INTELLIGENCE AT THE FINGERTIPS

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Abstract: *This article analyzes the role of neuropedagogy in increasing the intellectual potential of students in technology classes at secondary schools. The author highlights the impact of fine motor skills, spatial imagination, and creative construction processes on strengthening neural connections between the brain hemispheres based on scientific evidence. The article proves that technology education is not just a practical skill but a strategic tool that increases cognitive flexibility, logical thinking, and stress resistance. Furthermore, methodological recommendations are provided for increasing the efficiency of students' academic achievement through interdisciplinary integration (STEAM).*

Keywords: *Neuroplasticity, fine motor skills, cognitive development, technology education, neuropedagogy, sensory integration, executive functions.*

In modern neurobiology, the fingers are referred to as "the part of the brain that has come to the outside." Every delicate movement performed in technology classes — from threading a needle to carving patterns on wood — causes a real "neuron explosion" in the brain hemispheres. Scientific research shows that the area in the brain's motor center responsible for finger movement is much wider than for any other organ. In science, this is called the "Penfield homunculus" (brain map). That is, when the fingers are activated, the brain wakes up. When a student works with tools in a technology class, a vast part of the cerebral cortex is activated.

Activities related to fine motor skills accelerate the formation of the myelin sheath around neurons. From a neuropedagogical point of view, the brain's motor center and Broca's area (the speech center) are located side-by-side.

When a student performs complex technological processes with their hands, an excitation wave passes to the speech center. As a result, the vocabulary and the ability to express thoughts logically of students who are active in technology classes are higher compared to their peers.

Sensing the texture of materials (silk, wool, metal, etc.) enriches the sensory cortex of the brain. This shapes "tactile memory." Working with both hands at the same time (for example, holding a tool in one hand and supporting the material with the other) strengthens the exchange of information between the right and left hemispheres of the brain through the corpus callosum.

Observing with the eye and working on a three-dimensional object with the hand is a very complex calculation process for the brain.

The most highly valued skill in the modern labor market is the ability to see a problem and solve it effectively. For a student, technology classes serve as a "cognitive simulator" that teaches them not only knowledge but also how to overcome real-life difficulties. The process of making any object is full of unexpected challenges. For example, wood cracking, a part's dimensions not matching, or a stitch falling crookedly. In such a situation, the following processes occur in the student's brain:

1. Analysis and diagnostics: The brain seeks the cause of the problem ("Why didn't the parts join?"). During this stage, the frontal (prefrontal) cortex of the brain is activated to its maximum potential.
2. Hypothesis generation: The student considers several solutions ("Should I glue it or cut it anew?"). This process develops divergent thinking (generating multiple solutions for a single problem).

Decision-making and responsibility: Choosing the most suitable path requires willpower from the student and demands responsibility for the outcome.

In technology classes, a student looks at a two-dimensional (2D) drawing on paper and creates a three-dimensional (3D) object from it. This process is a very complex operation for the brain. Here, the student analyzes the location and shape of objects in space. In the process of reading the drawing and materializing it, neurons in the brain are activated. Furthermore, the process of Mental Rotation (mental turning) occurs in the student. That is, before making the object, the student mentally tries rotating it in different directions. This exercise strengthens the brain's "geometric processor" and creates a foundation for easily solving complex stereometry problems.

While geometry and mathematics are often taught through dry formulas in textbooks, they become a vital necessity in technology classes. Even a millimeter matters when cutting a part, which cultivates extreme precision in the student. Logical-thinking centers are strengthened through the practical application of the laws of symmetry and proportion.Construction involves joining several parts to create a complete structure—this develops the ability to see the whole from parts (synthesis) and parts from the whole (analysis).Neurobiological research has proven that children with strong spatial imagination achieve high results in future fields such as engineering, architecture, surgery, and IT.

Drawing and construction exercises in technology classes connect the brain's right hemisphere (creative-spatial) with the left hemisphere (logical-analytical). This "holistic brain" system significantly increases the student's overall intellectual coefficient (IQ).In modern education systems, high intellectual loads, constant exams, and competition can cause chronic stress in students. In such conditions, technology classes serve not only to provide knowledge but also as a "psychological filter" that restores the student's spirit and lowers stress levels. Every movement in technology classes specifically has practical therapeutic significance.

Tactile contact: Working with natural materials (wood, wool, soil) has a positive effect on human instincts and reduces anxiety.Rhythm of movements: Repetitive movements (for example, planing, weaving, or drawing) have meditative properties, calming the student's nervous system and preventing emotional outbursts.The practical labor process directly affects the biochemical state of the brain:

Reduction of Cortisol: When attention is focused on making a specific item, the brain's "anxiety centers" calm down, and the level of the stress hormone—cortisol—decreases.Dopamine and Endorphins: The joy of creating with one's own hands (creative satisfaction) stimulates the release of "happiness hormones" in the brain. This strengthens the student's self-confidence.

In today's "gadget era," students' attention is fragmented (clip thinking). Achieving a result in a technology class requires focusing attention on one point for a long time. This process teaches the brain "long-term concentration."

The ability to focus on one thing will also help the student in mastering other complex subjects (mathematics, physics) later on.

In conclusion, it can be said that technology classes are not just a subject that teaches practical skills, but a strategic process that shapes the student's brain. Strengthening neural connections through finger movements, seeking solutions in problem situations, and developing spatial imagination turn the student not only into a craftsperson but also into a strong analyst and a creative individual.

In today's era of information overload, these classes serve as the only "golden bridge" that restores the student's spirit and connects theoretical knowledge with life. A modern neuropedagogical approach to technology education is the most effective way to raise a generation with high intellectual potential, healthy, and logical thinking. For, the "smart hands" formed in the classroom today lay the foundation for the genius minds that will create the great projects of tomorrow.

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