

# Modern Educational Technology in Teaching of Transport Field

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**Abstract.** Technical universities that carry out educational activities in the field of transport training and specialization have accumulated rich experience of modern teaching technologies. The final result of specific competence developing can be achieved only on the basis of a number of intermediate results in the learning of several disciplines through the implementation of multi-disciplinary projects. Multi - disciplinary projects implementation allows to develop the graduate qualification work more efficiently and in a short term. Of great importance in preparation of graduates in the field of transport specialization are the connection of education, science and operation. Creation of a practice-oriented educational process ensures the efficiency and attraction of the education for the all involved participants.

## 1 Introduction

Transport education can be defined as a system of training engineers, technicians and skilled workers in the field of design, construction, construction and operation of various modes of transport. The system of transport education in Russia is unique, has its own specifics, conditioned by historical, technical, technological factors of transport development, as a branch of the national economy. Currently, the idea of creating a Russian transport university is actively being promoted, which will undoubtedly contribute to the improvement of the quality of transport education, and, accordingly, to the development of technology and technologies in the industry. However, I would like to note that the technical universities that carry out educational activities in the field of transport training and specialization have accumulated rich experience in the use of modern teaching technologies.

## 2 Material and methods

Let's consider this issue on the example of FSBEI of Higher Education «Kuban State Technological University» and Sochi branch of FSBEI of Higher Education «Moscow Automobile and Road Construction State Technical University» (MADI).

At Kuban State Technical University and at Moscow Automobile and Road Construction State Technical University the following modern teaching technologies are implemented:

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- **problem-based learning** - is the systematic inclusion of students in the process of solving creative problems of a practical and cognitive nature when studying the nodal provisions of the academic discipline. The peculiarity of problem-based learning in contrast to the traditional - explanatory-illustrative, is that students are not informed of the knowledge in the finished form. Knowledge is acquired by them in the process of resolving problem situations. A problem-oriented approach to learning allows focusing the learner's attention on the analysis and solution of a particular problem situation;

- **project-based learning**- is a complex of methods, processes and methodological materials used in the organization of project-based learning for students, as well as organizational measures, operations and techniques aimed at obtaining design results with a predetermined quality, composition and regulated costs (temporary, for the use of laboratory equipment etc.), due to the current level of development of science, technology and society as a whole. Thus, performing all the stages of the project, the student, in addition to practical skills, forms engineering thinking; [1,2]

- **infocommunication technology** include various educational resources, organization technology, personnel and technical support of the educational process, virtual visualization of the environment. By means of infocommunication technology the student is able to access a number of educational resources: the library of electronic publications; library of automated laboratory workshops (ALP) of remote access, containing computationally-simulation workshops on the study of processes and phenomena on the basis of developed mathematical models; ALP on the basis of laboratory equipment allowing during experiments classes or on-line mode to conduct experiments on laboratory stands and installations, to carry out the necessary control over them and to take readings from devices for the purpose of further processing; ALP on the production base, enabling the student to observe the real production and technological process on the equipment of enterprises in on-line or off-line modes etc. [3]

- **game training** (business games, live modelling of the studied processes). Participation in business games allows students not only to understand the essence of the production process, but also to acquire professional skills, since classes in this form represent the recreation of the subject and social content of future professional activity.

- **interactive learning**. By studying engineering disciplines the most effective are the following types: work in small groups, heuristic conversation, round table (discussion, debate), brainstorming, case-study (case study, situational analysis), public project presentation, decision tree, master class.

- **cross-cutting course and diploma design** allow the graduates who are able to solve the professional tasks at the interdisciplinary level, representing the project process as a whole, competent in scientific and technical issues, problems of the industry, can be trained. The application of this technology is due to the fact that bachelors for a shorter period of training should be trained for professional activities in practically the same positions as specialists.

- **practice-oriented training** - a teacher and a student work and study in the same team, while creating a real object that can have practical and commercial value for both the university and the employer.

### **3 Theory**

The combination of basic fundamental training and practice-oriented training of students is the basis of an innovative system for the training of graduates who possess not only the necessary amount of knowledge, but the skills to independently solve new scientific and technical problems prepared for working on a project in a team that can, in a short time, to work in the related field of knowledge and technology. The research work of the students of FSBEI of Higher Education «Kuban State Technological University» and Sochi branch of

FSBEI of Higher Education «Moscow Automobile and Road Construction State Technical University» (MADI), carried out within the framework of economic contracts with industrial enterprises and research organizations, is of interdisciplinary cross-cutting design. [4]

The federal state educational standard provides for the implementation of a competence approach to the content of training for the formation of the necessary competencies at the end of the development of the educational program for students.

Specific competence can not be formed in training in one discipline, the process is extended in time, and the final result can be achieved only on the basis of a number of intermediate results in the study of several disciplines through the implementation of interdisciplinary projects.

## 4 Results and Discussion

The interdisciplinary project is an independent educational and research work and involves an in-depth study of individual problems of professional activity by students. Work on the project contributes to the emergence of students' independence, creativity, initiative and managerial skills in solving scientific and practical problems.

In modern conditions employers put forward a number of new requirements for bachelors who must be ready to work in a team, have research and organizational abilities, in order to be motivated to learn and practice, and have the ability to creatively solve professional problems. [5,6]

One of the effective forms of the educational process is course design, in which it is possible to model professional activities, the implementation of problem-oriented teaching methods. During the course design students acquire knowledge through creativity, search activity, developing the ability to solve problem situations.

FSBEI of Higher Education «Kuban State Technological University» has an experience in the field of real problem-based learning design. [7,8] For example:

- by the specialty 08.03.01 the course project "Automated design of highways", the implementation of which is based on the knowledge, skills and skills acquired by students during six semesters in the course of studying such disciplines as "Research and design of highways", "Foundations and foundations transport facilities", "Computer graphics";
- by the specialty 23.03.01 coursework "Management of the transportation process in transport hubs", the implementation of which is based on the knowledge, skills and skills acquired by students during seven semesters during the study of such disciplines as "Cargo transportation", "Passenger transportation" "Transport infrastructure", "The theory of transport processes and systems", "Practice on obtaining professional skills and experience of professional activity".

The structure and content of the work programs for such kind of disciplines are closely linked, suggest a gradual expansion of knowledge, skills and skills acquired at each stage. The above examples are not unique in the plans for the preparation of bachelors, a similar principle is also observed when teaching masters and specialists. [9,10]

The peculiarities of the implementation of interdisciplinary projects include the need to organize the interaction of teachers who participate in an interdisciplinary chain, especially when the disciplines are read by different departments. Coherence of actions and requirements of teachers in Kuban State Technological University is provided by discussion at methodological seminars of departments and decision-making on the composition of the set of accounting documents and compliance with the general requirements in each discipline at each stage of students' fulfillment of interdisciplinary projects. By implementing interdisciplinary projects, the following tasks could be solved:

- achievement of students' understanding of the connectivity of individual stages (or aspects) of professional activity on examples of solving study assignments correlated with specific situations of professional activity;
- the students receive their own results of educational activities in a particular discipline and continue working with them in other disciplines, with the passage of practices and the state final attestation.

The implementation of interdisciplinary projects in training programs for bachelors, masters and specialists in educational programs in the field of transport, implemented in Kuban State Technological University, allows more efficiently to develop the final qualification work in a short time. [11,12].

An example of the implementation of interdisciplinary approaches is the attraction of students from Kuban State Technological University to the work of the Student Design Research Bureau (SCIB) "Transport. Roads. Cadastre". Student Design Research Bureau made interdisciplinary projects and assignments are performed on specific production tasks by groups of students of one or several areas of training, helping to develop their competencies such as: teamwork, interpersonal skills and skills, the formation of an effective team, the ability to manage small teams of performers, various types of communication. [13]

In Kuban State Technological University students from every area of training in the field of transport participate in the development of real projects, for example, "Diagnostics and monitoring of the state of transport facilities" and "Road Traffic Organization Project". Interdisciplinary projects are implemented in the Laboratories of the Problem Laboratory of Road Traffic and Innovations in Road Construction in the MFIA SF. Students are involved in the development of master plans for transport services and road traffic projects in the city of Sochi during the mass events. [14] The branch has a student team, whose work is a vivid example of the implementation of practical-oriented training, students were involved in the construction of the Kerch bridge and the Olympic stadium "Fisht".

In the process of education of graduates in the transport areas and specialties in Kuban State Technological University and the Federation of the MFA, the important role lays on the connection of education, science and production. [15] Students regularly take part in various scientific and technical events (conferences, forums, seminars), for example, in the International Road Construction Forum, the International Congress "Road Traffic in the Russian Federation".

The use of all the technologies described in the preparation of bachelors, masters and specialists in educational programs in the field of transport contribute to the training of specialists trained for professional activities.

Creation of a practice-oriented educational process ensures the effectiveness and attractiveness of training for various participants of this process: for university by increasing the level of university, investing from employers and attracting new partners; for graduating departments at the expense of new places of practice and employment of graduates, strengthening of ties with professional communities, concluding economic agreements with enterprises; for teachers by creating new methodological developments, material benefits, expanding the professional sphere of activity; for students through the choice of jobs, material interests. A practice-oriented approach is realized by immersing students in a professional environment while passing through educational, technological, production and pre-diploma practice. [16].

## **5 Conclusion**

Modern educational technology in teaching in the transport field for all specialties are being successfully implemented in Kuban State Technological University and in Sochi branch of Moscow Automobile and Road Construction State Technical University. For all disciplines

of the curricula, methodological materials have been developed that make it possible to implement the above-mentioned teaching technologies in the educational process.

In the training of engineering personnel in transport, an important role is played not only by studying the subject area of future professional activity, but also by mastering special methods and methods of analyzing problems, setting and solving professional problems. The emphasis is on increasing the amount of independent work of students in the curriculum.

In Kuban State Technological University started work on the formation of methodological support of the educational process using distance learning technologies. Work has also started on the application of the innovative complex methodology of case studies ("portfolio") in the educational process on bachelor's programs in combination with the organization of self-and mutual control and emphasis on independent work in the group.

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