; Wach, 2012; Wenden, 1991). Most of the various definitions of the concept of learner autonomy focus on the control and responsibility of learners in managing and evaluating their own learning. Autonomy is a state in which learners exercise as much control as possible over the learning process and are as little dependent on the teacher as possible. Benson (1997) distinguished three perspectives of the learner autonomy concept in language education: 1. a “technical” perspective, emphasizing skills or strategies for unsupervised learning such as “metacognitive”, “cognitive”, “social” and other strategies identified by Oxford (1990); 2. a “psychological” perspective, emphasizing broader attitudes and cognitive abilities which enable the learner to take responsibility for his/her own learning; 3. a “political” perspective, emphasizing empowerment or emancipation of learners by giving them control over the content and processes of their learning (Ivanovska, 2015). The technical perspective on autonomy may emphasize the development of strategies for effective learning: this approach is often referred to as “learner training” (Oxford, 1990, Wenden, 1991). The psychological perspective suggests fostering more general mental dispositions and capacities (Holec, 1981: 3); while the “political” perspective highlights ways in which the learning context can be made more empowering for the learner (Benson, 1997; Little, 2003).

Modern language teaching methodology regards learner autonomy as a highly desirable outcome and often relates it to ICT. Although CALL can be a route to learner autonomy and is capable of promoting it, most researchers now would not deny that autonomy and autonomous learning are not synonyms of “self-instruction”, “self-access”, “self-study”, “self-education”, “out-of-class learning” or “distance learning”, and “independent learning” provided by computers. It is very important to understand that without proper guidance and feedback the opportunity for self-study offered by the computer is no guarantee of autonomy and providing access to language resources does not automatically lead to the development of autonomy. “Learner autonomy does not mean that the teacher becomes redundant, abdicating his/her control over what is transpiring in the language learning process... There has to be a teacher who will adapt resources, materials, and methods to the learners' needs and even abandon all this if need be” (Thanasoulas, 2000). Learner autonomy is not an absolute concept, a static product, a state, which is reached once and for all. There are degrees of learner autonomy and autonomy development should be viewed as a permanent, dynamic, delicate, step by step process. The central role in this process belongs to the teacher (Jones, 2001). It is the teacher who can and must support students on their way to autonomy. The author totally agrees with Sheerin (Sheerin, 1997, p. 63) in the

fact that “all learners need to be prepared and supported on the path to greater autonomy by teachers” (Sheerin, 1997). Luzón and Ruiz-Madrid (2008) point to the role of instructors in helping learners become autonomous through technology-based resources: “In order to help students harness the potential of ICT for the development of an autonomising competence, it is necessary to carefully design learning environments or learning tasks that promote the active use of metacognitive strategies, that is, that prompt students to plan, monitor and evaluate their own learning” (p. 28 cited in Wach, 2012).

4. Purpose of the Study

In view of the issues outlined above, the aim of the paper is to reveal the effective strategies of applying ICT in profession-oriented foreign language teaching and learning with the control of learner autonomy development in mind.

5. Research Methods

Traditionally, scholars in the field of foreign language methodology mark out three stages of foreign language curriculum in non-linguistic institutions of higher education: the preparatory stage, the profession-oriented stage, and the stage of professionally specific communication training (Bulatova, 1999; Primernaya programma..., 2000). Each of these stages requires different aims, tasks and ways of ICT application.

The first stage is intended to adapt students to the aims and tasks of a profession-oriented university language-learning curriculum. This stage should equalize students' foreign language skills and provide a basis for their further collective studies. The leading role at this stage belongs to reading as it forms the ground for developing listening, speaking and writing skills. Our observations show that most students of technical universities in Russia need special attention to their ability to perceive and decode written structures of the English language. This problem can be solved by using specially designed computer-aided instruction materials.

The second stage should be aimed at developing learners' communication skills in writing in professionally relevant communicative situations. Students should learn to fix information they receive through reading in written forms and then use it in their oral activities, such as presentations, reports, discussion, etc. This requires specially designed language learning materials as well as a specific strategy of using ICT aids.

Finally, the third stage is directed towards developing and perfecting communicative skills of profession specific communication, both oral and written. Here quite different ways of using ICT are needed.

Below, an integral approach to ICT-based profession-oriented foreign language education, aimed at the learner autonomy development of students as subjects of culture and intercultural professional communication, is presented. Learner autonomy is defined as “the learner's psychological relation to the process and content of learning – a capacity for detachment, critical reflection, decision-making, and independent action” (Little, 1991, p. 45).

The basic idea of the proposed approach is the notion that different stages of a foreign language curriculum should be in compliance with different strategies of using ICT. These stages should gradually increase learner autonomy and ensure a step-by-step transfer of the learning process control to the students themselves, creating prerequisites for the transfer from the instruction totally controlled by a teacher to the fully autonomous learning.

6. Findings

6.1. Effective strategies of applying ICT in profession-oriented foreign language teaching and learning

To achieve the aims of the first stage, preferences should be given to the ICT-based means of instruction and teaching materials created within the ideology of the strongly controlled computer-assisted learning programs aimed at shaping the skills of foreign language sentence structure recognition and decoding. The programs of this kind are based on the idea of programmed learning and algorithmic rules. To shape the receptive vocabulary skills for reading we recommend using lexical computer games.

The second stage requires quite different approaches to the design of computerized materials for foreign language instruction. This stage is aimed at the development of writing, speaking, and listening skills implying much higher flexibility level of the instruction control. Therefore, at this stage the so called authoring instruments are more efficient and thus more appropriate. They allow teachers to create their own instruction materials for developing students' writing, speaking, and listening skills. This stage implies a teacher and learner face-to-face contact and flexible control of the learning process by the teacher. At the same time students can use the Internet in their learning process.

At the third stage, students are allowed to use the Internet more intensively and independently to find authentic professional information and create their own speech products within the context of professionally relevant communicative situations. By the beginning of this stage students should already possess necessary skills forming the basis for their learning autonomy. These skills should proclaim themselves in the ability of students to control their learning through formulating aims and tasks, choosing topics, and simulating situations of conventional professional communication.

An essential component of the proposed approach is an active participation of students in all the methodological and organizational issues of the learning process in the so-called "reflective dialogues", which serve as a means of developing learner autonomy and assessing its level. Reflective dialogues are intended to perfect students' cognitive and metacognitive skills as a foundation of their autonomy as foreign language learners and professionals-to-be.

6.2. Computer-based instruction tools to implement the teaching strategies

To put the suggested strategies into practice and prove their efficiency we designed a number of computer-based instruction tools. Testing of the first-year students of the National Research University of Electronic Technology showed that at the first stage of the English language curriculum in the technical university the most acute problem for the students consists in their poor receptive vocabulary skills and grammar skills for reading. To improve those skills a number of rigidly-controlled computer-assisted learning programs were designed based on the materials of such journals as *IT Professional*, *Advancing*

Microelectronics, Computer Science, etc. Their aims were to teach students to differentiate the subject and the object in a sentence; to understand the meaning of the words ending with *-ed* and *-s(es)*, verbs *to have* and *to be*, a combination of noun with infinitive; to understand and translate noun chains.

At the second stage, where the emphasis shifts towards speaking, listening, reading and writing skills development, different approaches to creating computer-assisted instruction materials and tools are needed. Two types of instruction programs in audio-visual modality seem relevant at this stage:

1. rigidly-controlled instruction programs allowing a unique answer;
2. instruction programs allowing multiple answers and flexible control with either face-to-face student-teacher communication or delayed teacher control of the results of the student's independent work stored by the program.

To create these instruction programs, a computer based authoring tool WRESPLIS (Write – REad – SPEak – LISTen) was designed. WRESPLIS belongs to the class of flexible dialogue programs allowing teachers to easily design her/his own teaching programs. It provides an opportunity to realize practically all types of exercises for developing any foreign language skills at any level of speech units (word, word combination, sentence, text). The tasks support a gradual elimination of help and transfer from a program-controlled or teacher-controlled to an unassisted/independent student activity of a student.

As a source of language samples, abstracts and papers presented at the sites of professional engineering societies and various universities, as well as video and audio lectures and conference talks were used.

At the second stage students should be taught to work more or less independently with the materials of the Internet: to find additional information on the subject, examples of the language use, text genres, conference proceedings, etc. Through this activity, students get to know professionally relevant sites, various types of on-line dictionaries, activities of the professional societies

At the third stage special teaching tools called “templates” are needed. In templates, a teacher sets tasks to the students, provides sources of information, controls to some degree students activity. Templates are flexible and mobile teaching formats allowing corrections and additions made not only by teachers but also by students themselves.

Using the instruction tools and materials described above students transfer from the minimal level of independence at the first stage through the transitional level at the second stage to the well-developed independence/autonomy at the final stage.

7. Conclusion

The approach presented in the paper outlined three strategies of applying ICT in profession-oriented foreign language teaching and learning. Each of the three stages corresponds to different ICT-based language teaching and learning materials and different levels of learner autonomy. The basic idea of the proposed approach is the notion that various stages of a foreign language curriculum should be in compliance with various strategies of using ICT aids, which provide gradual learner autonomy increase and ensure a step by step transfer of control of the learning process to the students themselves. An essential component of the proposed methodology is an active participation of students in all the

methodological and organizational issues of the learning process by means of the so-called “reflective dialogues”.

The concept of “a virtual socio-cultural professional context” introduced in the paper gives grounds to the concept of “a foreign language professional socio-cultural competence” which implies awareness of the rules and regulations governing communication within linguistic and cultural communities formed by the activities of international professional societies. The activities of these societies should be used as a resource for the profession oriented foreign language education materials.

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