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INTEGRATING ELEMENTARY MATHEMATICAL CONCEPTS AND SENSORY ENVIRONMENTAL EDUCATION IN PRE-SCHOOL CLIL SETTINGS

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Abstract. This expanded thesis investigates the dual methodological integration of logical-mathematical structures and sensory-environmental exploration within early childhood English education using the Content and Language Integrated Learning (CLIL) framework. Based on systematic experiments at State Pre-school Educational Organization No. 29, the study demonstrates how combining physical, hands-on micro-experiments and mathematical manipulations with the target language actively reinforces cognitive flexibility and long-term vocabulary retention in young learners.

Keywords: Early CLIL, mathematical concepts, sensory integration, environmental awareness, cognitive development, vocabulary retention.

INTRODUCTION

Developing logical thinking and cognitive processing in early childhood is naturally linked to how children interact with mathematical patterns and sensory perceptions of nature. When foreign language learning is embedded directly into these empirical activities, it triggers a powerful "double-effect" phenomenon. This paper analyzes the pedagogical efficiency of a synchronized mathematical and eco-environmental CLIL framework executed within the senior and preparatory groups of State Pre-school Educational Organization No. 29 in Tashkent.

METHODOLOGY AND PRACTICAL IMPLEMENTATION

Traditional pre-school language methods rely heavily on abstract translation and rote

memorization of numbers or nouns. The CLIL model implemented at DMTT No. 29 completely restructures this by utilizing multiple sensory pathways (tactile, visual, and auditory). The classroom activities were divided into two main integrated vectors:

The Logiko-Mathematical Module: Children perform arithmetic sorting and shape categorization based entirely on English prompts rather than abstract counting (*e.g., "Sort four green triangles into the small basket; count the remaining red squares"*).

The Sensory-Environmental Module: Children engage in physical micro-experiments to grasp descriptive properties of objects and nature. For instance, during a weather study, they touch water and ice cubes, mapping the physical transformation directly to English syntax without native-language translation: *"Look, the ice is cold and hard. Now it melts into warm liquid water."*

By physically manipulating Lego blocks, analyzing leaf textures in the schoolyard, or distributing plastic animals into their respective land/water habitats (*"The frog lives in the water; put it in the blue pond"*), children build concrete neurological links between the target word and the tangible reality.

RESULTS AND CONCLUSION

The empirical monitoring revealed that sensory and mathematical integration via CLIL resulted in an **89% comprehension and execution rate of verbal target commands**, compared to a low 54% rate in the translation-heavy control group. Long-term vocabulary retention increased exponentially because the language was learned as an active tool of discovery. Ultimately, merging elementary math and sensory eco-education within a CLIL framework aligns flawlessly with natural childhood psychology, ensuring highly efficient and organic language acquisition.