

# Design and Development of an Interactive Sex Education Book for Kindergarten Children

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## ABSTRACT

**Background:** Kindergarten is an ideal stage to introduce comprehensive sex education, as preschool children can learn holistically. However, reproductive health materials for kindergarten students remain limited and lack comprehensiveness. This study aims to develop educational media based on the International Technical Guidance on Sexuality Education to facilitate comprehensive sexuality education at the Laboratory Kindergarten, Universitas Negeri Malang

**Method:** The study utilized the Borg and Gall research model. Participants included four kindergarten teachers and 63 students, divided into two grades: grade A (ages 3–4) and grade B (ages 5–6) at the Laboratory Kindergarten, Universitas Negeri Malang.

**Result:** The results show that the majority of teachers agree that the use of sentences in the book is in accordance with Indonesian language rules, pictures, and the purpose of the book. Furthermore, the feasibility test by 4 kindergarten teachers showed that the book is very feasible (percentage of feasibility > 82.25%). The lowest eligibility score was 83.3%, while the highest score was 100%. Based on the results of the calculation of the feasibility assessment, the book is very feasible to use as a health promotion media for early childhood.

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## INTRODUCTION

Kindergarten time is an ideal time to introduce comprehensive sex education, as preschool children are capable of learning holistically across subjects and developmental content areas.(1) It indicates that providing a comprehensive and extensive curriculum at this stage can enhance children's knowledge, attitudes, and skills, empowering them to make responsible decisions in terms of their reproductive health. Promoting a healthy and complete understanding of reproductive health is crucial for protecting children from sexual abuse.(2) According to UNICEF, over 370 million girls and women have experienced rape or sexual assault before the age of 18. This statistic underscores the pervasive nature of sexual violence against children In Indonesia, the number of child sexual abuse remains high. According to the Indonesian Child Protection Commission (KPAI), the number of child sexual abuse accounted for 536 cases, ranking first in sexual violence cases.(3)(4) The commission also reported 285 incidents of rape or intercourse and other children being victims of same-sex sexual abuse and rape. In 2020, the number of sexual violence cases against children rose significantly to 12,855.(5)

A significant barrier to implementing comprehensive sexual education in early childhood is the misconception that this stage of development is not appropriate for teaching reproductive health. Consequently, sexual health education is neglected in various educational processes during early childhood. Inadequate sexual education can lead to various issues, including misinformation and a lack of awareness about reproductive health.(6) Cultural attitudes and educational practices significantly influence the approach to delivering sexual education to preschool children.(7) Recent studies indicate that reproductive education in early childhood is not yet sufficiently comprehensive, particularly in the provision of materials and the use of educational media for reproductive health education. Knowledge transfer about sexuality must be conducted scientifically and comprehensively to ensure children develop an accurate and age-appropriate understanding of the subject.(8) UNESCO suggests that few students receive comprehensive, high-quality sexual education to prepare them for a life of taking control and making responsible, evidence-based decisions.(9)

An alternative approach to introducing sexual education to kindergarten students is through activity

books. By incorporating eye-catching images and vibrant colors, these books can capture the attention of young learners and increase their enthusiasm for learning. This is inline with Ashar's belief that learning media serve the following purposes, including: cognitive functions for giving students new information and insight into a subject; psychomotor functions for helping students become more proficient in their physical abilities; and motivational functions for helping students become more motivated to learn. Moreover, multisensory activity books facilitate children's learning experience with an object.

Early childhood educators believe that visual aids and pictures are more effective than films and videos when presenting sex education-related information to young children because they are not yet able to understand the symbolic messages conveyed.(5) Furthermore, based on our preliminary study at the Laboratory Kindergarten Universitas Negeri Malang showed that reproductive health materials for the students are still limited and not comprehensive enough. The material provided focuses exclusively on identifying which body parts can be touched and which should not be, particularly regarding oral contact. However, the use of suboptimal media continues to dominate the approach to educating young children about sexual and reproductive health at UM Laboratory Kindergarten. Given the urgency of this research, it is necessary to develop media that facilitates comprehensive sexuality education based on the "International Technical Guidance Comprehensive Sexuality Education". This media should be adapted to the needs of early childhood, culture, and norms that exist at Laboratory Kindergarten, Universitas Negeri Malang. As a result, additional research is required to design and develop the sex-educational book on the knowledge among early childhood.

## **METHOD**

### **Study Design and Setting**

This study was conducted between January to October 2023 at Laboratory Kindergarten, Universitas Negeri Malang. UM Laboratory Kindergarten is located near the campus and has been incorporated into a foundation with the State University of Malang since 1997. Universitas Negeri Malang is the oldest education institute in Malang which makes UM Laboratory Kindergarten as one of the most well-established Kindergarten currently standing.(10) The research involved 4 kindergarten teachers and 63 kindergarten aged 3-6 years old (31 male and 32 female). A purposive non-probability sample was employed to obtain a population more aligned with the research objectives.(11-13) The inclusion criteria for this study were teachers and

students aged 4-6 years old. The students with mental disabilities and visual limitation were excluded. The Borg and Gall research model was applied. This research is a pilot study aiming to design and develop the sex-educational book. Ethical approval was received from the Health Research Ethics Committee Kepanjen College of Health Sciences (Protocol No. 509/S.Ket/KEPK/STIKesKPJ/VI/2023). Informed consent was obtained to all students from parents and teachers.

### **Design and Development Procedure**

The development of this study was adapted the Borg and Gall research model. The development consists of at least twelve stages from the evaluation of potentials and problems to the dissemination and implementation. This study classified these stages into three stage-groups including: need assessment, design and development, and testing and implementation.(14)

Need assessment in this study included the evaluation of current potential and problems in the targeted group using literature review and information gathering form. The narrative literature review was conducted to evaluate the recent studies on sex education in preschool students especially in Indonesia. The review also aimed to construct the idea of the effective learning media and/method in delivering sex education for kindergartners. The information gathering was conducted by running interviews with teachers of the targeted group and observations on the learning activity at the school. The interview aimed to obtain information of the needs and possibility for delivering sexual education using certain media and to assess the effective material delivery method to the targeted group.(15)

Product design and making stage consists of several steps including product design, design validation, design revision and product making. The content of the book was adapted from the International Guidance on Sexuality Education (ITGSE) by UNESCO 2018.(16) ITGSE was developed to support governments in developing sexuality education curricula, which are then adapted and customized to meet national needs. The ITGCSE guidelines have facilitated consensus on the notion of comprehensive sexuality education, ensuring it is age, gender and developmentally appropriate for children. There are 8 key points that must be included in the media. The form and appearance of the book were designed to align with the target age group, their preferences, and cultural context. The book was validated by 4 a panel of experts from the Indonesian United Nation Population Fund, the Indonesian National Population and Family Planning Board, Child

Psychologist, Early Childhood Educationist, and author of children’s book.

The testing and implementation phase consisted of several sub-stages. The teachers were provided with a single copy of the book and instructed to read through it and identify each section. Subsequently, the teachers were asked to assess the book's feasibility in terms of material and media using an 18-item questionnaire. This instrument, which was designed to assess the feasibility of the book, included questions regarding the quality of the book, its size, the combination of colors, the images, the fonts, the printing, the material’s suitability to the target

audience, and the language. Furthermore, the book was implemented in a small-group setting with students. Each group, consisting of three to four children, was provided with a book and was accompanied by the research team. The implementation phase involved the observation of students' interactions with the book, aiming to gather feedback on its performance. The entire activity took approximately 20 to 30 minutes to complete. It was conducted at UM Laboratory Kindergarten. The eligibility criteria for the book prototype was based on Arikunto’s learning media eligibility criteria in table 1 for the details.(14)

**Table 1.** Arikunto’s learning media eligibility criteria

Assessment Percentage	Category	Description
81% - 100%	Excellent	No revision needed
61% - 80%	Good	No revision needed
41% - 60%	Good enough	Revision
21% - 40%	Poor	Revision
0 - 20%	Very poor	Revision

The final result of the eligibility test used in this study was the average percentage given by each expert and teacher. Revisions were made when needed based on the result of the eligibility test, which in this study, was considered as the revision I. After the revision, the book – which was previously a prototype– was produced and then tested in a small group. The group consisted of 7 kindergarten students outside the primary target group. The result of the small group trial was used for the improvement of the book. After several improvements, the activity books were tested in the primary target group (a large group).

**RESULT AND DISCUSSION**

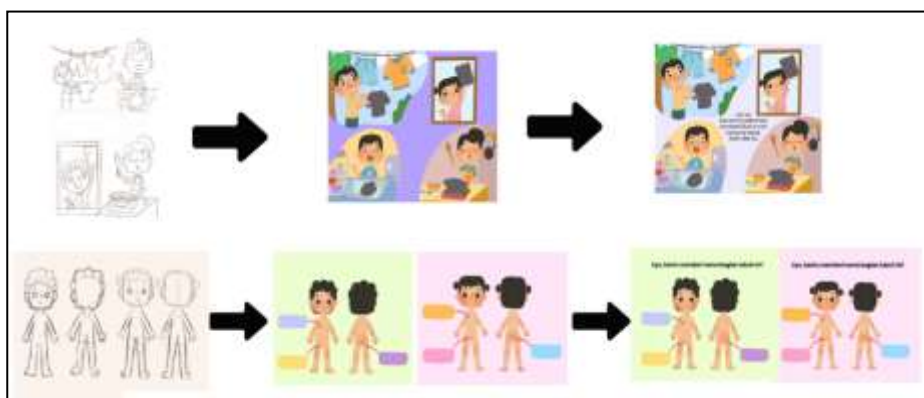
**Need Assessment**

A needs analysis was conducted at the UM Laboratory Kindergarten to evaluate the current state of reproductive health education. The findings of the needs analysis revealed that while some reproductive health education is provided, it remains incomplete. Existing

efforts primarily focus on toilet training, identifying body parts, and teaching appropriate behavior during interactions with the opposite sex. However, these lessons are delivered solely through singing activities and lack the use of educational media. Based on interviews conducted by the principal at UM Laboratory Kindergarten needs a comprehensive reproductive health education media so that UM Laboratory Kindergarten students are able to understand and apply reproductive health education comprehensively in their daily activities.

**Product Design**

The creation and design of the product were carried out in three stages: sketching, initial design, and final design. This stage involved determining the characters featured in the book and creating initial sketches. Two primary characters were developed: Asa (female) and Ase (male). The sketching process provided a preliminary visualization of the book's design. Once the initial sketching is complete, the subsequent phase is to commence the integration of illustrations and color. During this phase, chromatic values were assigned to the illustrations to enhance their relevance and appeal. The use of vibrant colors was emphasized to create an engaging and child-friendly visual aesthetic. The final phase is the incorporation of textual elements, including commands, which are instrumental in guiding the production of the book. The results of the stage can be seen in figure 1.



**Figure 1.** Product design process

**Product Material**

Comprehensive reproductive health education media with the title "Finally, I know!" designed to enhance reproductive health knowledge in early childhood, specifically targeting children aged 3–6 years. The book is developed in alignment with the International Technical Guidance Comprehensive Sexual Education (ITGCSE) by UNESCO which encompasses eight key concepts: 1) relationships, 2) values, rights, culture and sexuality, 3) understanding gender, 4) violence and staying safe, 5) skills for health and well-being, 6) the human body and development, 7) sexuality and sexual behavior, and 8) sexual and reproductive health. The book spans 20 pages and includes engaging activities such as matching pictures, "yes" or "no" puzzles, body part identification, matching exercises, and drawing tasks.

Printed in A5 size (148 x 210 mm) on art paper with a glossy lamination finish, the book is durable and reusable. This book is designed to be an interaction book, so it is packaged in the form of an activity book. Activity books allow children to engage in play-based learning tailored to their interests and developmental needs.(17) In addition, activity books are also able to reduce stress in children.(18) The book is intended for use both at school and at home, with the involvement of parents and teachers. However, children still need to be accompanied

by parents and teachers when using this book. Children's language development and pre-literacy skills can be improved through parental support in reading books.(19) The parent and teacher guidelines added in the book can facilitate weaknesses in storytelling because parents and teachers may have different storytelling styles that can affect children's literacy skills.(20) Hence, the book comes with instructions for use aimed at parents and can be used both individually and in groups, which can be given in stages.

**Media and Material Validation**

The book was validated by 4 experts (2 media and 2 material experts). Media was validated by experts from the Indonesian United Nation Population Fund and authors of children's books. In the validation process, the expert assessment sheet was used which contained a review of the suitability of the product developed with the target situation and circumstances. The assessment given was based on size, design, content illustration, content design, and product quality, as well as the validator's assessment in general regarding all aspects.

The media validation process by experts was given twice. In the first validation, some input was obtained which was then used as a consideration in revising the product and the second validation was carried out as the final product assessment. A recapitulation of the first validation results by experts is presented in table 2.

**Table 2.** Media design validation results by experts

Assessment	Expert 1		Expert 2	
	Preliminary (%)	Final (%)	Preliminary (%)	Final (%)
<b>Size of health promotion media</b>				
The size of the busy book is standard	50	100	50	100
The size of the busy book is adjusted to the material	50	100	50	100
<b>Health promotion media design</b>				
The composition of layout elements is harmonious and clarifies functions	50	100	50	100
The colors of the layout elements are harmonious and clarify functions	50	100	50	100
The fonts and images used are attractive and easy to see	75	100	50	100
Does not use too many combinations of letters, images and colors	25	100	50	100
<b>Illustration of health promotion media content</b>				
Images are presented clearly, interestingly, and the colors support the clarity of the material	75	75	75	100
Appropriateness of images and materials	50	100	75	100
<b>Health promotion media content design</b>				
Spacing between text and illustrations is appropriate	25	100	50	100
Use of font variations (bold, italic, etc.) is not excessive	50	100	50	100
<b>Product quality of health promotion media</b>				
The material of the busy book is not easy to tear, not easy to get wet, easy to erase and reuse	50	100	50	100
Good printing	50	100	50	100

Table 2 shows that the preliminary design indicated a need for improvement in almost all items, particularly engraving, spacing, and color. In early childhood development, coloring and drawing are essential activities.(21) In fact, research highlights that color not only sets the mood but also provides clues about the emotional state of characters, emphasizes certain objects in illustrations, and conveys relationships between characters and/or objects.(22-24)

The mean score of media validation results showed that the book could be used with minor revisions (50.3% and 55%). The experts suggested limiting the font selection to one to two types, improving punctuation and spelling, the adjusting the size of images and other book elements to eliminate empty spaces and create more balanced proportions. After implementing these revisions based on the feedback of the preliminary design, the book was refined to final design. The results of the final design validation from both experts show that the book can be used without revision (97.8%). Based on Arikunto’s learning media eligibility criteria, it can be included in the without revision category. The improvement validation result from preliminary to final design can be seen in figure 2.

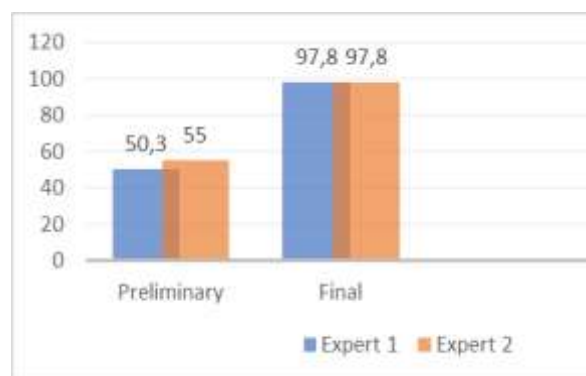


Figure 2. Mean score media validation by experts

Meanwhile, the book material was validated by 2 experts from the Indonesian United Nation Population Fund and Early Childhood Educationist. Data collection techniques in the material validity test using a questionnaire which includes content, presentation quality, linguistic quality to general assessment. The results of the material validity test by experts can be seen in table 3.

Table 3. Material design validation results by experts

Assessment	Expert 1		Expert 2	
	Preliminary (%)	Final (%)	Preliminary (%)	Final (%)
<b>Book material</b>				
Suitability of material with literature	75	100	75	100
Suitability to the target age	50	100	25	100
<b>Health promotion media design</b>				
Presentation of busy book material systematically and logically	50	100	50	100
Presentation of attractive and colorful illustration	75	100	75	100
Has a table of contents and instructions for using the busy book	25	100	25	100
<b>Linguistic quality</b>				
The use of sentences in the busy book is in accordance with good and correct Indonesian language rules	75	100	75	100
The language used is simple, straightforward, and easy to understand the target	50	100	50	100
Clarity of interpretation of the sentences used in the material	50	100	50	100
Accuracy of sentence structure	75	100	75	100
Standardization of terms	75	100	75	100
Suitability to the target education level	25	100	50	100



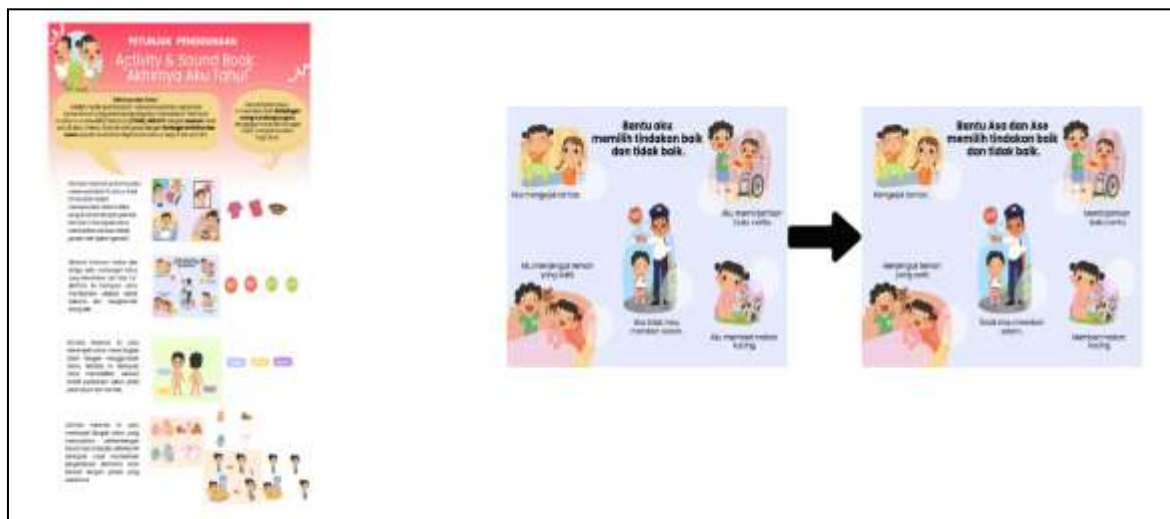


Figure 3. Design revision process

The experts suggested adding instructions, adjusted to the age of the children, such as introducing elements of their surrounding environment and applicable norms. Improvements were also recommended in the use of pronouns, particularly the word "I". The use of the pronoun "I" was advised to be reconsidered, with a rationale provided to ensure the target audience can distinguish between their own identity and the concept of 'pretend'. After making revisions based on the results of the initial material validation, the final material validation was conducted. Then the revision based on the results of the preliminary design, the book was revised to final design. The revision result from the preliminary to the final design can be seen in figure 3.

The results of the final design validation show that the book can be used without revision (100% and 98%). Based on Arikunto's learning media eligibility criteria, it can be included in the without revision category. The improvement validation result from preliminary to final design can be seen in figure 4.

### Testing and Implementation

At this stage of the project, each teacher was provided with the revised book for review. After reading the book, they identified areas for improvement and provided feedback. In addition, testing and implementation were conducted with students. The students were divided into small groups of 3-5 children. Each group was given a book and accompanied by a teacher or research team. Furthermore, observations were then carried out to evaluate the book's usability and identify whether further improvements or refinements were needed.(25) The feasibility assessment of the book was carried out by four teachers. The teachers evaluated both the media and the

material using a rating scale: excellent (4); good (3); poor (2); very poor (1). In part of media assessment, the majority of teachers agree that color, picture, material printing is excellent. In this book, teachers and students are encouraged to read together. Reading picture books together is not only an enjoyable everyday activity for many young children. It also provides different types of learning opportunities.(26) In previous studies, research indicates that toddlers and young children can learn information from picture books and apply this knowledge to real-world situations.(27) For instance, a study found that 4-year-old children learned information about animals from a book and subsequently applied this knowledge to interactions with live animals.(28)

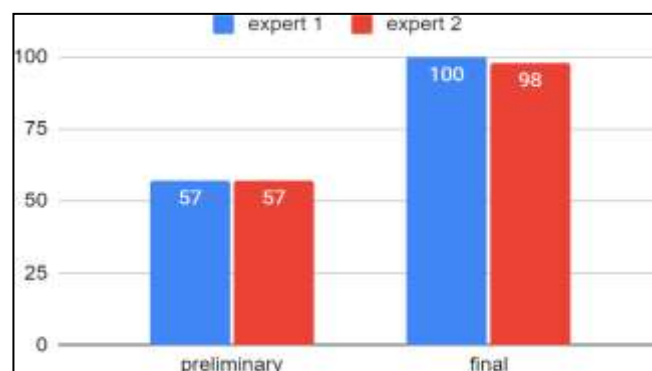


Figure 4. Mean score material validation by experts

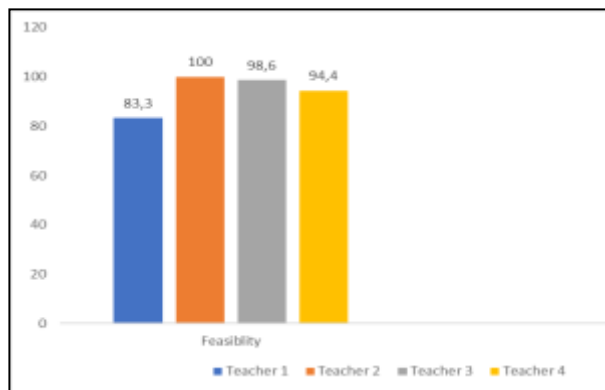
Furthermore, in the material book, the majority of teachers agreed the book's language adheres to Indonesian language rules and that the illustrations and content align well with the book's objectives. The feasibility of the assessment can be seen in table 4.

**Table 4.** Feasibility test assessment

Assessment	Rating Scale			
	Teacher 1	Teacher 2	Teacher 3	Teacher 4
<b>Book media</b>				
The size of the busy book is appropriate	3	4	3	4
Varied colors, using good color combinations	4	4	4	4
The letters used are attractive, not many letter combinations and easy to read	3	4	4	3
The colors in the images presented are clear and interesting	3	4	4	4
The images used are in accordance with the material	3	4	4	4
The quality of the images used is good	4	4	4	4
Does not use too many fonts	3	4	4	4
The typeface used is simple	4	4	4	4
The material used for the busy book is not easily torn	4	4	4	4
The printing quality of the busy book is good	4	4	4	4
<b>Book material</b>				
The material is easy to understand	3	4	4	3
The presentation of the material is coherent and logical (makes sense)	3	4	4	4
Presentation of material in accordance with the objectives	3	4	4	4
The use of sentences in the busy book is in accordance with good and correct Indonesian language rules	3	4	4	4
The language used in the busy book is simple, straightforward, and easy for the target to understand	3	4	4	3
The sentences used are not double meaning	3	4	4	4
The sentences used are in accordance with the images presented	4	4	4	4
Sentences used are appropriate for the target age	3	4	4	3

Note : Rating scale, including: excellent (4); good (3); poor (2); very poor (1)

The results of the feasibility test by all teachers showed that the book is very feasible (> 82.25%). The lowest eligibility score was 83.3%, while the highest score was 100%. Based on the results of the calculation of the feasibility assessment, the book is very feasible to use as a health promotion media for early childhood. The feasibility of the assessment can be seen in figure 5.



**Figure 5.** Feasibility test by teacher

According to observation during the large

group trial period, responses varied. Some students had difficulty in doing the activities in the book due to the small size of the book, making it unsuitable for use in groups. In addition, some students were still confused about the section of the book explaining what they should do if they experience sexual harassment. From the observation results, positive responses from students were also obtained. For example, they seemed very interested when discussing the correct and appropriate dress ethics for girls and boys. They also enjoyed the part of the book that allowed them to draw illustrations of girls' and boys' faces, as well as the section that described the stages of birth in cats, chickens, and humans. In fact, activity books are an alternative tool that facilitates fun, interactive sexual and reproductive health learning in early childhood.(29) They can improve children's visual literacy skills after the implementation of a visual literacy activity-based learning program.(30) In fact, information and knowledge are more easily accepted and understood when presented in a storybook format with interactive activities that are easy for children to

complete.(31)

## CONCLUSION

The development and design of activity books for early childhood sexual and reproductive health education involved multiple stages, beginning with a needs assessment and concluding with a feasibility study. The results of the evaluation by media and method experts show that this book can be used for sexual and reproductive health education. The design elements, such as illustrations and colors, as well as the content, including language and sentence structures, have been carefully tailored to meet the needs of young children. Children demonstrated high enthusiasm for using the book, a sentiment echoed by their teachers. This is indicated by the results of the teachers' feasibility test. The book has the potential to provide a comprehensive sexual and reproductive health education media for early childhood. Thus, teachers and health workers are encouraged to incorporate this book into their educational practices. However further research is needed to test the effectiveness of this book so that it can be used by both parents and teachers.

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## Conflict of Interest

There are no conflicts of interest in this research.

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