JURNAL INDRIA
Jurnal Ilmiah Pendidikan PraSekolah dan Sekolah Awal
Vol. 11 No. 1 Maret 2026
http://journal.umpo.ac.id/index.php/indria/index

Development of "MAMOLA KIDS" Using QR Codes to Stimulate Fine Motor Skills in Children Aged 5–6 Years

Ima Miftaku Rauf[1)], Pramono[2)], Munaisra Tri Tirtaningsih[3)]
[1,2,3] Universitas Negeri Malang

Article Information

Article Hsitory
Received: Nov 20, 2025
Revised: Jan 3, 2026
Accepted: March 13, 2026

Keywords:
Learning Media, Fine Motor Skills, Smart Books

Abstrak

Penelitian dan pengembangan ini bertujuan untuk menghasilkan produk media pembelajaran berupa *mamola kids* atau media *smart book* berbasis *QR* untuk menstimulasi kemampuan motorik halus pada anak usia 5-6 tahun. Hasil penelitian yang dilakukan menemui beberapa anak masih kurang berkembangnya aspek motorik halus , seperti anak mengalami kesulitan dalam menali sepatu, kesulitan untuk menulis dan pembelajaran jarang menggunakan media sehingga terkesan membosankan. Penelitian ini menggunakan metode research and development (R&D), model pengembangan *Sintesis* (adaptif pramono). Kelayakan *mamola kids* berbasis *QR* memperoleh hasil 85,00% dari ahli materi, 88,33% dari ahli media, uji coba kelompok kecil 96,25%, dan uji kelompok besar 97,03% dari respon pengguna lembaga tiga TK di Kota Malang. Kesimpulannya dengan demikian media *mamola kids* berbasis *QR* sangat layak digunakan sebagai alat pembelajaran untuk menstimulasi kemampuan motorik halus anak umur 5-6 tahun.

Abstract

This research and development project aims to create an educational media product called *Mamola Kids*—a QR-based smart book designed to stimulate fine motor skills in children aged 5 to 6 years. Initial findings revealed that several children exhibited underdeveloped fine motor abilities, such as difficulty tying shoelaces and writing. Moreover, classroom activities often lacked engaging media, making the learning process monotonous. The study employed a Research and Development (R&D) approach, specifically adopting the Synthesis (adaptive Pramono) development model. The feasibility evaluation of the Mamola Kids QR-based smart book resulted in a score of 85.00% from material experts, 88.33% from media experts, 96.25% in small group trials, and 97.03% in large group trials conducted in three kindergartens across Malang City. In conclusion, the QR-integrated Mamola Kids media proves to be highly suitable for enhancing fine motor skills in early childhood learning for 5–6-year-old children.

✉ Corresponding author
E-mail: ima.miftaku.2001536@students.um.ac.id

ISSN 2579-7255 (Print)
ISSN 2524-004X (Online)

INTRODUCTION

Early Childhood Education (PAUD) is an educational institution that cannot be overlooked, as a child's developmental success is determined by their cognitive development. This aligns with Article 28 of Law No. 20 of 2003 of the Republic of Indonesia on the National Education System, Chapter 1, Article 1, Point 14, which states that: "Early childhood education is an effort to nurture children from birth to the age of six by providing educational stimulation to support their physical and spiritual growth and development so that children are prepared to enter further education."

Development is the process of increasing the complexity of the body's structure and functions in gross motor skills, fine motor skills, speech and language, as well as socialization and independence. [2] Children between the ages of 0 and 6 develop sensitivity and responsiveness to various stimuli. This sensitive period occurs when a child's physical and psychological functions have matured and are ready to respond to environmental stimuli [9] . To foster children's development across various stages, there are six key areas to focus on: language development, cognitive development, social-emotional development, religious and moral values, physical and motor skills, and the arts [18]. One aspect that needs to be developed is fine motor skills, which are a fundamental aspect of early childhood development [11] .

Hurlock (1978:151) explains that motor skills are the development of processes that control body movements through the coordinated action of the nervous system and muscles [20] . Fine motor skills are a stage of a child's development that involves coordinating the small muscles, such as finger, hand, and eye coordination. For example, activities like weaving, coloring, drawing, and so on [1] . At this stage of development, children are able to coordinate their eyes, hands, and body together, as seen in activities such as writing, coloring, tracing, and drawing [4] .Fine motor skills need to be developed through continuous or gradual stimulation [17] . If these fine motor skills are not consistently stimulated, they will certainly not develop to their full potential during this stage of development.

Regarding children's fine motor skills, the researcher conducted observations at a kindergarten in Malang, specifically KB & TK Taman Indria 01. At this kindergarten, several issues were identified, including underdeveloped fine motor skills—such as

children having difficulty tying shoelaces, writing, and cutting—as well as the fact that educators rarely used teaching aids during lessons, making the learning process seem boring. The researcher reviewed several references from previous studies and found that issues regarding children's fine motor skills persist, namely that some children still become easily bored during learning because the teaching aids used by educators are not engaging enough[3]. Some children are not yet able to copy shapes; this is evident during the learning process, as the shapes they draw do not match the examples and are not yet correct [16] . Another issue is that some children still cannot hold a pencil properly, cannot unbutton their shirts, and are still not following the pattern [14] .

Based on the findings regarding fine motor skill development, researchers need to create an educational media product that can stimulate the fine motor skill development of children aged 5–6 years, in the form of a QR-based smart book or Mamola Kids. A smart book is a book specifically designed with various interactive activities, such as snapping buttons, tying shoelaces, and sewing, with the aim of helping children stimulate their fine motor skills in a fun and challenging way. [10] . This media was previously developed by (Oktaviani & Setiyono, 2022), They differ in various ways, such as in the materials used—like flannel—and in the content of the activities, whereas contemporary researchers use printed materials. What they have in common is that both materials promote the development of children's fine motor skills.

Educational media are teaching aids that educators can use. The purpose of educational media is to spark children's interest, facilitate the delivery of information, and overcome limitations of time, space, and cost [21] . The educational media created by the researcher was subsequently innovated and developed into a Smart Book—a printed book containing various play-based activities. The book's cover features a QR code linking to a video tutorial that can be accessed via a smartphone. The advantages of this medium include the scannable QR code, colorful visuals, and the fact that the medium can be used over the long term. The benefits of QR-based Smart Books are intended for children aged 5–6 years to develop fine motor skills, support learning activities so that children can more easily understand the material presented by educators, help educators create a fun learning environment, and foster children's critical thinking skills

METHOD

This research and development project employs the Research and Development (R&D) method. Research and Development (R&D) is the process or series of steps involved in developing a new product or improving an existing one [13]. According to Sugiyono (2018), the R&D method is a research method used to develop specific products and test their effectiveness [19]. Meanwhile, according to Albert Maydiantoro, the data collection methods consisted of observations and questionnaires validated by three subject matter experts and two media experts, as well as observation sheets for kindergarten teachers. The observations were conducted to directly observe the challenges currently faced by young children [6] Meanwhile, the questionnaire was evaluated based on its efficiency in collecting data on a large scale through standardized questions [8]. The Mamola Kids QR-based media platform utilizes data analysis techniques, specifically qualitative and quantitative data. The following is the synthesis method.

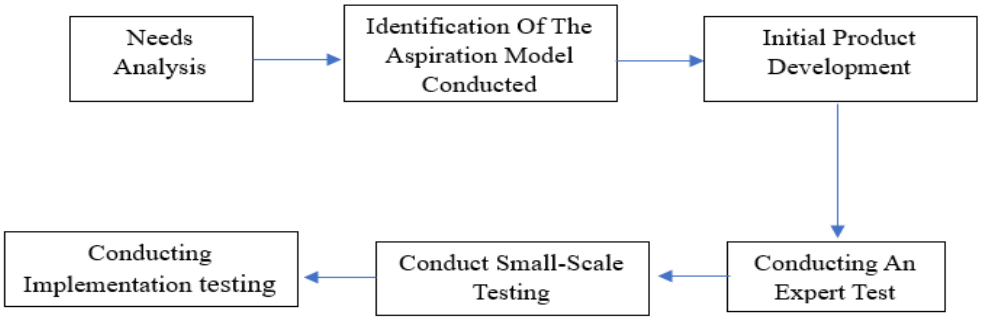

Figure 1. Stages of Adaptive Product Development Based on the Synthesis Model (Pramono et al., 2019)

The research model uses Pramono's Adaptive Synthesis method, which consists of six stages: conducting a needs analysis, identifying the desired aspirational model, developing the initial form of the product, performing expert testing, and conducting small-scale testing. Conducting a field trial implementation [15] .

RESULTS AND DISCUSSION

NEEDS ANALYSIS (CONDUCTING A NEEDS ANALYSIS)

In the first phase, the researchers conducted direct observations and identified several issues children were experiencing related to their fine motor skills, namely underdeveloped fine motor skills—such as difficulty tying shoelaces, difficulty writing and cutting—and, during the learning process, teachers rarely used teaching aids.

Identifying the Desired Aspirational Model

In the second phase, the researcher identified the desired aspirational model. The issue identified through the observation activity described above was that Taman Indria 01 Preschool and Kindergarten had not diversified the play equipment used to stimulate the fine motor skills of children aged 5–6 years. This was because teachers rarely used learning materials and made insufficient efforts to provide appropriate learning activities to address the children's learning challenges. Subsequently, the researcher searched for and collected reference sources from journals, articles, and books or e-books to support the design of the developed product. Consequently, the Mamola Kids media (a QR-based smart book for play and learning) was created to stimulate children's fine motor skills in coordinating their eyes, hands, and fingers.

Developing the Initial Version of the Product

The third step is to create a preliminary design plan for the product to be developed. The researchers designed a physical product consisting of several pages intended to help children practice activities that improve their fine motor skills, such as stringing, weaving, tying shoelaces, puzzles, sticking and peeling off pictures, coloring, and tracing letters of the alphabet. The following is the design of the Mamola Kids product,

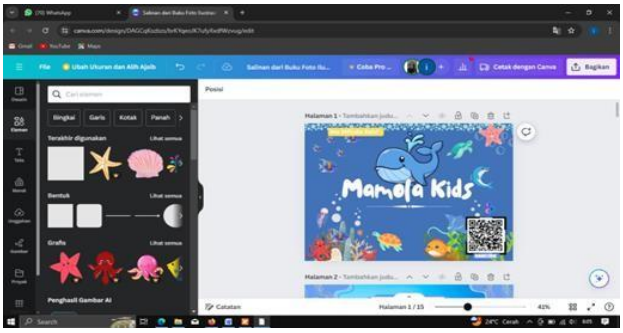

Figure 2. Mamola Kids Product Cover

Figure 2 illustrates the steps in the production process of the Mamola Kids book and the tutorial video on how to use the materials, which are then converted into QR codes. The book includes sections such as the cover, book details, activities for tracing letters of the alphabet, coloring, beading, tying shoelaces, sticking and peeling off pictures, weaving, and puzzles.

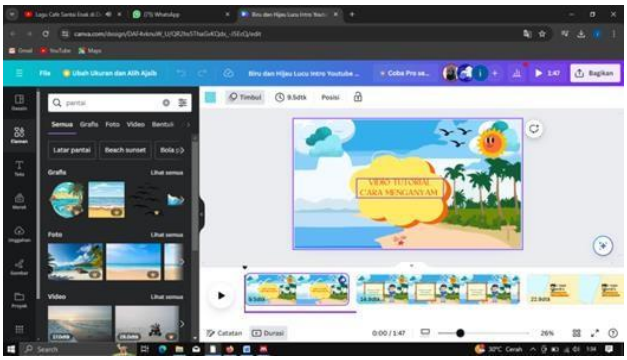

Figure 3. Mamola Kids Tutorial Video

Figure 3 shows the process of creating a video tutorial on how to complete the activities in the book using QR codes. A QR code, short for Quick Response Code, is a two-dimensional matrix code that can be scanned using a smartphone or tablet camera to access information or learning materials that have been provided [7] . This tutorial video is intended for teachers to help them innovate their teaching methods and to help children aged five to six years old develop their critical thinking skills. The tutorial video is available for each of the children's play activities; to access it, simply scan the barcode found in the book.

Figure 4. Supporting Equipment for the Mamola Kids Play Media

In Figure 4, there are several play aids containing various objects that can be used to stimulate the sense of touch. Children can feel textures that are rough, smooth, and squishy. The play aids are designed to be safe, easy to use, simple, and visually appealing, which aligns with the effectiveness of the facilities at the institution.[5] . These items include slime, modeling clay, beads, construction paper, sponges, peel-and-stick stickers, non-permanent markers, cotton balls, clothes brushes, and beach sand.

Conducting Expert Validation

In the fourth stage, the researchers conducted a validation test of the QR-based Mamola Kids media with three subject-matter experts and two media experts. Validation was conducted by distributing a questionnaire to the validators to assess the media's validity. The questionnaire used a Likert scale, where each validator rated each item on a scale ranging from 1 (strongly disagree) to 4 (strongly agree).

Table 1. Results of Subject Matter Expert Validation

No.	Aspect Overall	Results Validation			Description
		Σx	Σxl	100%	
1.	The Effectiveness of Mamola Kids Media in Stimulating Fine Motor Skills in Children Aged 5–6 Years.	52	60	86,66%	Highly Valid
2.	The effectiveness	48	60	80,00%	Valid

	of Mamola Kids in stimulating fine motor skills in children aged 5–6 years.				
3.	The Appeal of Mamola Kids Media in Stimulating Fine Motor Skills in Children Aged 5–6.	53	60	88,33%	Highly Valid
	Quantity	153	180	85,00%	Valid

In Table 1, the expert validation results for the material achieved a score of 85.00%. Based on the criteria used, the product can be considered suitable for use. Based on these results, it can be concluded that the research and development of the QR-based Mamola Kids media is valid for use as a learning tool to stimulate fine motor skills in children aged 5–6 years, which is beneficial for training hand-eye coordination.

Table 2. Results of Media Expert Validation

No.	**Aspect** **Overall**	**Results** **Validation**			**Description**
		Σx	Σxl	100%	
1.	The Effectiveness of Mamola Kids Media in Stimulating Fine Motor Skills in Children Aged 5–6 Years.	32	40	80,00%	Valid
2.	The effectiveness of Mamola Kids in stimulating fine motor skills in children aged 5–6 years.	39	40	97,05%	Highly Valid
3.	The Appeal of Mamola Kids Media in Stimulating Fine Motor Skills in Children Aged 5–6.	35	40	87,05%	Highly Valid
	Quantity	106	120	88,33%	Highly Valid

In Table 2, the validation results for the Mamola Kids QR-code-based media yielded a score of 88.33%. Based on the criteria used, the product can be considered highly suitable for use. Based on these results, it can be concluded that

the research and development of the Mamola Kids QR-code-based media is highly valid for use as a learning tool to stimulate fine motor skills in children aged 5–6 years, which is beneficial for training hand-eye coordination.

Conducting Small-Scale Testing

This fifth stage involved a pilot study conducted by teachers and children aged 5–6 years at Taman Indria 01 Preschool and Kindergarten. The initial pilot study (small group) involved 5 children. According to Suharsimi Arikunto (2013: 254), the ideal number of participants for a small-group pilot study is 4–5 children [12]. At this stage, the teacher, acting as an observer, will complete a questionnaire regarding the product, while the children will serve as users of the Mamola Kids platform currently under development. This process is intended to assess the viability of the Mamola Kids product and gather feedback to guide its further development.

Table 3. Results of the Small Group Test

No.	Aspect Overall	Results Validation			Description
		Σx	Σxl	100%	
1.	The Effectiveness of Mamola Kids Media in Stimulating Fine Motor Skills in Children Aged 5–6 Years.	33	35	94,24%	Highly Valid
2.	The effectiveness of Mamola Kids in stimulating fine motor skills in children aged 5–6 years.	24	25	96,00%	Highly Valid
3.	The Appeal of Mamola Kids Media in Stimulating Fine Motor Skills in Children Aged 5–6.	20	20	100,00%	Highly Valid
	Quantity	77	80	96,25%	Highly Valid

In Table 3, the results of the small-group trial yielded a score of 96.25%. Based on the criteria used, the product's performance can be considered highly suitable for use. Based on these results, the use of the QR-based Mamola Kids medium is highly suitable as a learning tool to stimulate fine motor skills in children aged 5–6 years, which is beneficial for training hand-eye-finger coordination.

Conducting a Field Trial Implementation

This sixth and final stage involved a large-scale pilot study. The study involved 30 children aged 5–6 years from three institutions in Malang: 10 children from KB & TK Taman Indria 01, 10 children from PG-TA Hidayatul Mubtadi-in, and 10 children from KB & TK Mutiara Indonesia.

Table 4. Results of the Large Group Test

No.	Aspect Overall	Results Validation			Description
		Σx	Σxl	100%	
1.	The Effectiveness of Mamola Kids Media in Stimulating Fine Motor Skills in Children Aged 5–6 Years.	204	210	97,14%	Highly Valid
2.	The effectiveness of Mamola Kids in stimulating fine motor skills in children aged 5–6 years.	142	150	94,66%	Highly Valid
3.	The Appeal of Mamola Kids Media in Stimulating Fine Motor Skills in Children Aged 5–6.	120	120	100,00%	Highly Valid
	Quantity	466	480	97,03%	Highly Valid

Table 4 shows that the small-group trial yielded a result of 97.03%. Based on the criteria used, the product's performance can be considered highly suitable for use. Based on these results, the QR-code-based Mamola Kids medium is highly suitable for use as a learning tool to stimulate fine motor skills in children aged 5–6 years, which is beneficial for developing hand-eye-finger coordination.

CONCLUSION

The Mamola Kids educational media (Smart Book Play and Learn) based on QR codes has undergone pilot testing by subject matter experts and media experts. The results show that the subject matter experts deemed it valid or suitable for use, while the media experts deemed it highly valid or highly suitable for use. Additionally, the Mamola Kids QR-based media has been field-tested in small-group settings, yielding highly suitable results as it helps children concentrate while playing, and children are enthusiastic and happy while engaging in activities within the Mamola Kids QR-based book. The results of the large-group pilot test were also highly suitable.

Based on these results, it can be concluded that the QR-based Mamola Kids media is highly suitable for use as a learning aid that effectively stimulates the fine motor skills of children aged 5–6 years by training their eye-hand and finger coordination, as well as encouraging them to explore problem-solving activities in the book.

REFERENCES

[1]. Asmawulan, T., Agustina, L., Kurnianingrum, D., & Herawati, N. (2023). Media Goodie Book untuk Meningkatkan Perkembangan Motorik Halus Anak Usia 5-6 Tahun. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *7*(2), 2202–2212. https://doi.org/10.31004/obsesi.v7i2.3902

[2]. D, K. & L. (2021). *Aspek Perkembangan Anak Usia Dini* (K. & L. dkk D (Ed.)). Nasya Expanding Management.

[3]. Darmiatun, S., & Mayar, F. (2019). Meningkatkan Kemampuan Motorik Halus Anak melalui Kolase dengan Menggunakan Bahan Bekas pada Anak Usia Dini. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *4*(1), 257. https://doi.org/10.31004/obsesi.v4i1.327

[4]. Dewi, A. T. (2020). Pengembangan Kegiatan Bermain Pasir Kinetik untuk Meningkatkan Kemampuan Motorik Halus pada Anak Usia 5-6 Tahun di TK Aisyiyah Bustanul Athfal 6 Mataram Tahun Ajaran 2019. *Prosiding Seminar Nasional Pendidikan Inklusif*, *1*(1), 62–68.

[5]. Dini, J. U., Anggraini, E. S., Batubara, L. F., Utara, S., & Prasarana, S. (2021). *EVALUASI PEMENUHAN STANDAR MINIMAL SARANA DAN*. *7*(1), 20–26.

[6]. Education, E., Elisa, P. N., & Perjuangan, U. B. (2021). *Jurnal basicedu*. *5*(1), 446–452.

[7]. Huzaifah, H. (2023). Pengembangan Media Video Pembelajaran Berbasis Qr Code Pada Materi Sistem Gerak Manusia. In *FITK UIN Syarif Hidayatullah jakarta*.

[8]. Kuesioner, W. D. A. N. (n.d.). *TEKNIK PENGUMPULAN DATA : OBSERVASI ,*. *3*(1), 39–47.

[9]. Lawati, S., & Ismaniar, I. (2022). The Relationship Between Family-Centered Stimulation And Cognitive Development Of Children Age 5-6 Years In Akad Village. *SPEKTRUM: Jurnal Pendidikan Luar Sekolah (PLS)*, *10*(1), 23. https://doi.org/10.24036/spektrumpls.v10i1.114786

[10]. Nazara, W., & Tegeh, I. M. (2023). *Busy Book Media Based on a Contextual Approach in Improving Fine Motor Skills in Early Childhood*. *11*, 220–228.

[11]. Novianto, E. (2020). *Mengembangkan Keterampilan Motorik Halus Anak Usia 5-6 tahun Dengan Menggunakan Media Kolase*.

[12]. *Nurjanah, dkk., Pengembangan Media Pembelajaran PENGEMBANGAN MEDIA PEMBELAJARAN*. (n.d.). *12*(01), 15–37.

[13]. Nusantara, D. A., Pendidikan, J., Vol, B., & Arrahmaniyah, O. S. (2023). *Research And Development (R & D) Penelitian Yang Inovatif Dalam Pendidikan*. *1*(1).

[14]. Oktaviani, E., & Setiyono, I. E. (2022). PESBOOK: Permainan Edukatif Smart Book sebagai Media Stimulasi Motorik Halus Usia Dini. *Aulad: Journal on Early Childhood*, *5*(3), 335–342. https://doi.org/10.31004/aulad.v5i3.387

[15]. Pramono, Nurhasanb, Kusnanik, N. W., & Winarno, M. E. (2019). Playing motion activity model development to improve early childhood creative thinking. *International Journal of Innovation, Creativity and Change*, *5*(4), 219–236.
[16]. Pratiwi, B. I., Zulkifli, N., & Chairilsyah, D. (2021). Pengaruh Media Busy Box terhadap Kemampuan Motorik Halus Anak Usia 5-6 Tahun di TK Nurussalam Kecamatan Bukit Raya Kota Pekanbaru. *Jurnal Pendidikan Tambusai*, *5*, 5–6.
[17]. Putri, R., Maghfiroh, R., Jumiatmoko, Hafidah, R., & Nurjanah, N. E. (2021). Meningkatkan Kemampuan Motorik Halus Anak Melalui Permainan KolaseBahan Bekas Studi Literatur. *Jurnal Golden Age*, *5*(2), 314–322.
[18]. Safitri, L. (2022). *Perkembangan Kemampuan Motorik Halus Anak Usia Dini 5-6 Tahun melalui Kegiatan Memegang Pensil*. *4*(2), 492–502.
[19]. Sugiyono. (2018). *Metode Penelitian Pendidikan. pendekatan kuantitatif, kualitatif, dan R&D*. Alfabeta.
[20]. Suparyanto dan Rosad. (2020). Perkembangan fisik dan motorik anak. In *Suparyanto dan Rosad (2015* (Vol. 5, Issue 3). https://www.mendeley.com/catalogue/120581bb-b3dd-3dec-9f7c-3c1a41a27e6b/?utm_source=desktop&utm_medium=1.19.8&utm_campaign=open_catalog&userDocumentId=%7B1a95ff22-ec10-40f4-9c87-1d95902690ab%7D
[21]. Usep Kustiawan. (2016). *Pengembangan Media Pembelajaran Anak Usia Dini*. Penerbit Gunung Samudera.