

*Materials of the Conferences***CLUSTER APPROACH IN MODELLING
PROFESSIONALLY SUCCESSFUL
CREATIVE GROUP**

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Nowadays we are intensively looking for both rational ways of using innovation impulses in the existing educational reality and attempts to make new approaches to realize strategies of innovation education based on the idea of development new vision of students in practical application of technologies, methods, knowledge and encouragement of their innovation activity. The main distinctive feature of modern interpretation of innovative education is that it is described as one of the factors of innovation but not as an innovation itself which should be practically applied. The value of any innovation is defined by its demand in having competitive advantage which is one of the key points in the globalization perspectives of modern economy. So all these things require quite different organization of educational process in technical higher educational establishment which should make an impulse for stimulation of innovative activities among students in terms of getting real order from industry and business on new innovation product development, technical solution, etc.

Problems associated with active search of new approaches allowing to re-think dynamically changing educational practice, should be analyzed at theoretical and methodological level. Recombination of the already known approaches to the organization of studying process has exhausted its innovative potential. Essentially new tasks aimed at forming key professional competencies, allowing to solve unusual and complicated problem in terms of uncertainty but not simple verbal interpretation of potentially significant knowledge, require new forms of organization of research practices. So, a problem of forming small creative groups arises where the members would be able to interact, feel the team

spirit and effectively communicate to achieve certain goal. That is why cluster approach seems rather interesting because it allows to make typical analyses based on sociological, psychological and pedagogical data.

The idea of practical application of cluster approach to solve the problems of educational practices has its history in modern science. Though, the frequency of using this term does not always follow its meaning and theoretical character fixed by the term «cluster». There is a great variety of approaches to interpret the meaning of the term. According to modern scientific sources referring to the problems of education we can find the following approaches to cluster interpretation.

1. Cluster is interpreted as *an instrument for increasing competitiveness* of educational system. This position is presented in detail by Mr. Zakharevitch V. (1), the Head of South Federal University, supposing that forming of interacting groups, teams, organizations including universities, branches and institutions would be able to increase national and regional competitiveness on the global market. Cluster can be on regional, city and district scale. The role of university, which is meant as a higher educational establishment of innovative and entrepreneurial type, means to provide cluster participants with innovations and highly qualified specialists. According to Mr. Zakharevitch, active participation of business will stimulate cluster development and encourage forming of innovative zone development around universities as it takes place in many foreign countries.

2. Cluster is interpreted as a group formed as a result of application of technical procedures used to combine objects and people similar on two or more professional characteristics. A cluster analysis is *an instrument for typology* resulted in finding a certain number of clusters (2). There are several algorithms for cluster analysis, presented in computer statistical programs. The most popular one is SPSS 8.0.(3). This point of view is described in the research works on pedagogy and psychology. So, Fedotova O. (4) described clusters of university and school teachers combined to investigate

multilevel problems for reforming our education system, presented her ideas in tree diagram (dendrogram) and designed the mechanism of their interaction. Mikhailova O. (5) exposed groups of people according to their values and standards, which helped to identify some clusters combining people with certain defects of their evaluation of other people in general or towards women.

3. Cluster is also interpreted as analysis of electronic structure of different crystal substances. «Cluster is a group of atoms of a crystal, located on the circles of different radius with the same centre and tied up by some kind of reaction» (6). Cluster approach is interpreted as a *selective method* of modern research science which allows to simulate the object reflecting its features with the help of its small copy. Cluster taken as its physical projection becomes its prototype to create the working program for high school.

So, today there is no unified interpretation of what a cluster is, its meaning and standards of practical application in theory and practice of education. Though, these positions can be combined by referring to the same term which is actively used in professional and pedagogical sphere.

The first two positions described above are based on instrumental interpretation of cluster approach to solve problems in sphere of education. They are combined on the idea of grouping certain objects on the level of their social type non-hierarchy character. The differences are in the scale and similarity of objects, covered by cluster and a target for further classification procedures. The second theoretical approach is an attempt of studying process optimization based on analog method. Designing of program cluster on the approach in physics is in the beginning of its theoretical development.

The scientific and research project «Cluster application as the methodological principle of stimulating innovative activity of students», which is being realized within targeted analytical program «Development of scientific potential of High School (2006-2008)» aimed at finding the optimal mix of creative groups of students, makes the problems of interpretation of theoretical and methodological foundations relevant to further scientific research.

We suppose that Mr. Zakharevitch views logically give format for the requirements of business, acting as a potential employer. The concept of distribution the data (interviewees, subjects, content and topical cases) into the homogeneous groups according to their similarity, which makes the theoretical foundation of the second position, seems rather interesting. According to the views described above we can formulate the general definition of cluster which is groups (of people, specialists, students) homogeneous on their professional skills and similar on general and special abilities. We interpret cauterization as a process of combining people (participants of studying process, technical specialists, students, etc.) into homogeneous groups according to their professional trends, targets, general and special abilities ready to solve innovative tasks on the base of mutual interests of designers and consumers.

Another important thing for our research is the definition of cluster parameters, which are dispersion, density, sizes, shapes, detachability, and the problem of integral parameters and indicators that allow to make cluster analysis.

According to the tasks of our research the structural cluster elements are professional and personal characteristics of a person.

Initially we have formulated the basic principles for choosing characteristics which will become the structural cluster elements:

1. The described parameters should reveal such characteristics of a person that would allow working in a group effectively. Under effective work we understand such a situation in which cooperative work of people is more effective than the sum of their individual activities. It is necessary to follow this principle to achieve the main goal that is to form creative groups for effective innovation activity on the base of clusters that requires not individual but group approach in problem solving.
2. The described parameters should reveal the person's creative potential and those aspects of knowledge where this potential could be realized to the full. Under creative potential we mean the hidden ability of a person to create something new. It is necessary to follow the second principle to create various groups according to their creative and

professional abilities, which would give them the opportunity to solve different problems on the base of synergy effect.

Following the principles mentioned above let us hypothetically define four groups of characteristics for forming professional and personal clusters.

The first group of characteristics means professional growth of a person. Here we take into account such personal aspects which describe the main types of specialisms, according to which the students are trained in the higher educational establishment.

The second group of characteristics means creative abilities. The base for outlining this group of characteristics is the combination of verbal and non-verbal indicators of personal creativity level.

The third group of characteristics is the peculiarities of exchanging information between a person and environment. Logically we defined this group of characteristics on the results of research of students with the help of social and typical methods.

The fourth group of characteristics means the way of personal perception of a group.

The method of description for such characteristics includes the following stages:

1. We suppose that it is possible to use a certain personal characteristic as a structural element of designing clusters.
2. The analysis is made to evaluate theoretically the peculiarities of a certain characteristic.
3. We formulate the reasons and factors which served as a base to define these very characteristics among others.
4. We formulate clear definition of a certain characteristic.
5. We describe some alternative forms for a certain characteristic if any.
6. We define criteria that allow choosing theoretically that alternative form of a person characteristic that suits the best our aims and tasks of the project.
7. According to the given criteria we select one of the forms of a person characteristic.
8. Then we choose methods which could give quantitative assessment of a chosen characteristic.
9. We experimentally research the parameters of a characteristic on a certain group of people.

10. We make conclusion on the relevance of this characteristic for forming clusters and make recommendations based on quality and quantity analysis.

All the participants of the creative groups have lots of benefits from new type of links: there is free mutually interesting exchange of information and quick dissemination of innovations on all possible contacts. The participants of a team from different clusters speed up its development, stimulate innovative work of the whole team, provide with opportunities for implementing new ideas and strategies. Links inside cluster sometimes very unpredictable lead to the new ways in improvement not only innovative but educational activity and give new opportunities because of new combinations of people resources and ideas.

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