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INTERACTIVE EDUCATION IN THE SUBJECT OF ENGINEERING AND COMPUTER GRAPHICS

Dotsent **D.U.Sabirova**

Senior Lecturer **K.M. Samatova**

Tashkent State Technical University named after Islam Karimov

Abstract

This article presents the application of the interactive method of the subject engineering and computer graphics in teaching the topic of threaded connection “Venn diagrams” and the analysis of the properties of the connection using the “Venn diagrams” method.

Keywords

Education process, pedagogical technology, interactive education, interactive method, teacher, student, education goal, traditional method, bolted connection, today's conditions, stud connection, connection property, threaded connection, machine mechanisms, detachable and non-detachable connections.

Introduction

In the higher education system, the development of pedagogical technologies is being widely implemented across the stages of pedagogical education—namely traditional, active, and interactive teaching technologies—within academic subject modules. A module represents a set of knowledge designed for the theoretical, practical, and independent study of a particular topic.

Under modern conditions, the most effective way to increase educational efficiency is considered to be the organization of lessons through interactive methods. Every educator working in the field of education clearly understands that traditional teaching is also based on dialogue, and this dialogue is organized in the following forms of interaction:

- Teacher–student;
- Participants of dialogue within traditional instruction;
- Teacher–group of students.

In traditional education, information naturally forms the basis of dialogue. However, the primary source of information transmission is the teacher’s experience, and in this process the teacher plays a leading, dominant role. That is, during most of the lesson, the teacher strives to deliver knowledge to students orally. Activity is characteristic mainly of the teacher, while students remain passive listeners. Their primary tasks consist of listening to the teacher, taking notes when necessary, responding to questions when addressed, and speaking only when permitted.

This one-sided nature of traditional education prevails in the higher education system not only in lecture sessions but also in practical classes.

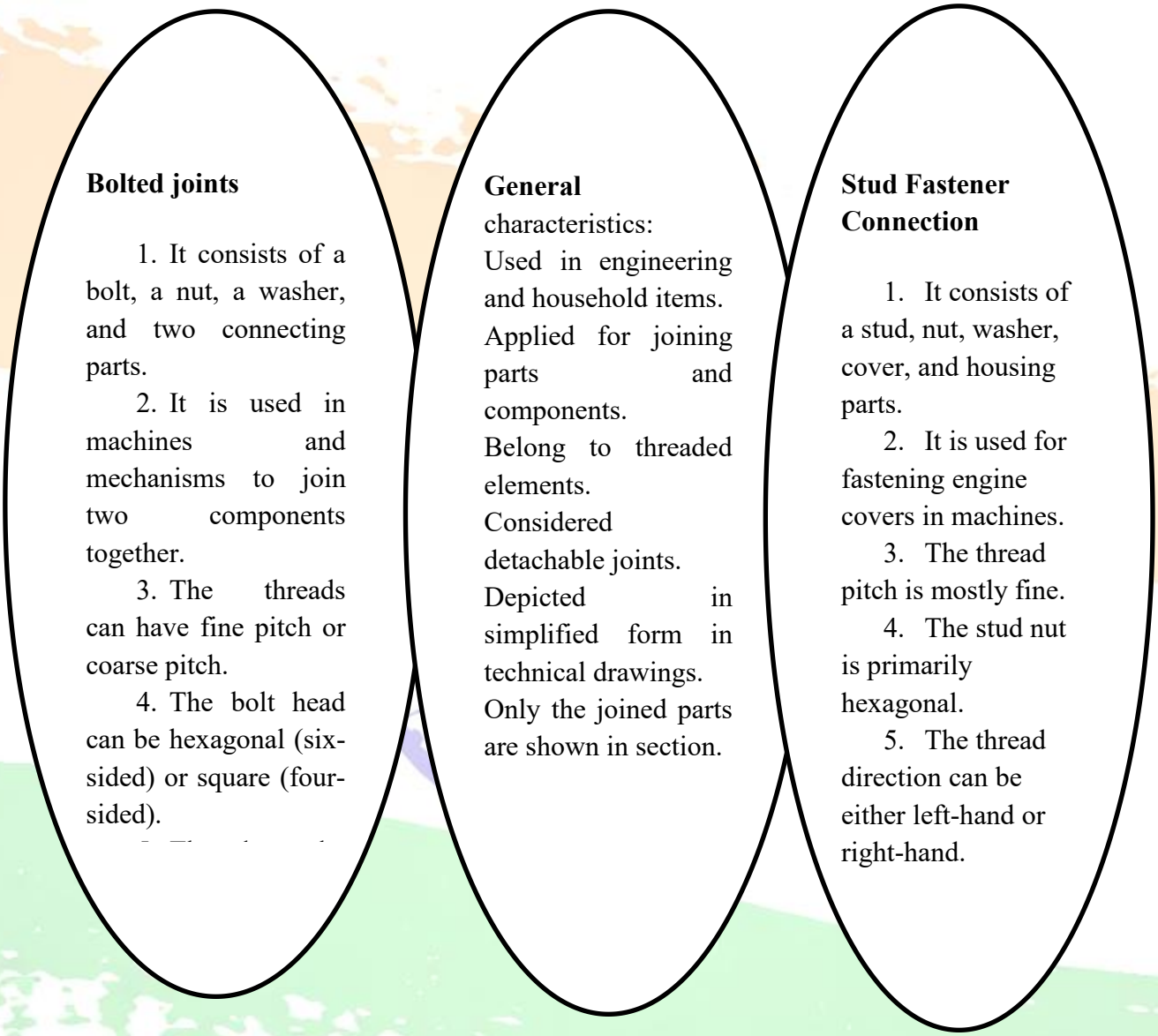
Interactive teaching, by contrast, is organized on the basis of cooperation, lively discussions, debates, and mutual exchange of ideas among the main participants of the educational process—teacher, student, and student group. It is characterized by free thinking, the confident expression of personal views, collective search for solutions in problematic situations, the development of closeness among students in mastering educational materials, and mutual respect, understanding, support, sincerity, and psychological unity among "teacher–student–student group."

By its essence, interactive learning implies organizing dialogue in the form of student–information and communication technologies interaction, where knowledge, skills, and competencies are acquired independently by students or under the guidance of the teacher through the use of information technologies.

Through the use of interactive learning in the educational process, the teacher facilitates the development of students' abilities such as independence, self-control, self-management, effective communication, teamwork, listening to and understanding peers' opinions, independent and critical thinking, proposing alternative solutions, freely expressing ideas, defending their viewpoints, striving to solve problems, and overcoming complex situations. Most importantly, by applying interactive methods, the teacher gains the opportunity to organize, direct, manage, monitor, and coordinate students' cooperative actions toward achieving clearly defined educational goals, as well as to conduct objective assessment.

Interactive methods form the foundation of interactive learning. In the continuation of the article, attention will be given to interactive methods, their essence, conditions of application, and didactic potential.

Below is a description presented in the form of a “Venn Diagram” graphic



organizer on the topic of the characteristics of bolted and stud joints.

Nowadays, in developed countries, extensive experience has been accumulated regarding the use of pedagogical technologies that enhance teachers' instructional and practical activities and reflect the effectiveness of the educational process. The basis of this experience is largely formed by interactive methods.

The "Venn Diagram" method is aimed at developing students' analytical approach to a topic, as well as skills for understanding (synthesizing) the general essence of the topic based on certain parts. It is implemented according to a specific scheme through the formation of small groups.

Parts can be connected in ways that are either detachable or non-detachable. In modern mechanical engineering, detachable connections of machine parts are more widely used. Such connections are usually made using threads of various profiles.

Conclusion

When studying this subject, students first get acquainted with the components and elements of threaded fasteners. Then, they study the threaded connections themselves and their drawings. To reinforce the topic of threaded fasteners, it is appropriate to apply the "Venn Diagram" interactive method. In this case, it is useful to employ a comparative analysis of the similarities and differences between bolted and stud connections.

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