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Picture Book With Interactive Play Toy Design: A Study of Auxiliary Mixed-Age Kindergarten Aesthetic Education

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Summary

Games play an important role in children's learning stages. Diverse forms of interactive play nurture children's social relationships, foster diverse thinking, and unlock creative potential. This study explored how teachers in mixed-age preschool classrooms can use interactive picture books to promote aesthetic education for preschool children. User research was combined with design practice to develop a protype of an interactive toy called *Listen! Who's singing!* The prototype was subsequently brought into three different mixed-age classrooms for teaching field experiments and use evaluation. The results indicated that the interactive toy, when combined with multisensory game narratives, improved teachers' teaching effectiveness, stimulated greater engagement with children, promoted interaction and cooperation among children of different ages, and increased children's interest in aesthetic education. Analysis of the results revealed potential areas for improvement in the design of the interactive toy and highlighted challenges and difficulties in terms of its teaching applications. The ultimate goal of this study was to provide a new teaching tool and technique for teachers in mixed-age preschool classrooms.

In 2016, Taiwan implemented the policy of mixed-age education in preschools to promote interaction among children of different ages, thereby enhancing their understanding of social roles and providing more varied interpersonal experiences. In addition to the development of social skills, society also demands the cultivation of children's intrinsic comprehensive abilities through

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STEAM (science, technology, engineering, arts, mathematics) teaching methods. This is reflected in the toy market, where most intelligent toys are designed to facilitate programming education and logic development. Conversely, relatively few toys are aimed at promoting aesthetic education. To address this gap, this study combined user research methods and the Double Diamond model (Design Council, n.d.) to examine the needs and pain points of preschool teachers and designed a picture book that provides interactive feedback. The purpose of this interactive toy was to help teachers cultivate aesthetics and creativity in preschool children.

The objectives of this study were threefold: (1) to understand the current use and design focus of interactive toys as a medium for assisting aesthetic education in mixed-age preschools; (2) to develop a prototype of an interactive toy based on the above research findings; (3) to bring this prototype toy into the classroom, observe teacher–student interaction, conduct teaching experience evaluation and reflection, and discover new knowledge that could be applied to further improve the toy.

The first stage of this study was to gather data through user research. Researchers conducted expert interviews, then used affinity diagrams, empathy maps, user journey maps, and point of view (POV) research methods to integrate and summarize the research subjects, questions, and direction. These findings were integrated into design concepts, and a prototype was built. Next, in the implementation stage, the high-fidelity prototype was brought into preschool classrooms for field research to evaluate the teaching experience. Through the use of technology, researchers gathered real-time feedback to understand the analogy between sound and foundational aesthetics. Finally, semi-structured interviews and questionnaire surveys were conducted with preschool teachers to gauge their experience incorporating the toy into their lessons, and affinity diagrams were used to summarize the interview data and the overall teaching experience with this toy.

The teaching field experiments and qualitative data analysis revealed these primary findings. First, to enhance teaching efficiency and cultivate increased creativity and active response skills in children, interactive toys should be open and intelligent, with diverse story situations and feedback mechanisms.

Second, interactive toys should promote interaction and cooperation among children of different ages to achieve the goal of aesthetic education, but at the same time, they should provide clear and simple feedback to avoid confusing or frustrating children.

Third, by combining the concept of an interactive toy with that of a picture book, multisensory game narratives can be delivered to stimulate children's learning and provide more opportunities for teacher–student interaction in the classroom.

Finally, when using interactive toys, children should also be given ample time to communicate their opinions and share ideas in groups, as this affects the completeness and innovation of their work.

The goal of this study was to contribute to the advancement of aesthetic education by proposing a prototype design of an interactive toy that could be applied to the aesthetic education of mixed-age preschoolers. Through teaching field experiments and usage evaluation, researchers discovered new knowledge and suggestions for further improvement of the toy. It is hoped that the results of this study will lead to the development of a new teaching tool and technique that will assist teachers in mixed-age preschool classrooms in cultivating children's aesthetic literacy and creativity.