

Let's give the examples of cognitive visualization means, applied by the authors while working out of educational materials, illustrating the use of separated ways of cognitive visualization.

Tabular-matrix structures. With the help of these cognitive visualization means at the expense of additional systemization and generalization, the educational information is condensed, concentrated. More often they serve for systemization of already studied material. However, they aren't less effective while studying of a new material when they are presented incompletely or being designed (filled in) during the course of study. In the process of knowledge control, the tabular-matrix structures can be presented as matrix tests (matching tests) or classical tests of a choice. Tabular-matrix structures are also convenient for using of a multicode presentation of the educational information.

Flow-charts. They are characterized by a rigid structure of the represented material. The obligatory presence of each element of the scheme demonstrates the severity, symmetry and beauty, and also the cause-and-effect relationships of various elements of the educational content. With the help of these cognitive visualization means the generalization of representation of an intrinsic semantic core of the educational information is carried out. The flow-charts are used both in a theoretical part, and in mastering and controlling blocks, for example, as tasks for the description of algorithms of the problem decision.

The generalization technique works also while using of structurally-logic schemes, functional structurally-logic schemes, schemes-classifications.

Within the framework of mathematical courses students should master independently the sequence of actions during the solving of the basic classes of typical problems. In order to describe the process of the algebraic problem solution in training manual it is quite enough to point out and enumerate the steps of problem solution, but it is more difficult to do the same with a geometrical problem. In our opinion, one of the most effective ways of the visual description of dynamics of process of the geometrical problem solution is the graphic algorithm. It is based upon the principle of simplicity and a minimum of the verbal information. The problem solution is reduced to a series of the visual drawings (shots), reflecting the stages of its solution. Such representation allows to restore the process of the problem solution easily. Thus, the algorithm constructed in such a way, carries out not only the illustrative function, but also a cognitive one.

The graphic algorithm can be «sounded», i.e. the verbal information is placed near each drawing. Such types of algorithms can be used in tasks of two types:

- 1) the verbal information is available, it is necessary to restore the visual one;
- 2) the visual information is available, it is necessary to restore the verbal one.

Notably, the task can be offered both to the whole algorithm, and to its separate stages – drawings.

A variety of properties and action mechanisms, differentiation of forms and functions of visual means allows to include them into an educational activity taking into account the didactic expediency, educational problems, conditions and situations.

The techniques of representation of the educational information given above, allow to organize an educational material in an optimum way and to provide the professional competence formation of the future experts.

In particular, in the course of the long-term work we have realized that due to the considered techniques and ways of cognitive visualization in the educational mathematical information organization during the creation of training manuals and working out of training technologies, the following results were reached:

- the activation of educational-informative activity;
- the formation of the mechanism of self-development of the student's personality;
- strengthening of professionally-pedagogical orientation of teaching disciplines;
- the initiation of the author's style of the future teacher;
- the support of the modernization process of traditional technologies and innovative educational processes.

References

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THE PROFESSIONAL-PEDAGOGICAL WORK FROM POSITIONS OF THE COMPETENT APPROACH

Filimonjuk L.A.

*The Stavropol State University, Stavropol,
e-mail: filimonuk.l@rambler.ru*

The competence approach to education convinces us in necessity to analyze critically and to estimate the gained experience in pedagogical activity of the teacher. Only the teacher can create for pupils conditions for success, self-determination and self-realization. In our opinion, the motivation of the teacher, his personal and professional opportunities is the main conditions for introduction of the competence approach.

On the one hand, the pedagogical activity appears as one of kinds of the activity, which is expressed in a purposeful development of the learner,

in mastering of culture's bases and in an all-around development of his abilities. On the other hand, the joint activity assumes «the subject – subject attitudes», the teacher and the learner act as equivalent subjects of the pedagogical process.

Knowledge, skills, abilities and personal qualities of the teacher under certain conditions can be considered from the point of view of professional competence.

Competence represents the personal characteristic, it assumes, that the individual is not simply informed and is able to apply this information, but also uses it as a basis for own decisions acceptance.

Professional competence of the teacher is defined by experience and individual abilities of the person, his motivate aspiration to self-education, self-improvement and to the creative attitude to business. Professional competence of the modern teacher is characterized by the following: the first, the task of the teacher does not consist of knowledge transfer, but it must support new kinds of the pupil's behaviour (activity). It is necessary to consider the competence of each pupil and to organize cooperation of pupils and the teacher for an effective use of experience of all learners and for training of new ways of thinking. And the second, teachers always have got one task set: to take possession of new pedagogical and information technologies.

The base components which form teacher's professional competence, in our opinion, are: the project and the research competence, the information and the personal-humanistic competence.

The project competence is a leading component of professional competence of the teacher. A modern and successful teacher should be competent in the following technologies: planning of the own activity; projection of the educational process and the individual development of pupils; projection of the innovative curriculum, the plan of the training course, etc.

Mastering of the research competences is command of the time. The teacher is an explorer of changes in educational sphere and works in conditions of changes: increase of volume of the scientific-methodical and the research components in structure of pedagogical activity.

The process of development of the research competences is long and also demands regular tracking of the productivity.

The research competence of the teacher can be defined as an ability and a readiness of the person independently and effectively to carry out the research activity, to predict its results and to put them into practice.

The research activity which forms the research competence, is a component of the teacher's professional work. The research competence can exist as an independent ability of the teacher, or can be shown as the special kind of the professional competence of the teacher.

The research activity allows expanding the set of necessary skills in professional work, that it is

means of development of intellectual skills which, in their turn, provide success of any activity, in particular, the professional pedagogical activity.

Thus, the formation of the research competence is necessary, because it can be a universal way of the of any problem solving in the professional pedagogical activity. Besides, the innovative potential of the teacher is defined in the given conditions by a degree of its readiness for the research activity, which depends not only on its creativity, but also on a level of the following components formation : the motivational aspiration and the requirement to carry out the innovative activity; the methodological possession of the conceptual and theoretical bases of the research activity, the orientation in modern approaches to the decision of pedagogical problems, presence of own pedagogical position; the technological skill for carrying out a choice of an innovative problem and a subject of research, the skill to make the program of experimental work, the possession of a technique of development of author's programs, various ways of introduction of innovations in the pedagogical process and the ability to introspection of the activity and the pedagogical problems.

There is a representation in pedagogical studies that only this person can effectively influence pupils of any age who possesses certain set of «teacher's features». And when oftener the educational process is considered as art, then the greater accent is done on personal qualities of the teacher, especially at the decision of problems of educational process's optimization because the teacher passes its personal values to the pupils; the teacher reinterprets the purposes of their training and education on the basis of the analysis of the pupils' features; personal factors define style of pedagogical activity which renders the specific influence on pupils.

The modern training is the means of expansion of opportunities for cooperation of the teacher and the learners and the creation of absolutely new culture of training. Introduction of new educational technologies in educational process puts forward essentially new requirements to teachers: skill to create the special psychological climate, which is constructed on coauthorship and cooperation; mastering of the new pedagogical technologies; using of subject's knowledge for the more effective education of the person; development of computer techniques; ability to vital self-determination and an active creative position.

The pedagogical creativity is a basis that determines the professional competence. The teacher participates in the creative act – becoming of the new person, hence, the creativity is the most essential side of the teacher's activity. First of all, teacher's creativity is the faith in potential and opportunities of the child, the skill to see the social role in success of the learners, their moral becoming.

The professional experience is the essential factor that determines the attitude of teachers to

problems of perfection of their skill. The professional experience includes set of knowledge, skills, ways of activity and valuable orientations. The professional experience is reflected in style of activity which is shown in character of the forwarding purposes, problems and results of education, in the use of various methods and means of education, in breadth and depth of spiritual contacts to pupils.

Thus, one of the factors that influences improvement of the education's quality is the professional competence of the teacher which is reached by the optimum productive organization of the methodical preparation at municipal and regional levels.

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DIAGNOSTICS QUALITY PREPARATION STUDENT TO SOCIAL-ECOLOGICAL FORMATION SCHOOLBOY: ASPECT OF THE OBSERVATION AND TESTING

Shilova V.S.

National exploratory university «BELGU», Belgorod,
e-mail: shilova@belnet.ru

A necessary element of the students training system for the schoolchildren social-ecological education is the diagnosis of quality of this training. In social-ecological diagnostics various students' characteristics are outlined on cognitive, activity, and personal level; the attitude of society to the problem of mankind and nature interconnection is defined in its global, regional, and local scale; the peculiarities of education process aimed for the formation of social-ecological readiness are revealed; necessary conditions that influence the outlined parameters are defined. For example, while defining the degree of students' readiness for social-ecological school children education we should reveal the condition of their theoretical preparation, their attitude to the natural environment, the condition of its optimization, relations with various competent social structures, personal involvement of each student into practical creative activity in nature.

Besides, it has been defined that the diagnostics include not only the content, but also the corresponding methods. An approximate complex of social-ecological diagnostic methods is represented by the means of social, psychological, pedagogic, and ecological diagnostics. And the selection of sought-for methods from the outlined groups is carried out via definition of the greatest presence of any of them in each totality. As a result, we have outlined four major method groups:

- **monitoring:** observation, evaluation, content-analysis, prognosis;
- **questioning:** questionnaire poll, conversation, interview, testing;

- **mathematic methods:** statistic methods, definition of the tested totality;

- **modeling:** analog, logical, mind experiment.

The used scientific approaches, method groups of social-ecological students' education diagnostic, as we see, will allow us to establish an actual condition of their readiness to interact with natural environment, education of different society groups in this area, especially school children. The reveal of particular diagnostic methods essence formed the content of one of the objectives of this research, the next goal is to reveal the essence and functions of each method, its approval within experimental work. The outlined social-ecological students' diagnostic methods required their testing in experimental work. On this stage *observation* and *testing* were examined. The development of these methods' content was carried out considering principles that raise their effectiveness: continuance, systematicness, diversity, objectiveness, large-scale involvement.

Let us show the major results. Thus, the *observation technology* includes the following commonly-known steps: the definition of goals and objectives, the outlining of objectives, the development of the observation scheme, registration of the results, data processing (N.V. Kuzmina and others) [2].

According to the introduced algorithm and the matter of the research, we will describe each of the steps.

I. Observation goals.

1. Natural-science block

Observation objectives:

- definition of students' motivation in the area of interaction between the society and person and nature;

- reveal of students' awareness condition in the area of social-ecological interactions (actual level of social-ecological students' knowledge);

- definition of the actual level of students' skills formation in the area of natural interaction (social-ecological skills);

- definition of the level of creative and emotional-value attitude of students towards nature.

2. Psychological-pedagogic block.

Observation objectives:

- students' motivation in the area of social-ecological school children education;

- definition of the students' knowledge on social-ecological school children education formation level;

- definition of the students' level of skills formation in the area of social-ecological school children education;

- definition of the students' attitude level towards the solution of the problems of social-ecological school children education (reproductive, search, creative);

- reveal of the condition of emotional-value attitude of the students towards the social-ecological school children education.