

# METHODOLOGY FOR USING 3D TECHNOLOGIES IN FORMATION OF CONSTRUCTIVE COMPETENCES OF STUDENTS

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**Abstract.** *In this article, the tree cluster method was used to form students' constructive competencies. In addition, a training manual was created and applied to the training process. A meaningful component of the structure of the development of students' constructive competence using 3D technologies is the completeness and variability of knowledge that ensures the unity of professional, information and communication education. In this regard, the student needs to learn how to use software and technical tools, use different color models, the basics of working with 3D technologies, build skills, work with special literature, references, etc., to build knowledge in the field of engineering and computer graphics.*

**Keywords:** *3D technologies, interactive methods, tree cluster, engineering and computer graphics, connections, constructive competence.*

## INTRODUCTION.

Technical higher education institutions are increasingly interested in using interactive methods in the educational process. Basically, if students are taught to acquire ready-made knowledge, interactive methods allow them to search for the knowledge they are acquiring, independently study and analyze it, and draw their own conclusions to the best of their ability. The student improves in this process, his psychological characteristics are formed, he is able to learn and learn information, and in this place he performs the function of managerial activity.

Interactive methods are based on collective thinking and methods of pedagogical influence, which are part of the educational content. The uniqueness of these methods is that they are implemented only through the joint activity of the pedagogue and the student. Today, professors and teachers are also required to know modern technologies and have the skills to use them appropriately in their professional activities.

The pedagogue skilfully manages the situation in which he can freely fulfill the constructive task given to the future engineers, carefully observes and analyzes it, and, depending on the situation, enters into a dialogue. Future engineers take into account their ideas about the logical solution of the problem and their ideas about the presentation by the pedagogue and announce the scores at the end of the lesson.

Studying the interdisciplinary educational module based on the meaningful unity and connection of the subjects in the "Engineering and computer graphics" and educational blocks of future engineers, as well as the formation of professionally important personal qualities in the performance of the system of constructive assignments, as a criterion for the formation of information-communication thinking and learning - the level of development of cognitive activity was selected.

In the development of constructive competence of future engineers in higher educational institutions, it is necessary to pay special attention to the selection of educational methods in the organization of training sessions, especially practical sessions. The correct choice of educational methods guarantees the achievement of the following results: formation of interest and motivation in students to thoroughly master the basics of general professional subjects; increase their learning activity; to ensure that students have the ability to think independently, critically and creatively; improving the quality of teaching the basics of general professional subjects by students; serves to increase the effectiveness of teaching general professional subjects.

**LITERATURE ANALYSIS AND METHODS.** Extensive work is being done to accelerate the introduction of information and communication technologies in the world education system. The process of informatization of education, without a doubt, is inextricably linked to the competence of teachers in the use of information and communication technologies in the course of their professional activities.

The theoretical and practical foundations of using information technologies and modern didactic tools in education were studied by R. Hamdamov, Kh. T. Omonov, D. T. Pulatova, U. Begimkulov, N. I. Taylokov, S. R. Zohidova and others.

Methodology of education information in the works of scientists of the Commonwealth of Nations Yu.F. Shafrin, E.V. Kuznetsov, L.A. Zaitseva and others, N.A. Fedyanova, P.N. Klushina, M.N. Petrov and others the theory, methodology and practice of educational informatization in his studies, issues of creating modern educational software were studied in the works of V.M.Fetisov, V.I.Kochetov, I.A.Zimnyaya.

Foreign scientists I.V.Robert, A.Yu.Uvarov and others conducted studies on the theory of using multimedia tools in the creation of pedagogical software tools.

**RESULTS.** Based on the above considerations, it can be said that the psychological-pedagogical and didactic possibilities, methodology, scientific foundations of creating and using modern didactic tools for training students of technical higher education institutions have not been fully revealed, the problem of their improvement not specifically studied [23].

#### **Genealogical cluster method**

The purpose of the game: to test the ability of students to apply the knowledge they have learned and help to increase their knowledge potential.

Tent of the game: Helps to learn more about the types of connections. During the clustering process, the student's opinion is not challenged.

1. Write whatever comes to your mind.
2. Ignore spelling mistakes.
3. Don't stop writing until the allotted time is up.
4. If you don't have an idea, draw it.

Using interactive methods in teaching the topic of connections based on the above ideas. Come on, who can draw fast

In the clear images of the detail, the connections are drawn and next to them, the types of connections based on the connection rules are shown. This game is designed to copy and draw the links within a given time. (A clear picture of the detail is not drawn. It is shown to students for practical application of theory).

The goal. To improve the skills of various movements of the hand, to improve the ability of the eye, spatial thinking, to draw connections, to increase the knowledge and skills of students.

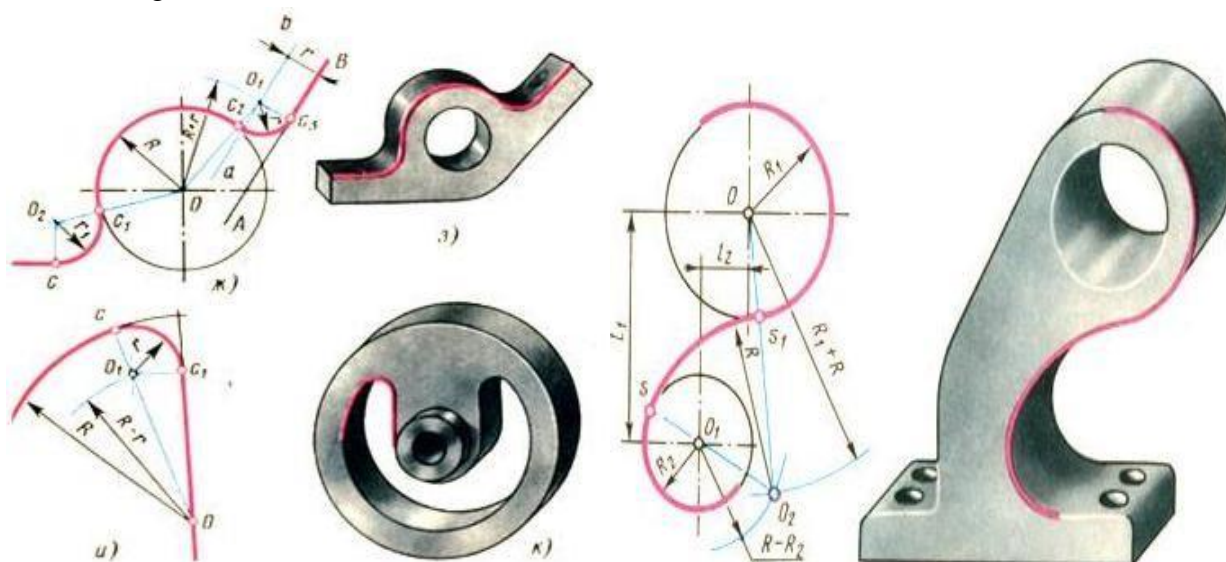
# WHO SAYS CORRECT

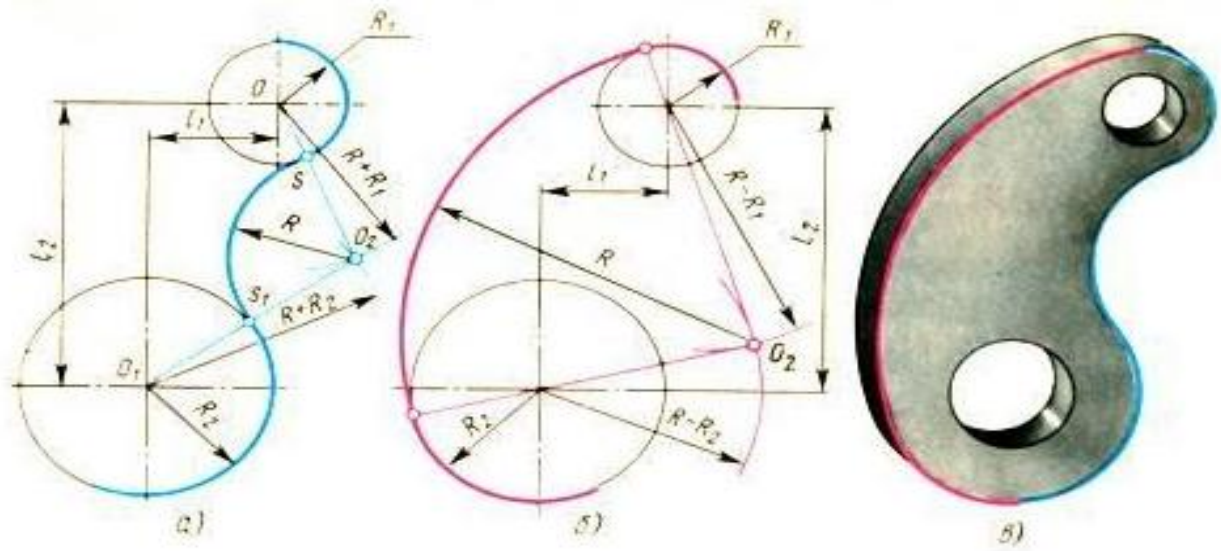
**Equipment.** Cards with detailed views that are accessible to every player, but not too complicated. A drawing with detailed views that look good from a distance and the rules of the law of connections.

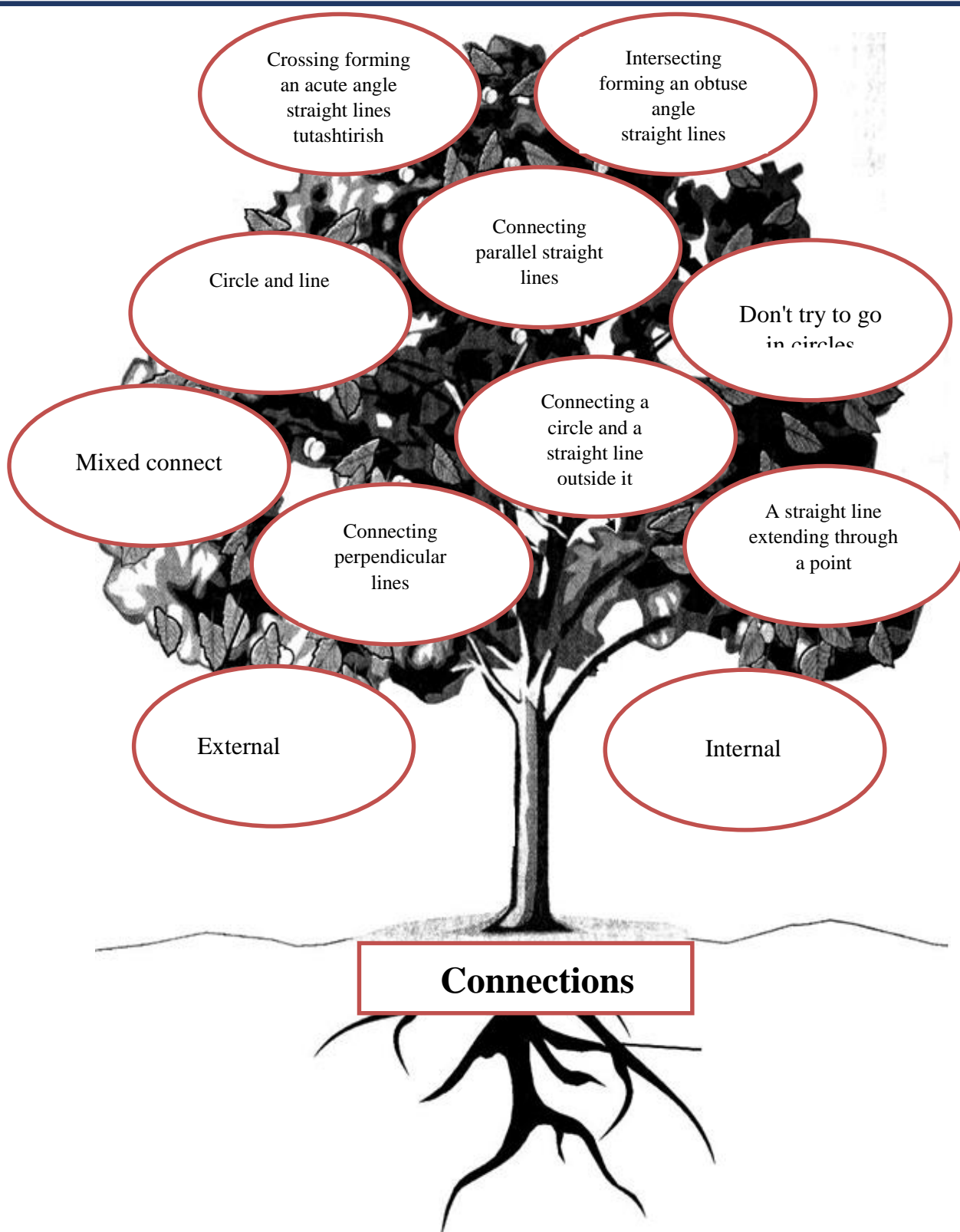
**Going.** Students are divided into three groups and given cards with diagrams of connections and given a short time to draw them. In order to help students, if they find it difficult to move the connections, a diagram with the rules of the connection law is posted.

**The end.** Students who make good and correct connections in the shortest possible time will be declared the winners.

Before playing this game, it is recommended to practice with the students the rules of connection law and type diagrams. To introduce the idea of drawing an arc of an attempted circle to two straight lines and connecting the sides of right, acute and obtuse angles. Connecting two circles using a third circle arc.







**DISCUSSION.** In the process of conducting the research, attention was paid to the effective use of interactive methods in lectures and practical training. In this, first of all, interactive methods with the possibility of providing the expected result, taking into account their characteristics, were chosen for lectures and practical training. That is: below we will mention the interpol methods selected for theoretical training.

We developed constructive competencies in the following forms:

- in the auditorium
- outside the audience
- in independent educational processes

In the auditorium. We used a new method (Family Tree Cluster) to form students' constructive competencies. In addition, a training manual was created and applied to the training process.

Outside the auditorium. By engaging students in graphic work, using the Windows platform in various "Engineering and Computer Graphics", performing computational graphic work.

In independent educational processes. Students collect, analyze and draw conclusions from the data obtained from independent studies of graphic work.

**CONCLUSION.** To sum up, it is possible to say that by engaging students in graphic work, the efficiency of using the Windows platform has been increased by performing various "Engineering and computer graphics" computational graphic work. Constructive competencies of students are formed by summarizing, analyzing and drawing conclusions from the data obtained while performing graphic work. In addition, the "Genealogical cluster" method was used to form students' constructive competencies, and a study guide was created and applied to the educational process.

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