

The Use of STEAM Technologies in Economic Education of Preschool Children: Pedagogical Problems and Solutions

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Abstract:

This study investigates the pedagogical problems associated with economic education in preschool settings and explores the potential of STEAM technologies as a solution for improving economic literacy among young children. Using a qualitative research design based on theoretical analysis, comparative review, and synthesis of contemporary educational literature, the study identifies key challenges and proposes pedagogical strategies for effective implementation. The findings indicate that STEAM technologies contribute significantly to children's understanding of economic concepts by promoting inquiry, creativity, collaboration, problem-solving, and experiential learning. Furthermore, the research highlights the importance of teacher competence, family involvement, digital learning resources, and interdisciplinary project-based learning as essential factors supporting successful economic education. The study concludes that STEAM-based approaches provide an innovative and effective framework for developing economic awareness and responsible decision-making among preschool children while simultaneously fostering twenty-first-century competencies required for future educational and social success.

Keywords: economic education, preschool children, STEAM technologies, economic literacy, early childhood education.

Introduction

The rapid transformation of modern society has significantly altered the competencies required for successful participation in economic and social life. Technological innovations, globalization, digitalization, and changing labor market demands have increased the importance of economic literacy as a fundamental life skill. Contemporary educational systems increasingly recognize that economic education should not be postponed until secondary or higher education but should begin during early childhood when fundamental attitudes, values, and behavioral patterns are established [1].

Economic literacy encompasses a broad range of knowledge, skills, attitudes, and behaviors related to understanding economic processes, making informed decisions, managing resources responsibly, and participating effectively in economic activities [2]. In today's world, individuals encounter economic challenges from an early age, including decisions related to consumption, saving, resource allocation, and financial responsibility. Therefore, developing economic competence during preschool years represents an important investment in children's future personal and social well-being.

Research in developmental psychology suggests that preschool children possess a greater capacity for understanding economic concepts than traditionally assumed. Even at an early age, children demonstrate awareness of ownership, exchange, value, and resource limitations through their interactions with family members, peers, and community environments [3]. These early experiences serve as the foundation for later economic reasoning and behavior.

According to Piaget's theory of cognitive development, preschool children actively construct knowledge through direct interaction with their surroundings [4]. Similarly, Vygotsky emphasized the significance of social interaction and guided participation in cognitive growth [5]. These theoretical perspectives suggest that economic education should be grounded in practical experiences, meaningful social interactions, and authentic learning situations rather than abstract instruction.

However, despite the growing recognition of economic literacy as an important educational objective, many preschool institutions continue to encounter significant pedagogical challenges in its implementation. One of the primary problems involves the abstract nature of many economic concepts. Terms such as value, scarcity, production, consumption, and saving can be difficult for young children to comprehend when presented through traditional teaching methods [6]. Consequently, educators often struggle to identify age-appropriate strategies for introducing economic ideas effectively.

Another challenge concerns the limited methodological preparation of preschool teachers. Many educators have received little formal training in economic education and may lack confidence in integrating economic concepts into daily learning activities [7]. As

a result, economic education is frequently treated as an isolated topic rather than being systematically incorporated into broader educational experiences.

Furthermore, traditional approaches often fail to engage children actively in the learning process. Contemporary educational theories emphasize the importance of active participation, inquiry, collaboration, and creativity in knowledge construction [8]. Yet economic education in many preschool settings remains focused on passive information transmission rather than experiential learning.

The emergence of STEAM education offers promising opportunities for addressing these challenges. STEAM education integrates Science, Technology, Engineering, Arts, and Mathematics into interdisciplinary learning experiences that encourage creativity, critical thinking, communication, and problem-solving [9]. Rather than treating knowledge as separate disciplinary domains, STEAM promotes meaningful connections among different fields while emphasizing real-world applications.

The integration of economic education within STEAM learning environments enables children to explore economic concepts through hands-on activities, projects, experiments, and collaborative problem-solving tasks. For example, children may participate in designing products, managing classroom marketplaces, creating simple business models, or solving resource allocation challenges. These experiences allow economic concepts to emerge naturally within meaningful contexts [10].

One of the key strengths of STEAM education lies in its emphasis on inquiry-based learning. Young children are naturally curious and motivated to explore questions about the world around them. STEAM activities encourage children to ask questions, investigate problems, test ideas, and evaluate solutions. Such processes align closely with the development of economic thinking, which requires analyzing alternatives, making decisions, and considering consequences [11].

The arts component of STEAM is particularly valuable in preschool settings. Through storytelling, role play, drawing, dramatic activities, and creative expression, children can explore economic concepts in developmentally appropriate ways. For instance, role-playing activities involving shops, markets, restaurants, or businesses enable children to engage with concepts such as exchange, production, and consumer behavior while maintaining high levels of motivation and enjoyment [12].

Technology also plays an increasingly important role in supporting economic education. Interactive applications, educational games, digital simulations, and multimedia resources can help children visualize economic processes and engage with complex ideas through age-appropriate experiences [13]. However, effective technology integration requires careful pedagogical planning to ensure that digital tools enhance rather than replace meaningful human interaction and hands-on learning.

The family environment represents another critical factor influencing children's economic development. Economic socialization begins within the home, where children observe parental behaviors related to spending, saving, budgeting, and work [14].

Therefore, successful economic education requires strong collaboration between preschool institutions and families. When educators and parents work together to reinforce economic concepts and behaviors, children receive consistent messages that support long-term learning outcomes.

In recent years, educational reforms in many countries, including Uzbekistan, have increasingly emphasized competency-based learning, innovation, digital transformation, and the development of practical life skills. These reforms recognize that future generations must possess not only academic knowledge but also the ability to adapt, innovate, and make informed decisions in complex environments [15]. Economic literacy and entrepreneurial competence are increasingly viewed as essential components of this broader educational mission.

Despite growing interest in both economic education and STEAM pedagogy, relatively little research has examined how these two areas can be effectively integrated within preschool education. Existing studies frequently address either economic literacy or STEAM learning independently, leaving a gap in understanding regarding their combined application. Moreover, there remains limited consensus concerning the specific pedagogical conditions necessary for successful implementation.

This study seeks to address these issues by examining the pedagogical problems associated with economic education in preschool settings and identifying STEAM-based solutions that support children's economic development. The research aims to contribute to the theoretical understanding of preschool economic education while providing practical recommendations for educators, curriculum developers, and policymakers.

The central research question guiding this study is: How can STEAM technologies contribute to solving pedagogical challenges associated with economic education among preschool children?

The study is based on the assumption that effective economic education requires innovative pedagogical approaches that align with children's developmental characteristics and contemporary educational goals. Through the integration of STEAM technologies, preschool institutions can create engaging learning environments that foster economic understanding, creativity, collaboration, and responsible decision-making from an early age.

Methods

This study employed a qualitative theoretical research design aimed at identifying the major pedagogical challenges associated with economic education in preschool settings and determining how STEAM technologies can contribute to their solution. The research was based on systematic literature review, comparative pedagogical analysis, and conceptual synthesis. Such an approach was considered appropriate because the purpose of the study was not to measure a specific intervention statistically but rather to examine theoretical foundations and pedagogical practices described in contemporary educational research.

The methodological framework combined perspectives from early childhood education, developmental psychology, economic literacy education, educational technology, and STEAM pedagogy. Integrating these perspectives made it possible to develop a comprehensive understanding of how economic education can be effectively organized for preschool-aged children.

The study analyzed scientific publications indexed in international databases, books, conference proceedings, educational reports, and policy documents published by organizations such as UNESCO, OECD, UNICEF, and the World Economic Forum. Sources published between 2005 and 2025 received particular attention because they reflect contemporary approaches to early childhood education and competency-based learning.

The selection criteria included:

- relevance to preschool education;
- focus on economic or financial literacy;
- discussion of STEAM learning approaches;
- empirical or theoretical contribution to educational practice;
- publication in peer-reviewed academic sources.

Results

The analysis revealed several significant pedagogical problems that hinder the effective implementation of economic education in preschool institutions. Simultaneously, the findings demonstrated that STEAM technologies provide practical and innovative solutions to many of these challenges.

One of the most frequently mentioned difficulties concerns the abstract nature of economic concepts. Preschool children often struggle to understand ideas such as value, scarcity, production, consumption, profit, saving, and exchange when these concepts are explained through verbal instruction alone [16].

Young children think primarily through concrete experiences rather than abstract reasoning. Consequently, traditional explanations of economic concepts often exceed their developmental capabilities.

STEAM technologies enable educators to transform abstract concepts into tangible experiences. Through project-based activities, children interact directly with economic phenomena.

For example, in a classroom marketplace project, children create products using available materials, assign symbolic prices, exchange tokens, and evaluate purchasing decisions. Through these experiences, they begin to understand concepts such as value, choice, and exchange without requiring complex theoretical explanations.

Similarly, engineering activities involving limited construction materials help children experience resource scarcity directly. Such experiences make economic concepts more understandable and meaningful.

Traditional approaches to economic education often fail to generate sustained interest among preschool children. Lessons based primarily on explanation and repetition may not correspond to children's natural curiosity and desire for active exploration [17].

As a result, children may perceive economic topics as irrelevant or difficult.

STEAM learning naturally increases motivation because it emphasizes investigation, creativity, experimentation, and discovery. Children become active participants rather than passive recipients of information.

For example, during a project titled “Building a Mini Business,” children may design products, create advertisements, construct displays, and organize sales activities. Such experiences generate excitement and personal involvement while simultaneously introducing economic concepts.

The analysis suggests that STEAM activities significantly increase children's engagement because they combine learning with play, creativity, and authentic problem-solving.

Many preschool programs address economic education through isolated activities disconnected from other areas of learning. Consequently, children may struggle to transfer knowledge from one situation to another [18].

STEAM education promotes interdisciplinary integration. Economic concepts become connected to science, technology, engineering, arts, and mathematics within unified learning experiences.

For instance, a project focused on environmental sustainability may include:

- scientific investigation of natural resources;
- engineering solutions for resource conservation;
- mathematical calculations;
- artistic presentations;
- discussions about responsible consumption.

In this way, children understand economic ideas as part of broader real-world systems rather than isolated facts.

Another major challenge concerns teachers' preparedness to implement economic education effectively. Many preschool educators report uncertainty regarding both economic content and instructional strategies [19].

Without sufficient knowledge and confidence, teachers may avoid economic topics altogether or rely on simplistic explanations.

Professional development programs focused on STEAM pedagogy can significantly strengthen teachers' instructional capacities.

Effective training should help educators:

- understand age-appropriate economic concepts;
- design interdisciplinary projects;
- facilitate inquiry-based learning;
- integrate technology effectively;

- assess children's learning outcomes.

The findings indicate that teachers who receive STEAM-oriented professional development demonstrate greater confidence and creativity in implementing economic education.

Economic socialization begins within the family environment. However, many educational programs fail to establish meaningful connections between school-based learning and children's home experiences [20].

When economic education remains confined to the classroom, opportunities for reinforcement and application may be limited.

STEAM projects provide numerous opportunities for family participation.

Examples include:

- family saving challenges;
- home entrepreneurship projects;
- collaborative recycling initiatives;
- parent-child marketplace events;
- community resource-management activities.

Such activities strengthen the relationship between educational institutions and families while promoting consistent economic learning experiences.

Although contemporary children grow up in digital environments, many preschool institutions continue to underutilize educational technologies in economic education [21].

Technology can significantly enrich learning experiences when used appropriately.

Interactive applications, educational games, coding tools, digital storytelling platforms, and simulation activities help children explore economic relationships through engaging and visually rich experiences.

For example, digital simulations may demonstrate how goods are produced, distributed, and consumed. Educational games can encourage children to make decisions regarding resource allocation and budgeting.

The findings indicate that technology is most effective when integrated into broader STEAM projects rather than used as an isolated instructional tool.

Discussion

The findings suggest that the challenges associated with preschool economic education are not primarily related to children's inability to understand economic concepts. Instead, they arise largely from the pedagogical approaches traditionally used to present those concepts.

This conclusion aligns with constructivist theories proposed by Piaget and Vygotsky, which emphasize active participation and social interaction as essential mechanisms of learning [4,5]. Young children are capable of developing meaningful economic understanding when concepts are embedded within authentic experiences and social contexts.

STEAM technologies appear particularly effective because they create opportunities for experiential learning. Rather than learning about economic concepts through explanation alone, children engage directly in activities involving production, exchange, resource management, and decision-making.

Another important finding concerns the relationship between creativity and economic thinking. Modern economies increasingly value innovation, adaptability, and entrepreneurship. Through STEAM projects, children learn not only how economic systems function but also how to generate ideas, solve problems, and create value. These competencies are likely to become increasingly important in future labor markets [22].

The integration of arts within STEAM deserves special attention. Artistic activities provide developmentally appropriate pathways for exploring economic concepts. Through storytelling, dramatic play, and creative design, children can investigate economic relationships in ways that are emotionally engaging and cognitively accessible.

Furthermore, the findings highlight the importance of interdisciplinary learning. Economic problems rarely exist independently from scientific, technological, environmental, or social issues. STEAM education reflects this reality by encouraging children to explore connections among different domains of knowledge.

Teacher competence emerged as a critical factor influencing implementation quality. Even well-designed curricula may fail to achieve intended outcomes if educators lack sufficient preparation. Consequently, teacher education programs should incorporate greater emphasis on economic literacy, STEAM pedagogy, and interdisciplinary curriculum design.

The study also reinforces the importance of family engagement. Since children encounter economic experiences daily within their homes and communities, cooperation between educators and parents significantly enhances learning outcomes.

Finally, technology should be viewed as a supportive rather than dominant component of economic education. Digital tools can enrich learning experiences, but meaningful social interaction, hands-on exploration, and guided reflection remain essential elements of early childhood education.

Conclusion

The present study examined pedagogical problems associated with economic education in preschool settings and explored the potential of STEAM technologies as a means of addressing these challenges.

The findings identified six major pedagogical problems:

1. Abstract economic concepts;
2. Low learning motivation;
3. Fragmented learning experiences;
4. Limited teacher preparation;
5. Weak family involvement;
6. Insufficient use of educational technologies.

The analysis demonstrated that STEAM-based learning offers effective solutions to each of these challenges. By integrating science, technology, engineering, arts, and mathematics within authentic learning experiences, STEAM education enables children to develop economic understanding through exploration, creativity, collaboration, and problem-solving.

The study concludes that STEAM technologies provide an innovative pedagogical framework capable of transforming economic education from a largely theoretical subject into a meaningful and engaging aspect of preschool learning. Through carefully designed STEAM projects, children can develop foundational economic literacy while simultaneously acquiring critical twenty-first-century competencies such as creativity, communication, critical thinking, and collaboration.

Future research should focus on experimental and longitudinal studies examining the long-term effects of STEAM-based economic education on children's attitudes, behaviors, and academic development. Additionally, further investigation is needed regarding teacher training models and curriculum design strategies that support successful implementation across diverse educational contexts.

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