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Volume 7 Nomor 2 (2026) Pages 218–233
Hadlonah: Jurnal Pendidikan dan Pengasuhan Anak
Email Journal:jurnalhadlonahuibbc@gmail.com
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Development of Digital Reflective Learning Media to Support Cooperative Behavior through Collaborative Reflection

Saveria Shabrina Zahwa Arsapermana[1] ✉, Asep Kurnia Jayadinata[2], Dhea Ardiyanti[3]

[1,2,3] Pendidikan Guru Pendidikan Anak Usia Dini, Universitas Pendidikan Indonesia

Email: saveria.shabrina@upi.edu[1] ✉, asep_jayadinata@upi.edu[2], dheaardy@upi.edu[3]

Submitted: 2026-06-25; Accepted: 2026-09-23; Published: 2026-09-29

Abstract

This study aimed to develop a digital reflective learning medium, "*Blok Ceria*" to support early childhood *Gotong Royong* behavior through a Collaborative Reflection approach. This study employed a Research and Development (R&D) method using the ADDIE development model, which consists of the Analysis, Design, Development, Implementation, and Evaluation stages. The participants consisted of 10 children aged 3-5 years at Daycare Jagad Solution. Data were collected through observation, interviews, expert validation, and a *Gotong Royong* behavior observation sheet covering seven indicators. The validation results showed that the "Blok Ceria" media obtained an average feasibility percentage of 87% and was categorized as highly feasible. The four-day implementation showed an increase in the average *Gotong Royong* behavior score from 17.65 on Day-1 to 26.80 on Day-4. The Wilcoxon Signed-Rank test showed a significant difference between the Day-1 and Day-4 scores ($W = 0$; $p = 0.002$). The overall average achievement across the four days was 76.47%, which was categorized as Good. Although the results were positive, this study had limitations related to the small number of participants, the use of convenience sampling, the short implementation period, and the absence of a control group. Therefore, the findings cannot be used to definitively establish a causal relationship or the effectiveness of the media. The "*Blok Ceria*" media may serve as an alternative interactive learning medium to support the introduction and reinforcement of *Gotong Royong* behavior through structured play activities and social reflection.

Keywords: *Blok Ceria*; Collaborative Reflection; *Gotong Royong*; reflective media; Early Childhood Education.

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INTRODUCTION

Character education is one of the main foundations of the educational process in early childhood because, during this period, children begin to develop habits, attitudes, and patterns of interaction with their social environment. The rapid development of information technology and social changes have made strengthening character from an early age increasingly important (Nurhaeti & Romadona, 2024). One character value that is relevant to social life is Gotong Royong, which reflects the spirit of togetherness, cooperation, mutual assistance, and concern for others (Hayati & Utomo, 2022; Maimunah et al., 2025). Understanding the developmental characteristics of early childhood in the physical-motor, cognitive, social-emotional, language, moral, and creativity aspects is also an important foundation for educators in providing appropriate stimulation (Nurasyiah & Atikah, 2023).

Character development through *Gotong Royong* plays an important role in early childhood education because it is related to children's ability to cooperate, share roles, take responsibility, help one another, and support others in achieving common goals. This value is in line with the Gotong Royong dimension of the Pancasila Student Profile and needs to be introduced through real-life experiences that are appropriate to children's developmental stages (Fauziddin & Mufarizuddin, 2018; Lestari & Muarifah, 2022). Character development in early childhood also requires directed and consistent learning management (Maulana, 2020; Trimuliana et al., 2019). Therefore, developing *Gotong Royong* in children is not sufficient through merely providing an understanding of this value; it also needs to be manifested through observable behaviors in group activities.

Daycare is one of the early childhood education services that functions not only as a childcare setting but also as a learning environment that supports various aspects of children's development (Wardani & Suryana, 2021) The characteristics of daycare activities, which take place over a relatively long duration, allow children to interact intensively with educators and peers through various daily activities. This condition provides opportunities for educators to stimulate children's social development and cooperative behavior through concrete learning experiences. Sitompul et al. (2022) showed that learning environments involving group activities can support the development of *Gotong Royong* character in children. In the context of play activities, Rochmah (2020) also showed that games can be used to improve children's cooperation skills because games provide opportunities for children to interact and engage in activities together with their peers. In line with these findings, Hardiyana (2020) demonstrated that play activities can improve interpersonal intelligence in early childhood, which is related to children's ability to interact with others. Shabrina et al. (2021) found that cooperative games can improve children's interpersonal intelligence through shared play activities involving cooperation and interaction with peers. Latief & Hijriah (2022) showed that play activities can improve children's social-emotional skills, including their ability to cooperate with peers, play together, and express emotions during play activities.

The role of educators and the learning environment is also an important part of providing stimulation for children's social-emotional development. Hidayati et al. (2023) showed that educators play a role in stimulating children's social-emotional development through guiding, training, motivating, and managing the classroom, as well as through collaboration with parents. In addition to the role of educators, play activities can also serve as a means of developing children's emotional aspects. Rantini & Hardiyana (2021) showed that the role-playing method can be used to improve emotional abilities in early childhood through play experiences that

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actively involve children. Therefore, learning activities aimed at supporting cooperative behavior need to provide opportunities for children to interact, communicate, express ideas, and receive guidance throughout the activities.

However, the use of digital media in early childhood education does not mean that children aged 3–5 years need to use digital devices continuously. At this age, children still need concrete experiences, play activities, and direct interaction with educators and peers. Therefore, the use of digital media in this study is positioned as a learning support tool that is used in a limited manner and in accordance with children's developmental characteristics. Digital media can be utilized when it helps children gain interactive learning experiences, visualize their experiences, and support them in remembering and reflecting on social experiences they have engaged in.

Along with technological developments, the use of digital media in early childhood education has continued to expand. Digital media can be used to provide stimulation and create interactive learning experiences when designed according to children's developmental characteristics (Aini et al., 2026). In its implementation, the use of digital media also requires educator readiness. Novitasari & Fauziddin (2022) showed that educators' digital literacy is one of the supporting factors in the use of digital devices for early childhood learning. However, the use of digital media does not automatically result in meaningful learning. Media need to be designed not only to focus on entertainment but also to provide opportunities for children to interact, participate actively, and gain learning experiences that are relevant to early childhood. Therefore, digital media for early childhood need to be appropriately designed so that they do not focus solely on entertainment aspects (Kurniasih, 2019; Mulyani et al., 2020). Silviani (2022) showed that digital games such as ludo can incorporate character values and be utilized as character education media for early childhood. These findings indicate that digital games have the potential to be used in character learning, but media design still needs to be directed toward learning experiences that are appropriate to children's developmental goals. In line with this, Budiarti & Yasmin Adar (2023) showed that the use of digital media in early childhood can be associated with social-emotional development, including the emergence of positive behaviors in children's interactions.

These findings are consistent with a systematic review and meta-analysis by Alotaibi (2024), which showed that game-based learning in early childhood education has the potential to support children's cognitive, social, and emotional development, including their social engagement. However, the study also indicated that there is still room for further research regarding the character and design of games used in early childhood education. Therefore, the development of digital media for early childhood needs to consider not only the form of the game but also the social experiences and learning outcomes that are intended to be developed through the game.

Although play activities and digital media have the potential to support children's social development, character education in early childhood education and daycare settings still faces several challenges. Overly instructional learning may limit children's active participation, while the media used do not always provide opportunities for children to understand the social experiences they have engaged in. In addition, opportunities for children to discuss their experiences, express their opinions, listen to their peers, and evaluate their cooperative behavior

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are not always incorporated as structured components of learning activities (Solihin et al., 2024).

One approach that can provide children with opportunities to understand these experiences is the Collaborative Reflection model, which is a reflective process carried out collectively through the exchange of experiences, perspectives, discussions, and feedback. Veen et al. (2022) explained that Collaborative Reflection emphasizes participants' active participation in the collective reflection process through the sharing of experiences and perspectives. This approach is relevant to the development of cooperative behavior because it provides opportunities for children to listen to their peers' opinions, express their ideas, and understand experiences carried out together. Clarà et al. (2019) also showed that Collaborative Reflection involves the exchange of experiences, discussion, and feedback in developing an understanding of shared experiences.

Reflection is a process that helps children connect their experiences with a more meaningful understanding. Tani et al. (2018) showed that Collaborative Reflection can support learning activities and processes, as reflective activities can serve as a bridge between concrete experiences and the process of meaning-making. In the context of early childhood education, reflection can emerge through children's verbal and nonverbal responses to their experiences (Hastuti et al., 2025). Meanwhile, Nurhidayah Ilyas et al. (2026) emphasized the importance of strengthening teacher reflection in responding to children's digital experiences. These findings indicate that reflection needs to be adapted to children's characteristics and the learning experiences they encounter.

These findings are reinforced by Schürmann et al. (2025), who showed that collaborative reflection activities can be used to support the collaboration process and help learners pay attention to and understand the process of cooperation within a group. Although the study was conducted in a higher education context, its findings provide a basis for understanding that collaborative reflection can be an important component in helping learners understand collaborative experiences. The application of this concept in early childhood education, however, requires adaptation to the developmental characteristics of young children.

The development of media or activities that provide children with direct experiences can also serve as a means of character education. Purwastuti (2022) showed that outbound activities can be used as a medium for Pancasila character education in early childhood. These findings indicate that character education can be developed through experiences that directly involve children. However, such experiences can still be further developed through digital media that enable children to engage in play while also reflecting on their experiences of cooperation.

Based on previous studies, play activities and digital media have been widely used to support children's social development. However, the use of non digital media, such as verbal discussions or physical worksheets, still has limitations in facilitating collaborative reflection among children aged 3-5 years, particularly because their attention spans and understanding of emotional concepts are still developing. The “Blok Ceria”-based digital reflective media was developed to provide support through visual feedback, interactive emotion emojis, and accumulated group points that help concretize children's social experiences. This integration is expected to help children process their social experiences and reflect on cooperative behavior with their peers.

Based on the description above, this study aimed to develop digital reflective learning media through the Collaborative Reflection model to support cooperative behavior in early

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childhood, analyze the feasibility level of the developed media based on validator assessments, and describe the implementation of the media in supporting cooperative behavior in early childhood. In line with these objectives, this study focused on three aspects: the development of digital reflective learning media through the Collaborative Reflection model, the feasibility of the media based on validator assessments, and the implementation of the media in supporting cooperative behavior in early childhood.

METHODS

This study employed a Research and Development (R&D) method using the ADDIE development model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation (Branch, 2009). The R&D method was selected because it aims to produce a specific product while systematically and measurably testing its feasibility (Adeleke et al., 2024; Rachman et al., 2024; Sugiyono, 2013). This method was used to support the development of *Gotong Royong* character in early childhood.

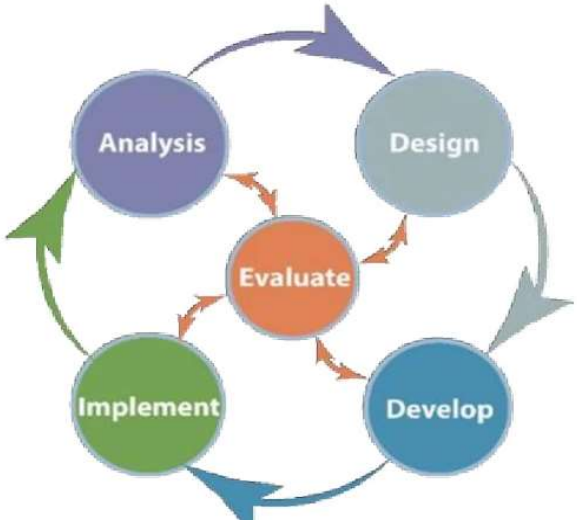


Figure 1. Research and Development (R&D) Process Using the ADDIE Model

The Analysis stage was conducted through interviews with the Daycare Jagad Solution to identify the need for learning media. The interview results showed that the use of digital media in learning activities was still limited to the use of television to display videos from YouTube. This condition became the basis for the researchers to develop more interactive digital media that could be used in children's play and reflection activities.

The Design stage involved designing the game concept, activity flow, visual appearance, and reflection activities using Canva. The media design was adapted to the characteristics of children aged 3-5 years and revised several times until a design that met the learning needs was obtained. Subsequently, in the Development stage, the design was developed into digital media and validated by one material expert and one media expert. Each validator assessed 25 statements using a 1-4 scale. The validation results were used as the basis for improving the media before it was implemented with the children.

The participants consisted of 10 children aged 3-5 years at Daycare Jagad Solution, comprising 4 girls (C1, C6, C8, and C9) and 6 boys (C2, C3, C4, C5, C7, and C10). The participants were selected using convenience sampling based on the availability and suitability

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of the children to participate in the research activities. This selection was conducted to ensure that the children could participate in the use of the media and reflection activities, which required interaction and communication with peers and teachers. The limited number of participants and the use of convenience sampling limit the generalizability of the findings to the broader early childhood population. Daycare Jagad Solution serves children aged 6 months to 9 years, with learning activities based on the Kurikulum Merdeka and a center-based learning model integrated with learning-through-play activities.

The Implementation stage was conducted over four meetings, from Monday to Thursday, with a duration of 30-45 minutes for each meeting. The activities began with an opening session, followed by free play using blocks combined with other play activities. At the end of the activity, the children formed a circle with the teacher and used a tablet to play the developed digital media. After completing the game, the children viewed the points they had earned and received stars through the interactive touch feature, which they then attached to the designated place. The activity continued with an oral reflection session before the learning activity was concluded. The Evaluation stage was conducted based on the validation results and the implementation of the media. The evaluation also showed that the initial version of the media did not include a song; therefore, improvements were made by adding a song to increase children's interest.

The research instruments consisted of an expert validation sheet and a children's *Gotong Royong* behavior observation sheet. The validation sheet was used to assess the feasibility of the media, while the observation sheet was used to observe children's behavior during the use of the media. The observation covered seven indicators: children actively played together using the media, followed the rules for using the media, discussed while using the media, demonstrated empathy during play, expressed ideas, cooperated in solving problems, and accepted their peers' ideas during play. The observation assessment used a 1-4 scale consisting of BB (*Belum Berkembang*), MB (*Mulai Berkembang*), BSH (*Berkembang Sesuai Harapan*), and BSB (*Berkembang Sangat Baik*).

Observation was conducted by the teacher and the researcher over four meetings. Each observer independently assessed each child based on the predetermined indicators. After the activities were completed, the scores from the teacher and the researcher were averaged to obtain a combined observation score for each child. The assessment was conducted individually so that the development of children's *Gotong Royong* behavior could be identified based on observations during the activities. Before data collection was conducted, the researcher and the school principal held a one-day perception-alignment session to discuss the rubric and operational definitions of the seven *Gotong Royong* behavior indicators. Observations were conducted independently and simultaneously over the four-day implementation period. The scores from the two observers were then averaged to produce an objective combined observation score for each child.

The research data were analyzed using descriptive quantitative analysis by calculating the percentage of the scores obtained relative to the maximum score. In addition to the descriptive analysis, differences in *Gotong Royong* behavior scores between the Day-1 and Day-4 observations were analyzed using the Wilcoxon Signed-Rank test. This test was used to determine whether there was a difference in scores before and after the use of the media among the same research subjects. The test was conducted at a 5% significance level ($\alpha = 0.05$). The

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results were considered significant when the p-value was < 0.05. The percentage was calculated using the following formula:

$$P = \frac{\sum X}{\sum X_{maks}} \times 100\%$$

Description:

P : Percentage of research results
ΣX : Total score obtained
ΣXmax : The amount of the Maximum Score

The percentage results were then interpreted based on the criteria from the book by Riduwan (2016), as used in the study by Ardianti & Susanti, (2022), namely 81-100% as Excellent, 61-80% as Good, 41-60% as Pretty Good, 21-40% as Not Good, and 0-20% as Very Bad. These ranges were used to determine the level of media feasibility based on the percentage of scores obtained. The average observation score obtained by each child was then converted into a percentage and categorized according to the qualitative criteria for the achievement of children's *Gotong Royong* behavior. A percentage of 61% was established as the minimum threshold for the "Good" achievement category, as presented in Table 1 below:

Table 1. Percentage Interpretation Criteria

Percentage	Categories
81% – 100%	Excellent
61% - 80%	Good
41% - 60%	Pretty Good
21% - 40%	Not Good
0% - 20%	Very Bad

The categorization presented in Table 1 was used as a reference for describing the level of children's cooperative behavior achievement during the observation activities. The study was conducted after obtaining a research permit from the relevant institution and permission from Daycare Jagad Solution. The children's parents or guardians were informed about the research activities through a WhatsApp group by the school principal and provided verbal consent for the children's participation. The teachers involved were also informed that the activities were part of the research. The children's identities were kept confidential during data processing and presentation, while photographs and videos of the children were not included in the article.

RESULTS AND DISCUSSION

This study produced a digital-based simple reflective learning medium called "Blok Ceria," designed to support the development of cooperative behavior in early childhood through a Collaborative Reflection approach. The product was developed by adapting the ADDIE model, which consists of the Analysis, Design, Development, Implementation, and Evaluation stages (Mdodana-Zide, 2024).

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Analysis Stage

The analysis stage begins through Observations and interviews with the management of Daycare Jagad Solution. The results of the analysis show that the use of digital technology in institutions was still limited to one-way video views. On the other hand, the habituation of the value of collaborative behavior and learning reflection activities are generally carried out orally without the support of interactive structured media. Therefore, digital learning media that is able to integrate group play activities with directed reflection sessions is needed to stimulate prosocial interactions.

Design Stage

In this stage, the game concept, interaction mechanics, visuals, and flow of collaborative reflection activities were designed using the Canva platform. The "Blok Ceria" media is specially designed for children aged 3–5 years old by combining a game of matching three blocks (similarity of colors and animal images) as well as simple reflection sessions based on emoji choices and quick "Yes/No" responses. To strengthen the character of collaborative behavior, this media applies a group score accumulation system that is converted into a collective star award, so that children are encouraged to help each other and discuss to achieve common goals.



Figure 2. Media "Blok Ceria"

Development Stage

The media design was developed into an interactive digital product and tested for feasibility by two validators, namely media experts to PSTI Lecturers and material experts to School Principals with validation using 25 indicator assessment instruments on a scale of 1-4.

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Table 2. Expert Validation Results

No	Validator	Score Obtained	Score Maximum	Percentage	Categories
1.	Media Expert (PSTI Lecturer)	94	100	94%	Highly Feasible
2.	Material Expert (Principal)	80	100	80%	Feasible
3.	Overall average		87%		Highly Feasible

Based on Table 2, the media expert's assessment obtained a percentage of 94% with a feasible category which indicates ease of navigation, interesting visualization, and suitability of reflection features. The assessment of the material experts obtained a percentage of 80% with a feasible category that confirmed the suitability of the game content with the early childhood *gotong royong* indicator. Cumulatively, the average validation reached 87% of the very feasible category, so the product was declared ready for field testing.

Media Implementation Results

The media trial was carried out for four consecutive days at Daycare Jagad Solution involving 10 children with C1-C10 children aged 3–5 years, 4 girls and 6 boys. The duration of daily activities lasts for 30-45 minutes, including free play sessions, the use of digital media *"Blok Ceria"* in groups, and Collaborative Reflection sessions. Observations were carried out independently by two observers, the classroom teacher (Teacher L) and researchers, using observation sheets that included 7 indicators of collaborative behavior behavior on a scale of 1-4 (BB = 1, MB = 2, BSH = 3, BSB = 4; Maximum Score per observer = 28).

Table 3. Cooperative Behavior Indicator

NO	Cooperative Behavior Indicator	Rating Scale	Observed Behavior
1.	Actively Play Together	1 - 4	Actively engage in media with group friends
2.	Follow the rules of media usage	1 – 4	Adhere to the rules of the game and take turns
3.	Discuss while playing	1 – 4	Communicate with each other when choosing blocks
4.	Showing empathy	1 – 4	Caring for and helping friends who are struggling
5.	Pitch ideas	1 – 4	Brainstorming during play and reflection sessions
6.	Work together to solve problems	1 – 4	Collaborate to complete round challenges
7.	Receiving Ideas from Friends	1 – 4	Receive input or suggestions from friends when choosing answers

The observation scoring scale (1-4) was operationally defined based on the level of child independence and frequency of showing cooperative behaviors 1 BB (Not Yet Developed)

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indicates the child does not exhibit the target behavior even with teacher guidance 2 MB (Starting to Develop) indicates the child exhibits the behavior only when prompted or guided by the teacher; 3 BSH (Developing as Expected) indicates the child consistently performs the behavior independently; and 4 BSB (Very Well Developed) indicates the child spontaneously initiates the behavior and actively encourages or assists peers during activities.

Assessment data from teachers and researchers were then averaged at each meeting to present objective combined daily achievement scores.

Table 4. Average Recapitulation of Children

Name	Age/Gender	Day1	Day2	Day3	Day4	4 Days	Percentage	Categories
C1	5 Years/P	19	21.5	23.5	28	23	82.14%	Excellent
C2	5 Years/L	13	14.5	20.5	26	18.50	66.07%	Good
C3	5 Years/L	20	21.5	23	26.5	22.75	81.25%	Excellent
C4	5 Years/L	15	18	19	24.5	19.13	68.30%	Good
C5	4 Years/L	17	19	21	27.5	21.13	75.45%	Good
C6	4 Years/P	18.5	21.5	22.5	27	22.38	79.91%	Good
C7	4 Years/L	17.5	18	19	26.5	20.25	72.32%	Good
C8	5 Years/P	16	18.5	23.5	27.5	21.38	76.34%	Good
C9	5 Years/P	22.5	22.5	23.5	28	24.13	86.16%	Excellent
C10	3 Years/L	18	20.5	21	26.5	21.50	76.79%	Good
Overall Mean		17.65	19.55	21.65	26.8	21.41	76.47%	Good

The data in Table 4 shows a progressive increase in children's *Gotong Royong* scores. Three children achieved the Excellent category (C9 = 86.16%, C1 = 82.14%, and C3 = 81.25%), while the other seven children were in the Good category. To determine whether there was a significant difference in *Gotong Royong* behavior scores between Day-1 and Day-4 indicated a significant difference, the Wilcoxon Signed-Rank test was conducted because the measurements were taken from the same subjects. The results of the analysis are presented in Table 5.

Table 5. Wilcoxon Signed-Rank Test Results of Children's *Gotong Royong* Behavior Scores

Measurement	N	Mean Score	Mean Difference	W	p-value
Day-1	10	17.65	9.15	0	0.002
Day-4	10	26.80			

Based on Table 5, the average Gotong Royong behavior score increased from 17.65 on Day-1 to 26.80 on Day-4, with an average increase of 9.15 points. The Wilcoxon Signed-Rank test yielded $W = 0$ with $p = 0.002$ ($p < 0.05$). Because the p-value is substantially lower than the significance threshold ($\alpha = 0.05$), the null hypothesis is rejected. Statistically, this result demonstrates a significant empirical difference in children's Gotong Royong behavior scores between Day-1 and Day-4, indicating that the structured implementation of the *"Blok Ceria"* digital reflective media was accompanied by a measurable positive change in cooperative interactions over the intervention period.

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Evaluation Stage

The Evaluation stage is carried out as an overall evaluation of the development process and use of the "Blok Ceria" media. The evaluation is based not only on the results of expert validation, but also on findings during the four-day implementation and input from teachers involved in implementing the activity. The implementation results showed that when the game was played together, some children tended to want to take turns first, so the atmosphere became less orderly, and the children did not fully follow the game's turn flow. These findings are useful for evaluating game implementation management, especially in providing direction and arranging turns so children can participate in activities in a calmer, more structured manner. Teachers can also support a more gradual approach, for example by giving children the opportunity to play in turns first, then continuing with joint reflection activities. In addition, reflection activities need to be deepened through conversations that are initiated based on children's responses during play. For example, when a child chooses a specific emoji, the teacher can explore the reason for the choice and relate it to the child's experience and the friend's condition during the activity. Based on the evaluation, the development improvements include not only media aspects, such as adding songs and improving the color contrast of navigation buttons, but also game implementation settings and teachers' strategies for facilitating Collaborative Reflection.

The findings indicate that integrating interactive digital learning media with the Collaborative Reflection model contributes positively to the development of cooperative behavior in early childhood. The expert validation rate of 87% strengthens the argument of K. Mulyani et al. (2025) and Solihin et al. (2024) that character-oriented media development requires clear visual structure, ease of access for children, and explicit sociocultural value content.

A progressive increase in the child's score from an average of 17.65 (Day 1) to 26.80 (Day 4) suggests that the habit of interacting collaboratively develops through repeated hands-on experiences. At the beginning of the implementation (Day 1), some children, such as C2 and C4, tend to play individualistically and are not used to taking turns. However, providing *"Blok Ceria"* game interventions that require mutual agreement when choosing block images creates a natural space for interaction. This element of game-based learning aligns with the findings of a systematic review by Alotaibi (2024) and Hibana et al. (2024), which states that cooperatively designed digital games are effective in stimulating social engagement and early childhood emotional regulation.

The main advantage of this media lies in the Collaborative Reflection session, which is integrated with interactive mechanics to support children's self-regulation during play. The star feature serves as a concrete visual marker of shared achievements, directly supporting children's emotional impulse control by encouraging them to wait their turn to tap and offer mutual appreciation when attaching a star. Meanwhile, emoji expression features and simple questions support emotion regulation by helping children recognize, voice, and validate the social emotions they feel after interacting. As explained by Clarà et al. (2019) and Veen et al. (2022), collaborative reflection bridges concrete experiences to conceptual social meaning. Children are not only playing games but are also invited to recognize the importance of listening to friends, sharing, and providing help. These findings strengthen research by Hastuti et al. (2025)

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and Tani et al. (2018) on the importance of structured reflective activities in shaping the social intelligence of early childhood children.

Regarding the variation in the dynamics of child achievement, observations on C9 subjects presented an interesting phenomenon. C9 maintained a stable high score on Day 1 and Day 2 with an average score of 22.5, then increased to a maximum score of 28.0 on Day 4. This initial stability was driven by C9's active involvement, as they continued to follow the treatment flow in its entirety while daycare activities were implemented alongside the institution's routine agenda. When the mentoring instructions were emphasized on Days 3 and 4, C9's social-emotional maturity developed optimally in leading group discussions (Gladh et al., 2022). This variation between subjects is consistent with the argument that the rate of prosocial development in children is dynamic and influenced by the level of emotional maturity and adaptation to their social environment.

Although the results are positive, they should be interpreted carefully in light of the study's design limitations. The trial's limited sample size (N=10) at a single daycare location and the short four-day intervention limit the generalizability of the findings. Crucially, the absence of a control group prevents the definitive attribution of the observed behavioral gains solely to the "Blok Ceria" media. Extraneous variables, such as routine daycare interactions, ongoing teacher guidance, and natural peer familiarity over time, may have also contributed to the score improvements. Consequently, the data remain descriptive-correlational and cannot establish a strict causal relationship. Therefore, these findings provide an initial proof-of-concept that digital reflective media can serve as a promising supplementary tool to encourage early childhood cooperative behavior, rather than conclusive evidence of standalone media efficacy.

CONCLUSION

This study developed a digital reflective learning medium called "Blok Ceria" using the ADDIE development model (Analysis, Design, Development, Implementation, and Evaluation), which was integrated with the Collaborative Reflection approach to support *Gotong Royong* behavior in early childhood. Based on the validator assessments, the "Blok Ceria" media obtained an average feasibility percentage of 87% and was categorized as highly feasible, covering visual aspects, ease of navigation, and content suitability for character development.

During the implementation stage involving 10 children aged 3–5 years at Daycare Jagad Solution, the *Gotong Royong* behavior score increased from an average of 17.65 on Day-1 to 26.80 on Day-4. The Wilcoxon Signed-Rank test showed a significant difference between the two measurements ($W = 0$; $p = 0.002$). The average achievement across the four days was 76.47%, which was categorized as Good. The seven observed *Gotong Royong* behavior indicators included the ability to play together, follow rules, engage in discussion, demonstrate empathy, express ideas, cooperate in solving problems, and accept peers' opinions. Based on the average scores across the four days, three children were categorized as Excellent and seven children as Good, with no children falling into a lower category.

Theoretically, this study indicates that the integration of digital technology with group play activities and structured social reflection sessions can serve as a supportive context for learning *Gotong Royong* behavior in Early Childhood Education. Practically, the "Blok Ceria" media can be used as an alternative interactive learning instrument for educators to introduce

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and strengthen *Gotong Royong* values through concrete and enjoyable activities. Although the results were positive, this study had limitations in terms of the limited number of participants (N = 10), the use of convenience sampling, the four-day implementation period, and the absence of a control group. Therefore, although there was a significant difference between the Day-1 and Day-4 scores, these results cannot be used to establish a causal relationship or definitively determine the effectiveness of the media. Further research is recommended to examine the use of this media with a larger number of participants, employ an experimental design with a comparison group, incorporate inter-rater reliability analysis into the evaluation, and involve parental monitoring to examine the consistency of children's *Gotong Royong* behavior development over a longer period.

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