



RESEARCH ARTICLE

Practical Analysis of Design Principles for Multifunctional Calligraphy Pop-up Books for Preschool Children

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ARTICLE INFO	ABSTRACT
Received: Oct 29 2024	<p>To develop a multifunctional calligraphy pop-up book for preschool children. The lack of appropriate calligraphy learning materials for preschoolers affects their interest in learning calligraphy. To address this problem, researchers developed and designed a multifunctional calligraphy book to stimulate the interest of 4- to 6-year-old preschoolers in learning calligraphy. The research model consists of five phases: analysis, design, development, implementation, and evaluation (ADDIE). Questionnaire survey, user experience evaluation, in-depth interviews, fieldwork, and mixed research methods were used. Research Process An eight-week field survey and validation of 120 preschool children from three public kindergartens was conducted to obtain valid data analysis results through pre-test and post-test for valid formative evaluation. To analyze the interest and satisfaction in learning calligraphy using Multifunctional Calligraphy Stereoscopic Books. The results of the study show that the multifunctional calligraphy pop-up book is beneficial for children aged 4-6 years to learn calligraphy, solves the difficulties in learning calligraphy for children, and has high pedagogical satisfaction and interest. The research-designed product enhances the sensibility and fun of the learning process through multifunctional forms, and tactile and sensory information transfer, making calligraphy learning more attractive to preschool children. The results of the research include 1) innovating the content of calligraphy teaching materials; 2) solving the current situation and problems of preschool children's learning of calligraphy; 3) improving preschool children's ability and interest in learning calligraphy; and 4) developing and designing multifunctional calligraphy pop-up books. The conclusion shows that the multifunctional calligraphy pop-up book is an effective innovation for preschool children to learn calligraphy.</p>
Accepted: Dec 17, 2024	
Keywords	
Multifunctional Calligraphy Pop-up Book	
Calligraphy	
Cultural Elements	
Preschoolers	
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INTRODUCTION

Educators around the world are now prioritizing creativity, critical thinking, communication, and collaboration skills(Kumar, 2022). Cultural and social values, educational practices, and parental involvement influence the development of creative thinking in Chinese children. Traditional Chinese educational practices limit preschoolers' creativity, but the art of calligraphy can enhance it(Cai, Zhang, & Cai, 2023). Finding innovative solutions to improve calligraphy education and encouraging innovative development research. Research and development to make traditional culture more accessible to preschool children and to increase interest in learning calligraphy. Calligraphy education, both ancient and modern, focuses on teaching students to read and write, and the Chinese character and its composition is an important part of this education. Countless experiments in teaching calligraphy have shown that children's attention, observation, expression, and aesthetic

ability can all be improved by practicing calligraphy. Learning calligraphy is a complex process that can have a positive impact on a child's psychological development(Qiu & Perey, 2021; Jam et al., 2011). Calligraphy education also carries the following functions: literacy education, cultural inheritance, moral education, and art education(Xin, 2021). Studies have shown that through calligraphy education, preschoolers are more likely to appreciate traditional culture and develop an interest in calligraphy.

The researcher grew up in Anshan City and is familiar with the local culture. She has a deep understanding of the local culture. The researchers chose to focus on preschool calligraphy education and cultural development. That is, the goal of this study is to develop a multifunctional calligraphy pop-up book for preschool children and cultivate the interest of preschool children aged 4-6 in learning calligraphy. Selected learning materials should be safe, educational, developmentally appropriate, and meet current standards. Children need to develop literacy skills from an early age. Providing early literacy instruction will aid children's development and make it easier for them to interact and communicate with others(Ismail & Masruddin, 2023; Qadri et al., 2024).

Early Childhood Education (ECE) is education that guides the growth and development of children from birth to eight years of age(Yunitasari, 2019). The researcher's study was on the early literacy aspects of school-aged children aged 4-6 years. Children begin to have a behavioral awareness of scribbling at an early age, and their simple scribbles represent cognitive processes(Cora et al., 2021). Using multifunctional calligraphy dioramas is an innovative solution to engage children while developing their calligraphy writing skills. The multifunctional calligraphy pop-up book is a useful tool in the calligraphy teaching process. It is a visual aid that displays each Chinese character in a more appealing, clearer, and intuitive way. This makes learning calligraphy more fun for preschoolers and helps to stimulate their creativity and imagination(Ismail & Masruddin, 2023). Calligraphy has a positive effect on mood and can help children develop temperament and intelligence(Zhou, Liu, & Sang, 2021).

Calligraphy is based on the observation of images. In this study, specific images in a multifunctional calligraphy pop-up book are presented, communicated, and manipulated in innovative and practical ways. The purpose is to introduce preschoolers to specific images or patterns within images. From explanation to literacy, the strokes are disassembled to form a pop-up image that pops out of the book page, and the static lines in the template change shape, and then the children dynamically connect the Chinese characters through hands-on operations and perform writing exercises to achieve the purpose of research. The innovation lies in the development of a versatile preschool learning medium in the form of a calligraphy pop-up book. Designed with the theme of early childhood education courses, the form includes functionality (brushes, watercolors), pop-up design, moving splicing of colorful fonts, traditional cultural pop-up couplets, pictures, and interesting stories. Adopting innovative early childhood calligraphy teaching material models is an effective way to strengthen preschool children's calligraphy learning. Its ease of use can promote innovative development and improve children's ability to learn calligraphy.

Research Objective(s)

1. Analyze the design principles of multi-functional calligraphy pop-up books.
2. Explore the impact of multifunctional calligraphy pop-up books on preschool children's interest in stimulating and participating in learning calligraphy.
3. Examine the cognitive experience of multi-functional calligraphy pop-up books and traditional calligraphy teaching materials in preschool children's calligraphy learning.
4. Provide suggestions for the application of preschool calligraphy education, enrich the teaching methods of preschool education, and promote the calligraphy learning effect of preschool children.

LITERATURE REVIEW

Calligraphy, as an art and traditional culture, is based on the observation of images and the understanding of strokes, which is of great significance for preschool children's calligraphic learning (Leo et al., 2022). Calligraphy is a writing art form involving the use of Chinese characters and symbols. It is based on the strokes, structure, and meaning of these characters. It is an art that uniquely emphasizes the beauty of words. In China, calligraphy is considered a traditional and important art form, and its ability to convey the essence of language is unparalleled. In essence, calligraphy is the art of writing without the use of images, sounds, or lines, but through the beauty of words (Dong & Sabran, 2023).

This study is dedicated to introducing specific images and patterns to preschool children through the display, communication, and innovative practical operation of multifunctional pop-up calligraphy books, from explanation to literacy, forming pop-up images through the dismantling of strokes, guiding children's practical operation, dynamically connecting Chinese characters, and finally practicing writing, to achieve the research goal of improving preschool children's ability to learn calligraphy (Pezoa, Mendive, & Strasser, 2019). Its innovation lies in the design and development of multifunctional preschool calligraphy learning materials in combination with the early childhood education curriculum, calligraphy pop-up book, incorporating brushes, water canvas, pop-up design, colorful fonts splicing, traditional culture pop-up Spring Festival couplets, pictures, fun stories, and other elements, for preschoolers to bring new possibilities for calligraphy learning.



Figure 1 The scope and relationships of the study

Note. Photographed by researcher in 2024.

Conceptual framework:

Preschool children's calligraphy learning theory: Discuss the cognitive development characteristics and educational needs of preschool children's calligraphy learning, and study how multi-functional pop-up calligraphy books can be combined with preschool education curriculum design to effectively promote children's calligraphy learning. The application theory of multi-functional technology in preschool education: Analyze how multi-functional technology can help preschool children understand calligraphy strokes, improve calligraphy writing ability, and stimulate learning interest through image display, communication, and innovative practical operations. Educational innovation design theory: Explore how to combine functionality, pop-upity, fun, storytelling, and other elements to design innovative preschool learning media represented by calligraphy pop-up books to improve

the calligraphy learning effect of preschool children. Early childhood education teaching methods: Study how to apply innovative calligraphy teaching materials to early childhood education practice, improve children's calligraphy learning ability through ease of use and interest, and promote the development of early childhood education.

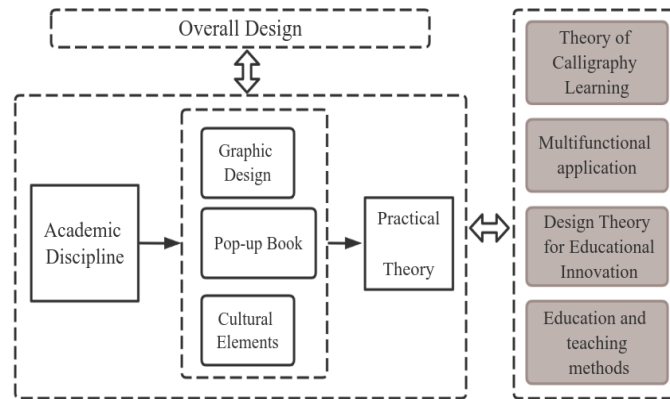


Figure 1 Conceptual frameworks

Note. Photographed by researcher in 2024.

RESEARCH METHODOLOGY

This study conducted a qualitative study on the innovation model of preschool calligraphy materials. The purpose is to explore the impact of multifunctional calligraphy pop-up books on preschool children's learning interests. The following sections describe the research process and methodology in detail.

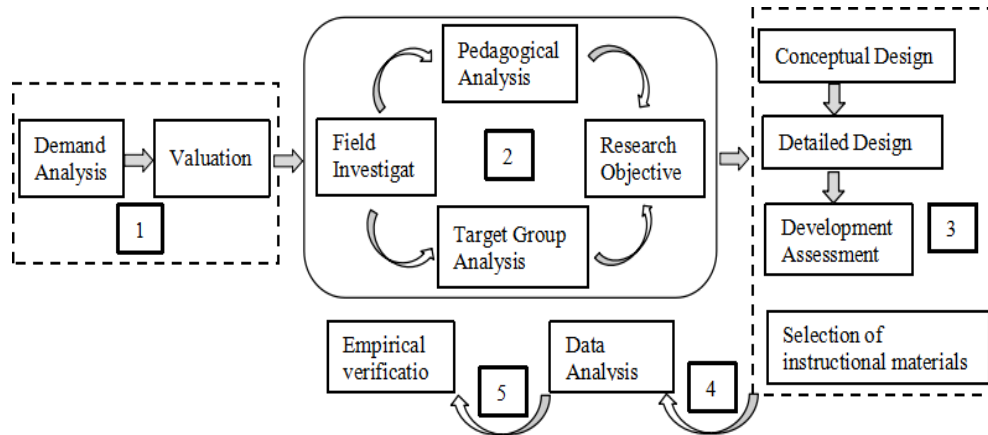


Figure 2 Research process

Note. Photographed by researcher in 2024.

Research objects: 120 preschool children aged 4-6 years old in three kindergartens were selected as the research objects, and a survey and analysis of multifunctional calligraphy pop-up books were conducted.

Data collection: To ensure the comprehensiveness of the data on preschool children's calligraphy learning, the researchers used three data collection methods.

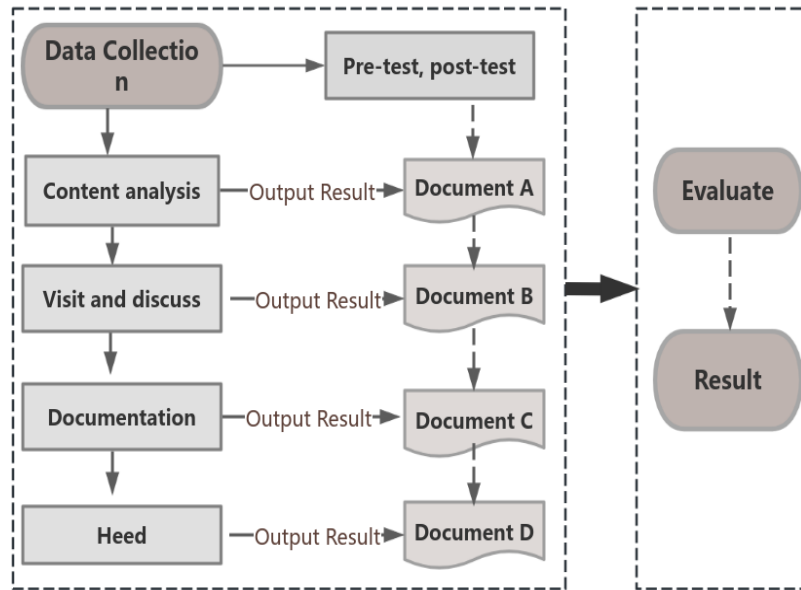


Figure 3 Data analysis charts

Note. Photographed by researcher in 2024.

The first method is to interview educators and preschoolers to collect verbal information on how to use multifunctional calligraphy pop-up books to cultivate interest in calligraphy.

The second method is the documentation method, in which researchers examine the differences in learning outcomes between traditional calligraphy materials and innovative model materials.

The third method is a questionnaire survey to observe and record the application principles of innovative demonstration materials.

Analysis of preschool children's difficulties in learning calligraphy. In this study, the student's learning status was observed, the age and cognition of the target group, and the questionnaire was completed together with parents. A total of 120 questionnaires were distributed, 120 were recovered, and 118 were valid questionnaires. Method: After applying Excel statistics, effective data on preschool calligraphy education needs were obtained.

Survey research shows that preschool children's psychological analysis and educational countermeasures for learning calligraphy do need improvement and innovation. Not only are teachers familiar with child psychology knowledge, but they must also be good at applying it in educational practice. Survey results are quantified on a 0-4 scale. 0 means irrelevant, 1 means slight impact, 2 means average impact, 3 means obvious impact, and 4 means complete impact. To reduce the large errors caused by personal subjectivity in the evaluation, 120 preschool children were used to collect questionnaire data, and the results were obtained by averaging and rounding to determine the results. The specific statistical tables are shown in Tables 1 and 2.

Table 1 Psychological analysis of preschool children learning calligraphy

Element	Psychological Aspect	Cognitive Aspect	Interest Aspect	Need
Preschool Children	2	4	4	3

Note. Compiled and analyzed by the researcher in 2023.

Table 2 Data analysis form of questionnaire survey on calligraphy education needs of preschool children

No.	Question	Options					Ratio
1	Whether preschoolers enjoy learning calligraphy	Like very much	Prefer	Ordinary	Not really like	Dislike	0.64
		76	23	12	5	2	
2	The extent to which learning calligraphy improves children's cognitive abilities	Attention	Ability Remember	Concentration	Ingenuity	Synthesize	0.29
		15	23	35	10	35	
3	Expectations for teaching preschoolers in a calligraphy program	Interactive	Playful	Video	Fulfill	Synthesize	0.53
		16	10	4	25	63	
4	The most interesting aspects of calligraphy learning for preschoolers	Copy the copybook	Basics	Originality	Knowledge-related	Synthesize	0.38
		20	14	17	21	46	
5	What elements would you like to see included in a calligraphy textbook	Competition	Exhibition	Traditional Culture	DIY Production	Story	0.31
		19	5	37	34	23	
6	What help would you like in learning calligraphy	Technique Instruction	Creative Inspiration	Tool Use	Individual Development	Increased Interest	0.51
		7	14	2	34	61	
7	What is recommended for preschoolers learning calligraphy	Reward System	Creative Activities	Innovative teaching materials	Innovative Teaching	Showcase Results	0.52
		6	5	62	36	9	
8	What skills do preschoolers learn in calligraphy?	literacy	Write	Hand-eye coordination	Aesthetics	Self-confidence	0.38
		45	30	27	11	5	
9	What are the activities where you want to experience calligraphy for yourself?	DIY Production	Calligraphy Exhibition	Lecture	Calligraphy Contest	Synthesize	0.48
		57	18	3	6	34	
10	Calligraphy study focuses on which area of ability	Writing Skill	Aesthetic sense cultivation	Creative Development	Psychological Adjustment	Synthesize	0.33
		24	14	26	15	39	

Note. Compiled and analyzed by the researcher in 2023.

After analyzing the data from the questionnaire, the following results were obtained:

64% of the preschoolers enjoyed learning calligraphy very much; 29% of preschoolers think that learning calligraphy is helpful to their cognitive ability; 53% of the preschoolers' expectations of the way the calligraphy program is taught; 38% of preschoolers were most interested in learning calligraphy; 31% of the preschoolers believed that learning calligraphy would help pass on traditional culture; 51% of the preschoolers hoped that the calligraphy course could enhance their interest; 52% of the preschoolers expected to use innovative teaching materials in the calligraphy program; 38% of the preschoolers believed that learning calligraphy helped them to recognize words;

48% of preschoolers were interested in DIY-making activities in the calligraphy program; 33% of the preschoolers thought that calligraphy learning should focus on developing multi-faceted abilities.

Based on the above findings, it can be concluded that the feasibility of the development of multifunctional calligraphy pop-up books for preschool children is high, because preschool children have a high interest and demand for calligraphy learning, and also recognize the importance of calligraphy learning for multi-faceted abilities. Designing innovative teaching materials with cultural elements and DIY production elements for calligraphy learning is expected to attract the attention and participation of preschool children and promote their comprehensive development.

Research design: A mixed research method that combines quantitative and qualitative research was used to comprehensively evaluate the impact of multifunctional calligraphy pop-up books on preschool children's interest and their effect on calligraphy learning. Research, develop, and design multifunctional calligraphy pop-up books for preschool children.

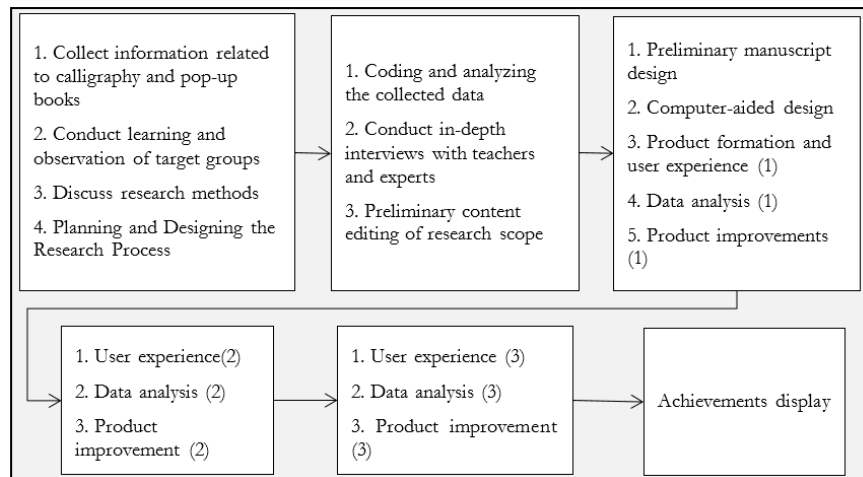


Figure 4 Research Structure

Note. Photographed by researcher in 2024.

Data analysis: Statistical analysis was used to analyze the quantitative data, including a comparison of pre-test and post-test results; at the same time, content analysis was performed on the qualitative data to gain a deeper understanding of preschool children's feedback on the multifunctional calligraphy pop-up books and experience.

Empirical verification: Ensure the credibility and validity of the research results through expert verification and data analysis.

RESEARCH RESULTS

The study focused on preschool children's interest in calligraphy learning, specifically using multifunctional calligraphy pop-up books. and includes developmental and innovative educational tools for preschoolers. This article aims to explore the impact of multifunctional calligraphy pop-up books on preschool calligraphy education.

Experimental principle:

Researchers developed, studied, and designed a multifunctional calligraphy pop-up book. Using pop-up page technology and interactive design principles, the calligraphy content in the book is presented in a pop-up and interactive way. This involves the structural design of the book, the arrangement of the content, and the presentation of pictures and texts. The research model follows the five stages of ADDIE (Analysis, Design, Development, Implementation, and Evaluation) to develop multifunctional calligraphy pop-up books for preschool children.

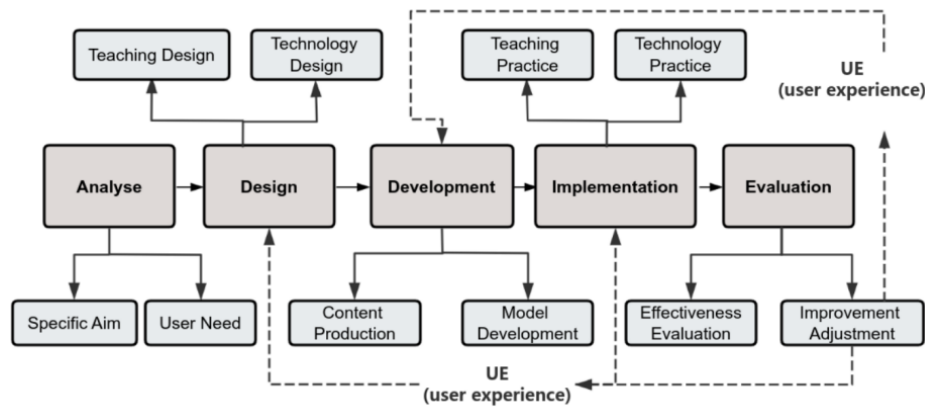


Figure 5 ADDIE

Note. Photographed by researcher in 2024.

1. Analysis stage

Clear goal: The goal of developing multi-functional pop-up calligraphy books is clear, such as improving the interest and effectiveness of preschool children in learning calligraphy.

User demand survey: Conduct a demand survey among teachers and students to understand their expectations and needs for pop-up calligraphy books.

2. Design stage

Instructional design: Design the display methods, interactive elements, learning paths, etc. of multi-functional calligraphy books to achieve educational goals.

Technical design: Design the technical architecture to support the functions of calligraphy books, including pop-up book page design and interactive design.

Table 3 Chinese character encoding in multifunctional pop-up book

人 1	间 5	顺 9	事 13
一 2	全 6	帆 10	家 14
风 3	万 7	春 11	意 15
门 4	如 8	福 12	满 16

Note. Compiled and analyzed by the researcher in 2023.

Study designs are being adapted to the cognitive characteristics of preschoolers. Preschoolers learn calligraphy mainly to stimulate their interest. In each lesson, children learn a Chinese character and its meaning, story, evolution, structure, pronunciation, writing, and usage. The words and characters in the book are arranged from easy to difficult according to the structure and complexity of the Chinese characters. This approach is designed to adapt to the cognitive characteristics of preschool children. (The numbers in the table represent the order of lessons) The text in the table is written in a simplified script. Researchers designed this font after analyzing a large amount of literature and coding various calligraphy styles. It is specifically tailored to work best for preschoolers.

The innovative calligraphy book removes the complicated and difficult-to-write traditional Chinese characters and presents them in simplified writing form, which is easy to learn.

As shown in the figure: Comparison of conventional and simplified Chinese characters in traditional calligraphy textbooks and innovative textbooks.

間—间 風—风 萬—万 門—门



Figure 6 Six forms of traditional calligraphy teaching materials

Note. Photographed by researcher in 2023.

The current preschool calligraphy textbooks present a single text form, simple pictures, and lack thematic content, resulting in a disorganized learning process. Although the page layout has been updated, it is still too simple and dull. This approach does not take into account the cognitive and psychological characteristics of preschool children and fails to stimulate their interest in learning calligraphy and improving their writing ability.

2.1 Textbook editing content

2.1.1 Preface

Children, there is an ancient and great country in the world. Every word of it is like a beautiful poem or a beautiful painting. This kind of text is Chinese characters.

2.1.2 The first lesson

Teaching objectives

Commonly used calligraphy tools: the four treasures of the study: pen, ink, paper, inkstone, and seal. As shown in the picture.

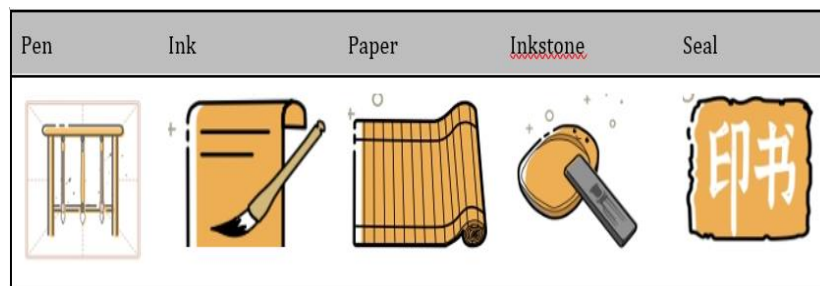


Figure 7 Common calligraphy tools

Note. Photographed by researcher in 2024.

The picture pop-up model can pop up pop-up on the book page, allowing children to touch and operate intuitively.

2.1.3 Teaching focus

Spring couplets:

Chinese couplets are a unique form of poetry consisting of pairs of ordered sentences. Couplets are an ancient Chinese literary form consisting of two consecutive lines of poetry and have a history of more than a thousand years. In the couplet, the first line is called the ascending line and the second line is called the descending line (Chiang et al., 2021).

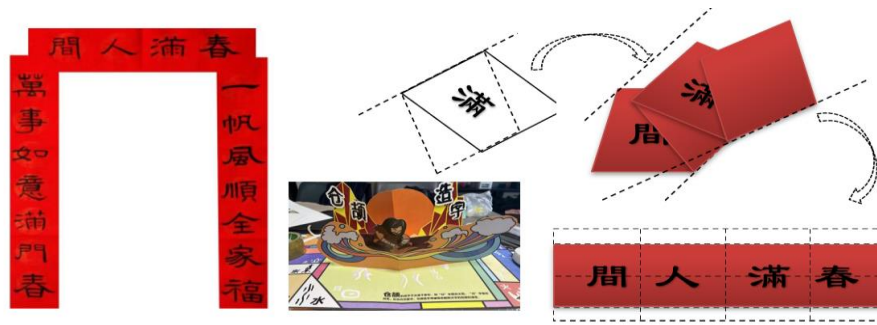


Figure 8 pop-up form couplets in design book pages

Note. Photographed by researcher in 2024.

Table 4 Origin of Chinese characters

Knotting notes	Picture	Carving symbols	Word

Note. Compiled and analyzed by the researcher in 2024.

The picture comes from the book "Chinese Art History" published by REN MIN University of China Press in 2014.

2.14 Teaching difficulties

Table 5 The historical evolution of the Chinese character

Image	Oracle	Inscriptions on gold	Seal script	Official script	Regular script	Pop-up Chinese character

Note. Compiled and analyzed by the researcher in 2024.

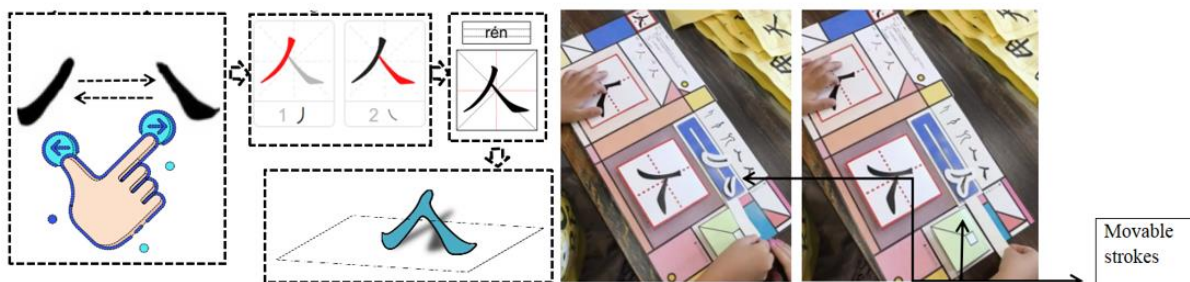


Figure 9 Decomposition and pronunciation of herringbone strokes

Note. Photographed by researcher in 2024.

Personally experience spelling Chinese characters and pop-up formation of Chinese characters. pop-up fonts appear on the page, providing a tactile and visual experience. This interactive approach promotes intense engagement and helps inspire interest in learning calligraphy.

Writing: Water painting book writing, can be written repeatedly, no ink is needed, easy to use, and suitable for preschool children

Tools: water painting brush

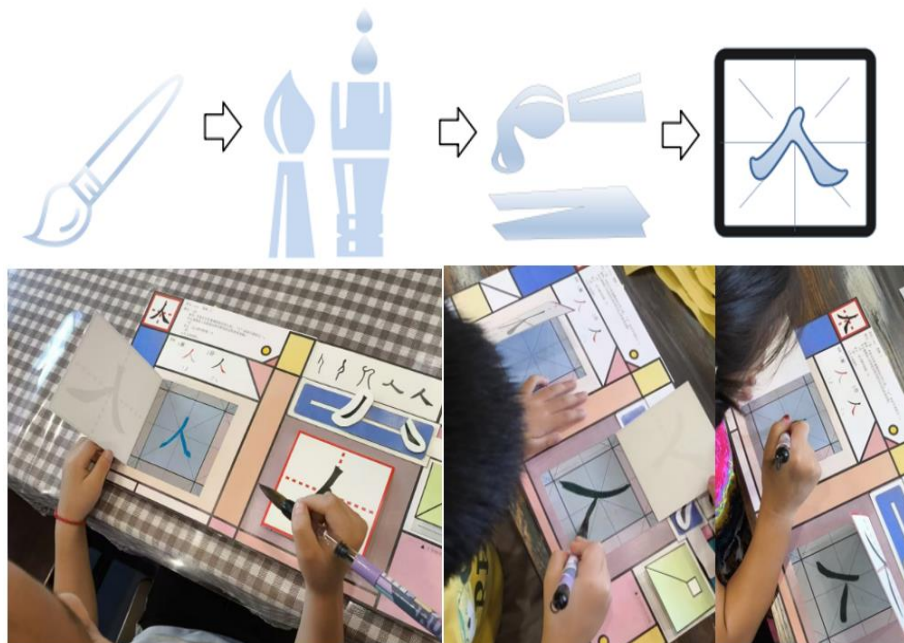


Figure 10 How to use a water painting brush

Note. Photographed by the researcher in 2024.

A new type of writing brush was developed with clean water injected into the pen barrel. It can write Chinese characters repeatedly on the water canvas and write colorful Chinese characters.

The multifunctional calligraphy pop-up book has the following three innovative features:

Painting bag function: The pop-up calligraphy book has a built-in storage space design to help students easily carry writing tools and materials, making calligraphy learning more convenient.

Water painting page repeat writing function: The pages of the pop-up calligraphy book can be designed with water painting pages. Students can practice writing, erasing, and rewriting to achieve the function of repeated practice.

2.15 Chinese character stories: Chinese character stories related to calligraphy are more interesting and educational, stimulating students' interest and motivation in learning calligraphy. Questionnaire survey data of 120 preschool children aged 4-6 in Anshan City. The data analysis is as follows:

Table 6 Functional satisfaction of preschool children's multifunctional calligraphy pop-up book

Function	Satisfaction	Weights
Paint package function	78%	1
Water painting page repeated writing function	82%	1
Chinese character story	94%	1
total	-	-
Functional requirement satisfaction	84.67%	-

Note. Compiled and analyzed by the researcher in 2024.

According to the survey data of 120 preschool children, the satisfaction rate of the multifunctional pop-up calligraphy and painting bag function is 78%, the satisfaction degree of the water painting page repetitive writing function is 82%, and the satisfaction degree of Chinese children is 78%. The character story rate is 94%. Assuming that the weights of each function are equal, that is, the weights are all 1, ABC is calculated according to the weighted average method of calculating the functional requirements satisfaction index (Haming et al., 2019), which represents the painting package function, the water painting page repeated writing function, and the Chinese character story satisfaction. The degree reached 78% respectively. $82\%, 94\% \text{ } = \frac{(A \times w_A) + (B \times w_B) + (C \times w_C)}{w_A + w_B + w_C}$, the calculation function requirement of the painting package satisfies the function (A), water painting page repeated writing function (B), Chinese character story satisfaction (C).

The specific parameters are as follows:

Painting package function satisfaction (A) = 78%

Satisfaction with water painting page repeated writing function (B) = 82%

Chinese character story satisfaction (C) = 94%

If it is assumed that the weight of each function is equal ($w_A=w_B=w_C=1$), the functional requirement satisfaction calculation formula is: Functional requirement satisfaction = $1+1+1(A \times 1) + (B \times 1) + (C \times 1) = 378\% + 82\% + 94\%$

Substituting the specific values into the calculation, we can get: Functional requirement satisfaction = $378 + 82 + 94 = 3254 \approx 84.67\%$

Therefore, based on the above data and parameters, the demand satisfaction of these three functions is approximately 84.67%. Feasibility is high.

3. Development stage

Content production: book page design, pop-up font design, interactive elements, and other content production. children's application interfaces often use brighter colors (Lyu, Xi, & Liu, 2022).

The research theory of book page content production is shown in the table

Table 7 Research theory table of page content production of calligraphy pop-up book

Research Theory	Theoretical explanation
Child development psychology theory	Ensure that the design is consistent with the cognitive, emotional, and social development characteristics of preschool children.
Perception and Sensation Theory	Design elements such as materials, colors, textures, and sounds with children's perception and sensory experiences in mind.
Multi-sensory learning theory	Supports the design of multi-sensory experiences to promote the comprehensive development and learning effects of preschool children.
Interaction and education theory	Provide interactive elements to promote children's sense of participation and enhance learning motivation.
Game-based learning theory	Integrate learning elements into game-based design to stimulate the interest and motivation of preschool children.

Note. Compiled and analyzed by the researcher in 2024.

4. Implementation stage

Pre-teaching before designing and developing models: Let teachers and students understand how to effectively use multi-functional calligraphy pop-up books for learning and teaching activities.

5. Evaluation Phase

Prediction effect: Through in-depth interviews, questionnaires, and literature research methods, the impact of multi-functional calligraphy pop-up books in teaching is evaluated.

Improve and adjust the research plan: Based on the evaluation results, adjust and improve the design and implementation of the multi-functional calligraphy pop-up book to improve the teaching effect.

This study will systematically carry out the design, development, and implementation of multi-functional pop-up calligraphy pop-up books based on the five stages of the ADDIE model, and ultimately evaluate the effectiveness and feasibility of its teaching (Komari, Widiyaningrum, & Partaya, 2022).

CONCLUSION

The research results show that in response to the lack of suitable calligraphy learning materials for preschool children, the research team developed a multi-functional calligraphy pop-up book aimed at stimulating the interest of preschool children aged 4-6 in learning calligraphy. By adopting the five stages of the ADDIE model for research and design, during the research process, valid data were obtained through mixed research methods such as questionnaires, user experience evaluations, interviews and observations, and formative evaluations of pre-test and post-tests. Analyze results and validate data.

The survey covered 120 preschool children in three kindergartens and analyzed the preschool children's interest and satisfaction in learning calligraphy through multifunctional calligraphy pop-up books and traditional calligraphy books. Research results show that multi-functional calligraphy pop-up books are beneficial to preschool children aged 4-6 years old, and their teaching satisfaction is high. The books stimulate the learning process by providing information through touch and the senses, and new interactive learning formats make calligraphy more interesting to preschoolers.

The study's findings are divided into three parts :

1. Design innovative teaching materials: The research team successfully developed a multi-functional pop-up calligraphy book that combines the elements of calligraphy learning with the cognitive characteristics of preschool children to provide a new learning experience for learners of this age group.
2. Learning interest and satisfaction: Research results show that students are more interested in multi-functional calligraphy manuals. This shows that the design of new teaching materials effectively stimulates learners' enthusiasm and interest.
3. Interactive learning form: The multifunctional calligraphy pop-up book provides an interactive learning mode of information through touch and senses, which can promote preschool children's participation in calligraphy learning.

The final research results include the design of calligraphy teaching materials, the situations and problems faced by preschool children in calligraphy learning, the ability and interest of preschool children in learning calligraphy, and the development and design of multi-functional calligraphy teaching materials. The conclusion shows that the multifunctional calligraphy pop-up book is a useful innovation for preschool children to learn calligraphy.

DISCUSSION

This article studies the impact of multifunctional calligraphy pop-up books on preschool children's calligraphy learning. Analysis of preschool children's questionnaire survey on satisfaction with multifunctional calligraphy pop-up books, including how to improve their performance in calligraphy font recognition and skills. The paper also explores how multifunctional calligraphy pop-up books can stimulate preschool children's interest in learning calligraphy, and its impact on students' learning attitudes and self-confidence. In addition, the researchers also studied the design process of

the multifunctional calligraphy pop-up book, including page layout design, pop-up structure design, interactive element design, and other specific details. It also analyzes how multi-functional design can enhance the learning experience of preschoolers learning calligraphy, promoting multi-sensory engagement and deeper understanding.

The paper also explores the potential of pop-up design in education and proposes future development directions for multi-functional calligraphy pop-up books, such as personalized customization and application prospects. The paper analyzes possible limitations in the study, such as experimental design, sample size, and other limitations, and makes suggestions for future research improvements. Look forward to the areas that future research can focus on, such as the development trend of interdisciplinary cooperation, the integration of new technologies, etc.

Study the social significance of multifunctional calligraphy pop-up books in improving the creativity of preschool children, solving practical problems, and promoting innovation in preschool calligraphy education. Explore the promotion value of multifunctional calligraphy pop-up books in different educational scenarios. Finally, the article summarizes the survey results and emphasizes the important role and advantages of multifunctional calligraphy pop-up books in preschool children's calligraphy learning.

The multi-functional calligraphy pop-up book is designed to attract preschool children's attention and improve their calligraphy learning experience through interactive and experiential learning. The formative evaluation methods help evaluate its impact on preschool children's calligraphy learning. Research shows a positive impact but has limitations in sample size, research time, and methods. Further research is needed.

Recommendations

Based on the research on the application of multi-functional calligraphy pop-up books in preschool education, suggestions are made for future research and practice:

1. Theoretical Recommendation

Research framework expansion: It is recommended that future research start from cognitive psychology, educational technology, art education, and other disciplines to build a more complete research framework and deeply explore the application of multi-functional calligraphy pop-up books in calligraphy education.

Theoretical verification: Advocate to verify theoretical assumptions through empirical research, explore how multifunctional calligraphy pop-up books affect students' learning motivation, learning outcomes, and learning experience, and provide more reliable empirical support for theoretical research.

2. Practical Recommendations

To improve the participation of preschool children in calligraphy learning and promote the reform and innovation of preschool calligraphy education, the following suggestions are put forward: **Innovation in teaching methods:** Encourage teachers to explore diversified teaching methods, such as using multi-functional calligraphy pop-up books. **Resource-sharing platform construction:** It is necessary to establish a resource-sharing platform for preschool calligraphy education. The platform will promote exchanges, share successful cases and best practices, and encourage reform and innovation in preschool calligraphy education in different regions.

These suggestions aim to integrate multifunctional calligraphy pop-up books with preschool calligraphy education, promote development and innovation in related fields, and improve education quality and teaching effects. Suggestions combining theory and practice will provide comprehensive and targeted guidance for the application and promotion of research results.

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