

# FORMING A CLUSTER OF UNIVERSITY STUDENTS' PEDAGOGICAL COMPETENCE: CHALLENGES AND SOLUTIONS

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## Abstract

Extensive development of industrial civilization, integration of science and culture as well as global changes in the world expect university graduates to possess new qualities and, thus, respond quickly to the challenges of time, join innovative processes, use the competences in brand new conditions, and constantly acquire new ones. Russia is solving this issue by reforming the system of higher education, particularly, by establishing university-based educational clusters that bring together the educational and research potential of the university and business itself, which a Bachelor's training is focused on.

Following the Bologna Process, the Federal State Educational Standard specifies that all training programmes should offer several occupations that a student can master. The first place is taken by the occupations directly related to the selected training programme and educational programme specialisation. For example, for Design Studies students this is Art, Design, and IT. The bottom of the list is organizational, management and teaching activities. In fact, the two latter ones are not considered when drawing up the curriculum. At the same time the labour market realities are such that a certain percentage of Design Studies graduates seek employment in educational institutions of different tiers and types, e.g. in 2013 32% of Design Studies graduates of Kazan Federal University, Russia, were employed by state schools and institutions of supplementary education for children, in 2014 - 36%, in 2015 – 40%, and this year 43% of the graduates are going to choose teaching as a career.

The thing is that it is essential for students doing a Bachelor's degree to acquire a cluster of pedagogical competences that help them adapt to a profession of a teacher in a fairly short period of time. Thus, the educational cluster, the centre of which is the academic university, together with the world of business should also involve educational authorities and educational institutions where students will do internship and school teaching. The function of the university in the cluster is to produce an innovative product – a competent flexible specialist that will meet labour market requirements under specific social and economic conditions.

The cluster of pedagogical competences is based on the core teacher training competences which are related primarily to the issues of training and education of students. Teacher training, as one of the activities contributing to purposeful development of the student, their mastering of the basics of culture, and comprehensive development of their abilities, is based on the core competences of the teacher and includes personal qualities, a goal-setting ability, an ability to motivate and organize training, and information competence.

The article presents the study results of the formation of basic competences of teachers of Fine Arts, Technology and teachers of supplementary education for children (case study of the teachers of Kazan, Republic of Tatarstan); the analysis of the educational institutions' demand in teachers of relevant specialisation. The survey has shown educational institutions' demand in university graduates possessing pedagogical competences along with high-quality training in design. One of the solutions to the problem is seen in creating organizational and pedagogical conditions to ensure that Design Studies students will develop a cluster of pedagogical competences.

Keywords: cluster of educational competence, pedagogical conditions, design, professional problems, the university.

# 1 INTRODUCTION

## 1.1 Background

The traditional model of education is too static and is focused on the disciplinary knowledge and narrow-profile distinction of knowledge as relatively self-contained, closed information storage systems that do not fit the reality of the process of global changes in the world that enters, according to Laszlo, the era of the bifurcation. The economic and education reform in Russia created the need for an effective development of an innovative component of the Russian higher education system and improvement of its competitiveness on the global education market. One of such areas is the competence based approach to the educational process, which allows to adjust the set of general cultural and professional competences in accordance with the needs of the labour market. Ongoing substantive changes are required alongside organizational and structural changes in the system of training as well as the search for new forms and methods to ensure the preparation of students to innovate activity in all the professional spheres defined by the Federal Education Standard for Higher Education.

The socio-industrial sector today is enhancing the demand for new skills and competences in relation to the changed working conditions, such as increasing the level of interaction, individual responsibility, teamwork, etc. The labour world requires the training of a new graduate who is capable of innovation, has systematically organized intellectual, communicative, reflective, and other abilities to successfully organize their career. The main feature of many studies of the professions of the future is a clear trend for the 'mixture' - a combination - of several areas: an IT-geneticist, an urban specialist and environmentalist, a manager of crowd founding platforms, space trips, a city farmer, a designer of virtual worlds, etc.

In the last ten to fifteen years clustering has become an important part of the state policy in the field of regional development in many countries. The concept for the long-term socio-economic development strategy of the Russian Federation until 2020 identification and encouragement of the development of emerging regional industrial clusters is regarded as one of the most important areas.

In the structure of professional and pedagogical competences a special place is occupied by the cluster of pedagogical skills demanded by modern employers and relevant in the context of the implementation of the Professional Teacher Standards. These include competences in communication, teamwork, self-management, problem solving, initiative, learning, planning and organization, technology. The Federal State Standard that sees learning outcomes in the professional and general cultural competences, the competence group data can be classified as occupying an intermediate position.

Cluster learning is a relatively new trend in professional pedagogy, its implementation in the preparation process requires determination of pedagogical conditions and experimental verification of the effectiveness of the formation of a competent professional. The role of the university in the cluster is to ensure the production of innovative products. Research institutions and industrial establishments are the basis of practices and get an opportunity to participate in the formation of a specialist on their own scientific and training base in accordance with their needs and development prospects.

## 1.2 Status of a problem

In Russian pedagogy there is research devoted to the formation of individual skills, abilities and competences for individual jobs, the formation of professionally significant qualities of the person, general cultural competence. There has been studied professional activity and its impact on the system of values, purposes of life and motives of the teacher activities.

Despite the wide range of the aspects of the topic under consideration, the problem of formation of professional and pedagogical competences of students of a university as a cluster has not yet become a subject of research in teaching.

The conducted research has allowed us to identify the **contradictions**:

- between the order of society and the state of new quality of training of graduates and lack of orientation of higher education on the formation in university students of competencies that contribute to the success of teaching;

- between the need for the formation of a cluster of pedagogical competences of university students and the insufficient development of pedagogical conditions of formation of these competences in vocational training in university.

The identified contradictions have formulated the problem: what organizational and pedagogical conditions will ensure the formation of a cluster of pedagogical competences of university students in the course of vocational training?

## 2 MATERIALS AND METHODS

To solve the problems, the authors used a set of complementary research methods:

- Theoretical (scientific analysis of psychological and educational, methodical literature, development of conceptual and terminological system of the issue);
- Empirical (observation, questioning, free and formalized interviews with employers, students, teachers).

### 2.1 Case Study

For the “Design” programme the Federal State Education Standard of Higher Education defines pedagogical competences of a Bachelor in professional scientific and pedagogical activity – “it is aimed at teaching at educational institutions, institutions of secondary professional education and further education, is able to manage the learning process, carry out methodological work, read lectures and do practical training” [5].

For the European education standard the tool for matching the labour market requirements and learning outcomes is a methodology of qualifications framework as an innovative technology of education programs development [6]. It is particularly relevant for areas of training that later face serious problems with recruitment. The tiered nature of the qualifications framework provided by the Bologna process, takes into account the specifics of the regional labour market and the local measurements in each city.

Expansion of academic freedom of universities allows to meaningfully fill the variable part of educational programs independently, taking into account the labour market needs of the region. The guidelines for the selection of the content of education must be a cluster of competencies identified by the request of educational services consumers. Being a key concept of qualifications framework, competences carry out the function of language to exchange information between the labour market and education. Competence is an integrated concept that indicates the ability of the individual to independently use various elements of knowledge, skills and attitudes in everyday and new situations. [4]

Cluster is defined as geographically related groups of interconnected companies, specialized suppliers, service providers, firms in relevant industries, as well as institutions in certain areas associated with their activities that compete but at the same time lead to work together”. [5]

Education cluster is a set of interrelated professional education institutions, pooled according to different sectors, and partnerships with companies in the sector.

Analysis has shown that the concept of educational cluster has been developed both by Russian and foreign researchers. For example, M. Porter analyzes the educational cluster of Massachusetts (MIT leaders and Harvard) [3]. This cluster is described in detail. Its role in the field of education in the country (compared to other states, primarily California) and other countries is analyzed.

In the Russian regions there are attempts to form educational clusters. The leader in this area is the Republic of Tatarstan. 13 educational clusters are being formed in Tatarstan.

One of the main problems which educational clusters in the Republic of Tatarstan are designed to solve is the problem of popularization and development of blue-collar jobs. To meet this demand three major universities of the Republic of Tatarstan - Kazan Federal University, Kazan State Technology University and Kazan State Aviation University were integrated with vocational schools. As a result, graduates of such clusters will receive a university degree (increase of prestige), and it will ensure a greater possible number of students with the possibility of continuing professional education.

In addition to the joining vocational institutions to the leading engineering universities, there is also involvement in the learning process of the largest specialized companies in order to improve the quality of training.

Ministries of the Republic of Tatarstan play an active role in the formation of clusters and educational development. Thus, according to agreement, the Ministry of Economy and Industry in cooperation with the Ministry of Labour and Employment of the Republic of Tatarstan will monitor the national labour market and determine current and projected (to 10 years) need of industry in professionals. Each year the Ministry of Economy will form a government order for the industry to train qualified workers and specialists on the basis of employers' demand.

The main advantages of educational clusters are:

- 1 efficient organization of the educational process;
- 2 identification and training in demanded specialties;
- 3 preparation and timely updating of the content of the educational complex; creation of a material and technical base;
- 4 carrying out targeted research projects: targeted funding for research projects and their implementation in production; competitive staff in the labour market;
- 5 improvement of educational and scientific processes where businesses provide themselves with competent, high-qualifies personnel and the state reaches socio-economic and innovative development.

There are basic functions of the educational cluster:

- economic – creation of spheres of effective educational services that timely meet the demand for the industry;
- social – creation of guarantees for graduates of vocational education institutions;
- marketing – promotion of advanced educational technologies, vocational guidance;
- legal – development of the legal framework of partnerships; provision of a subject position of all social partners;
- pedagogical – collaborative design of educational activities in the field of specialist training; provision of content and technology side of social partnership between all participants of the educational cluster.

Basic strategies for the development of the educational cluster: economic - creating spheres of effective educational services, timely meet the demand for the industry; social - the creation of guarantees for graduates of secondary specialized educational institutions; Marketing - Promotion of advanced educational technologies, the organization of vocational guidance; Legal - ensuring the development of the legal framework of partnerships; providing a subject position of all partners; pedagogical - collaborative design of educational activities in the field of specialist training, provision of content and technology side of public-private partnership between all participants of the educational cluster.

In our opinion, the formation of a cluster of pedagogical competences of university students while training to solve professional tasks in accordance with the professional activities in "Design" programme will be effective if a set of organizational and pedagogical conditions of formation of the cluster of pedagogical competences of classical university student will be designed and implemented. By the cluster of pedagogical competences we mean: orientation of students to the formation of professional and pedagogical skills in classroom and extracurricular activities, promoting respect to teaching and forming motivational and cognitive components of the cluster of pedagogical competences; communication of innovative educational technologies used in the process of vocational teacher training designers, the social order, ensuring the formation of regulatory and ethical component cluster of pedagogical competences; application in the educational process of innovative teaching technologies and their transfer, contributing to the formation of organizational-activity component cluster of pedagogical competences of the student; involvement of students in the process of formation of a subject position to form a reflective-evaluative component of the cluster of pedagogical competences by means of practice-based learning.

## 2.2 Objectives of the Research

Extensive development of industrial civilization, the integration processes in various fields of science and culture and other global changes in the world that enters, according to E. Laslo, the era of bifurcation, require graduates to have new qualities that will allow them to react quickly to the challenges of time, join innovation processes, apply existing competences in brand new conditions and constantly acquire new ones. Russia is solving this issue by reforming the system of higher education, in particular by establishing university-based educational clusters, bringing together educational and scientific potential of the university and actual production, which focuses on Bachelor's training. The content of the Federal State Educational Standards in all areas of training shows several types of professional activities, which a Bachelor may possess. The first place is occupied by activities directly related to the chosen specialization and profile training. For example, for Design students this is art, design, and information technology. The list is completed by organizational, management and teaching specializations.

The latter two activities are generally not considered when the curriculum is made. At the same time the labour market realities are such that a certain percentage of Design graduate students go to work in educational institutions of different levels and kinds.

The situation is such that undergraduate students need a cluster of pedagogical competences that enable to adapt to the teaching profession in a fairly short period of time. In connection with this, the educational cluster, the center of which is a classic university, along with the production should also include educational authorities and educational institutions on the basis of which Bachelors will be able to have training in companies and schools. The role of the university in the cluster is to ensure the production of an innovative product - a competent mobile professional meeting labour market requirements under specific socio-economic conditions.

## 2.3 Factual Material of the Research

The article presents the results of a study of the pedagogical conditions of formation of the cluster of pedagogical competence of university students in the course of vocational training.

The study is based on the results of research conducted between 2011 and 2015 with the help of theoretical and empirical methods at Kazan Federal University and Orenburg State Teacher Training University.

The findings were discussed at the methodological meetings of the Design and the National Arts Department of Kazan Federal University, seminars on the issues of continuous education in art of the Department of Art and Aesthetic Education of Orenburg State Teacher Training University.

The theoretical and methodological basis of research were the works of Russian and foreign researchers: M. Dembrovskaya, S. Kotov, M. Nikolaeva, I. Kharchenko, N. Bazhenova, M. Krasnova, S. Shmeleva, M. Shnayder, A. Angelovski, Y. Andreeva, A. Klenina, E. Tenilov, N. Terzi, V. Chernjavskaya, I. Shevchenko, I. Abakumova, L. Antsyferova, A. Asmolov, A. Bodalev, P. Ermakov, Y. Zabrodin, V. Olshansky, A. Petrovsky, V. Slobodchikov, V. Shadrikov, D. Feldstein, M. Janitsky, Michael Eugene Porter.

**The model of the education cluster** is holistic education that includes organizational, managerial, technological, and informative levels providing a clear picture of a purposeful process of development of social partnership, allowing to determine the conformity of the goal with the final result. The peculiarity of the educational cluster is the unity of content and procedural aspects of effective implementation of social partnership in the vocational education system with the aim of improving the quality of graduates. The interaction of various social partners is based on the principles of cooperation, integration, enterprise, self-development, self-organization and social adaptation of vocational education.

Orientation of students on formation of professional pedagogical skills can be carried out in various forms of classroom and extracurricular activities.

Special courses chosen by the student and manufacturing practices, as required for the study of the student section of the basic educational program, define substantive content generated pedagogical competencies.

In the classroom one of the most effective methods of training of students, contributing to successful adaptation to the profession, is a lesson in the form of training. We have developed the training of

pedagogical interaction that accumulates the content of practice-oriented disciplines, promoting adaptation of students to the professional-pedagogical activity: "Practical class on the decision of pedagogical problems," "Introduction to the teaching profession", "Methods of teaching fine arts and technology." Training sessions are devoted to the issues of professional identity, case studies from students' personal experience: life and professional, personal characteristics that are important for professional activity. In each session students are offered to study an issue proposed by students or the teacher. At the same time, students can act as direct participants or observers.

Pedagogically oriented content of optional special courses defines the formation of basic pedagogical knowledge in the field of training and education theories, methodological aspects of teaching disciplines of artistic cycle.

Students are able to obtain practical skills in the course of the educational process in practical classes. The practice of students is part of the basic educational program of higher professional education. It is organized and conducted with the purpose of acquiring and improving practical skills in the performance of official duties on purpose, to deepen and consolidate the acquired knowledge and skills. Russian universities provide three main types of practices: educational, industrial and pre-diploma. Production (teaching) practice is a form of the educational process, in the course of which the direct connection of theoretical education with practical future professional activity (in this case, the teacher).

The aim of the practice is to prepare a university student to the realization of the planning and organization of its management strategies in an educational organization, problem solving professional and personal self-improvement. Passage of production (teaching) practice of student non-teaching institution associated with the development of the ability to independently formulate and analyze pedagogical problems, consolidating and extending the theoretical knowledge, the preparation for the study of specialized courses, mastering the techniques of the educational process in practice, the acquisition of practical skills in cooperation with co-workers and independent teaching activities.

We believe that the training of university students should be improved on organizational, substantive and methodological levels allowing, on the one hand, to preserve fundamental, traditional, and science-based approaches and, on the other hand, to suggest modern approaches to the training of a mobile teacher during school practice. In our opinion the relationship of educational technologies used in the process of vocational teacher training of Design Studies students and the social order is important. This connection ensures the formation of regulatory and ethical component cluster of pedagogical competence of university students.

### **3 RESULTS**

In the course of our research we have found that a certain percentage of graduate students receiving education in Design programme, goes to work in educational institutions of different levels and types: in 2013, 32% of Design Studies graduates of Kazan Federal University were employed by state schools and institutions of additional education for children, in 2014 - 36%, in 2015 - 40%, in the current year 43% of the graduates are planning to get a job in education. The university students (doing a degree in Design) were asked to express their attitude to a number of issues related to the importance of the teaching profession, willingness to be engaged in educational activities. The responses were grouped in blocks that revealed the respondents' attitude to the subject.

To the question "Do you plan to engage in professional pedagogical activity" the students responded as follows: "Yes" - 20%, "Most Likely" - 50%, "No" - 30%. The students mentioned lack of confidence in their own abilities. They find that they do not have professionally important qualities of the teacher such as responsibility, independence, communicative skills and confidence. Only 30% of the students understand the value of the teaching profession and the positive result of its development. 55% of them are not quite sure. Those who answered negatively is 15%. These results suggest that for students do not value the profession of a teacher.

To the question "How important is school practice for you?" the answers were distributed as follows: 67% of the students believe that school-based experience gives them an opportunity to "test your strength", "try on" the role of teachers, and gain experience in teaching. In other words, for this group of students, school practice serves as a self-test of their professional suitability. For 36% of the students school practice is the ability to apply theoretical knowledge in practice. It is noteworthy that only 3% of the respondents said that the purpose of school practice is to convey knowledge, skills and

abilities to schoolchildren. Such a low percentage of the students regarding the importance of school practice from this point of view can be attributed to their lack of confidence in their profound methodological and psychological skills and inability to solve problems related to teaching.

The study investigated the difficulties faced by the students during school practice. The first place (22% of the students) takes "reaching out to students"; the second - the "problems of psychological preparation for classes," and "keeping school records" (11%); third place - "preparation for a lesson" (6%); fourth place - "lack of contact with children" (5%).

On this occasion we can make a number of assumptions, the most important of which, perhaps, is the complexity of the transfer of theoretical knowledge to solving practical issues.

Therefore, in dealing with this problem, students should be able to integrate knowledge from scientific areas. As a rule, this kind of integration is connected with great difficulty; all this is the consequence of the imperfection of teacher training. The fact is that the traditional subject system of teacher education as if breaks the standard teaching and educational process on the part that prevents the formation of a holistic view of the process of formation of the child's personality. This is added by the fact that the same subject in different faculties is taught in different courses and with unequal amount of training time. The negative consequences of such a construction of the educational process in university can be found in research papers. [3].

The findings lead to the following conclusion: undergraduate students require the acquisition of a cluster of pedagogical competences that enable them in a fairly short period of time to adapt to the teaching profession.

In connection with this, the educational cluster, the center of which is the university, along with the production should also involve education authorities and educational institutions on the basis of which the Bachelors will be able to have production and school practices. The role of the university in the cluster is to ensure to produce an innovative product - a competent mobile professional meeting labour market requirements under specific socio-economic conditions.

We believe that the competency clusters are not only the result of the activities of educational institutions for training but are a concentrated resource of creation and promotion of new ideas and technologies, which are accumulated at the level of research groups, centers of innovation and technology transfer, innovation regions. In these circumstances, it is advisable to talk about a cluster of competencies as a certain concentration of a variety of interrelated skills and individual skills of specialists to solve common problems in the innovative development of the system.

Transfer of educational technology can be implemented through interaction between students and student groups with educational organizations, parent communities, by training and retraining (as educational element for all life), additional professional education programs, and so on. Transfer of educational technology within the education cluster can be provided by tutoring.

Our experience shows that the dominant way of introducing the subject-subject relations in the educational process is to change the organization of educational process. Its effectiveness increases when these changes take place on the basis of a systemic approach, i.e. taking into account several directions: informative (implemented through the divergent educational programs), the activity (implemented through a modular complex) and procedural (defining the types of communication and ways of organizing learning activities, chief among which is cooperation).

In order to develop a subject position of students it is necessary to expand the opportunities of the socio-productive sphere:

- by increasing the rotation of staff between higher education and business and the supply of high-quality young people into higher education, it is necessary to significantly increase the labour of young professionals pay;
- by establishing an independent center for the evaluation of demand for graduates, whose task is to gather information about the possibilities of the career of graduates;
- by introducing a system of external monitoring of the quality of training of university graduates.

The closer the cooperation of employers and higher education institutions is, the more training of graduates training meets the requirements of employers.

## 4 DISCUSSION. MEETING THE CHALLENGE

The survey has shown that educational institutions demand university graduates that possess Design pedagogical competencies along with high-quality training. One of the factors solving the problem is creation of organizational and pedagogical conditions that ensure the formation of pedagogical competences in university students.

The practical training of university students must be changed on the organizational, substantive and methodological level thus allowing, on the one hand, to preserve the fundamental, traditional, science-based approaches to its organization, and, on the other hand, to offer a modern approach to the preparation of a qualified mobile teacher during teaching practice. One of such approaches defining a modern state of school practice of students is, in our opinion, the event approach. According to this approach, the training of intending teachers should be implemented in the educational environment that is event-triggered.

In our opinion the relationship of educational technologies used in the process of vocational teacher training of Design Studies graduates and the social order is rather important. This connection ensures the formation of regulatory and ethical component cluster of pedagogical competences of university students.

The study identified the issue of professional identity of students, lack of formation of professional pedagogical skills. The difficulties encountered by the students during the practical training show their inability to integrate knowledge of the subject, psychological, and cultural areas. The ability to apply this knowledge in practice also causes difficulty.

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