



Development of Coloring Book Media to Improve Fine Motor Skills in Children Aged 3-4 Years



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Abstrak

Penelitian ini dilatarbelakangi oleh pentingnya pengembangan kemampuan motorik halus pada anak usia dini, khususnya pada usia 3–4 tahun yang berada pada masa golden age. Hasil observasi di TK Negeri 2 Metro Timur menunjukkan bahwa sebagian anak masih mengalami kesulitan dalam mengontrol gerakan tangan, memegang krayon dengan benar, mengikuti batas garis saat mewarnai, serta mempertahankan konsentrasi dalam kegiatan pembelajaran. Kondisi tersebut menunjukkan bahwa media pembelajaran yang digunakan masih bersifat konvensional dan kurang menarik sehingga belum mampu menstimulasi perkembangan motorik halus secara optimal. Penelitian ini bertujuan untuk mengembangkan media buku mewarnai berbasis desain digital menggunakan aplikasi Canva sebagai sarana pembelajaran untuk meningkatkan kecerdasan motorik halus anak usia 3–4 tahun. Metode penelitian yang digunakan adalah penelitian dan pengembangan (Research and Development) dengan model ADDIE yang meliputi tahap analisis, perancangan, pengembangan, implementasi, dan evaluasi. Subjek penelitian terdiri dari 10 anak usia 3–4 tahun di TK Negeri 2 Metro Timur. Teknik pengumpulan data dilakukan melalui observasi, wawancara, dan dokumentasi. Hasil penelitian menunjukkan bahwa penggunaan media buku mewarnai mampu meningkatkan minat belajar, konsentrasi, serta kemampuan koordinasi mata dan tangan anak dalam kegiatan mewarnai. Dengan demikian, media buku mewarnai berbasis Canva dapat menjadi alternatif media pembelajaran yang inovatif dan efektif dalam menstimulasi perkembangan motorik halus anak usia dini.

Abstract

This study was motivated by the importance of developing fine motor skills in early childhood, particularly for children aged 3–4 years who are in the golden age of development. Observations conducted at TK Negeri 2 Metro Timur showed that some children still experience difficulties in controlling hand movements, holding crayons properly, coloring within the lines, and maintaining concentration during learning activities. These conditions indicate that the learning media used are still conventional and less engaging, therefore they have not been able to optimally stimulate the development of children's fine

	motor skills. This research aims to develop a coloring book learning media based on digital design using the Canva application as a learning tool to improve the fine motor skills of children aged 3–4 years. The research method used is Research and Development (R&D) with the ADDIE model which includes the stages of analysis, design, development, implementation, and evaluation. The subjects of this study were 10 children aged 3–4 years at TK Negeri 2 Metro Timur. Data collection techniques were carried out through observation, interviews, and documentation. The results of the study show that the use of coloring book media can increase children's learning interest, concentration, and eye-hand coordination in coloring activities. Therefore, Canva-based coloring book media can be used as an innovative and effective learning alternative to stimulate the development of fine motor skills in early childhood.  Jurnal Indria (Jurnal Ilmiah Pendidikan Prasekolah dan Sekolah Awal) is licensed under a Creative Commons Attribution 4.0 International License.
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INTRODUCTION

Fine motor development is an important part of the physical and motor development aspects of early childhood, requiring consistent and sustained stimulation and practice. In accordance with the provisions issued by the Ministry of Education, Culture, Research, and Technology, children aged 3–4 years need to acquire various learning experiences that support improved eye hand coordination, the ability to use writing tools appropriately, and more directed control of finger movements. These provisions serve as a reference for educators in systematically and continuously monitoring and evaluating children's development. In addition, the regulation also establishes a number of fine motor development indicators formulated based on the Standard Level of Achievement for Early Childhood Development (STPPA), which serves as the national standard for early childhood education in Indonesia (Ministerial Regulation No. 5 of 2024 on National Standards for Early Childhood Education).

Early childhood education (PAUD) is the level of education that serves as the initial foundation for supporting children's overall development. The early childhood period is often identified as the "golden age," a period during which children's growth and development occur very rapidly and significantly. During this period, providing

appropriate stimulation is an important factor in developing various aspects of development, such as religious and moral values, physical-motor skills, cognition, language, socio-emotional skills, and the arts. One aspect that plays an important role is fine motor development, as this ability is closely related to children's readiness to engage in learning activities and various daily-life activities that require precise movement coordination.

Fine motor ability refers to the skill of controlling small muscles, particularly those in the hands and fingers, through harmonious coordination between vision and movement. This skill plays an important role in supporting children in carrying out various activities that require precision of movement, such as writing, drawing, cutting, folding, putting on or buttoning clothes, and using simple tools independently. Fine motor stimulation therefore needs to be designed through activities appropriate to children's characteristics and developmental level. According to Beaty, as cited in Wahyudin and Agustin (2024), fine motor skills relate to a child's ability to coordinate small muscle movements through dexterity, precision, and hand-and-finger coordination. This view is reinforced by Sumantri (2025), who explained that fine motor skill is the ability to effectively organize the use of small muscles, requiring high accuracy and optimal visual-motor coordination.

Fine motor development in children aged 3–4 years begins to be evident through their ability to perform various activities involving hand-and-finger movement coordination, such as drawing simple shapes, pasting, cutting, and arranging blocks into a particular construction. At this stage, children show improved control of hand movements, enabling them to better complete tasks that require accuracy, precision, and concentration. This ability does not develop instantly but is formed through a process of repeated and continuous practice. Learning experiences are therefore needed that give children the opportunity to maximally practice the use of their small muscles in accordance with their developmental characteristics (Kisno & Annisa Herlida Sari, n.d.).

According to Yamin (2013), various activities involving hand-and-finger movement, such as kneading, stamping, arranging, and shaping objects, make a significant contribution to children's fine motor development. These activities not only help strengthen the small muscles in the hands but also play a role in improving eye–

hand coordination. Providing stimulation in a manner that is appropriate, consistent, and suited to children's developmental needs will therefore have a positive impact on optimizing fine motor ability.

Nasution and Sutapa (2022) explained that children aged 3–4 years with good fine motor development are generally already able to perform various simple activities independently. These activities include combing their hair, opening and closing zippers on clothing, using eating utensils correctly, and holding writing tools in the proper position. These abilities serve as important indicators for assessing children's level of independence as well as their readiness to enter the next stage of development.

In addition, various creative activities are also known to provide effective stimulation for fine motor development. Seefeldt and Wasik (2023) suggested that activities such as coloring, cutting patterns, stringing beads, and folding paper can help improve eye–hand coordination. Through these activities, children learn to control their hand movements in a more directed and precise manner, so that their fine motor skills develop gradually in line with their age-appropriate level of maturity. Nevertheless, observations and interviews conducted with educators at TK Negeri 2 Metro Timur indicate that children's fine motor abilities have not yet developed optimally. Some children still have difficulty holding a crayon in the correct position, coloring within the boundaries of a picture, and controlling their hand movements in a directed manner. In addition, children's concentration during activities involving fine motor skills is also relatively low, making them easily distracted and unable to independently follow the teacher's instructions. This condition indicates that the learning media used so far have not been fully able to provide effective stimulation for children's fine motor development (Wahyuningsri, n.d.).

This problem indicates the need to develop learning media that are more innovative, engaging, and suited to the characteristics of young learners. Learning media do not only function as tools to assist the teaching-and-learning process, but also play a role in facilitating the delivery of material, making children's learning experiences more meaningful and enjoyable (Yuliana et al., 2023).

One alternative medium that can be used to support fine motor development is the coloring book. This medium is known as an educational tool capable of training eye–hand coordination, strengthening the small muscles in the fingers, and improving

children's concentration and creativity. Through coloring activities, children learn to control hand movements, recognize the boundaries of an image, choose appropriate colors, and creatively express their ideas. Coloring books therefore function not only as a medium for play but also as an effective learning tool for developing fine motor skills in early childhood (Nurul, 2023).

Advances in digital technology have opened opportunities to develop coloring books in a more engaging form through the use of the Canva application. Canva is a graphic design platform that provides various features that make it easier for teachers to create learning media that are creative, interactive, and suited to the needs of young learners (Nurlaili, 2023). Through this application, educators can design coloring books with a variety of themes close to children's daily lives, such as animals, plants, fruits, vehicles, and objects found in the surrounding environment. According to Santrock (2023), children tend to understand learning more easily through concrete experiences and the use of media that attracts their attention. The development of Canva-based coloring books therefore has the potential to create a more enjoyable learning atmosphere while increasing children's participation in the learning process. In addition, teachers can also apply a scaffolding strategy by providing gradual assistance according to each child's needs during the activity.

Canva based coloring books have great potential to support fine motor development in children aged 3–4 years, as they involve visual-motor coordination activities and intensive use of finger movements. Coloring activities designed to match children's developmental characteristics have been shown to improve movement accuracy, eye–hand coordination, and overall fine motor skills (Rahmawati & Pratiwi, 2023; Sari et al., 2024). Research conducted by Amalia, Wahono, Kurniawati, and Abidin (2025) showed that creative, visually based learning can provide effective stimulation for fine motor development in early childhood. This finding is consistent with that of Warlenda, Marlina, and Renaldi (2022), who stated that fine motor development is influenced by various factors, such as nutritional status, parenting patterns, learning experiences, and the type of play activities provided to children.

Research by Niluh Sri Murdian (2023) also showed that picture-coloring activities can significantly improve children's fine motor skills. This finding is reinforced by research from Siti Endang Susilowati, which concluded that coloring

activities contribute to improving children's concentration, precision, and movement coordination. However, research specifically focusing on the development of Canva-based coloring books as a fine-motor-stimulation medium for children aged 3–4 years remains limited, so further research is needed to enrich this field of study.

On the other hand, Fadillah and Putra (2023) revealed that one obstacle in developing technology-based learning media is teachers' limited ability to make full use of technology. Learning media that are easy to use, flexible, and adaptable to the needs of young children are therefore needed. Azizah and Fitriani (2022) also emphasized that the effectiveness of a learning medium is strongly influenced by how well it matches learners' developmental characteristics.

Based on these various theoretical studies and previous research findings, the development of Canva-based coloring books is regarded as an innovative and relevant alternative learning medium to support fine motor development in early childhood. This medium is expected not only to improve fine motor skills but also to foster interest in learning and create a more engaging, enjoyable, and meaningful learning experience. This study therefore focuses on the development of Canva-based coloring book media as an effort to improve fine motor skills in children aged 3–4 years at TK Negeri 2 Metro Timur.

METHODOLOGY

This study used the Research and Development (R&D) method. This method was chosen because the research aimed not only to produce a learning product in the form of a Canva-based coloring book medium, but also to test the medium's feasibility and effectiveness before it was used in the learning process. According to Sugiyono (2017), research and development is a research method used to produce a particular product while also testing the effectiveness of that product. This view is reinforced by Sugiyono (2023), who stated that development research is a systematic process for producing, improving, and refining a product through validation stages, so that the product achieves a quality suitable for use.

The product developed was a Canva-based coloring book medium intended as a learning medium to improve fine motor skills in children aged 3–4 years at TK Negeri 2 Metro Timur. The development model used was ADDIE, consisting of five stages:

Analysis, Design, Development, Implementation, and Evaluation (Hidayat & Nizar, 2021). The ADDIE model was chosen because it provides a systematic, simple development procedure that is easy to apply in research on the development of learning media.

This study used the ADDIE model, comprising Analysis, Design, Development, Implementation, and Evaluation (Hidayat & Nizar, 2021). The development of the Canva-based coloring book medium was tailored to the characteristics of young children and the Standard Level of Achievement for Child Development (STPPA) in accordance with the Ministry of Education, Culture, Research, and Technology (2022). The medium's feasibility was validated by material experts and media experts before it was implemented with 15 children aged 3–4 years.

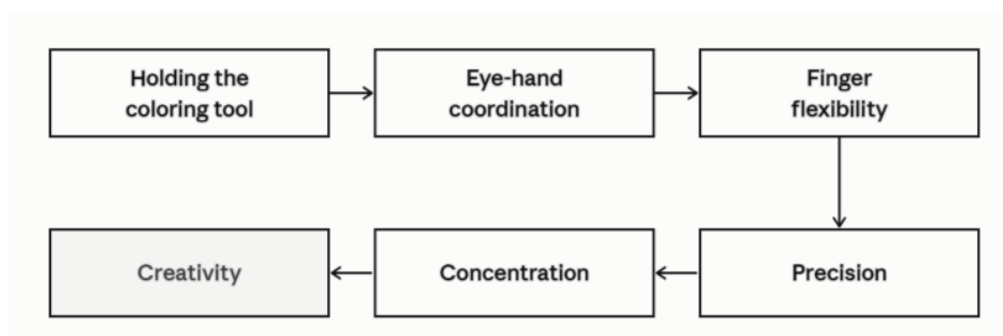


Figure 1. Stages of fine motor development in children aged 3-4 years (Seefeldt and Wasik, 2008)

Research indicators were developed based on the Standard Level of Achievement for Child Development (STPPA), the fine motor development theory of Seefeldt and Wasik (2008), as well as the research objectives, which focus on eye-hand coordination, crayon-handling skills, precision, concentration, and children's creativity during coloring activities.

Table 1. Instrument rating scale

Score	Category	Criteria
4	Very Good	All indicators met
3	Good	Most indicators met
2	Fair	Some indicators met
1	Poor	Indicators not yet met

The research instrument used a four-point Likert scale adapted from Sugiyono (2017) and tailored to the characteristics of the ADDIE development research. This scale was used by the validators to assess aspects of content, media, language, visual appearance, and the ease of use of the learning medium.

Table 2. Feasibility scale for expert team validation

Percentage	Category
81–100%	Very feasible
61–80%	Feasible
41–60%	Fairly feasible
21–40%	Less feasible
0–20%	Not feasible

The feasibility criteria for the medium were used to determine the product's quality level based on the validation results from the material and media experts. The percentage was obtained by dividing the score obtained by the maximum possible score and multiplying by 100%. The interpretation of the categories refers to Sugiyono (2017), which is widely used in development research. A medium was considered feasible if it achieved at least the "Feasible" category, while the "Very feasible" category indicated that the medium could be used at the implementation stage without requiring major revisions.

Table 3. Diagram of children's developmental outcomes

No.	Overall aspect	Number of children	Percentage	Description
1	Developing very well (BSB)	10	7,1%	Children were able to perform all fine motor indicators independently and consistently.
2	Developing as expected (BSH)	10	70,6%	Children were able to achieve most fine motor indicators

				appropriate to their developmental stage..
3	Beginning to develop (MB)	10	22,3%	Children began to show development in their fine motor skills but still required teacher guidance.
4	Not yet developing (BB)	10	0%	No children were in the "not yet developing" category.
	Total number of students	10	100%	The Canva-based coloring book medium was effective in improving fine motor skills in children aged 3–4 years.

The implementation results showed that the majority of children fell into the Developing as Expected (BSH) category at 70.6%, while 22.3% were in the Beginning to Develop (MB) category, and 7.1% reached the Developing Very Well (BSB) category. No children were in the Not Yet Developing (BB) category. These findings indicate that the use of the Canva-based coloring book medium was able to provide positive stimulation for eye-hand coordination, crayon-holding skills, and precision in children during coloring activities.



Figure 2. Results of medium revision based on validator feedback

Table 4. Validation diagram

Aspect	Before revision	After revision
Cover design	Paper material was easily damaged	Book material improved and no longer single-use
Image size	Some images were too small	Image sizes were enlarged
Instructions for use	Not yet available	Instructions for use were added
Layout	Images were spaced too closely	The coloring book medium should be made in landscape format
Cover color	Not attractive enough	A brighter color combination was used
Language	Some sentences were not simple enough	Language was simplified to suit children's age level

Table 5. Expert validation results after revision

No.	Overall aspect	x	xi	%	Description
1.	Feasibility of the content of the Canva-based coloring book medium in improving fine motor skills in children aged 3–4 years.	47	56	83.9%	Feasible
2.	Feasibility of the Canva-based coloring book medium in terms of appearance, presentation, and ease of use.	44	56	78.6%	Feasible
Total		91	112	81.25%	Feasible

Table 6. Expert validation results

No.	Overall aspect	Validation result	Description
1	Feasibility of the content of the Canva-based coloring book medium in improving fine motor skills in children aged 3–4 years	91.0%	Very feasible
2	Feasibility of the Canva-based coloring book medium in terms of appearance, presentation, and ease of use	90.2%	Very feasible
Average		90.6%	Very feasible

The validation results showed an improvement in the quality of the medium following revisions based on feedback from the material and media experts. In the material expert validation, the feasibility percentage increased from 83.9% (Feasible category) in the first stage to 91.0% (Very feasible category) after revision. Meanwhile, the media expert validation also improved from 78.6% (Feasible category) to 90.2% (Very feasible category) following refinements to the appearance, layout, image size, and instructions for using the medium. The validation results indicate that the revision successfully improved the product's quality. Improvements to the content, visual appearance, layout, and usage instructions contributed to the increased scores from both validators. The Canva-based coloring book medium was therefore considered very feasible for implementation in learning for children aged 3–4 years, in accordance with the ADDIE model procedure (Sugiyono, 2017; Hidayat & Nizar, 2021).

RESULTS AND DISCUSSION

RESULTS

At the evaluation stage of the ADDIE model, the effectiveness of the Canva-based coloring book medium was evaluated through observation, interviews, and documentation. Observation was conducted during the learning process to examine children's ability to hold a crayon in the correct position, control hand movements while coloring, coordinate eye-and-hand movements, color within the boundaries of the image, and complete the activity with full concentration, in accordance with the

established developmental indicators. Interviews were conducted with the classroom teacher to obtain information on student engagement, responses to the use of the medium, ease of applying the medium in learning, and changes in fine motor skills observed after the activity. Meanwhile, documentation in the form of coloring outputs, photographs of learning activities, and records of children's development was used as supporting data to reinforce the observation and interview results. According to the author's analysis, the use of these three techniques allowed for a more comprehensive evaluation process, as each technique provided complementary information. Observation produced factual data on fine motor development, interviews offered insight into the teacher's experience during the learning process, and documentation served as empirical evidence reinforcing the research findings. Data triangulation therefore enhanced the credibility of the research, making the conclusions more objective.

The implementation results showed that the Canva-based coloring book medium was able to improve fine motor skills in children aged 3–4 years. Based on the observation results, 70.6% of students were in the Developing as Expected (BSH) category, 22.3% in the Beginning to Develop (MB) category, and 7.1% in the Developing Very Well (BSB) category, with no students in the Not Yet Developing (BB) category. These results indicate that the developed medium was able to provide stimulation appropriate to the developmental characteristics of young children. According to the author's analysis, the improvement in fine motor skills occurred because coloring activities involve integrated visual-motor coordination. Children not only learned to recognize colors and objects, but also trained their finger muscle strength, controlled pressure while holding a crayon, coordinated eye-and-hand movements, and maintained concentration until the activity was completed. Repeated activity gave children the opportunity to improve movement accuracy and manipulative skills, which are important components of fine motor development.

In addition to the coloring activity itself, the characteristics of the medium designed using Canva also contributed to improved learning outcomes. Simple illustrations, proportional image sizes, clear lines, and themes relevant to daily life made children more interested in participating in the learning process. According to the author, an appealing media design can increase intrinsic motivation and student

engagement, making children more active in completing each activity given. This condition provided children with greater opportunities to practice fine motor skills through an enjoyable learning experience. Interview results with the teacher also showed that students were more focused, enthusiastic, and able to complete coloring activities more independently compared to before the developed medium was used.

These findings are consistent with various international studies over the past five years, which show that visual-motor activities are one of the effective strategies for developing fine motor skills in young children. Recent studies report that drawing, coloring, and other manipulative activities can improve eye-hand coordination, finger movement control, and precision through consistent practice. In addition, research on digital learning media shows that visually appealing media design can increase engagement, learning motivation, and children's active participation during the learning process. According to the author's analysis, the consistency between the present findings and previous studies indicates that the success of the Canva-based coloring book medium is influenced not only by the coloring activity itself, but also by the quality of the media design, which is able to create a learning experience that is active, enjoyable, and appropriate to the developmental characteristics of young children. The novelty of this study lies in the development of a coloring book using Canva as a medium that is easy for teachers to design, flexible enough to be adapted to different learning themes, and capable of integrating fine motor stimulation with engaging, contextual learning.

Overall, the findings indicate that the Canva-based coloring book medium meets the feasibility criteria based on expert validation results and is effective for improving fine motor skills in children aged 3–4 years. This success was supported by a media design appropriate to children's developmental characteristics, the use of repeated visual-motor activities, and the high level of student engagement during the learning process. The Canva-based coloring book medium can therefore be recommended as an innovative alternative learning medium for stimulating fine motor development in young children.

DISCUSSION

At the evaluation stage of the ADDIE model, data collection was carried out through observation, interviews, and documentation to determine the effectiveness of using the Canva-based coloring book medium in improving fine motor skills in children aged 3–4 years. Observation was conducted during the learning process by examining children's ability to hold a crayon in the correct position, control hand movements while coloring, coordinate eye-and-hand movements, color within the boundaries of the image, and complete the activity with full concentration, in accordance with the established developmental indicators. Interviews were conducted with the classroom teacher to obtain information on student engagement, responses to the use of the medium, ease of applying the medium in learning, and changes in fine motor skills observed after the activity took place. In addition, documentation in the form of coloring outputs, photographs of learning activities, and records of children's development was used as supporting data to reinforce the observation and interview results. The use of these three techniques produced data that was more valid, objective, and comprehensive, serving as the basis for evaluating the success of developing the Canva-based coloring book medium.

Table 8. Overall assessment of fine motor skills

No	Developmental category	Number of children	Percentage	Criteria
1	Developing Very Well (BSB)	1	7.1%	Children were able to perform all fine motor indicators independently and consistently.
2	Developing as Expected (BSH)	7	70.6%	Children were able to achieve most fine motor development indicators appropriate to their age.
3	Beginning to Develop (MB)	2	22.3%	Children began to show fine motor development but still required teacher guidance.
4	Not Yet Developing (BB)	0	0%	No students were in this category.
Total number of students		10	100%	The medium was effective in improving fine motor skills in children aged 3–4 years.

The implementation results of the Canva-based coloring book medium showed an improvement in fine motor skills among children aged 3–4 years at TK Negeri 2 Metro Timur. Based on the observation results, most students were in the Developing as Expected (BSH) category at 70.6%, followed by the Beginning to Develop (MB) category at 22.3%, and the Developing Very Well (BSB) category at 7.1%, with no children in the Not Yet Developing (BB) category. These results indicate that the developed medium was able to improve children's ability to hold a crayon correctly, coordinate eye-and-hand movements, color within the boundaries of an image, and maintain concentration during the activity. Data validity was obtained through observation, interviews, and documentation carried out at the evaluation stage of the ADDIE model. According to the author's analysis, the improvement in fine motor skills occurred because coloring activities using the Canva-based medium provided integrated visual-motor stimulation. During the learning process, children not only held the crayon, but also controlled their finger movements, regulated hand pressure, followed the boundaries of the image, and maintained concentration until the activity was completed. This activity provided repeated practice for the small muscles of the hand, allowing eye-and-hand coordination to develop more optimally. In addition, simple illustrations, proportional image sizes, clear lines, and themes close to children's everyday lives increased students' interest in actively engaging in the learning process. According to the author, these characteristics of the medium were a driving factor behind increased learning motivation, giving children more opportunities to practice fine motor skills through an enjoyable learning experience.

Table 9. Overall Assessment Results of the Coloring Book Media Product

No	Developmental category	Number of children	Percentage	Criteria
1	Material expert validation	83.9%	91.0%	Very feasible
2	Media expert validation	78.6%	90.2%	Very feasible
3	Teacher response	87.50%	87.5%	Very good
4	Student response	83.93%	83.93%	Very good
	Average overall product assessment	81.25%	88.16%	Very feasible

These findings are consistent with various international studies over the past five years, which show that visual-motor activities contribute to fine motor development in young children. Research by Cameron et al. (2021) explained that manipulative activities such as drawing and coloring can improve eye-hand coordination through repeated practice. Furthermore, Pitchford et al. (2022) reported that visually appealing learning media increase children's engagement, making the learning process more effective. Research by Grissmer et al. (2023) also showed that learning experiences involving visual coordination, motor skills, and attention simultaneously have a positive effect on the development of fine motor skills and school readiness in preschool children. These findings reinforce the results of the present study, indicating that the effectiveness of the Canva-based coloring book medium is influenced not only by the coloring activity itself, but also by the quality of the media design, which is able to create a learning experience that is active, engaging, and appropriate to the developmental needs of young children.

Overall, the findings show that the Canva-based coloring book medium not only meets the feasibility criteria based on expert assessment, but is also effective in improving fine motor skills in children aged 3–4 years. This success was influenced by the alignment between the media design and children's developmental characteristics, which increased children's motivation, engagement, and opportunities to repeatedly practice motor skills. The developed medium can therefore serve as an innovative and effective alternative learning approach for stimulating fine motor development in young children, while also supporting more active and meaningful learning implementation.

CONCLUSION

The findings of this study confirm that the use of a coloring book medium developed through the Canva application has a positive impact on strengthening fine motor skills in children aged 3–4 years. The development process was carried out methodologically following the ADDIE cycle (analysis, design, development, implementation, and evaluation) to ensure the quality and relevance of the medium to the target audience.

The results of the data analysis showed that children's fine motor competence had not yet reached the expected level of development. These obstacles included ineffective crayon-holding techniques, poor manual control, and difficulty following the visual boundaries of an image. In addition, children's short attention span and high level of boredom confirmed that the existing learning media had not been able to comprehensively facilitate children's need for stimulation and interest in learning.

The research findings confirm that the use of the Canva-based coloring book medium made a significant contribution to strengthening children's fine motor skills. In addition to its notable visual appeal, this medium was found to be able to create an enjoyable learning environment.

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