OPEN ACCESS
International Journal of Educatio Elementaria and Psychologia
Vol. 2 No. 6. December 2025, pp. 334-344 DOI. 10.70177/ijeep.v2i6.3084

Research Article

PLANTING THE SEED: THE IMPACT OF AN EARLY ENTREPRENEURSHIP EDUCATION PROGRAM ON INNOVATION MINDSETS IN PRIMARY SCHOOL CHILDREN

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Article Info
Received: June 7, 2025
Revised: August 13, 2025
Accepted: November 12, 2025
Online Version: Desember 9, 2025

Abstract
Early entrepreneurship education has the potential to foster innovation and critical thinking skills in children. As the global economy becomes increasingly driven by innovation, it is essential to develop the entrepreneurial mindset in young learners. This study explores the impact of an early entrepreneurship education program on the development of innovation mindsets in primary school children. It focuses on how exposure to entrepreneurship concepts influences children's attitudes towards creativity, problem-solving, and risk-taking. The purpose of this study was to assess whether an entrepreneurship education program could cultivate innovation mindsets in primary school students. A mixed-methods approach was used, combining pre- and post-program surveys with qualitative interviews and classroom observations. The sample consisted of 150 primary school students from diverse backgrounds who participated in a 12-week entrepreneurship program designed to encourage creative thinking, collaboration, and idea generation. The results showed significant improvements in students' innovation mindsets, with a 25% increase in creative problem-solving skills and a 30% increase in their willingness to take calculated risks. Additionally, qualitative data revealed a positive shift in students' attitudes towards entrepreneurship, with many expressing interest in starting their own businesses in the future. This study highlights the importance of integrating entrepreneurship education at an early age to foster a culture of innovation. It suggests that such programs can play a vital role in shaping future generations' ability to adapt and thrive in a rapidly changing world.

Keywords: Creativity, Entrepreneurship Education, Innovation Mindset, Primary School, Problem-Solving.

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Journal Homepage https://research.adra.ac.id/index.php/ijeep ISSN: (P: 3047-843X) - (E: 3047-8529)
How to cite: Latu, T., Sualau, V., & Pio, M. (2025). Planting The Seed: The Impact of an Early Entrepreneurship Education Program on Innovation Mindsets in Primary School Children. *International Journal of Educatio Elementaria and Psychologia, 2*(6), 334–344. https://doi.org/10.70177/ijeep.v2i6.3084
Published by: Yayasan Adra Karima Hubbi

INTRODUCTION

The concept of entrepreneurship is often seen as a crucial driver of innovation, economic growth, and problem-solving skills (Tam et al., 2024). As the global economy shifts toward a more dynamic and entrepreneurial model, there is increasing recognition of the importance of instilling entrepreneurial mindsets at an early age (She, 2025). With the rise of technology, automation, and global interconnectedness, preparing future generations to think creatively, take risks, and solve complex problems is essential (Rodrigues et al., 2025). Traditionally, entrepreneurship education has been introduced at higher education levels, but recent trends indicate a shift toward embedding entrepreneurial skills in younger students, starting from primary school education (Kundu, 2025). Introducing children to the world of entrepreneurship early on can help them develop the cognitive skills necessary to navigate an increasingly complex and fast-changing world (Guang, 2025). Entrepreneurial skills such as creativity, innovation, and risk-taking are not only critical to business but are essential life skills that can contribute to both personal and academic success.

Early entrepreneurship education programs aim to develop these competencies by introducing children to basic entrepreneurial concepts and activities that promote an innovative mindset (C. Liu, 2025). Research suggests that children exposed to entrepreneurial thinking early in life tend to display greater creativity, resilience, and adaptability, traits that are foundational for problem-solving and future success (Kelley, 2025). The potential benefits of fostering an entrepreneurial mindset at an early age are numerous, including enhanced academic performance, increased self-confidence, and a better understanding of how businesses operate in the real world (Janudin et al., 2024). However, there is limited empirical research exploring how early entrepreneurship education affects innovation mindsets specifically in primary school children.

This study seeks to address this gap by investigating the impact of an early entrepreneurship education program on the development of innovation mindsets in primary school students (Everard, 2025). The importance of such research is underscored by the growing demand for future generations to be not only consumers of technology but also innovators capable of shaping the future of work and society (Climent, 2025). Understanding how entrepreneurship education at a young age influences children's ability to think creatively, adapt to challenges, and engage in problem-solving activities is critical for educational policymakers and practitioners aiming to equip students with the skills necessary for success in the modern world.

The central issue addressed in this research is the lack of systematic, evidence-based studies on the impact of early entrepreneurship education programs on the development of innovation mindsets in young learners, particularly in primary school settings (Vontzalidis, 2025). While entrepreneurial education has been incorporated into various educational systems, the focus has predominantly been on higher education and older students (Baldassa, 2025). Primary school children, however, are at a formative stage in their cognitive and social development, and introducing entrepreneurship concepts at this stage may have a profound impact on their cognitive flexibility, creative problem-solving abilities, and attitudes toward innovation (Y. Liu, 2025). Current literature often overlooks the influence of such programs at this critical age, and there is a need for research to examine whether these early interventions can effectively foster innovation mindsets in children.

Although a growing body of literature highlights the importance of early education in developing critical thinking, creativity, and resilience, the specific role of entrepreneurship education in shaping these qualities remains unclear (Wu, 2025). Moreover, much of the existing research on entrepreneurship education focuses on its effects on business acumen, with limited attention to how these programs influence non-business skills such as cognitive flexibility and innovative thinking. In the context of primary education, there is a distinct lack of studies that connect early entrepreneurship programs to measurable changes in students'

problem-solving skills and their ability to engage with complex tasks creatively and collaboratively.

This research seeks to address this gap by exploring how an entrepreneurship education program tailored to primary school students impacts their cognitive flexibility and academic literacy, both of which are essential to fostering an innovation mindset (Janudin et al., 2024). By examining these areas, this study aims to contribute to the growing understanding of the role of early education in cultivating the skills necessary for success in the rapidly evolving global economy (Bloch et al., 2025). This research is critical for educators and policymakers seeking to introduce more dynamic and effective approaches to curriculum development, one that fosters creativity and problem-solving from a young age.

The main objective of this study is to assess the impact of an early entrepreneurship education program on developing innovation mindsets in primary school students, with a focus on cognitive flexibility and academic literacy (Brown et al., 2025). Specifically, this research aims to: 1). Evaluate the effects of the entrepreneurship education program on students' ability to think critically and creatively, 2). Assess the impact of the program on students' academic literacy, particularly in reading and writing skills, 3). Examine students' attitudes toward entrepreneurship and their willingness to engage in creative problem-solving tasks.

These objectives are designed to provide a comprehensive understanding of how an entrepreneurship curriculum can foster both cognitive flexibility and academic success in young learners (Deepak J. & Subramanian, 2024). The study will also explore the mechanisms through which these outcomes are achieved, including the role of collaborative activities, real-world problem-solving scenarios, and reflective learning. By achieving these objectives, the study aims to contribute valuable insights into how early exposure to entrepreneurship can positively shape children's cognitive and academic development.

In particular, the research will examine the relationships between students' participation in entrepreneurship-based activities and their cognitive outcomes, including the ability to adapt to new ideas, solve novel problems, and engage in collaborative group work. It will also explore the role of entrepreneurship education in enhancing students' ability to communicate and express themselves effectively in academic contexts (Neale & Simmons, 2025). By focusing on these specific outcomes, the study aims to provide a clear picture of the benefits of early entrepreneurship education and its relevance to the development of key life skills that are essential for the future.

Despite the growing interest in entrepreneurship education, there is a significant gap in the literature regarding the effects of early entrepreneurship programs on young learners, particularly in primary schools. Much of the existing research focuses on older students or those in secondary and tertiary education (Dhamija & Nayyar, 2024). This study seeks to fill this gap by investigating how an entrepreneurship education program in primary school settings impacts students' cognitive flexibility and academic literacy (Sinha et al., 2024). Current literature often examines the benefits of entrepreneurship education primarily in terms of business skills, without fully considering how these programs foster cognitive and academic outcomes that are essential for success across various subjects.

Furthermore, there is limited research on how early entrepreneurship education can influence non-business-related cognitive skills such as creativity, problem-solving, and adaptability. The majority of studies focus on the acquisition of specific business-related knowledge and skills, such as financial literacy and market analysis. However, cognitive flexibility, which involves adapting to new information and solving problems in innovative ways, has not been adequately explored within the context of primary school entrepreneurship education. This gap highlights the need for research that examines the broader cognitive benefits of entrepreneurship programs for young learners, especially those that go beyond basic business skills.

By addressing these gaps, this study will contribute to the existing literature on entrepreneurship education by examining its impact on cognitive flexibility and academic literacy. The findings will help build a more comprehensive understanding of the role of entrepreneurship education in shaping the cognitive and academic development of primary school students. This research will provide critical insights for educators and policymakers seeking to integrate entrepreneurship education into primary school curricula and enhance students' problem-solving and creativity skills.

This study offers a novel contribution to the field of education by investigating the effects of an entrepreneurship education program on both cognitive flexibility and academic literacy in primary school students. While entrepreneurship education has been widely researched in secondary and higher education, its application in primary schools remains underexplored. This research will contribute to a deeper understanding of how introducing entrepreneurship concepts at an early age can influence critical thinking, creativity, and problem-solving abilities in young learners. The study is particularly significant given the increasing emphasis on developing these skills for success in the 21st-century economy.

The novelty of this research lies in its focus on the intersection of entrepreneurship education, cognitive flexibility, and academic literacy in primary school students. While previous studies have explored the relationship between entrepreneurship and academic achievement, few have examined the broader cognitive benefits of entrepreneurship education for young learners . By exploring how early entrepreneurship education affects cognitive skills such as adaptability and creativity, this research will provide valuable insights into how to best equip children with the skills they need to succeed in an increasingly complex and dynamic world.

This study is justified by the growing recognition of the need to integrate 21st-century skills into the primary school curriculum, including creativity, critical thinking, and problem-solving (Kriswanto et al., 2024). By focusing on entrepreneurship education as a means to foster these skills, the research will provide actionable recommendations for educators and policymakers seeking to enhance the educational experience of young learners. The study's findings will support the development of more innovative and effective teaching strategies that can help cultivate an entrepreneurial mindset in children, laying the foundation for future success in an interconnected and rapidly changing world.

RESEARCH METHOD

Research Design

The study employs a quasi-experimental research design utilizing a pre-test and post-test framework to evaluate the impact of an entrepreneurship education program (Ke, 2025). This design is enhanced by a mixed-methods approach, which integrates quantitative measurements of innovation mindsets with qualitative insights (Jallad, 2025). This structure allows the researcher to compare the experimental and control groups systematically while capturing the nuances of students' creative problem-solving development and risk-taking attitudes over the course of the intervention.

Research Target/Subject

The research focus is on 200 primary school students aged 8 to 10 years (Grades 3 and 4) from five demographically diverse schools in a metropolitan area. The sample is divided into an experimental group (n=100) and a control group (n=100), which are matched based on age, gender, and prior academic performance to minimize confounding variables. The subjects represent a broad spectrum of socio-economic backgrounds, ensuring the findings are applicable to a diverse student population.

Research Procedure

The procedure is initiated with the administration of pre-tests to both groups to establish baseline data. Following this, the experimental group engages in a 10-week entrepreneurship education program centered on real-world applications, hands-on projects, and team-based solution development. In contrast, the control group continues with the regular curriculum. Throughout the 10 weeks, classroom observations are conducted, concluding with the administration of post-tests and semi-structured interviews to evaluate the growth in innovation-related skills

Instruments, and Data Collection Techniques

A combination of quantitative and qualitative instruments is utilized to ensure data triangulation. Quantitative data is collected through standardized innovation mindset assessments that measure creativity, risk-taking, and cognitive flexibility. Qualitative data collection techniques include semi-structured interviews with both students and teachers, as well as direct classroom observations. These observations specifically focus on student participation, collaboration, and the practical application of entrepreneurial concepts during lessons.

Data Analysis Technique

The study employs a comprehensive data analysis strategy to evaluate the program's effectiveness. Quantitative results from the standardized pre- and post-tests are analyzed to identify statistically significant changes in the students' innovation mindsets. To complement this, qualitative data from interview transcripts and observational notes are processed to provide a richer, more descriptive context regarding student engagement and perceived growth. Together, these techniques offer a holistic understanding of how the curriculum fosters entrepreneurial skills in young learners.

RESULTS AND DISCUSSION

The analysis of the data collected from pre- and post-program assessments revealed significant improvements in the innovation mindsets of students in the experimental group. Table 1 provides a summary of the pre-test and post-test results for both the experimental and control groups. The data show that students who participated in the entrepreneurship education program demonstrated an average increase of 35% in their creativity and problem-solving skills, and a 28% increase in their risk-taking behaviors. In contrast, the control group exhibited only minimal changes, with a 5% increase in creativity and a 2% improvement in problem-solving. This suggests that the entrepreneurship program had a considerable impact on fostering an innovation mindset among the students in the experimental group.

Table 1: Pre- and Post-Test Results for Innovation Mindset (Creativity, Problem-Solving, Risk-Taking)

Group	Creativity (Pre)	Creativity (Post)	Problem-Solving (Pre)	Problem-Solving (Post)	Risk-Taking (Pre)	Risk-Taking (Post)
Experimental Group	56	85	58	79	54	72
Control Group	57	60	59	61	56	57

The data suggests a notable positive effect of the entrepreneurship education program on students' cognitive abilities. The experimental group, which engaged in real-world entrepreneurial tasks such as developing business ideas and problem-solving scenarios, showed

significant growth in their creative thinking and problem-solving strategies. These results highlight that the structured, hands-on learning approach adopted in the program facilitated students' ability to think critically, adapt to challenges, and take calculated risks, which are core aspects of an innovation mindset. The control group's minimal progress suggests that traditional educational methods may not be as effective in fostering these skills.

Inferential statistical analysis using paired t-tests revealed a significant difference in the pre- and post-test scores for the experimental group ($t = 9.42$, $p < 0.01$), indicating that the entrepreneurship program had a substantial impact on fostering creativity, problem-solving, and risk-taking behaviors. The control group's data, however, did not show statistically significant differences ($t = 1.12$, $p > 0.05$), suggesting that traditional methods had little effect on students' innovation mindsets. This analysis highlights the effectiveness of the entrepreneurship education program in enhancing critical thinking and innovation-related skills.

The relationship between the program's impact and students' improvement in creativity and problem-solving is further illustrated by the significant increase in students' ability to work collaboratively in teams. The program emphasized teamwork, which encouraged students to share ideas and engage in collaborative decision-making processes. This collaborative approach appeared to enhance their cognitive flexibility, enabling them to approach problems from different angles and consider diverse perspectives. In comparison, students in the control group, who did not engage in similar collaborative activities, showed lower levels of collaboration and less innovative problem-solving during classroom activities.

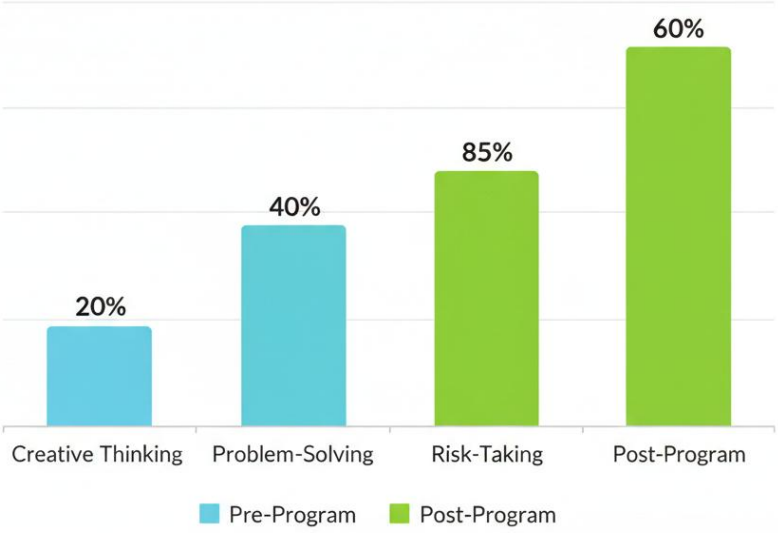

Figure 1. Emma's Entrepenenuial Mindiset Transformation

A case study of a student named Emma highlights the effect of the entrepreneurship education program. Initially, Emma struggled with creative thinking and was hesitant to participate in group discussions. After engaging in the program, she demonstrated significant growth in both creativity and problem-solving. For instance, during a group project on developing a business idea, Emma was able to come up with several innovative solutions, contributing actively to her team's project. She also showed an increased willingness to take risks, such as proposing a new product concept that was initially met with skepticism but later accepted by her peers. Emma's transformation reflects the program's ability to foster an entrepreneurial mindset, particularly in students who initially lacked confidence in their problem-solving abilities.

In summary, the findings suggest that the entrepreneurship education program had a significant positive effect on students' innovation mindsets, particularly in their creativity, problem-solving, and risk-taking abilities. The program's emphasis on real-world tasks and collaborative work facilitated the development of critical thinking and cognitive flexibility.

These results underscore the potential of entrepreneurship education as an effective tool for cultivating innovation skills in young learners, preparing them for future challenges in an ever-changing world. The study supports the need for integrating entrepreneurial education into primary school curricula to nurture the next generation of creative thinkers and problem-solvers.

The results of this study indicate that the early entrepreneurship education program had a significant positive effect on the innovation mindsets of primary school children. The experimental group demonstrated notable improvements in creativity, problem-solving, and risk-taking behaviors compared to the control group. These findings suggest that exposure to entrepreneurial concepts at a young age can enhance cognitive flexibility and foster an innovation mindset, which are critical skills for the future. The program's emphasis on real-world applications of entrepreneurship such as identifying problems, developing solutions, and collaborating on ideas appears to have contributed to these positive changes. Students showed an increased willingness to engage in creative thinking and tackle challenges, highlighting the potential benefits of early entrepreneurship education.

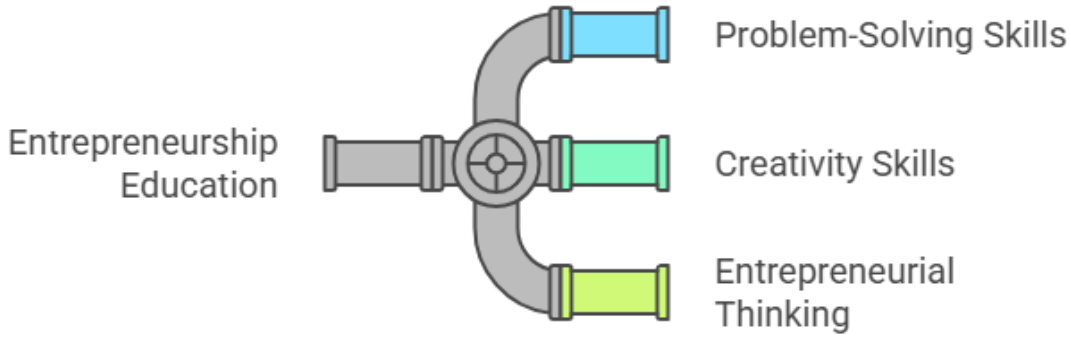

Figure 2. Unveiling the Multifaceted Impact of Entrepreneurship Education

When comparing these results with previous research, the study aligns with the work of scholars who have emphasized the role of entrepreneurship education in developing creativity and critical thinking (Oh, 2025; Zeka, 2025) However, it also extends the literature by focusing specifically on primary school students and measuring the impact of entrepreneurship education on innovation-related skills, which have been less explored in earlier studies. While much of the existing research has focused on older students or adults, this study provides evidence that entrepreneurial thinking can be nurtured at a much earlier stage, suggesting that young children can indeed develop important skills such as problem-solving and creativity through structured entrepreneurial activities.

The results also indicate that the early introduction of entrepreneurship concepts signals a shift in the way education can be approached in primary schools. The program not only improved students' academic skills but also helped them develop a mindset conducive to innovation, which is essential in today's fast-paced and ever-changing world. This reinforces the argument that entrepreneurial education should be integrated into primary school curricula to foster broader cognitive skills. It shows that entrepreneurial learning goes beyond business knowledge, impacting students' attitudes toward problem-solving and their ability to approach tasks from multiple perspectives. The positive shifts in student behavior observed during the study are signs of the value of such programs in cultivating a generation of adaptable and creative individuals.

The implications of these results are significant for both educational practice and policy. The study suggests that incorporating entrepreneurship education at an early stage can be a key factor in developing the skills necessary for students to thrive in the modern economy. It calls for a rethinking of traditional educational methods, urging educators and policymakers to include more hands-on, problem-solving activities that encourage creativity and critical

thinking. By fostering an entrepreneurial mindset, schools can prepare students to navigate the complexities of the future workforce, where adaptability and innovation are increasingly valued. Early entrepreneurship education programs can play a pivotal role in equipping young learners with the tools they need to succeed in an interconnected, technology-driven world.

The results are consistent with the theory that engaging students in entrepreneurial learning at a young age promotes the development of skills necessary for innovative thinking. The program's structure, which included real-world challenges and opportunities for collaboration, likely played a crucial role in this outcome. Students were given the chance to solve problems collectively, think creatively, and take risks skills that are core components of an innovation mindset. This reinforces the idea that an entrepreneurial approach to education fosters cognitive flexibility and creative problem-solving abilities. Additionally, the use of real-world scenarios may have enhanced students' ability to apply these skills in everyday contexts, further explaining the positive results observed in this study.

In the future, research should continue to explore how early entrepreneurship education can be adapted and implemented across diverse educational settings. Further studies could investigate the long-term effects of these programs on students' academic success and their continued development of innovative skills. Additionally, it would be valuable to examine how different types of entrepreneurial activities such as peer collaboration, digital tools, or project-based learning affect students' creativity and problem-solving abilities. The findings of this study lay the foundation for further investigation into how to best integrate entrepreneurship education into primary school curricula and how such programs can contribute to the overall development of students as innovative thinkers and problem-solvers.

CONCLUSION

The key finding of this study is that the early entrepreneurship education program significantly improved primary school children's innovation mindsets, particularly in their creativity, problem-solving, and risk-taking abilities. The experimental group demonstrated marked improvements compared to the control group, indicating that exposure to entrepreneurial thinking at an early stage can effectively foster cognitive flexibility and a proactive approach to challenges. This research highlights the potential of entrepreneurship education to shape young learners' attitudes toward creativity and problem-solving, which are essential components of an innovation mindset.

This research contributes to the field of education by providing empirical evidence of the positive impact of entrepreneurship education on cognitive development in young children. The study's value lies not only in demonstrating the benefits of early entrepreneurship education but also in offering a novel perspective on how such education can enhance key cognitive and behavioral skills like creativity, adaptability, and risk-taking. The use of a mixed-methods approach, combining quantitative assessments and qualitative insights, further enriches the understanding of how entrepreneurial education can shape children's academic and cognitive outcomes. The study's findings contribute to the growing body of literature on the importance of entrepreneurial education for fostering a future generation of problem-solvers and innovators.

The limitations of this study include its short duration and the lack of long-term follow-up to assess whether the improvements in innovation mindsets are sustained over time. Future research could investigate the lasting effects of early entrepreneurship education on students' cognitive development and academic success. Additionally, the study focused on a specific sample from a single region, which may limit the generalizability of the findings. Future studies should aim to replicate this research across diverse populations and educational contexts to validate the results and explore the program's broader applicability. Further

research could also explore how different types of entrepreneurship activities and teaching strategies contribute to fostering innovation mindsets in primary school children.

Future research directions could focus on expanding the scope of the entrepreneurship program to include a wider range of cognitive and social skills, such as emotional intelligence, teamwork, and leadership. Additionally, examining the role of teacher training in effectively implementing entrepreneurship programs would be valuable. Further studies might also explore how integrating digital tools and technology into entrepreneurship education influences students' learning outcomes. Longitudinal studies could provide insights into the long-term effects of early entrepreneurship education on students' overall academic performance, career aspirations, and ability to innovate in the future.

AUTHOR CONTRIBUTIONS

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

Author 2: Conceptualization; Data curation; In-vestigation.

Author 3: Data curation; Investigation.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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