

## THE FORMATION OF NEW TECHNOLOGIES IN UNIVERSITIES AND THE ROLE OF STUDENTS IN PROMOTING THE SPECIALIZATION

Rozhkov P.V.<sup>1</sup>  
 Purikova I.A.<sup>1</sup>  
 Tertitsa S.V.<sup>1</sup>  
 Dimitryuk Yu.S.<sup>2</sup>

1. Russian technological university, MIREA branch in Stavropol, Stavropol, Russia, 355029, 8 Kulakov avn.

2. SAEI HPT «Nevinnomyssk State Humanitory and Technical Institute», Nevinnomyssk, Russia 357108, Bulvar Mira, 17

**Abstract:** It's said in the article that now it becomes extremely important among modern specialists in the construction field the striving and the ability to an independent search of appropriate information, the acquisition of background knowledge which is the theoretical basis of professional activity as well as the skills to create and implement new strategies of behavior and professional activity. Informational-communicative component is one of the main in the structure of specialist training to social and professional activities in the field of construction. Essential methods of informational-communicative competence formation are considered in this paper.

**Keywords:** education, formation of informational-communicative competence, Computer Assisted Design (CAD), professional training in the field of construction, project activity.

### INTRODUCTION

The development of modern society is marked with an ever-accelerating dynamism, a deeper knowledge of nature and effects of its laws, the transformation of social order. Desire and ability are very important for an independent search of the necessary information, the acquisition of back ground knowledge, which is the theoretical basis of professional activity, skills to create and implement new strategies of behavior and professional activity under new conditions. Informational-communicative component is one of the main in the structure of specialists training for social and professional activities. In this regard, the problem of informational-communicative competencies formation and expansion becomes one of the most relevant and basic requirements for university graduates [1]. Under these conditions, the higher professional education is challenged to an urgent need of transition from a rigid system of training to a more flexible system, which will allow to prepare a highly qualified specialist, more adaptable to changes in the labor market, able to decide and act within the framework of inconsistency and uncertainty, focused on the creative approach to a business as well as with a high culture of thinking.

The thematic justification of our research is based on the reforms in the system of higher professional education. The transition to the model of competency-based approach, the introduction and use of multi-level programs of higher professional education allow us to move away from the traditional cognitive model of education, when students work out and develop mainly the readiness to a reproductive activity. In Russian circumstances, the implementation of the competency-based approach is a way of maintaining an integrated

informational, cultural-value and professed qualification space as well as a factor in the confluence with the world educational space. We support the opinion of modern scientists that the competence is a quality of a person who has got a certain level of education which is evident as the ability and readiness (on the basis of education) to effective (productive, successful) activities, taking into account its social significance and social risks that can be associated with professional activities. Informational-communicative competence is an integrated, dynamic personal formation of a future specialist with broad information outlook, special competencies and a rational style of information and communication activities in the development of new information technologies and capable to master the basic educational program of higher professional education, free orientation in the information space, and creative activity in the system "man-information".

## DISCUSSION

As practice shows, the formation of informational-communicative competence of university students is the result of such training, which acts as the basis for building of education content in university and meets all innovation requirements for educational programs. At the same time, we came to a conclusion, that it is necessary to solve the following tasks: definition of the aggregate and sequence of forming universal and professional competences in the context of informational-communicative competence; definition of academic disciplines study sequence with an active adoption of information and communication technologies; making connections between informational-communicative competence of undergraduates and the content of academic disciplines providing the formation of professional and key competencies [2].

The organization of training, in the light of the features of informational-communicative competence under innovation conditions of institutional training allows to provide a gradation of students from educational informational-communicative activities to the real scientific studies of production specific problems, to certain innovative developments which can be implemented in the production process with the aim of its optimization, that will improve the level of graduates readiness for professional activity. The choice of specific teaching methods is conditioned by many factors: basic knowledge level of students, psychological and motivational attitude of a group mastering new knowledge, the nature of scientific matter perception, by external circumstances and many others [3]. The practical value of informational-communicative activity analysis as a method of professional competence development of students at university is that:

- \* it was worked out and tested a set of educational factors for the professional competence formation of university students in the course of informational-communicative work studying in order to organize the educational process aimed at the implementation of the project potential of students, which in its turn can be applied in construction practice;

- \* it was given the description of student's individual work organization methods in the process of volunteer activities research, favoring to the maximum fulfillment of student personal potential on the basis of which the teaching and educational program was elaborated in all faculties, institutes of university;

- \* the system of interrelated conditions of informational-communicative activities and professional competence of students was checked. A set of diagnostics to determine the levels of this phenomenon was also marked, allowing its use in professional activity.

The key targets, the solution of which shows directly the acceleration degree of scientific and technical development of society, are the improvement of operating efficiency of new products developers to a qualitatively new level, minimization of project deadlines as

well as a significant improvement in the quality of project development. The formation, development and implementation of CAD systems is based on a developed scientific and technical basis, which combines such components as modern production facilities and computer equipment complexes, innovative methods of processing and display of information, the development of new, better ways to solve emerging engineering problems as well as their optimization. CAD systems in construction, based on the latest achievements and discoveries made in the fundamental sciences, realize the opportunity to invent and improve new design methods and in addition, promote the balanced growth of mathematical theory in the field of complex aggregates and objects design. Tools and techniques were elaborated and applied by means of which you can automate such patterned everyday acts like graphics creating, converting and editing of drawings, preparation of text documentation, etc. at this stage of development. One of the most important features of CAD is the possibility of automated development on some stages and in the design of objects as a whole, or their component parts. In the course of design and creation of CAD components or the system as a whole, it is necessary to rely on the following fundamental principles: system unity; compatibility of software and system components; typification of the CAD elements, phases and operations design; systematic modernization and development.

The components of CAD, closely integrated into the structure of the design organization are subsystems, in which the solution of a logically combined set of CAD tasks in the construction operations is carried out by means of highly specialized complexes. These subsystems due to their functional orientation are divided into the designing and servicing ones. Designing subsystems are based on an object-based orientation and at the stage of project development they perform either a set of closely related design tasks or perform a certain stage of design. A specific feature of the servicing systems is their system-wide application, which ensures highly productive work of the designing subsystems, as well as the rational formation, transmission and date display obtained as a result of the work of these designing subsystems. The system unity of CAD in the field of construction operations is provided by a broad range of an interrelated components set describing the design object in general as well as a set of system interfaces, due to which such close interaction is achieved. Within the designing subsystems, the system unity can be implemented through the creation of a single information model of the part of the object, the design of which should be performed in this subsystem. To perform their functions, these systems have the ability to combine their computing and information power, thus forming local computing clusters of subsystems or even entire systems.

The category of systems structural pieces also includes components of the following service types: software, information application, methodological, mathematical and linguistic support. The optimal operation of systems should be achieved by using the results of mutually agreed development (coordination with purchased) of components, which are structural parts of systems. According to the developed classification CAD is designated to solve such important tasks: the creation of a consolidated formal description of the CAD in accordance with the accepted classification criteria; CAD marking created in organizations of different industries branches as well as in construction; planning of progressive increase of design automation level, greater complexity of construction automation and other CAD characteristics in the process of their development; modeling of conditions positively influencing on the development of technically based standards for ensuring the process of creation, operation and development of CAD by specialists, hardware and software, energy, information, financial and other resources.

Quality improvement and reduction of design terms is one of the top preconditions for the accelerating of scientific and technological development. A significant obstacle for quality improvement and reduction of the construction design terms is the increasing contradiction between the growing cohesion of construction projects on the one hand and

formed methods and means of their design – on the other. The above-mentioned controversy cannot be solved by mathematical increase in the number of planning organizations and planners of different professions. The CAD system is designated to solve an important problem in improving the methods of architectural and urban design at the current stage of social development and it tends to achieve the following target goals: 1. Well-timed provision of design specifications and estimates; 2. The ability of CAD systems to provide high scientific, technical and aesthetic quality of design solutions; 3. Complete record keeping of all possibilities and resources of construction to achieve the best result in the design.

The CAD system has to possess for it the appropriate capabilities [4]: 1. Comprehensive comparison of competitive design alternatives and their tech-financial justification at establishing a rational option; 2. Comprehensive review of the task in planning at the definition of main design concept; 3. Maximum absolute accounting of social and financial, natural and climatic, functional, useful and aesthetic requirements for the organization of site and construction projects; 4. Continuous implementation of a single design process with continuous communication of architects and engineers with experts of neighboring fields of knowledge; 5. Maximum reduction of time for making design decisions and their further research taking into account all conditions and requirements considered in the context; 6. Operational extraction of regulatory information according to the requests of designers in a form comfortable for the purpose of its immediate assimilation and use in the accelerated course of construction object design; 7. Online registration of accepted design reports and preparation of technical documentation in accordance with the terms of construction technology.

In recent years, a whole range of innovative teaching technologies, appropriate forms, means and methods, that have great opportunities in the development of informational-communicative culture of students was worked out in pedagogics. They include such technologies of training as concentrated training, problem-modular training, a large list of special techniques and methods aimed at the comprehensive development of students' creativity. Among them is also the technology of project teaching, having a great potential in the diverse and deep personal enhancement of students. Actually, the topicality of project teaching ideas is stipulated by social transformations taking place in the process of social development. The modern phase of social development is characterized by the formation of a paradigm shift, the evolutionary transition of society into a qualitatively new period of its development, with the corresponding period of process design type culture. Design at the present stage has become a lifestyle and comes not only from architects, professional designers but also from specialists of applied sciences, scientists, legislators, politicians, etc. Hence the concept and the term "design culture", which denote the phenomenon of the century and the point of view on culture.

In our opinion, the leading interactive teaching methods are organizational and pragmatist games, clubs, support of teachers in the process of informational-communicative skills acquisition, knowledge, skills (interaction and cooperation of students with the teacher, assistance of teacher to students and at the same time improving their own informational-communicative culture), filling classes with creative and research methods of work. Moreover, the students attend special courses, which favor to the acquisition of theoretical and practical knowledge, skills and practical skills to carry out information and communication activities of professional competence. As a result, students of construction specialties obtain skills of organization and implementation of practical activities [5]. Project-oriented technology plays an important role in the achieving higher education goals, as it affects on all aspects of human life, especially on the research activity, which also includes training. The expansion and development of project-oriented technology application is directly related to the problem of improving the efficiency of training. In recent years, we can increasingly frequently observe the tendency to the project activity. The results of university

teachers survey confirm it clearly: about 90% of teachers believe that the involvement of students to informational-communicative activity is necessary; about 70% bachelors on technical profile training, interviewed during the survey, expressed a desire to engage in informational-communicative and design activity within studying the academic disciplines, and, moreover, the number of participants of scientific conferences is increased from year to year.

The methodology of the projects is presented in the form of a flexible system of educational and research process organization, favorably affecting on the progress of observation and the desire to find correct and comprehensive answers to emerging questions, the ability to check the correctness of the answers in the process of research and experiments as well as on the basis of the obtained formation analysis. Within the framework of specialized training the designing should be considered as the main type of cognitive and informative-communication activity of university students' education. The consideration of student cognitive activity structure characteristics in mastering and use of acquired knowledge is a starting point in the definition and development of effective ways and means of the training activities organization and management. In conclusion, it is necessary to mention that therefore the process of students entering into an active cognitive activity is significantly activated. But at the same time, the analysis of presented student's works, their speeches and reports at conferences allows us to conclude that in the large majority of cases, the project work as a phenomenon is not completely independent.

This situation is because students have no experience in informative-communication and project activity. Students have to apply the proposed algorithm of work without prior training, not possessing the basic knowledge and skills that relate to informational-communicative and project activity, which in its turn leads to a lack of internal motivation for this type of activity [6]. Having selected from the whole set of teaching methods used for the purpose of formation of informative-communication competence of students, we grouped them as follows: a group of innovative and activity methods, including new educational technologies: modeling, algorithmization, creative invariance, etc.; a group of training-actable methods, providing the development of individual and group experience as well as the correction of knowledge and professed activity in a specially given conditions: training, business games, etc.; a group of reflexive methods based on individual experience, self-analysis and awareness of their own knowledge and skills in reality: self-assessment, self-analysis, etc.

As practice shows, the formation of informational-communicative competence of university students is the result of such training, which acts as the basis for building of education content at university and meets all the innovative requirements for educational programs. At the same time, we came to a conclusion that it is necessary to solve the following tasks: definition of the aggregate and sequence to form universal and professional competences in the context of informational-communicative competence; definition of the construction disciplines study sequence with an active inclusion of informational-communicative technologies; establishment of links between informational-communicative competence of university students and the content of academic disciplines, ensuring the formation of professional and key competencies.

There is another difficulty associated with the spiroid nature of the cognitive process. No matter how well the teaching material is offered, and no matter how much the students show their cognitive activity, the perception and understanding of the material does not provide its deep understanding. Further self-directed educational learning is necessary for the purpose of more detailed and full comprehension of knowledge (in psychology there are two types of perception and comprehension of studied material –the primary and subsequent). It is clear that the nature of such work is associated with the degree of complexity and the amount of material to be mastered. If the learning material is simple enough and not large in volume, so for its understanding is sometimes enough only a primary perception. But such

material in university subjects (for example, theoretical mechanics) is just a little. In most cases, we cannot go without further independent work for a better understanding of knowledge.

Institutions of higher education are becoming the main source and the leading professional and resource base, thanks to which changes in the socio-economic structure of the country are formed. The emphasis on quality education in the developing society and high human potential are dominant in the implementation process of various directions of transformations. Adequate socio-economic policy both at the regional and especially at the federal level favors to the building capacity, concentration and effective application of scientific and educational potential of higher education institutions and society as a whole [7]. The given methodologies of informational-communicative competence formation of university students are the preconditions by means of which the personal agency in the educational process is formed as well as the preparation for the future of innovative professional activity is carried out. Global changes in the world have caused a new look at the problem of personality formation in the world community. A number of scientists involved in the study of future specialists training point out the necessity of young people involvement in informational-communicative activity having a great importance for the formation of personality and its entry into the world educational space.

## CONCLUSIONS

Summarizing the above mentioned we believe that the improvement of the methodology for the formation of informational-communicative competence is directly and closely related to the propaedeutic work with future specialists in the field of construction, which includes the following items: educational work focused on the formation of know-how complex in educational and informational-communicative work; revelation of all objective laws and methodological methods of perception and understanding of scientific-theoretical material; development and expansion of ideas that knowledge mastering on the assimilated scientific branch is impossible without active mental activity, without the development of an individual approach to a detailed understanding of information; organization of student's individual work on the assimilation and understanding of lecture material, with obligatory self-control and self-analysis; formation of a strong belief that the strength and depth of students professional training depends largely on the proper organization of such individual work; teaching students how to plan extracurricular activities with the obligatory alternation of classes on other disciplines; organization of student's individual work in the course of mastering informational-communicative technologies.

## REFERENCES

- [1] Gubaydullin A.A. Formation of research competencies of students under the conditions of project training: study guide // E. M. Ibragimova, A. A. Gubaidullin. - Kazan: Centre of innovative technologies, - 2010 - 160 p.
- [2] Efimov Y.V. Formation of informational-communicative competence of university students in the context of higher school modernization// Modern problems of science and education. - 2012. - № 6.; URL: <http://science-education.ru/ru/article/view?id=8031> (date accessed: 23.05.2018).
- [3] Dimitryuk Yu.S. Formation of research competence of students in the context of innovative changes in university: dissertation ... the candidate of pedagogical sciences: 13.00.08 / Dimitryuk, Yu.S.; [Place of defense: university of Russian Academy of education, Moscow]. - Nevinnomyssk, - 2014, - 172 p.
- [4] Butko A.O. Principles of modeling in CAD NX: textbook / A. O. Butko, V. A. Prudnikov, G. A. Tsyrcov, 2nd edit. - M.: RC INFRA - M, 2016. -199p.

[5] Kochemasova L.A., Ostapenko A.S. Informational-communicative activity as a means of development of professional competence of university students. Modern problems of science and education. - 2015. - Nº 5.; URL: <https://science-education.ru/ru/article/view?id=22169> (date accessed: 25.07.2017).

[6] Vokhmentseva E.A. Project activity of students as a means of key competences formation / E. A. Vokhmentseva - Materials of International scientific-practical conference "Actual problems of pedagogics": Publishing house of Young scientist (Chita) – 2011, - 58-65 p.

[7] Dolgopolova N. In. Systemic and structural changes in the contemporary higher education in Russia/ N. In. Dolgopolova - Materials of International scientific-practical conference "Science and business: ways of development" Nº8 (38): Publishing House Imprint (Tambov), 2014, - 34-37 p.