

Developing Thinking Through Systems Learning in Technology Education

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Abstract: This article explores how applying a systems-based approach in teaching technology can develop students' thinking skills. The method enhances logical, systemic, and creative thinking. Practical examples and teaching strategies are also discussed.

Keywords: System education, thinking, technological science, logical thinking, project-based learning.

Introduction: In the modern education system, not only the level of knowledge of students, but also their ability to think, solve problems independently, think logically and adopt an innovative approach play an important role. In particular, technological science taught in secondary schools has great potential in this regard. Because through this subject, students acquire not only theoretical knowledge, but also engage in practical activities, learning the basics of production processes, the basics of design, construction and technical creativity. Developing students' thinking is an important factor in achieving efficiency in the educational process. For this, a systematic approach to the educational process is considered relevant. Systematic learning is based on the principle of learning material not by separating it into separate parts, but rather as an interconnected, holistic system. This method allows students to not only deeply understand the topic, but also to connect it with real-life situations, analyze cause-and-effect relationships, and develop skills such as finding solutions. For this reason, using a systems approach in teaching technology can greatly improve students' logical, analytical, creative, and constructive thinking. The article discusses the essence of this approach, the advantages of using it in technology lessons, methodological methods, and how to implement it in the lesson based on practical examples. In particular, in technology, the system learning approach plays an important role in achieving these goals. Through this approach, students learn to think deeply, understanding the internal connections

between topics rather than isolating them into separate parts.

The main part System learning is an educational technology based on breaking down knowledge into component elements and identifying logical, cause-and-effect relationships between them. Through this approach, students develop:

- logical thinking,
- analytical skills,
- systematic approach,
- the ability to independently solve problems.

Applying a systems approach in technology science Technology science has a practical orientation, and each lesson provides knowledge and skills related to real life. A teacher using system learning can organize a lesson in the following stages:

Example: 9th grade on the topic "Electrical Circuits"

- Stage 1: Circuit elements — source, consumer, measuring instruments — are studied.
 - Stage 2: The relationships between them are analyzed based on the circuit.
 - Stage 3: Students analyze simple circuits by simulating them.
 - Stage 4: Independent project – The task "Drawing a home lighting system" develops their creative thinking.
- Methods for developing thinking Based on system learning, the teacher uses the following methods:

- Constructive method – thinking based on modeling and drawing.
- Project method – finding a solution based on a real problem.
- Graphic organizers – conceptual maps, diagrams.
- Information technology - analysis using electronic programs (for example: Tinkercad, Fritzing, AutoCAD).

CONCLUSION

Teaching technology on the basis of systems learning deepens students' knowledge, develops independent thinking and innovative approach skills. The student is formed not only as a receiver of ready-made information, but also as a person who analyzes, models and proposes practical solutions. Therefore, technology teachers need to systematically plan the lesson process and effectively use modern educational technologies. In conclusion, organizing technology on the basis of systematic learning is an effective approach that fully meets the requirements of modern education and develops students' thinking in a deep and comprehensive way. This approach, along with consolidating knowledge, develops in students the skills to analyze, correlate, apply, make independent decisions, and promote new ideas. When the practical and engineering content of technological science is combined with systematic education, the following results are achieved:

- Analytical and logical thinking is formed in students;
- Each topic is associated with real-life problems, which deepens knowledge;
- The level of students' independent work, group activity, and career orientation increases;
- Inter-disciplinary connections are strengthened, and lessons are taught in an integrated manner;
- Students develop innovative thinking skills through working with real objects and problems.

Methodological recommendations:

1. When planning a lesson, pay attention to a systematic analysis of the components of each topic.
2. Explain each topic using graphic tools, diagrams, and concept maps.
3. Increase students' thinking activity through problem-based learning.
4. Assign students to develop projects based on real-life technological problems.
5. Effectively use ACT tools (Tinkercad, AutoCAD, Arduino) in the lesson.
6. Involve students in activities such as modeling, drawing, and assembly - this develops constructive thinking.

7. In each lesson, give students the opportunity to analyze their own thoughts and self-evaluate (reflection stage).

Practical suggestions:

- It is appropriate to rework the textbooks and workbooks of the 8th-9th grade of technology based on a systematic approach.
- It is necessary to develop interdisciplinary projects for each subject (for example, "Bicycle Mechanism", "Home Lighting System", "Ecologically Clean Transport").
- It is necessary to organize special training courses on system teaching methodologies for technology teachers.
- It is appropriate to establish mini-project laboratories or technical circles in schools.

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