

SCIENTIFIC AND THEORETICAL FOUNDATIONS OF ECONOMIC EDUCATION FOR PRESCHOOL CHILDREN BASED ON STEAM TECHNOLOGY

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Abstract. *This article examines the scientific and theoretical foundations of economic education for preschool children based on STEAM technology. The study analyzes the psychological and pedagogical prerequisites for forming economic concepts in early childhood, the essence and principles of STEAM technology, and the methodological approaches to integrating economic education with STEAM components. The research investigates the theoretical frameworks underlying the development of economic literacy in preschool-aged children, including constructivist learning theory, developmental psychology perspectives, and modern pedagogical innovations. The article presents a comprehensive analysis of how Science, Technology, Engineering, Arts, and Mathematics can be systematically integrated to create an effective methodology for economic education in preschool institutions. The findings demonstrate that STEAM technology provides a robust theoretical and practical foundation for developing economic concepts, skills, and attitudes in young children, preparing them for successful participation in modern economic life.*

Keywords: *STEAM technology, economic education, preschool children, theoretical foundations, constructivism, cognitive development, integrated learning, financial literacy, pedagogical methodology, early childhood education.*

The rapid transformation of global economic systems and the increasing complexity of financial environments have necessitated a fundamental reconsideration of when and how economic education should begin. Contemporary research in developmental psychology and early childhood education has demonstrated that the preschool years represent a critical period for establishing foundational concepts and attitudes that will shape an individual's future economic behavior and decision-making capabilities. This recognition has prompted educators and researchers worldwide to explore innovative approaches to introducing economic concepts to young children in developmentally appropriate and effective ways.

Economic education in preschool settings has traditionally been limited to basic concepts of money recognition, simple transactions, and elementary notions of saving and spending.

However, the demands of the twenty-first century economy require a more comprehensive and sophisticated approach that develops not only knowledge but also critical thinking, problem-solving abilities, and practical skills. STEAM technology, which integrates Science, Technology, Engineering, Arts, and Mathematics into a cohesive educational framework, offers a promising theoretical and methodological foundation for achieving these objectives.

The purpose of this research is to examine the scientific and theoretical foundations that support the implementation of STEAM technology in economic education for preschool children. By analyzing the psychological, pedagogical, and methodological underpinnings of this approach, the study aims to establish a comprehensive theoretical framework that can guide practitioners and researchers in developing effective economic education programs for early childhood settings.

The theoretical foundations of economic education for preschool children are rooted in several interconnected domains of scientific inquiry. Developmental psychology provides essential insights into the cognitive capabilities and limitations of young children, informing our understanding of what economic concepts can be meaningfully introduced at different stages of early childhood. The pioneering work of Jean Piaget established that children progress through distinct stages of cognitive development, with the preoperational stage spanning approximately ages two to seven characterized by the emergence of symbolic thinking, language development, and intuitive reasoning. While Piaget initially emphasized the limitations of preoperational thought, subsequent research has demonstrated that young children possess greater cognitive capabilities than previously assumed, particularly when learning occurs in supportive, contextually rich environments.

Lev Vygotsky's sociocultural theory provides another crucial theoretical foundation for understanding how young children acquire economic concepts. Vygotsky's concept of the zone of proximal development suggests that children can master more complex ideas when supported by more knowledgeable others through scaffolded instruction. This theoretical perspective has profound implications for economic education, as it suggests that with appropriate pedagogical support, preschool children can develop understanding of economic concepts that might otherwise be considered too abstract for their developmental level. The social nature of learning emphasized by Vygotsky also aligns with the collaborative and interactive approaches characteristic of STEAM education.

Constructivist learning theory, drawing on the work of both Piaget and Vygotsky, as well as later theorists such as Jerome Bruner and John Dewey, provides the epistemological foundation for STEAM-based economic education. Constructivism posits that learners actively construct knowledge through interaction with their environment rather than passively receiving information. This theoretical perspective supports the hands-on, experiential, and project-based approaches that characterize STEAM education. When children engage in STEAM activities with economic content, they construct their understanding of economic concepts through direct experience, manipulation of materials, social interaction, and reflection on their actions and outcomes.

The theoretical foundations of STEAM technology itself merit careful examination in the context of economic education. STEAM emerged as an evolution of STEM education, with the addition of Arts recognizing the importance of creativity, design thinking, and aesthetic considerations in innovation and problem-solving. The theoretical rationale for integrated STEAM education rests on several premises. First, real-world problems and phenomena do not respect disciplinary boundaries, and effective problem-solving requires the integration of knowledge and skills from multiple domains. Second, integrated learning promotes deeper understanding by revealing connections and relationships that might remain hidden in traditional subject-based instruction. Third, the inclusion of arts enhances creativity, communication, and the ability to represent and express ideas in multiple modalities.

The application of STEAM technology to economic education for preschool children requires a theoretical framework that bridges these educational innovations with the specific characteristics and needs of young learners. Research in early childhood education has established several principles that must inform this framework. Young children learn best through play-based approaches that engage their natural curiosity and motivation. Learning experiences must be concrete and connected to children's lived experiences and interests.

Social interaction and collaboration are essential components of effective early learning.

Multiple modalities of representation and expression support diverse learning styles and promote deeper understanding.

The scientific component of STEAM provides theoretical foundations for understanding economic concepts related to resources, production, and environmental sustainability. Through scientific inquiry and experimentation, children can explore questions such as where materials come from, how products are made, and why resources must be used carefully. The process of scientific investigation develops critical thinking skills that are essential for economic reasoning, including observation, hypothesis formation, data collection, and evidence-based conclusion drawing. Furthermore, understanding the relationship between natural resources and economic activity establishes foundations for environmentally responsible economic behavior.

Technology as a component of STEAM education provides theoretical foundations for understanding the role of tools, systems, and digital technologies in modern economic life. For preschool children, technology education encompasses both the use of age-appropriate digital tools and the broader understanding of how technology shapes economic activities. Theoretical perspectives from media literacy and digital citizenship inform approaches to helping young children develop critical awareness of advertising, consumer culture, and the digital marketplace.

The integration of technology in economic education also prepares children for participation in an increasingly digitalized economy.

The engineering component of STEAM provides theoretical foundations for economic education through its emphasis on design thinking, problem-solving, and optimization. Engineering design processes involve identifying problems or needs, generating and evaluating potential solutions, building and testing prototypes, and iterating based on results. These processes parallel economic decision-making, which similarly requires identifying needs and wants, evaluating alternatives, making choices, and assessing outcomes. Through engineering activities, children develop planning skills, resource management abilities, and understanding of trade-offs and opportunity costs that are fundamental to economic literacy.

The arts component of STEAM contributes theoretical foundations related to creativity, communication, and the affective dimensions of economic education. Economic attitudes, values, and dispositions such as entrepreneurship, delayed gratification, and responsible consumption involve emotional and motivational factors that arts-based approaches can effectively address. Through dramatic play, visual arts, music, and storytelling, children can explore economic themes in ways that engage their emotions and imagination. The arts also provide means for children to represent and communicate their economic understanding, making their thinking visible and supporting metacognitive development.

Conclusion:

The scientific and theoretical foundations examined in this study demonstrate that STEAM technology provides a robust and comprehensive framework for economic education in preschool settings. The integration of developmental psychology, constructivist learning theory, and STEAM pedagogical principles creates a theoretically sound basis for introducing economic concepts to young children in developmentally appropriate and effective ways. The analysis reveals that each component of STEAM contributes unique and complementary theoretical perspectives that together address the cognitive, social, emotional, and practical dimensions of economic literacy.

The theoretical foundations presented in this article support several key conclusions for practice and further research. Economic education can and should begin in the preschool years, when children are developing foundational concepts, attitudes, and skills that will shape their future economic behavior. STEAM technology provides an effective methodological framework for this education, offering integrated, experiential, and engaging approaches aligned with how young children learn best. Future research should focus on empirical validation of STEAM-based economic education programs and development of assessment tools appropriate for measuring economic learning outcomes in preschool children.

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