PIONEER
ACADEMIC PUBLISHING LIMITED

Journal of Advanced Research in Education
ISSN 2709-3980
www.pioneerpublisher.com/jare
Volume 4 Number 5 September 2025

Design and Development of Kindergarten C-STEAM Curriculum from the Perspective of Five-Education Integration

Shuxin Zhang[1]

[1] Technology & Media University of Henan Kaifeng, Henan, China
Correspondence: Shuxin Zhang, Technology & Media University of Henan Kaifeng, Henan, China.

doi:10.56397/JARE.2025.09.06

Abstract

Based on China's localized educational policy of "Five-education Integration" and the practical needs of STEAM education in kindergartens, this study proposes the "C-STEAM" curriculum concept (Cultural-STEAM, i.e., STEAM education with cultural infiltration). It explores the integrated path for fostering the all-round development of children in morality, intelligence, physical education, aesthetics, and labor (the "Five Educations") and the cultivation of interdisciplinary inquiry abilities at the kindergarten stage. By employing methods such as literature analysis, action research, and case development, a "three-dimensional and four-level" curriculum framework is constructed, a library of thematic activity cases is developed, and implementation strategies are put forward. The research shows that the C-STEAM curriculum can effectively promote the development of children's multiple abilities and provide a practical model for kindergartens to implement the Five-education Integration.

Keywords: five-education integration, kindergarten education, c-steam curriculum, children's development

1. Introduction

The "Overall Plan for Deepening the Reform of Educational Evaluation in the New Era" emphasizes the "Five-education Integration" and requires education to return to its essence of nurturing people (Yuan, L., 2022). The "Guidelines for the Learning and Development of Children Aged 3-6" advocates "integrated education", providing policy support for the localization of STEAM education (Ministry of Education of the People's Republic of China, 2012). Currently, the STEAM curriculum in kindergartens has problems such as "emphasizing skills over literacy" (Banks, J. A., 2008), "superficial interdisciplinary integration", and "insufficient cultural infiltration". Therefore, it is necessary to reconstruct the curriculum logic under the guidance of the Five-education Integration. This study combines the excellent traditional Chinese culture with STEAM education to construct a "C-STEAM" curriculum model, providing a new path for kindergartens to implement the fundamental task of fostering virtue through education (Zhan, Z. H., Li, K. D., Lin, Z. H., Zhong, B. C., Mai, Z. Y., & Li, W. X., 2020).

The Five-education Integration refers to the organic integration of moral education, intellectual education, physical education, aesthetic education, and labor education to form an educational system for all-round development. The implementation of the Five-education Integration in kindergarten curricula aims to cultivate children's comprehensive quality and all-round development capabilities (Lamb, R., Akmal, S., et al., 2015). Domestic research mainly focuses on policy interpretation and practice in primary and secondary schools, while research at the kindergarten stage mostly focuses on the infiltration of a single field, lacking systematic curriculum design (Wan, H. W. F., Mohamad, M. F., et al., 2016).

STEAM education refers to the integration of five disciplines — Science, Technology, Engineering, Art, and Mathematics — to promote the comprehensive improvement of students' comprehensive abilities (Welling, J., Wright, J., et al., 2018). David Anderson, a foreign scholar, believes that STEAM courses, with their interdisciplinary characteristics, stimulate students' innovative thinking and problem-solving abilities, and cultivate their practical skills and teamwork abilities. Foreign research on STEAM education emphasizes interdisciplinary integration and problem-solving abilities. However, the practice of STEAM education in domestic kindergartens mostly draws on Western models, resulting in insufficient cultural adaptability.

C-STEAM education is a new model of STEAM education oriented towards excellent traditional culture. It combines excellent traditional Chinese culture with the educational concept of STEAM (Science, Technology, Engineering, Art, Mathematics). It aims to inherit and promote traditional culture through interdisciplinary approaches, emphasizing the integration of disciplinary knowledge and skills in real scenarios for problem inquiry and solving, thereby cultivating students' cultural inheritance literacy and interdisciplinary innovation literacy. Scholars such as Zhan Zehui have proposed interdisciplinary integrated education (C-STEAM) for cultural inheritance, analyzed the cultivation approaches of C-STEAM education, constructed the ETIC framework from two dimensions—training methods ("process-oriented vs. result-oriented") and ability development ("low-level vs. high-level")—and further distinguished four typical C-STEAM project models: experience-perception type, skill-training type, inquiry-learning type, and innovation-creation type (Yakman, G., & Lee, H., 2012).

In recent years, the emerging "culture + STEAM" model (such as the "STEAM + local culture" model in the United States) has provided references for the development of localized curricula, but a mature practical framework for kindergartens has not yet been formed (Aschbacher, P. R., Ing, M., et al., 2014).

2. Design Principles and Objectives of Kindergarten C-STEAM Curriculum from the Perspective of Five-education Integration

2.1 Curriculum Design Principles

1) **Child-centered Principle**: Respect children's interests and cognitive characteristics, and ensure that the difficulty level of activities is in line with their zone of proximal development.
2) **Five-education Integration Principle**: Each activity should contain at least two elements of the "Five Educations". For example, the "traditional paper art" activity integrates aesthetic education (aesthetic appreciation), labor education (hands-on practice), and moral education (cooperation).
3) **Cultural Infiltration Principle**: Take traditional cultural themes (such as solar terms, intangible cultural heritage, and folk customs) as carriers to infiltrate STEAM elements.
4) **Gamification Principle**: Stimulate the interest in inquiry through game forms such as situational creation, role-playing, and hands-on operations.

2.2 Curriculum Objective System

Dimension	Objective Content
Overall Objective	Cultivate "little citizens" with the spirit of inquiry, cultural confidence, and all-round development in morality, intelligence, physical education, aesthetics, and labor

Moral Education	Cultivate the awareness of cooperation, sharing, and responsibility, and understand traditional virtues (such as "filial piety to parents" and "diligence and frugality")
Intellectual Education	Develop the abilities of observation, thinking, and problem-solving, and master simple scientific inquiry methods (such as classification and measurement)
Physical Education	Develop motor coordination skills through physical operations (such as building and weaving), and cultivate healthy living habits
Aesthetic Education	Experience the beauty of colors, shapes, and rhythms in traditional culture, and express creativity in various forms
Labor Education	Participate in the use of simple tools and material processing, and experience the process of labor and the value of labor achievements

3. Construction of the Content System of Kindergarten C-STEAM Curriculum

3.1 Curriculum Content Framework: The Three-Dimensional and Four-Level Model

3.1.1 Horizontal Three-Dimensional Dimensions

- **Cultural Theme Dimension**: Traditional festivals (e.g., the Spring Festival, the Dragon Boat Festival), folk crafts (e.g., paper-cutting, pottery), natural solar terms (e.g., the Spring Equinox, the Winter Solstice), and traditional science and technology (e.g., the compass, the abacus).
- **STEAM Element Dimension**: Scientific inquiry (observation, experiment), technology application (tool use), engineering practice (design and construction), artistic expression (creation and aesthetic appreciation), and mathematical cognition (quantity, shape).
- **Five-education Objective Dimension**: Decompose activity objectives according to moral education, intellectual education, physical education, aesthetic education, and labor education.

3.1.2 Vertical Four-Level Dimensions

- **Junior Class**: Focus on sensory experience, such as "understanding traditional toys (diabolo, kite)".
- **Middle Class**: Focus on simple operations, such as "making sachets (sewing, cutting, and color matching)".
- **Senior Class**: Focus on problem-solving, such as "designing traditional bridges (structural construction, material selection)".

3.2 Development of Excellent Cases of Thematic Activity Cases

From the perspective of "Five-education Integration", this study further interprets STEAM education, believing that the "Five Educations" are an integral educational goal rather than several independent educational processes. Moreover, on the basis of the existing research by scholars, it strongly challenges the educational status quo where the "Five Educations" are fragmented like "five separate pieces of leather". Based on the interpenetrating relationship of the "Five Educations" where "each contains the other", this study further enriches and improves the relationship between the "Five-education Integration" and STEAM education.

Secondly, this study grasps the design and development of the STEAM curriculum in combination with the characteristics of education in Henan Province, especially the C-STEAM curriculum, which should be integrated with the educational characteristics of Henan Province. STEAM education based on excellent traditional culture is a brand-new educational paradigm and also one of the important ways to cultivate and develop students' core literacy.

From the perspective of the Five-education Integration, this study conducts action research on the kindergarten C-STEAM curriculum. Experimental kindergartens are selected based on their representativeness, willingness to participate in the research, and conditions for implementing the C-STEAM curriculum, taking into account factors such as their geographical location, teaching staff, and educational resources. Within the experimental kindergartens, several classes in the junior, middle, and senior grades are randomly selected as sample classes to ensure the

representativeness and comprehensiveness of the samples. The following are excellent cases from the development and implementation of thematic activities.

Case 1: "Dragon Boat Designer" for Middle Class (Integration of Five-education and STEAM)

Activity Stage	Corresponding STEAM Field	Key Points of Five-education Integration	Specific Implementation Content
Cultural Introduction	Science (S)	Moral Education: Cultivate initial teamwork awareness through group discussions; Intellectual Education: Stimulate the interest in exploring buoyancy and hull structure	1. Watch videos of dragon boat races to experience the culture of traditional festivals; 2. Conduct group discussions on "why dragon boats can float on water" and record initial ideas
Design Stage	Mathematics (M), Engineering (E)	Moral Education: Clarify division of labor in groups to strengthen the awareness of cooperation; Intellectual Education: Learn to measure the length of dragon boats with tools and understand symmetry; Labor Education: Get in touch with material selection methods initially	1. Work in groups to draw dragon boat sketches and mark the length and symmetrical structure; 2. Measure the size of building blocks/cartons with a ruler and select suitable building materials (building blocks, cartons, ropes)
Construction and Decoration	Technology (T), Art (A)	Intellectual Education: Practice the principle of hull structure stability; Aesthetic Education: Design traditional dragon patterns and use color matching; Labor Education: Use tape to fix and assemble models to exercise hands-on ability	1. Build the hull frame with building blocks and fix the joints with tape; 2. Draw traditional patterns such as dragon patterns and auspicious clouds on cardboard/cartons with colored pens to decorate the hull
Sharing and Improvement	Engineering (E), Science (S)	Moral Education: Conduct group presentations and sharing, and learn to listen to and respect others' opinions; Intellectual Education: Analyze model problems and explore optimization methods	1. Each group presents their dragon boat models and introduces the design ideas; 2. Conduct collective discussions on "how to make the dragon boat more stable" (e.g., adding bottom supports, adjusting the center of gravity) and record the improvement plans

In terms of activity objectives, moral education cultivates teamwork awareness through group cooperation; intellectual education encourages children to understand the structural characteristics of dragon boats, such as length and symmetry; engineering and technology involve building dragon boat models with building blocks and cardboard; and art involves designing dragon boat patterns, such as colors and patterns.

The overall activity process starts with cultural introduction: watching videos of dragon boat races and discussing "why dragon boats can float on water". Then, in the design stage, groups draw dragon boat sketches and select materials. Next, the construction and decoration stage begins: fixing the hull with tape and drawing dragon patterns with colored pens.

Finally, the sharing and improvement stage takes place: presenting the models and discussing "how to make the dragon boat more stable".

It can be seen from the case that the specific path of the Five-education Integration in this case study is reflected in the following aspects: moral education is carried out through group division of labor in construction; intellectual education is implemented through scientific inquiry, including discussions on buoyancy and structural stability; aesthetic education is reflected in artistic expression, such as the creation of traditional patterns; and labor education is conducted by developing hands-on ability, specifically through tool use and model assembly.

Case 2: "Erecting Eggs on the Spring Equinox" in Traditional Solar Terms for Senior Class (Science + Culture + Mathematics)

Activity Stage	Corresponding STEAM Field	Key Points of Five-education Integration	Specific Implementation Content
Solar Term Culture Introduction	Science (S), Humanities (Cultural Extension)	Moral Education: Learn to listen to others' opinions in group discussions; Intellectual Education: Perceive the characteristics of the Spring Equinox and the connection with the custom of "erecting eggs"	1. Watch animations about the Spring Equinox to understand the characteristics of the Spring Equinox (equal day and night, revival of all things); 2. Share the legend of "erecting eggs on the Spring Equinox" (e.g., "the tilt angle of the Earth's axis is suitable for erecting eggs on the Spring Equinox") and conduct group discussions on "why it is easier to erect eggs on the Spring Equinox"
Egg-erecting Inquiry Practice	Science (S, balance principle), Mathematics (M, angle/number of attempts statistics)	Intellectual Education: Explore the balance conditions of eggs (center of gravity, contact surface); Labor Education: Exercise fine motor skills and patience; Moral Education: Conduct mutual assistance in groups to try different methods	1. Work in groups to receive eggs, shallow plates, and salt grains (auxiliary materials), and try different methods such as erecting eggs without assistance and erecting eggs with salt sprinkled; 2. Use a simple protractor to measure the tilt angle of eggs initially, record the "success/failure" status, and observe the difference in placement between the egg tip and the egg tail
Data Recording and Analysis	Mathematics (M, statistics/comparison), Technology (T, tool use)	Intellectual Education: Learn to use tables for data statistics and analyze the key factors for "successful egg erection"; Moral Education: Respect different inquiry conclusions in collective sharing	1. Use pre-drawn statistical tables to record the "number of attempts and successful attempts of different methods" within the group (e.g., "10 attempts without salt, 2 successes; 10 attempts with salt, 6 successes"); 2. Conduct collective comparison of data from each group and discuss "why sprinkling salt can improve the success rate" (salt grains increase friction and help fix the center of

			gravity)
Solar Term Extension and Application	Art (A), Mathematics (M, symmetrical design)	Aesthetic Education: Decorate eggs with elements related to the Spring Equinox; Intellectual Education: Design patterns using the principle of symmetry; Labor Education: Use colored pens and stickers safely for decoration	1. Draw symmetrical patterns related to the Spring Equinox (e.g., willow leaves, peach blossoms, kites) on eggs with colored pens; 2. Place the decorated "successfully erected eggs" in the class solar term corner for display and discuss "how to keep the displayed eggs balanced" (e.g., matching with a base, adjusting the placement position)

The core objective of Case 2 is to explore the scientific principle of "egg standing" (center of gravity and friction) and understand the custom of the Spring Equinox. Through scientific observation of the curvature of the egg surface, different placement methods are tried; mathematically, the number of successfully standing eggs is recorded, and the success rates of "placing the big end down" and "placing the small end down" are compared; culturally, the legend of "erecting eggs" on the Spring Equinox is told, and solar term picture books are made, so as to achieve the STEAM curriculum design under the Five-education Integration.

4. Curriculum Implementation Paths and Strategies

4.1 Environment Creation: Building a "C-STEAM Cultural Inquiry Area"

Environment creation is an important part of kindergarten education. According to the practice of this study, building a "C-STEAM Cultural Inquiry Area" is an effective method. In terms of class areas, set up a "traditional craft corner" with pottery and tie-dye tools, a "science laboratory" with magnifying glasses and balances, and an "engineering construction area" with building blocks and waste materials. In addition, in the kindergarten environment, arrange a "solar term corridor" and an "intangible cultural heritage wall" to display children's works such as paper-cutting and facial masks.

4.2 Teacher Role Transformation

Teachers play an important role in the design and development of the C-STEAM curriculum. Therefore, the transformation of teachers' roles is also a necessary step, which specifically includes three aspects. Firstly, teachers should be cultural communicators, master knowledge of traditional festivals and folk customs, and infiltrate culture through stories, children's songs, and other forms. Secondly, they should be inquiry guides, stimulating children's thinking through questions such as "why glutinous rice is wrapped in zongzi leaves". Finally, they should be resource integrators, connecting with community resources such as inheritors of intangible cultural heritage and science and technology museums to carry out practical activities.

4.3 Home-Kindergarten Co-Education Strategies

The design and development of the kindergarten C-STEAM curriculum from the perspective of the Five-education Integration requires not only the efforts of the kindergarten but also the implementation of home-kindergarten co-education strategies. In terms of parent-child tasks, assign "family solar term inquiry" tasks, such as making mooncakes with parents and observing the phases of the moon during the Mid-Autumn Festival. In addition, set up parent open days to display children's C-STEAM achievements, such as the "traditional bridge model exhibition", and invite parents to participate in the evaluation.

Fund Project

This paper was supported by 2025 Annual Henan Provincial Philosophy and Social Sciences Education-Strengthening Province Project "Design and Development of Kindergarten C-STEAM Curriculum from the Perspective of Five-Education Integration" (Project Approval No.: 2025JYQS0489).

References

Aschbacher, P. R., Ing, M., et al. (2014). Is science

me? Exploring middle school students' STEM career aspirations. *Journal of Science Education and Technology*, (6), 735-743.

Banks, J. A. (2008). *Multicultural education: Issues and perspectives*. Psychological Publishing Co., Ltd. (Taipei, Taiwan).

Lamb, R., Akmal, S., et al. (2015). Development of a cognition-priming model describing learning in a STEM classroom. *Journal of Research in Science Teaching*, (3), 410-437.

Ministry of Education of the People's Republic of China. (2012). *Guidelines for the learning and development of children aged 3-6*. Capital Normal University Press.

Wan, H. W. F., Mohamad, M. F., et al. (2016). Fostering students' 21st century skills through Project Oriented Problem Based Learning (POPBL) in integrated STEM education program. *Asia-Pacific Forum on Science Learning & Teaching*, (1), 60-77.

Welling, J., Wright, J., et al. (2018). Teaching engineering design through paper rockets. *Technology & Engineering Teacher*, (8), 18-21.

Yakman, G., & Lee, H. (2012). Exploring the exemplary STEAM education in the US as a practical educational framework for Korea. *Journal of the Korean Association for Science Education*, (6), 1072-1086.

Yuan, L. (2022). *Theory and practice of the application of STEAM education for children*. Beijing Normal University Press.

Yuan, L., Zhang, S. X., & Zhang, J. (2021). Research progress and enlightenment of EU STEM transversal skills assessment. *E-Education Research*, (9), 1-10.

Zhan, Z. H., Li, K. D., Lin, Z. H., Zhong, B. C., Mai, Z. Y., & Li, W. X. (2020). Interdisciplinary integrated education for cultural inheritance (C-STEAM): The 6C model and practical cases. *Modern Distance Education Research*, *32*(2), 29-38, 47.