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Computational Thinking in Early Education: Developing Problem-Solving Skills Among School Students in India

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Abstract

Computational thinking has emerged as a fundamental skill in early education, enabling students to develop structured problem-solving abilities from a young age. This paper explores the role of computational thinking in enhancing cognitive and analytical skills among school students in India. It focuses on key components such as decomposition, pattern recognition, abstraction, and algorithmic thinking, and how these can be effectively integrated into the early school curriculum. The study highlights the benefits of introducing computational thinking through unplugged activities, coding platforms, and interactive digital tools. Findings suggest that early exposure to computational thinking improves students' logical reasoning, creativity, and academic performance across subjects. However, challenges such as lack of trained educators, limited resources, and curriculum constraints hinder widespread implementation. The paper recommends curriculum reforms, teacher training, and the use of affordable digital tools to promote computational thinking in Indian schools.

Keywords: Computational thinking, Early education, Problem-solving skills, India, School students, Coding education, Algorithmic thinking, Digital learning, Curriculum development, Educational technology.