

A LANDMARK WORK OF HIGH-QUALITY LOCALIZED EXPLORATION: RESEARCH ON THE DEVELOPMENT AND APPLICATION OF HIGH-QUALITY PROJECT RESOURCES FOR KINDERGARTEN STEAM EDUCATION

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Abstract: *Research on the Development and Application of High-Quality Project Resources for Kindergarten STEAM Education* is an integrated work that systematically explores the localized pathway of early childhood STEAM education. Centering on the core proposition of “high-quality development”, the monograph constructs a tripartite framework of “theoretical construction—resource development—practical exploration”. Its contributions are threefold: first, it takes the lead in constructing a high-quality indicator system for kindergarten STEAM education, transforming “high quality” from policy discourse into an observable reference framework; second, it firmly establishes an “authentic problem-driven” project generation pathway. By layering and deepening three types of authentic problems, project resources grow organically from real-life contexts, fundamentally avoiding the trap of formalization; third, the work emphasizes theoretical guidance, resource support, teacher role transformation, and ecological support guarantees, combining theoretical depth with practical warmth. Thus, it provides a valuable “Chinese solution” for the localized implementation and high-quality development of kindergarten STEAM education.

Keywords: Kindergarten STEAM education; High-quality; Authentic problem-driven; Project resource development

1 INTRODUCTION

At a time when profound changes unseen in a century are accelerating, and technological revolution is deeply intertwined with major-power competition, STEAM talent cultivation has become a critical variable in the strategic games of nations. The release of China's *STEM Education 2035 Action Plan* in 2024 has further pushed STEAM education to the forefront of building a strong education nation. However, as STEAM education extends from higher education to the preschool stage, “the localization of STEAM education” has become a fundamental issue in urgent need of investigation [1]. China's STEAM education has yet to form a theoretical system with Chinese characteristics [2], while practical dilemmas such as “enthusiastic concepts, scarce resources, and difficult implementation” have increasingly come to the surface during the process of application and promotion. For instance, preschool STEAM education still suffers from disconnection from daily life, superficial integration, and the absence of children's subjectivity [3], or from a scarcity of case resources, simple disciplinary stacking, and vague evaluation systems [4]. How can we respect children's subjectivity and root education in real life, providing preschool children with high-quality, implementable, and vibrant STEAM educational resources and learning experiences? Drawing on years of research and supported by the Ministry of Education's Humanities and Social Sciences Research Planning Fund Project (21YJA880049) and Jiangsu Province's Philosophy and Social Sciences Research Major Project (2020SJZDA123), Duhong Peng presents *Research on the Development and Application of High-Quality Project Resources for Kindergarten STEAM Education*. This work directly addresses the core proposition of “how preschool STEAM education can achieve high-quality development”, constructing a tripartite framework of “theoretical construction—resource development—practical exploration” across 13 chapters and 32 sections. The monograph transforms the abstract aspiration of “high quality” into actionable core objective orientation, high-quality content standards, appropriate activity models, and replicable exemplary project samples and resources, offering a solution that combines theoretical depth with practical warmth for the localized development of preschool STEAM education in China. Having been engaged in curriculum research for nearly 20 years, with extensive experience in kindergarten curriculum practice, I was deeply impressed upon finishing this book by how seamlessly it integrates a grand theoretical framework with grounded practical logic. In my view, this work stands as the most representative example of theory-practice integration in current Chinese preschool STEAM education research.

2 THEORETICAL CONSTRUCTION: SYSTEMATIC FOUNDATION BUILDING FROM THE PROPOSITION OF “HIGH QUALITY”

A comparison with similar works on STEAM education in childhood reveals that the most distinctive feature of Peng's work is that its first five major chapters are anchored in “high quality” [5-7], constructing a theoretical foundation that guides the subsequent development of high-quality STEAM project resources. Specifically, it starts with “the call for high-quality development in preschool STEAM education”, then proceeds to studies on the core goals of preschool STEAM education, the content selection for high-quality preschool STEAM education, the models for high-quality

preschool STEAM education, and finally culminates in the construction of an indicator system for high-quality preschool STEAM education. This framework is like the theoretical groundwork first laid by Jean and Barbre [8] but this work's theoretical construction oriented toward high-quality development goals is more prominent and more systematic. Therefore, this work does not remain at the level of empirical description but begins with “high-quality development” as its theoretical anchor. The book attempts to answer some fundamental questions like at the preschool stage, what exactly should STEAM education cultivate? What on earth does high-quality preschool STEAM education look like? Including where does the high-quality content resources come from and its high-quality features, and what is the most appropriate model for kindergarteners to implement STEAM project and activities, etc. The author approaches from both micro-process and meso-macro perspectives, transforming the relatively vague policy discourse of “high quality” into an observable indicator system. This effort ensures that “high quality” is no longer an empty value declaration but possesses operational significance capable of guiding practice. In the end, the author emphasizes in the book that high-quality preschool STEAM education should be “oriented toward children's lifelong learning and development. This value positioning elevates the book's theoretical construction beyond the limitations of instrumental rationality, returning to the authentic pursuit of education as human development.

3 RESOURCE DEVELOPMENT: METHODOLOGICAL BREAKTHROUGH THROUGH “AUTHENTIC PROBLEM-DRIVEN” APPROACH

Although authentic problem-driven approach is not Peng's original creation, her classification and hierarchization of complex real-world problems into a tripartite typology—authentic problems from preschool children, micro-authentic problems, and frontier unsolved authentic problems—represents a creative contribution. These three types of real-world problems are consistently woven throughout the entire work's research on resource development and application practices. This distinction is grounded in a clear understanding of children's cognitive developmental levels—“real-world frontier problems” do not require children to directly solve cutting-edge technological difficulties but instead select those “frontier technological engineering issues and real-world challenges that have reflections in children's lives”, thereby creating meaningful connections between grand topics and children's experiential worlds.

For example, the book's subsequent chapters present a series of project development cases aligned with this tripartite typology: Chapter 6 on developing projects based on authentic problems from preschool children, Chapter 7 on projects oriented toward frontier unsolved authentic problems, Chapter 8 on projects based on micro-authentic problems, and Chapter 9 on building an authentic problem-driven resource bank for kindergarten STEAM projects. The following three chapters in the section on applied research offer practical explorations of specific projects, including “How to Learn from Nature”, “How to Build a Sturdy Bridge”, and “How to Design Plastic Alternatives”.

4 PRACTICAL EXPLORATION: TESTING AND REFLECTION IN IMPLEMENTATION

Theory as root and resources as body ultimately must be tested in practice. Chapters 10 through 12 respectively revolve around three typical projects—“Learning from Nature” (bionic projects), “Building Sturdy Bridges” (bridge projects), and “Designing Plastic Alternatives” (plastic alternative projects)—fully presenting the entire process from practical preparation and approaches to processes and outcomes. These cases are not idealized instructional design templates but dynamic pictures that include children's responses, teachers' adjustments, and the emergence and resolution of problems in real classrooms. Chapter 13, “Necessary Support and Safeguards for the Application of Quality Kindergarten STEAM Project Resources”, reflects the author's pragmatic spirit. She does not evade the real difficulties in practice—teachers' mental states, educational philosophies, and STEAM literacy; preschool education evaluation policies; and the internal and external support of the home-kindergarten-community environment—factors that many researchers treat as “external variables” are incorporated into the core vision of this study.

5 INTEGRATED MANIFESTATION: MULTIDIMENSIONAL EFFORTS UNDER A CLEAR LOGICAL FRAMEWORK

Looking at the book, its leading and integrated nature stems from the convergence of multiple efforts by the author: First, the systematic nature of theoretical construction. The book completes a full-chain theoretical clarification from objectives, content, and models to evaluation indicators, providing a relatively complete analytical framework for preschool STEAM education research. High-quality STEAM learning experiences during early childhood are critically important for children's future academic development trajectories. Third, the conscious effort toward localization. The book is not satisfied with introducing foreign concepts but attempts to explore a Chinese pathway for implementing STEAM education within the context of China's preschool education policies (such as “high-quality education system” and “building a strong education nation”) and practical conditions.

6 ISSUES FOR FURTHER EXPLORATION

Of course, as a pioneering work, this book also leaves room for continued research. For example, while the indicator system in the book offers rich referential value, it has not yet been further empirically tested, nor have corresponding quality assessment tools been developed. Issues such as how such quality assessment tools can undergo reliability and validity testing and adaptive adjustments across different types of kindergartens require further deepening exploration in

future research. In the process of transforming “authentic problems” into “STEAM project activities”, how can teachers' professional judgment and curriculum decision-making capacities be effectively cultivated? What more specific supports are needed for the realization pathways of teacher role transformation (such as the role positioning of “support scaffolders”)? These are also real challenges and research questions facing preschool STEAM teacher education. Finally, the author offers a forward-looking perspective in the appendix under the title “AI+STEAM: A Prospect of Children's Interdisciplinary Imagination”, but this issue warrants continued in-depth exploration in future research.

7 CLOSING REMARKS

STEAM education, with interdisciplinary integration as its core concept, represents the developmental direction of international basic education reform [9]. *Research on the Development and Application of High-Quality Project Resources for Kindergarten STEAM Education* is a high-level work with clear positioning, complete structure, and both theoretical ambition and practical character. The publication of this work, rooted in local practice and oriented toward children's lifelong development, coincides with a critical period when China's preschool STEAM education is transitioning from conceptual advocacy to in-depth practical implementation. Through solid theoretical clarification, systematic resource development, and pragmatic practical testing, it provides a valuable “Chinese solution” for the high-quality development of preschool STEAM education in China and offers a valuable starting point for research on the coherent cultivation of science and technology education from preschool through primary and secondary education. Previous skewed investment that “emphasized the pinnacle while neglecting the foundation” failed to effectively address the deep challenges of skill shortages and insufficient talent reserves in the STEM fields [10]. This work provides timely reference for addressing these root causes.

Moreover, for kindergarten practitioners, this book stands out for its readability and appeal. Its projects are designed with strong scalability, with the potential to inspire and give rise to a broader array of high-quality STEAM initiatives and exemplary cases.

8 CONCLUSION

In sum, Peng's monograph represents a landmark contribution to the field of kindergarten STEAM education in China. By weaving together theoretical innovation, high-quality resource development and practical application, the book stands as both a scholarly milestone and a practical compass—one that will undoubtedly inform and inspire future research, policy, and practice in early childhood STEAM education for years to come. It is hoped that this work will serve as an engine for advancing high-quality kindergarten STEAM education, contribute to the cultivation of a distinctive Chinese STEAM education system, and provide fundamental support for the nation's broader strategic goals of building a strong education system, scientific and technological capacity, and a skilled talent pool.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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