Types and Forms of Independent Work in the Organization of Educational Activities of Students on the Subject "Descriptive Geometry and Engineering Graphics"

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Abstract: At present, special attention is paid to the formation and development of independent learning activities of students in the subject "Descriptive Geometry and Engineering Graphics". It was noted that the formation and development of independent learning activities of students in the disciplines of "Descriptive Geometry and Engineering Graphics" and "Engineering and Computer Graphics" play an important role in increasing the effectiveness of teaching.

Keywords: Drawing, independent, computer, computer graphics activity, state standard, projection drawing, perfect enrichment of the subject.

Relevance of the topic: The relevance of the topic to solve the problem of determining the types and forms of independent work aimed at the implementation and development of practical drawing tasks, the formation of independent activity of students.

1. Below are 5 types of students' independent work in the classroom:

The first type is to explore questions that are not fully covered when the teacher explains the topic.

The second type is to independently draw and review all the drawing materials described by the teacher in the classroom and to consolidate the knowledge. When the teacher explains the topic, she gives homework for independent study of unexplained drawing assignments.

The third type is the acquisition of previously undeveloped standard drawings on the basis of State Standard drawings.

The fourth type is the acquisition of new knowledge through the organization of drawing activities in accordance with the requirements of an independent new state standard during the lesson, without the task of learning to draw independently at home.

The fifth type is the way in which the teacher’s explanation reinforces the knowledge he or she has acquired from other additional sources through the perfect drawing of the drawings.

Drawing is a science of exact technique, which expresses in people a sense of punctuality, that is, accuracy, exactingness, always adhering to cleanliness. Any drawing must be clearly drawn. Drawing in accordance with standard requirements is a unique art that gives people aesthetic pleasure.

Students try to identify each other’s technical thoughts in the memory of the drawings, draw sketches to explain them to someone. This means that in both cases, drawing plays a mediating role in identifying technical ideas among people. There are three main areas of work with drawings in current production:

1. Draw a sketch based on the finished drawings detail, and others based on the original. Under such conditions, clear and accurate drawing of drawings is required.

2. Draw sketches of the finished detail, item, etc., depending on the original. In this case, it is
necessary to correct details, items, etc., made on the basis of previously prepared drawings, or make changes to someone's technical opinion.

3. Draw a drawing of an item, item, etc. that has not yet been created. In doing so, students try to create machines with a completely new look or make changes to existing ones by using their spatial imagination. This movement of students lays the foundation for becoming a highly skilled constructor.

2. Drawing ability - the activity of performing an independent graphic task of research type.

During this activity, students independently gain new knowledge by drawing different visual diagrams, which can be divided into 2 types:

- logical research activities related to the performance of task tasks in the acquisition of new knowledge, the improvement of previously acquired knowledge and the enrichment of the ability to imagine. Such activity requires a variety of logical operations: analysis and imagining, comparison of facts and events, identification of similarities and differences, separation of primary and secondary characters, disclosure of cause and effect relationships, and so on.

3. Know the projection connection - the activity of independently drawing a practical graphic task:

Such activities are aimed at expanding the connection of education with life, with production. During such activities, students acquire new knowledge based on experience that requires reasoned conclusions and generalizations. These are as follows:

- Practical research work on the drawing. Gets new knowledge based on drawing.
- Technical creative work: making proposals for the development of drawing tools, models, simple technical inventions, design and construction of simple models, equipment of classrooms and laboratories;
- Theoretical and practical tasks: independently perform drawing tasks on the basis of collected materials from life, drawing projections, isometric and dimetric projections of models;
- Socio-practical independent work related to participation in productive work, for example, by creating two-projection projections from simple details, as well as the ability to perform structured tasks.
- Know the projection connection given above - by drawing a practical graphic task in the sequence of the task in the example of one simple detail on the activity of independent drawing.
- Find a third view based on two views by drawing isometric and dimetric projections, rationally distributing the dimensions to the drawing, and placing the drawing.
- By completing the given task in the following sequence.
4. The ability to perform independent tasks of a creative type. Students will be able to read drawings and create something new with the rich insights and imaginations gathered from life experiences, as well as the power of thinking and active imagination based on methods of action. There are three types of such creative activities:

- **Figurative technical activity.** In doing so, students visualize the entity. Has an emotional response to facts and events. For example, the introduction of additional innovations in fantastic thinking as a result of the imagination of how the movement of machines and mechanisms is carried out.

- **The task to be performed on the teacher’s assignment is a creative activity.** For example, the most difficult is to draw Olympic tasks independently, to defend the method of independent performance, and so on.

- **Technical creativity.**

Such independent activity is formed taking into account the individual and age characteristics of the student. The following methods can be used in the formation of independent drawing activities of students in the subject: 1) the method of giving drawing assignments for research; 2) research method; 3) programmed Auto CAD task method; 4) method of informing; 5) method of execution; 6) explanatory-illustrative method of education; 7) the method of recalling imagination; 8) practical method of education; 9) incentive method; 10) research method.

The criteria on which the classification of independent works is based are as follows: They can be classified as follows:

**I. Independent assignments for didactic purposes:**

- Repetition and generalization of previously acquired basic knowledge;
- Study of new technical material;
- Systematization of knowledge;
- Strengthen knowledge and skills by performing complex repetitive tasks;
- Apply knowledge in a new situation;
- Check and control the knowledge, skills and abilities of students.

**II. According to the nature of the organization of students' independent graphic drawing activities:**

- Characteristic independent work on drawing tasks on machine mechanisms;
- Independent work of a partially exploratory nature;
- Independent research work.

**III. According to the form of organization of independent activities of students:**

- Work independently of the frontal (general) drawing assignments;
- Independent work with group assignments;
- Independent drawing, organized in an individual-stratified manner.

**IV. According to the source of reading the drawings and the means of explaining it:**

- Independent work with textbooks and other textbooks;
- Compile a synopsis of the ability to read the drawing in accordance with the requirements of the state standard;
- Independent work with handouts;
- Independent work on complex cutting tasks;
- Independently by creating models and details;
By performing control tasks;
By completing the Olympic schedule;
by drawing and performing graphic works;
through the preparation of reports and abstracts;
by solving test tasks independently;
Work with puzzles on the subject "Descriptive Geometry and Engineering Graphics";
Participation in didactic games on the subject "Descriptive Geometry and Engineering Graphics";
By involving students in the independent creation of graphic assignments and test options.

In order to increase students' interest in knowledge, it was important to gradually raise students from the level of elementary, simple knowledge to the level of drawing scientific understanding and conclusions by teaching them to see innovation in something familiar. Interest in knowledge is aroused when we talk about the techniques of scientific discoveries, the struggle of ideas, the work of scientists and the use of devices in life.

**Conclusion:** "Drawing Geometry and Engineering Graphics" The course material "Engineering and Computer Graphics" provides opportunities for technical development through the use of various independent works organized in accordance with the characteristics of students' interests and specific educational goals to activate the learning process. From the beginning of the lesson, the teacher thinks of different ways of engaging methods, taking into account the importance of students developing an interest in knowledge. The most important of these are 3 situations: first, focusing students' attention on the lesson objectives and assignments; second, to arouse interest in new techniques that are being repeated and re-learned; third, to organize a form of activity of machines and mechanisms in which students are interested. Active comprehension of new material has been observed in the formation of students' thinking in lessons where tasks related to problem situations are discussed. In this pedagogical situation, a research environment is created, in which students begin to more actively implement the tasks set for them.

**References:**