

DEVELOPMENT OF ABILITIES TO PROFESSIONAL COMMUNICATION AS AN IMPORTANT COMPONENT OF ENGINEER TRAINING FOR THE GLOBAL COMPANIES

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ABSTRACT

This paper reveals training experience of engineers for the global companies. Interaction experience is reflected between automakers and KFU Automobile Department at improving of professionals training system in the automotive industry. The results of questioning among heads of KAMAZ departments and the requirements of professional standards were taken into account in developing of integrated curriculum. The heads noted the competence, which should have an engineer in a global company. Among the professional competencies are information and communication technologies. Among personality are creative thinking, active social position, as well as the ability to communicate. It is shown that foreign language skills in modern conditions turn into the significant personal and professional characteristic of a specialist. Language training gives grounds to communicative skills formation, including bilingual communication. For modern engineers a foreign language becomes an orientation tool in information space and also a professional problem solving tool in bilingual communication. An integration of language modules into the curriculum is a distinguished feature of the given training system. Thus the principle of gradual problem solving skills broadening becomes a reality. Various interactive training courses and virtual training modules are used during this training. Such approach erases speech barriers, develops ability to communicate in a foreign language and also ability to work in team.

KEYWORDS

Engineering education; automobile branch; competitive personnel. Standards: 2, 3, 4, 5, 6, 7, 8, 9, 11

INTRODUCTION

The economy current state is characterized by the increasing globalization of the markets. Development of technologies provides broad opportunities for cooperation in different areas - at level of individuals and at level of companies. Emergence of global companies has caused change of requirements to employees. In such conditions abilities to communication are one of important components in the field of interpersonal skills and abilities. Development of abilities not only to dialogue, exchange of thoughts, data, ideas that communication means in the broad sense, but also to various kinds of professional dialogue is very important. It means studying world achievements in areas of engineering and technologies, carrying out research examination, an exchange of experience without which professional work is impossible.

The management of the global companies set tasks of personality formation and training of professionals with sufficient level of the professionalism which competitiveness on a labor market is defined now not only by his high qualification in professional sphere, but also by readiness for the decision of professional problems in conditions of bilingual communication providing processes of information interaction. Foreign language skills turn to the significant personal and professional characteristic of a professional when the foreign language becomes the orientation tool in modern information field. It demands lingvo-professional training technology change of the specialist that is competitive in the global markets.

Globalization process has resulted in the universal use of English language in business sphere. Today many companies declare availability of corporate language, usually English: it concerns not only the joint ventures which are in territory of Russia, but also to the Russian enterprises working in the global markets. Communicating with business partners, we hear the verbal stream of the information directed on us. Distinctions in intonation contours, melodic pattern of languages can lead to distortion of situation understanding. At grammar level communication failure can occur because of the grammatical categories which are not found in a native language. As values and the word compatibility, meaning this or that notion in various languages are different, incorrect use can entail semantic error interfering adequate perception of speaker's intentions. Therefore problem solution of intercultural communication is important. Communicating with foreign partners in a foreign language, each of us bears a national mentality in itself, the vision of the world and simultaneously faces other logic of attitude, the way of thinking, expressed in mentality of other ethno culture bearer. In the framework of professional communication, a speech activity is carried out in a wide social context which defines true sense of the statement. Distinctions in speech behavior and mentality can lead to emergence of semantic barriers in the course of communication.

Training of engineers becomes topical now. The world initiative ideology CDIO means not only giving students deep theoretical and practical knowledge in their professional sphere, but also ability working in a team. It is emphasized in general CDIO plan, as ability to communication, as well as a foreign one.

Features of competences development in the field of foreign communication at engineer training for the global company consist that language modules are integrated into the curriculum on the basis of gradual expansion of skills and a range of problems to be solved. At a stage of a problem statement and analysis carrying out of the studied subject students do the review of scientific and technical researches in English and prepare presentation on these materials. The following stage assumes participation in the international conferences, Olympiads and projects where students can communicate with the colleagues from other countries. Interactive training courses and virtual training modules are used during training session.

MODERNIZATION OF ENGINEERING EDUCATION IN RUSSIA: INTERACTION BETWEEN THE UNIVERSITY, BUSINESS AND AUTHORITIES

Interaction of Universities with a labor market

The current situation, which is typical for the Russian economy is complex and unpredictable: market relations, tend to globalization, open borders - all this makes the process of solving the tasks facing the country is extremely difficult. Only through a comprehensive and mutually beneficial cooperation between higher educational institutions, businesses, public

authorities, public organizations is possible to build a modern economy providing a stable and progressive development of the country. The changing labor market requires continuous development of professional skills and competencies of the employee.

Problems of training and recruitment of professional personnel whose competence most closely meets the requirements of production, remain relevant for more than a decade. This is due to the growing importance of human capital and socio-economic problems of modern society. Analysis of international experience shows that developed countries are focused on consistent efforts to build an integrated system of sustainable socio-economic development, which is based on the formation of partnerships and mutually beneficial relations between different spheres of society. Creating a constructive interaction mechanism of labor and education, which increase efficiency and reduce costs (time, financial, human, etc.) of training process and use of professional personnel, is one of the elements of such a system. This is especially concerns training of engineers.

Vladimir Putin noted in his speech at a joint meeting of the State Council and the Presidential Commission on monitoring of Russia socio-economic development targets achievement on December 23, 2013, that it is necessary to generate a wide range of cooperation mechanisms between business and educational institutions, "...so that future professionals can obtain necessary skills directly at enterprises, and those who are already working, could improve their skills, change their profession and, if necessary, change the scope of activity". I believe we must think how we revive a system of tutorship. Many of those who are successfully working in manufacturing, have experienced this school, and today we need modern forms of experience transfer at enterprises ", - said Russian President. "Training of highly skilled workers, engineers for the real economy - this is not someone's corporate, private task, it is a national necessity ... one of the key objectives of development", - he said (Joint meeting..., 2013).

Complaints from the businesses to the quality of engineer training are well justified: in the age of avalanche information accumulation and the emergence of new technologies, employers want to have an engineer who does not need to be adapted to the conditions of production. Inertia of the educational system is a brake in solving problems of this kind, the only real way is close interaction between business and education, as evidenced by international experience. A mutual interest is a condition to successful cooperation in a market economy. Interested parties at the regional level are: business, education, government. Interests of universities, that are included in the educational system, in this case must be considered apart from the interests of the authorities, as comprehensive educational institution in addition to state funding, engaged in commercial activity and carries risks of survival in the market environment. Therefore, it cannot be regarded as an absolute state interest medium. Interests of the parties in this case are as follows:

1. Interest of regional/federal authorities - training of personnel, capable to embody the public needs of the region / country.
2. Interest of the institution - to ensure uninterrupted entry of school leavers, maximizing of budget and commercial financing.
3. Interest in business - the ability to find professionals in the labor market with the right skills at minimal cost.

The educational system should adapt faster for the economy and manufacture realities which development is possible only due to its development. Thus it is necessary to be guided that rates of training and training of the professional for practical activities should correspond to

requirements of social and economic systems. Educational system should be based on application of innovative training techniques and technologies, on essentially new educational programs of the practical oriented training which are developed with requirements of professional standards, the best world experience of engineer training promoting both development of the person, and a society sustainable development.

Mutual interest is obvious: the fuller a university will satisfy requirements of the enterprise for qualitatively trained engineers, the more demanded will their educational services be. At the same time, highly skilled engineers will promote increase of competitiveness of the enterprise, business expansion, and new workplaces. And it will lead to requirement growth for engineers. Such mutual cooperation will promote stability of educational and industrial systems. To make such interaction be rational, it is necessary that a professional model image or profiles competences at the enterprise and university coincided or were similar. Complexities at conflict resolution between "demands" of industrial system and "offer" from educational system are caused by problems at formalization of the specialist competence estimation system.

The traditional education system and professional standardization does not establish norms in the areas on which company efficiency directly depends: decision-making, achievement of arrangements, responsibility, etc. Accordingly, using standard ways of estimation, we can define how a person in highly specialized area is professional, but we cannot tell how much he is effective in the company. Model competences serve for such estimation.

Steps are taken to strengthen cooperation on the part of employers and by the university community. In order to find a consensus between the professional community and the educational system in Russia, professional branch standards are developed where requirements to professional competences of a specialist are reflected according to a certain level and a kind of activity. Federal educational standards define requirements to training of professionals, by which the university is guided, developing educational programs. Harmonization of professional and educational standards will allow creating system of engineer training, corresponding to needs of time.

Universities are concerned about the condition of engineering education in Russia: the fall of its prestige, disproportions between demands of the labor market and graduates of students, complaints on the quality of training by employers. Therefore, numerous attempts are made to find the way out of the systemic crisis, where the engineering education is. For this purpose, we study the best international practices: Russian universities enter into various associations, join the global initiative CDIO and participate in international projects (e.g. "Formula Student").

Features of training engineers for global markets

Selecting the personnel for the global companies a complexity is that such companies are compelled for the branches in different countries to accept professionals living and trained at university in the given country. Thus diplomas with excellent marks and other documentary certificates of professionalism of the specialist, does not allow to assert that it is capable to carry out all necessary things at a high level in real operating conditions. Besides, it is not clear, how a new worker will be entered in culture and norms of the company.

A considerable number of researches is devoted to a problem of what competences should distinguish the engineer for the global market. Authors note that expectations of employers

include new competences such as economic knowledge, ecological and social responsibility considering university and business interaction experience in training of engineers for such global companies as Philips and Shell (Erik De Graaff & Wim Ravesteijn, 2001). The sustainable development should be a priority. The author of article (Michael Green, 1999) notes three objective filters of technical progress: scientists and engineers with the system approach to working out of technical and technological decisions; practical financiers and businessmen who invest money only in perspective decisions; the self-adjustable market as a way of choosing the most socially favorable technologies.

Wulf (Wulf, W., 1997) notes tendencies which considerably change activities of an engineer and make requirements to educational programs change. These are: huge files of new materials and the processes expanding design possibilities of an engineer; universal use of information technology; the increasing number and complexity of restrictions (for example, cost, safety, ecology); requirement growth to have a special and general technical knowledge; ability to work in a team and wide business knowledge; necessity to long life learning caused by fast rates of changes; globalization, transition from the enterprises working on domestic markets to more cosmopolitan. Mission of an engineer of the future consists in construction steadier, more stable and fair world. As engineers bear collective responsibility in the face of future generations for improvement of living conditions all over the world, they should think and operate at a global level.

Such difficult educational challenges demand revision of an educational paradigm. Thus, authors highlight three basic directions which should form «global competence» at the engineer. The first direction is caused by widening role of the engineer which are engaged not only in designing and product creation, but also in its market promotion, operation, service and recycling. Therefore engineers should have wider interdisciplinary knowledge base, especially in areas which are traditionally considered in engineering education: global socio economic and political systems, international trade and the world markets, ecological systems, scientific researches and technological innovations (Bordogna, J., 1997). The second direction is development of teamwork skills, interpersonal dialogue in the framework of global cooperation (Swearengen, J.C. et al., 2003; Andersen, A., 2005; Shuman, L.J., et al., 2005). Work in a multinational team according to the author of the paper (McGraw, D., 2004) has more chances to be innovative and effective. The third group of competences is connected with ability to communication, ability to live and work comfortably in the transnational engineering environment. Performing difficult transnational projects shows increased requirements to language and communicative skills. Ability to communicate in other languages and easily assimilating to foreign workplaces and a way of life has crucial importance for achievement of professional and vital success (Jack R. Lohmann et al., 2006).

EXPERIENCE OF COOPERATION BETWEEN UNIVERSITIES AND AUTOMOTIVE ENTERPRISES TO TRAIN ENGINEERS FOR GLOBAL MARKETS

Influence of personal and interpersonal competencies on competitiveness of an engineer

International experience shows that personal, interpersonal and system competences become important along with professional competences. It is understood that personal competences characterize cognitive and affective development of each graduate: the ability to engineering thinking and ability to solve problems; desire to conduct experiments, discover and invent novelty; creativity, systematic and critical thinking; professional ethics.

Interpersonal competence is characterized by: the ability of graduates to work alone and in a team, including interdisciplinary; its ability to be a leader and to communicate effectively within the team; capacity for criticism and self-criticism; ability to work in an international context, to perceive diversity and cross-cultural differences and a commitment to ethical values. Systemic competences require the development of instrumental and basic competences as the basis. These include: the ability to learn and apply knowledge in practice; research ability and creativity; ability to develop and manage projects; ability for leadership, initiative and entrepreneurship; understanding of the cultures and customs of other countries and the ability to adapt to new situations; ability to work independently, responsibility for quality and a will to success. Questioning the heads of various KAMAZ departments on competence priority, necessary for the modern engineer, showed that among the most important professional competencies are IT technology knowledge. Among personal competences we can single out creative thinking, active social position, as well as the ability to communicate.

Development of skills to bilingual professional communication

Analysis of personal and interpersonal competencies suggests that their development requires knowledge of a foreign language. In most cases, it is English. This is due to globalization of markets and to the fact that English is recognized as the "language of science" in the scientific community (Tonkin, H. 2011). Problems of development and improving skills of bilingual communications are considered by many authors as one of the problems of modern engineering training. Work (Alan Holgate, 1992) is devoted to the study of needs of engineers in the development of bilingual communication skills, depending on the type of their professional activities.

Bilingual communication skills, necessary for an engineer to work in a global company, can greatly vary depending on the type of their professional activities. We have carried out a survey among KAMAZ engineers of development section (scientific and technical center, technological center, as well as the department, that are in charge of sales and services in foreign markets). Survey "Why do you need English Language" includes the following topics:

- 1) To use a language for: (a) participation in design; (b) control of design; (c) manufacture control.
- 2) To communicate with foreign engineers in English.
- 3) To communicate by phone in (nontechnical) language.
- 4) To cope with an everyday life in the foreign country.
- 5) To conduct business and technical correspondence and to send faxes in English.
- 6) To read the advanced technical literature in English.
- 7) To conduct significant conversations and direct negotiations in English.
- 8) To design engineering specifications in English and manuals for a consumer.

Totally 73 persons have taken part in a survey. The posts and subdivisions distribution diagram is shown on Figure 1.

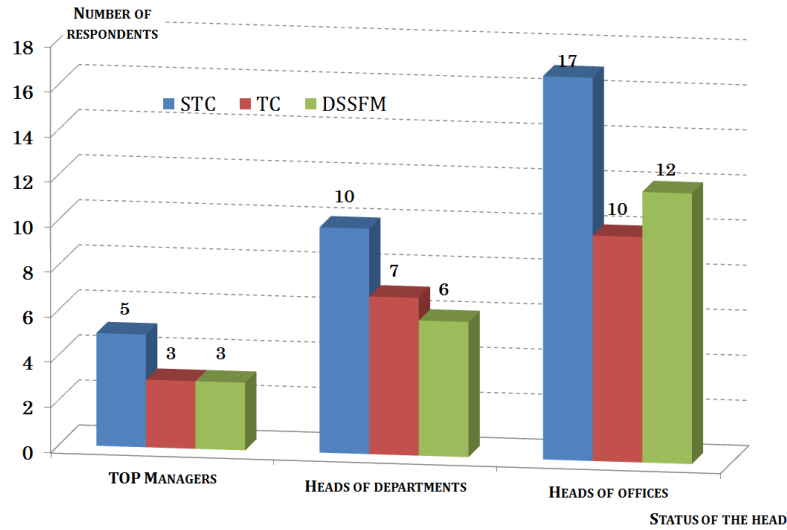


Figure 1. Survey results of professionals

Survey analysis showed a difference in the estimates by their importance in a direction of ability forming towards foreign communications (Figure 2). As the global companies can open assembly manufactures abroad, so engineer who will participate in the given processes, skills 1-8 will be necessary. If the company develops a dealer and service network abroad an engineer in this case should acquire skills 2-7.

Key competencies were agreed in the field of foreign communications with heads of departments, after that the corresponding modules were included in the integrated curriculum. The "language" modules were integrated in the curriculum on the principle of gradual expansion of skills and range of tasks.

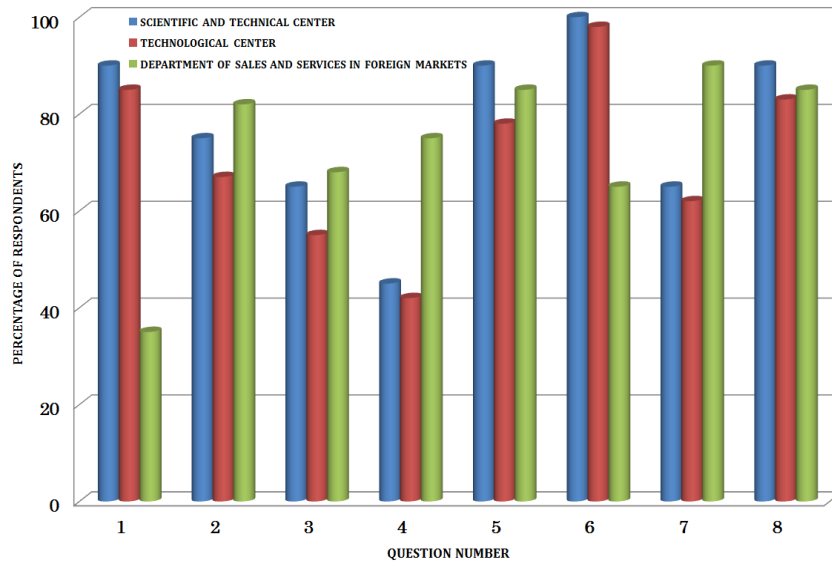


Figure 2. Survey results of KAMAZ engineers

At a stage of a problem statement and analysis carrying out of the studied subject students do the review of scientific and technical researches in English and prepare presentation on these materials. The following stage assumes participation in the international conferences, Olympiads and projects where students can communicate with the colleagues from other countries. Interactive training courses and virtual training modules are used during training session

To implement this step 7 language laboratories have been installed in addition to the existing ones. Accordingly, practical training in foreign languages was planned to increase in the curriculum by 20%. We compared academic performance of students in ordinary and experimental group. Two groups in each (containing 20-25 students) were selected for the analysis. The quality of training was assessed by two sessions in each academic year. Then the proportion of excellent, good, satisfactory and unsatisfactory marks was calculated. The results of the comparison are shown in Figure 3.

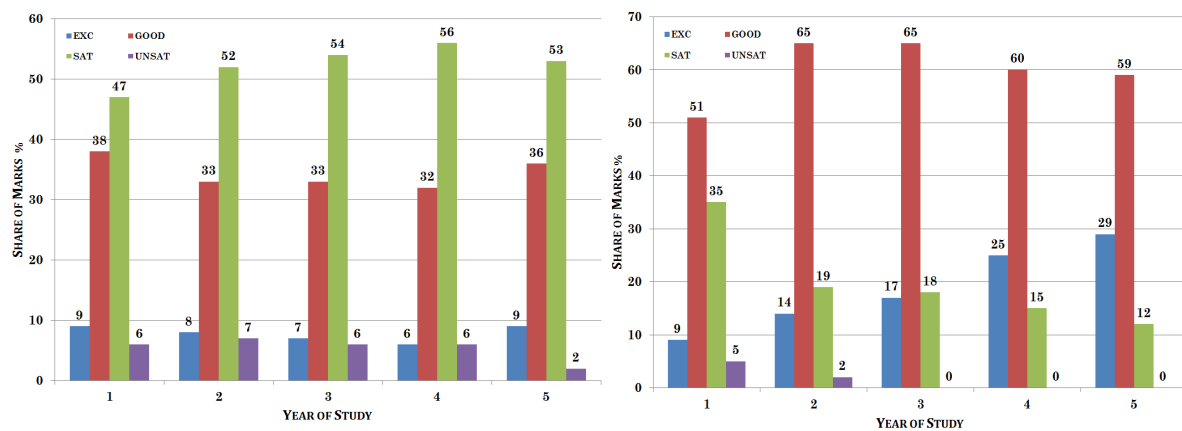


Figure 3. Academic performance of students. a - ordinary group; b - experimental group.

Another technology of bilingual competence development is the project activity, i.e., what will an engineer be engaged in directly during his career. Such type of training organization is understood in design activity at which students develop projects under the teacher's supervising. The peculiarity lies in the fact that designing is the activity directed on a specific topic, but not on the specific language purposes in which various kinds of speech will be involved.

To implement this step "Formula Student" project was launched which involves the participation in international competitions. Students learn procedure rules, develop business plan and design documentation. After it they prepare a presentation of the project in English.

Here the specific character of his subsequent career is taken into account, which is reflected in the content of the task and in presenting the results of the project. Depending on a planned result (a poster, a drawing, a broadcast, a video film, presentation of poll results, a scenario of promotion action etc.) the given work can be done during one or several classes. Thus for gathering necessary information students should carry out searched task which assume work with additional literature, interviewing fellow students, teachers, people in the street, conduct video and photography. Activity of students is based on group interaction which is not only mode of study, but also a natural component of educational process. The

university has cooperation agreements with foreign partner universities. Students take part in scientific conferences in these universities, where they make presentations in English.

Computer technologies essentially improve process of a foreign language teaching, having towards traditional methods such advantages as information capacity, intensification of unsupervised work of each student, increase of informative activity of students, and also motivation strengthening, creation of a communicative situation, personally significant for each student.

Use of computer technology has allowed increasing students' motivation. This is reflected in the improvement of the quality of their graduate works (Figure 4). With a decrease of entry level training quality in experimental groups (diplomas with honors share dynamics) the quality of graduate works increases (dynamic assessment of graduate works). Totally 35 to 35 students are trained in experimental groups each year.

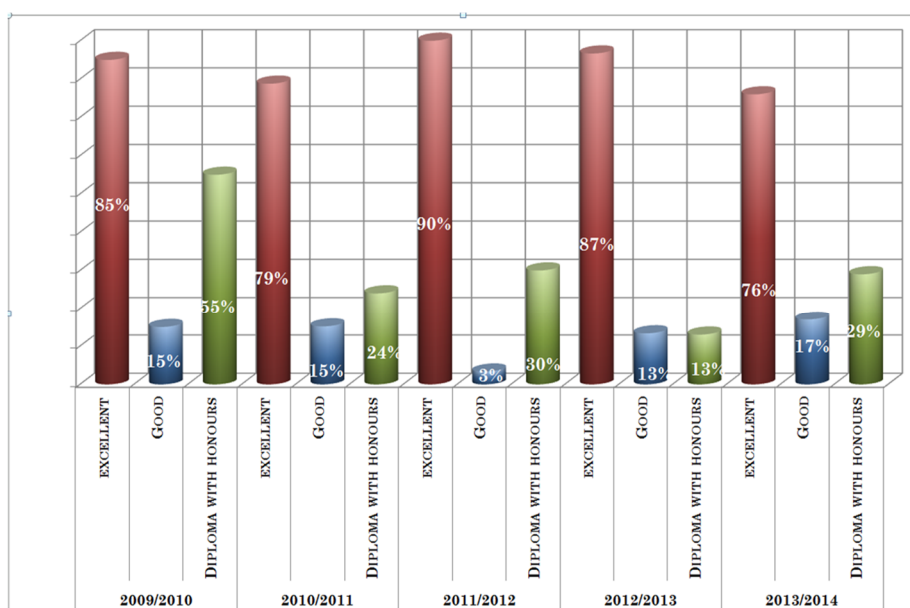


Figure 4. Results of graduate works defense

At network interaction of different universities of different cities and countries telecommunication projects can be carried out. Such projects are unique for us in respect that they give the chance to create the real language environment while it is traditional teachers of a foreign language have been compelled to be limited at lessons to conditionally speech exercises and situations thus it was impossible to generate original requirement for dialogue, and accordingly, original communication.

The great value has advanced training of foreign language teachers which should be competent in the sphere of their professional work and be able to use professional terminology. Training is carried out in close interaction with the partner companies for which personnel training is carried out. To implement this step teachers of foreign languages are trained in the universities of Great Britain.

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