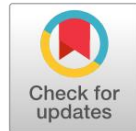


<https://research.adra.ac.id/index.php/ijen/>

P - ISSN: 2988-1579

E - ISSN: 2988-0092



Development of a Digital Narrative Learning Model Based on Social Emotional Learning Using Interactive Flat Panel for Bullying Prevention in Early Childhood Education

Mariana Panji Ramadan¹ , Gina Asri Ruwaida² ,
Yossi Srianita³ , Nabilah Aryani⁴ , Haniatul Hilali
Nurfazriah⁵

¹Universitas Pelita Bangsa, Indonesia

²Universitas Pelita Bangsa, Indonesia

³Universitas Pelita Bangsa, Indonesia

⁴Universitas Pelita Bangsa, Indonesia

⁵Universitas Pelita Bangsa, Indonesia

ABSTRACT

Background. Bullying prevention in early childhood education requires structured, concrete, and developmentally appropriate learning experiences that help children recognize emotions, understand peers' feelings, and choose prosocial actions. Social Emotional Learning (SEL) provides a relevant pedagogical foundation for strengthening anti-bullying behavior, while Interactive Flat Panel (IFP) offers opportunities to present visual, narrative, and interactive digital learning activities.

Purpose. This study aimed to develop a digital narrative learning model based on Social Emotional Learning using Interactive Flat Panel and to examine its feasibility, practicality, and initial effectiveness for bullying prevention in early childhood education.

Method. This study employed a Research and Development design using the ADDIE model. The analysis stage involved a needs survey of 47 kindergarten teachers, initial classroom observations, and interviews with teachers and parents. The limited implementation trial involved 95 children and 5 teachers from five kindergartens in West Java, Indonesia. The developed model was supported by digital flashcards, animated videos, digital storytelling, digital board books, and educational games. Data were collected using expert validation sheets, teacher response questionnaires, learning observations, and children's anti-bullying behavior observation sheets. Quantitative data were analyzed using Aiken's V, descriptive statistics, MSI transformation, normality testing, paired-sample t-test, and N-Gain.

Results. The validation results showed that the model, instruments, and digital products were feasible to highly feasible, with Aiken's V values ranging from 0.78 to 0.97. Children's anti-bullying behavior scores increased from 26.13 in the pretest to 46.05 in the posttest, with a mean N-Gain of 0.367 in the moderate category. The paired-sample t-test showed a significant difference between pretest and posttest scores, $t(94) = 25.38$, $p < 0.001$. Teacher responses indicated that the model was practical, with an average practicality score of 81.25%.

Conclusion. The developed model provides a feasible, practical, and initially effective approach to strengthening anti-bullying behavior in early childhood education through SEL-based interactive digital narrative learning. Further large-scale trials are needed to examine its broader effectiveness and adaptability.

KEYWORDS

Early Childhood Education, Interactive Flat Panel, Social Emotional Learning

Citation: Ramadan, P. M., Ruwaida, A. G., Srianita, Y., Aryani, N & Nurfazriah, H. H. (2026). Development of a Digital Narrative Learning Model Based on Social Emotional Learning Using Interactive Flat Panel for Bullying Prevention in Early Childhood Education. *International Journal of Educational Narrative*, 4(5), 1729–1746.

<https://doi.org/10.70177/ijen.v4i5.4075>

Correspondence:

Mariana Panji Ramadan,
marianapanjir@pelitabangsa.ac.id

Received: July 16, 2026

Accepted: August 15, 2026

Published: September 30, 2026



**Mariana Panji Ramadan, Gina Asri Ruwaida, Yossi Srianita, Nabilah Aryani, Haniatul Hilali
Nurfazriah**

INTRODUCTION

Bullying remains one of the most serious issues in educational settings because it is closely related to children's psychological safety, social relationships, and overall well-being. Bullying is not limited to physical aggression; it may also appear in verbal and social forms, such as mocking, name-calling, excluding peers, taking others' belongings, threatening, or showing dominance that makes other children feel afraid and uncomfortable. International studies have shown that the experience of being bullied is associated with psychosocial maladjustment, lower emotional well-being, and social and behavioral problems in children. Hawker and Boulton (2000), in their meta-analysis, found a relationship between peer victimization and psychosocial maladjustment, while Gaffney et al., (2021) emphasized that school bullying remains an important issue that requires systematic intervention. Other findings also indicate that school-based bullying prevention programs can reduce bullying perpetration and victimization when they are properly designed and implemented (Gaffney et al., 2019, 2021; Hawker & Boulton, 2000).

The issue of bullying becomes even more important when viewed from the perspective of early childhood development. In early childhood education, behaviors that may lead to bullying often do not yet appear in complex forms, as they do among older children or adolescents. However, early signs of unhealthy peer relationships can be observed through behaviors such as pushing peers, taking toys, refusing to share, mocking, refusing to play with certain children, laughing at others' weaknesses, or showing little concern when a peer is in difficulty. These behaviors may not always be fully categorized as bullying, but they may become the foundation for negative patterns of interaction if they are not guided from the beginning. Therefore, bullying prevention needs to begin in early childhood, when children are developing the ability to understand emotions, imitate social behavior, follow rules, resolve simple conflicts, and build relationships with peers. This view is in line with social learning theory, which emphasizes that children learn behavior through observation, imitation, and social reinforcement, as well as ecological developmental theory, which positions children's behavior as the result of interactions among family, school, peers, and the broader social environment (Bandura, 1977; Bronfenbrenner, 1979; Tremblay, 2010).

Attention to bullying in early childhood education needs to be strengthened because such behavior is not only related to momentary peer interactions but also to the development of children's emotional security, self-confidence, and long-term social-emotional competence. Recent studies consistently demonstrate that bullying experiences negatively affect young children's social-emotional development; however, they emphasize different dimensions of the problem. Almaziyah et al. (2025) primarily highlighted the developmental consequences of bullying experiences, particularly children's difficulties in building relationships, regulating emotions, and developing a sense of security within the school environment. In contrast, Wulandari et al. (2026) emphasized bullying prevention from a broader educational perspective by identifying early intervention and safe learning environments as essential components of children's holistic development. Taken together, these findings suggest that bullying prevention should not merely focus on reducing negative behaviors after they occur but should proactively foster empathy, emotional regulation, and positive peer interaction through systematic classroom learning. Nevertheless, existing studies largely discuss bullying prevention at the conceptual level and provide limited evidence regarding how these social-emotional competencies can be translated into structured digital learning models that are developmentally appropriate for kindergarten children. Therefore, early childhood learning should intentionally provide concrete opportunities for children to recognize emotions, understand others' perspectives, and practice prosocial behaviors through meaningful learning experiences.

Thus, bullying prevention in early childhood cannot rely merely on prohibition, punishment, or verbal advice. Young children need concrete, visual, enjoyable, and repeated learning experiences in order to understand social behavior in a meaningful way. In the context of early childhood education, anti-bullying education should be developed through activities that allow children to recognize their own emotions and others' emotions, understand the consequences of hurting peers, practice apologizing, sharing, helping, respecting differences, and choosing appropriate responses in particular social situations. Studies on bullying prevention indicate that effective interventions should not only target individuals, but should also be integrated into classroom climate, teacher involvement, and systematic learning activities. This is supported by Gaffney et al. (2021), who showed that the effectiveness of anti-bullying programs is influenced by program design and implementation quality, and by Zych et al. (2019), who emphasized the importance of social competence and positive peer relationships as protective factors against involvement in bullying.

One pedagogical approach that is relevant for building the foundation of bullying prevention from early childhood is Social Emotional Learning (SEL). SEL emphasizes the development of children's ability to recognize and manage emotions, understand others' perspectives, build positive relationships, make responsible decisions, and demonstrate prosocial behavior. In the context of bullying prevention, SEL is important because behaviors such as mocking, excluding, pushing, taking, or hurting peers are closely related to low empathy, weak emotional regulation, and limited social skills. Empirical evidence shows that school-based SEL programs can improve students' social-emotional skills, positive attitudes, prosocial behavior, and academic achievement. Durlak et al. (2011), in their meta-analysis, demonstrated the positive effects of SEL on various student developmental outcomes, and Cipriano et al. (2023), through a contemporary meta-analysis of 424 studies from 53 countries, further strengthened the evidence that SEL is an effective approach to supporting students' social-emotional development. These findings are also reinforced by Taylor et al., (2017), who showed that the benefits of SEL can be sustained beyond the intervention period.

In the context of early childhood, SEL is increasingly relevant because early childhood is a critical period for developing emotional regulation, prosocial behavior, and children's social readiness to interact in the school environment. Classroom-based SEL programs can help children understand emotions, manage problem behaviors, and build social skills needed in daily life. Hosokawa et al. (2024) showed that classroom-based SEL programs for young children can help control problem behaviors and prevent school maladjustment. This finding strengthens the view that anti-bullying learning in early childhood education should not stand as an incidental activity, but should be developed as part of structured, repeated, and developmentally appropriate social-emotional learning.

Along with the development of educational technology, social-emotional learning and bullying prevention can be strengthened through interactive digital media. However, technology in early childhood education needs to be used carefully and grounded in clear pedagogical purposes. Technology should not function merely as entertainment or as a presentation tool; rather, it should be designed to strengthen teacher-child interaction, facilitate concrete learning experiences, and help children understand social situations through engaging visualization. Educational technology should be used based on evidence, aligned with learners' needs, and should complement human interaction in the learning process (UNESCO, 2023). Therefore, in this study, the Interactive Flat Panel (IFP) is not positioned as a replacement for the teacher's role, but as a supporting medium to provide visual, interactive, collaborative, and reflective learning activities.

Interactive Flat Panel enables teachers to present learning through touch-screen activities, animation, digital stories, educational games, emotional visuals, and collaborative tasks. In early childhood education, interactive digital technology can support play-based learning, children's engagement, and more participatory classroom experiences when it is designed with clear pedagogical purposes and supported by teacher guidance (Syarifudin & Muttaqin, 2025; UNESCO, 2023; Widiyanto & Suprayitno, 2026). In SEL-based learning, IFP can help children observe social situations, recognize emotional expressions, distinguish appropriate and inappropriate behavior, discuss the consequences of an action, and choose suitable responses in simple conflict situations. Through digital flashcards, animated videos, digital storytelling, digital board books, and educational games, children can learn about empathy, sharing, apologizing, helping peers, respecting differences, and refusing hurtful behavior in concrete and enjoyable ways. Thus, digital media in this study does not stand alone as a technological product, but becomes part of a SEL-based digital learning model designed for bullying prevention in early childhood.

Although studies on SEL, bullying prevention, and digital media have continued to develop, several research gaps still need to be addressed. First, most anti-bullying studies still focus on elementary and secondary school levels, while preventive interventions in early childhood remain relatively limited. Second, studies on SEL in early childhood generally focus on the development of social-emotional skills in a broader sense, and have not specifically addressed bullying prevention through a structured learning model. Third, the use of digital media in early childhood education is often developed as separate products, such as videos, games, or digital stories, but has rarely been integrated into a single SEL-based digital learning model using IFP. Therefore, a learning model is needed that integrates the SEL approach, IFP technology, and a digital media package into a systematic, applicable, and developmentally appropriate learning design for young children.

Based on these identified gaps, this study offers a distinct contribution by developing a digital narrative learning model based on Social Emotional Learning (SEL) using an Interactive Flat Panel (IFP) for bullying prevention in early childhood education. Previous studies have investigated SEL programs to improve children's social-emotional competencies, digital storytelling and educational games to enhance children's engagement, and anti-bullying interventions in school settings. However, these studies generally examine these components separately. To the best of our knowledge, no previous study has integrated the five core SEL competencies, Interactive Flat Panel technology, and a comprehensive package of digital narrative learning resources including digital flashcards, animated videos, digital storytelling, digital board books, and educational games into a single instructional model specifically designed for bullying prevention in kindergarten. Therefore, the originality of this study lies not merely in developing digital learning media but in proposing and validating an integrated pedagogical model that combines social-emotional learning, interactive digital technology, and narrative-based learning experiences to foster empathy, prosocial behavior, emotional regulation, and anti-bullying awareness among young children.

Although previous studies have demonstrated the effectiveness of SEL programs, digital learning media, and anti-bullying interventions independently, there remains a lack of an integrated digital narrative learning model that combines these elements within a single instructional framework for kindergarten classrooms. This gap limits teachers' access to structured, developmentally appropriate learning resources that simultaneously promote socio-emotional competence and bullying prevention. Therefore, this study aims to develop and evaluate a digital narrative learning model based on Social Emotional Learning using an Interactive Flat Panel and to examine its feasibility, practicality, and initial effectiveness in fostering anti-bullying behavior among young children.

RESEARCH METHODOLOGY

This study employed a Research and Development (R&D) design using the ADDIE model, which consists of analysis, design, development, implementation, and evaluation stages. The ADDIE model was selected because it provides a systematic framework for developing and evaluating instructional products (Branch & Varank, 2009). The product developed in this study was a digital narrative learning model based on Social Emotional Learning (SEL) using an Interactive Flat Panel (IFP) for bullying prevention in early childhood education. The model was supported by five digital narrative media products, namely digital flashcards, animated videos, digital storytelling, digital board books, and educational games.

During the analysis phase, classroom observations, interviews with teachers and parents, and a needs survey involving 47 kindergarten teachers were conducted to identify bullying prevention needs and the integration of SEL in early childhood classrooms. Based on these findings, the design phase focused on developing the learning syntax, digital narrative learning media, and research instruments by integrating the five SEL competencies. In the development phase, the learning model and supporting digital products were produced, validated by two experts, and revised based on their suggestions. The implementation phase involved a limited trial in five kindergartens in West Java Province, Indonesia (Bandung, Sukabumi, Bekasi, Karawang, and Bogor), involving 95 children and five kindergarten teachers. Participants were selected purposively based on school willingness, teacher readiness, the suitability of the learning context, and the availability of Interactive Flat Panel facilities. Finally, the evaluation phase was conducted through expert validation, teacher responses, classroom observations, and children's anti-bullying behavior data to refine the model before broader implementation.

The research instruments included a teacher needs questionnaire, interview guidelines, expert validation sheets, teacher response questionnaires, learning implementation observation sheets, and children's anti-bullying behavior observation sheets. The teacher needs questionnaire and interview guidelines were developed to identify the needs for bullying prevention learning and the implementation of Social Emotional Learning (SEL). The expert validation sheet assessed the content, language, presentation, and media design of the developed model, while the teacher response questionnaire evaluated its practicality in classroom implementation. The observation sheets were used to assess learning implementation and children's anti-bullying behavior based on the five SEL competencies: self-awareness, self-management, social awareness, relationship skills, and responsible decision-making.

The validity of the developed model and research instruments was evaluated using Aiken's V coefficient based on assessments from two experts in early childhood education and educational technology using a four-point rating scale ranging from 1 (least relevant) to 4 (most relevant). Questionnaire and observation data were transformed from ordinal to interval scales using the Method of Successive Intervals (MSI) before statistical analysis. Descriptive statistics were used to summarize the needs analysis, expert validation, and teacher responses. The effectiveness of the developed model was analyzed using a paired-sample *t*-test to compare children's anti-bullying behavior before and after the intervention. In addition, the normalized gain (N-Gain) was calculated to determine the magnitude of improvement following the implementation of the digital narrative learning model. All statistical analyses were performed using IBM SPSS Statistics version 26.

RESULT AND DISCUSSION

The findings indicate that the development of a digital learning model based on Social Emotional Learning using Interactive Flat Panel was grounded in classroom needs related to anti-bullying learning in early childhood education. At the initial analysis stage, observations were conducted in two early childhood classrooms to obtain an initial picture of children's anti-bullying behavior awareness. The average observation score in the first class was 2.45, while the second class obtained an average score of 2.05. These results indicate that children's anti-bullying behavior awareness was still at a low to moderate level. In other words, some children had begun to demonstrate positive social behavior, but they were not yet consistent in understanding peers' feelings, regulating emotions, avoiding hurtful behavior, and showing prosocial responses in daily interactions.

These findings were reinforced by interviews with teachers and parents, which showed that behaviors such as teasing, refusing to share, excluding peers, and reacting impulsively still appeared in children's interactions. Some of these behaviors were often perceived as part of ordinary childhood behavior and, therefore, were not always addressed through structured learning. In addition, the needs survey involving 47 kindergarten teachers showed that social-emotional learning had not been systematically integrated into daily classroom activities. The survey results showed that 89.3% of teachers stated that they needed a learning model integrated with Social Emotional Learning. Taken together, the observation, interview, and survey data point to the need for a learning model that helps children recognize emotions, understand peers' feelings, develop empathy, and choose appropriate social behavior from an early age.

These initial findings suggest that bullying-related behavior in early childhood is better understood as part of children's social-emotional development rather than merely as an isolated behavioral problem. Kristianto and Wakhudin (2025) explain that SEL contributes to bullying prevention through the strengthening of emotional regulation, empathy, and social awareness, although its effectiveness depends greatly on the quality of pedagogical implementation. Similarly, Pranowo et al., (2026) emphasize that SEL plays a role in supporting social-emotional well-being and bullying prevention, but the sustainability of such programs requires a strong implementation context. Thus, the initial analysis in this study shows that teachers' need for a digital SEL-based learning model is not merely technical, but is directly related to the need to strengthen children's social behavior in the classroom.

Based on the analysis results, the learning model was developed by integrating five core competencies of Social Emotional Learning, namely self-awareness, self-management, social awareness, relationship skills, and responsible decision-making. These five competencies were operationalized into a digital learning sequence consisting of engagement, experience, explore, elaborate, and reflection. In the engagement stage, children were guided to recognize basic emotions through digital media displayed on the Interactive Flat Panel. In the experience stage, children were provided with learning experiences through stories, videos, or social situations close to their everyday lives. In the explore stage, children were invited to discuss the characters' feelings, the consequences of behavior, and appropriate choices of action. In the elaborate stage, children strengthened their understanding through interactive activities and prosocial value reinforcement. In the reflection stage, children reflected on positive behavior and selected anti-bullying actions in simple social situations.

This learning sequence shows that the Interactive Flat Panel was not used merely as a presentation medium, but as an interactive tool for presenting concrete, visual, and participatory social-emotional learning experiences. In the context of early childhood education, this is important

because children need stimuli that are observable, close to their daily experiences, and repeatable in an enjoyable learning environment. Therefore, the developed model goes beyond helping children distinguish between appropriate and inappropriate behavior by providing opportunities for them to observe social situations, recognize emotions, participate in discussions, and choose appropriate responses.

Table 1. Digital products used in the SEL-based learning model with IFP

Digital product	Function in the model	SEL competency	Targeted anti-bullying behavior
Digital flashcards	Introducing basic emotions and social expressions	Self-awareness	Recognizing one's own feelings and peers' feelings
Animated videos	Presenting simple social situations related to hurtful behavior toward peers	Social awareness	Understanding the impact of teasing, pushing, or excluding peers
Digital storytelling	Presenting stories about empathy, friendship, and conflict resolution	Relationship skills	Helping, apologizing, respecting peers, and building positive relationships
Digital board books	Reinforcing moral messages through visual reading activities	Self-management and social awareness	Regulating emotions, sharing, and caring for peers' feelings
Educational games	Training children to choose appropriate responses in social situations	Responsible decision-making	Avoiding aggressive actions and reporting to the teacher

Table 1 shows that the five digital products developed in this study do not stand as separate media, but form an integrated learning package that complements one another. Each product has a different pedagogical function and is linked to Social Emotional Learning competencies and indicators of anti-bullying behavior. Digital flashcards serve as initial stimuli to help children recognize emotions. Animated videos and digital storytelling help children understand social situations and the consequences of behavior toward others. Digital board books reinforce moral messages through simple visuals, while educational games provide opportunities for children to choose appropriate actions in particular social situations. This integration strengthens the position of the model as a form of digital learning that is not only visually engaging but also pedagogically directed.

The digital learning model was supported by several media products displayed through the Interactive Flat Panel. These media included digital flashcards, animated videos, digital storytelling, digital board books, and educational games, as illustrated in Figure 1.





Figure 1. Digital products supporting the SEL-based learning model using an Interactive Flat Panel: (a) digital flashcards, (b) animated videos, (c) digital storytelling, (d) digital board books, and (e) educational games.

The use of digital products in this model is supported by recent findings on digital learning in early childhood education. Alotaibi (2024) showed that game-based learning in early childhood education has moderate to large effects on children's cognitive, social, emotional, motivational, and engagement outcomes. This finding is relevant to the use of educational games in this study, as games do not merely function as entertainment activities but also serve as a means for practicing social decision-making. In addition, Sakir (2026) showed that digital storytelling in early childhood education can combine the strengths of traditional storytelling with digital multimedia, making learning more engaging and meaningful. Thus, digital storytelling and digital board books in this model are positioned as media that help children understand characters' feelings, the consequences of hurtful behavior, and alternative prosocial actions.

The feasibility of the learning model and its products was analyzed through expert validation using Aiken's V coefficient. The validated products and instruments included the anti-bullying behavior observation sheet, learning module, educational games, animated videos, digital board books, and digital storytelling. The validation results are presented in Table 2.

Table 2. Feasibility results of the model, digital products, and instrument

Digital product	Aiken's V	Category
Anti-bullying behavior observation sheet	0.83	Highly feasible
Learning module	0.89	Highly feasible
Educational games	0.78	Feasible
Animated videos	0.97	Highly feasible
Digital board books	0.90	Highly feasible
Digital storytelling	0.89	Highly feasible

The results in Table 2 show that all products and research instruments met the feasibility criteria. Most components were categorized as highly feasible, while the educational games were categorized as feasible. Animated videos obtained the highest Aiken's V value (0.97), indicating very strong expert agreement regarding their visual quality, audio, character suitability, and appropriateness for early childhood learning. Digital board books (0.90) and digital storytelling (0.89) also received high validity scores, suggesting that both media effectively support children's understanding of social-emotional concepts through age-appropriate stories and visual representations.

Educational games obtained an Aiken's V value of 0.78, which was lower than the other digital products but still within the feasible category. This finding suggests that game-based media require greater attention to technical aspects, including navigation, game control, duration, clarity of instructions, and interface simplicity. Such considerations are particularly important because educational games for young children should accommodate their developmental characteristics, including limited attention span, emerging motor skills, and cognitive readiness. This finding is consistent with Alotaibi (2024), who emphasized that game-based learning is most effective when its design aligns with children's developmental needs and learning objectives. Therefore, the relatively lower validity score reflects opportunities for technical refinement rather than weaknesses in the educational content of the games. Overall, the expert validation results indicate that the developed digital narrative learning model and its supporting media are appropriate for classroom implementation. The combination of Social Emotional Learning (SEL) principles with digital narrative media provides a pedagogically sound approach to supporting bullying prevention in early childhood education.

Following expert validation, a limited implementation trial was conducted in five kindergartens in West Java Province (Bandung, Sukabumi, Bekasi, Karawang, and Bogor), involving 95 children and five kindergarten teachers. Children's anti-bullying behavior scores were transformed using the Method of Successive Intervals (MSI) before statistical analysis. The descriptive results showed an improvement in children's anti-bullying behavior following the implementation of the developed model, as presented in Table 3.

Table 3. Descriptive results of MSI scores for children's anti-bullying behavior in the limited trial

Statistic	Pretest MSI	Posttest MSI	Gain MSI
N	95	95	95
Mean	26.13	46.05	19.92
SD	3.74	6.84	7.65
Minimum	20.00	26.78	2.92
Maximum	32.55	64.29	40.80

Table 3 shows that the mean score of children's anti-bullying behavior increased from 26.13 in the pretest to 46.05 in the posttest. The mean gain score was 19.92. This increase indicates that, after participating in digital learning based on Social Emotional Learning using Interactive Flat Panel, children showed initial improvement in anti-bullying behavior. These changes were reflected in children's ability to recognize emotions, understand peers' feelings, demonstrate prosocial responses, avoid aggressive actions, and choose more appropriate actions in simple social situations.

This score improvement can be explained by the characteristics of the model, which combines SEL with interactive digital media. Hosokawa et al., (2024) showed that SEL programs in early childhood classrooms can help control problem behaviors and prevent school maladjustment. Zhao and Sang (2025) also showed through a meta-analysis that SEL programs contribute to the improvement of social-emotional skills and the reduction of problem behaviors. Therefore, the score improvement in the developed model can be understood as an indication that strengthening social-emotional competencies contributes to the formation of anti-bullying behavior in early childhood. These findings suggest that integrating SEL principles with digital narrative media provides meaningful learning experiences that encourage children to practice prosocial behaviors repeatedly within authentic classroom situations.

Score improvement was also observed across all regions involved in the limited trial. The summary of scores by region is presented in Table 4.

Table 4. Mean MSI scores by region in the limited trial

Region	N	Mean Pretest MSI	Mean Posttest MSI	Mean Gain MSI	Mean N-Gain MSI
Bandung	20	26.90	45.61	18.71	0.350
Sukabumi	21	27.17	45.95	18.78	0.356
Bekasi	22	25.11	44.45	19.34	0.347
Karawang	17	24.71	46.81	22.10	0.400
Bogor	15	26.76	48.27	21.51	0.398
Overall	95	26.13	46.05	19.92	0.367

Table 4 shows that all regions experienced an increase in mean scores after the implementation of the model. Bandung increased from 26.90 to 45.61, Sukabumi from 27.17 to 45.95, Bekasi from 25.11 to 44.45, Karawang from 24.71 to 46.81, and Bogor from 26.76 to 48.27. The N-Gain MSI values in all regions were in the moderate category, with an overall mean of 0.367. This indicates that the model demonstrated an initial level of effectiveness in the moderate category in improving children's anti-bullying behavior. The relatively similar N-Gain values across regions suggest that the learning model produced a consistent pattern of improvement despite being implemented in different kindergarten settings. This consistency indicates that the integration of Social Emotional Learning (SEL) competencies with digital narrative media can be applied across diverse classroom contexts while maintaining comparable learning outcomes. The highest increases were observed in Karawang and Bogor; however, these findings are not intended to compare the effectiveness of the model across regions. The differences may be influenced by classroom context, teacher readiness, children's characteristics, and the dynamics of implementation in each kindergarten. Therefore, the consistent improvement observed across all

regions indicates that the developed model can be implemented in different kindergarten contexts while maintaining comparable levels of effectiveness.

Before conducting the difference test, the normality of MSI gain scores was examined using the Shapiro-Wilk test. The normality test results are presented in Table 5.

Table 5. Normality test results of MSI gain scores

Region	Shapiro-Wilk p	Interpretation
Bandung	0.486	Normal
Sukabumi	0.099	Normal
Bekasi	0.483	Normal
Karawang	0.286	Normal
Bogor	0.305	Normal
Overall	0.848	Normal

Table 5 shows that the MSI gain scores were normally distributed, both overall and in each region. All significance values were greater than 0.05; therefore, the difference between pretest and posttest scores was analyzed using a paired-sample *t*-test. The results of the difference test are presented in Table 6.

Table 6. Paired-sample *t*-test results of MSI scores for children's anti-bullying behavior

Region	<i>t</i>	df	<i>p</i>	Interpretation
Bandung	12.52	19	< 0.001	Significant
Sukabumi	13.17	20	< 0.001	Significant
Bekasi	10.44	21	< 0.001	Significant
Karawang	12.76	16	< 0.001	Significant
Bogor	8.95	14	< 0.001	Significant
Overall	25.38	94	< 0.001	Significant

The overall paired-sample *t*-test results showed a significant difference between pretest and posttest scores, $t(94) = 25.38$, $p < 0.001$. Similar results were found in each region: Bandung, $t(19) = 12.52$, $p < 0.001$; Sukabumi, $t(20) = 13.17$, $p < 0.001$; Bekasi, $t(21) = 10.44$, $p < 0.001$; Karawang, $t(16) = 12.76$, $p < 0.001$; and Bogor, $t(14) = 8.95$, $p < 0.001$. This pattern indicates that the improvement in children's anti-bullying behavior occurred not only at the overall level but also consistently across all regions involved in the limited trial. These findings suggest that the digital narrative learning model effectively supported the development of children's anti-bullying behavior by providing structured opportunities to recognize emotions, develop empathy, and practice prosocial decision-making through interactive learning activities. The consistency of the significant results across different kindergarten settings also indicates that the model has the potential to be implemented in diverse educational contexts while maintaining its effectiveness. This finding is consistent with previous studies showing that Social Emotional Learning (SEL)-based interventions contribute to improving children's social competence and reducing aggressive behaviors in early childhood.

The limited trial was implemented through guided classroom activities in which teachers used the Interactive Flat Panel to present digital narrative media, including visual materials, social-emotional stories, and educational games. Children were encouraged to observe emotional expressions, identify appropriate and inappropriate behaviors, discuss the consequences of hurting peers, and choose prosocial responses such as helping, apologizing, sharing, and reporting incidents

to the teacher. Through these activities, the Interactive Flat Panel functioned not only as a display tool but also as an interactive learning medium that actively engaged children in practicing anti-bullying behaviors and social-emotional skills. The implementation process is illustrated in Figure 2.



Figure 2. Implementation of the SEL-based digital learning model using Interactive Flat Panel in the limited trial.

This classroom documentation illustrates how the model was implemented as a guided learning process rather than as a stand-alone use of digital media. Empirically, these results strengthen the view that SEL can be used as a preventive approach to reduce problem behaviors and strengthen positive social behavior. Pranowo et al. (2026) showed that SEL contributes to the improvement of social-emotional competence and bullying prevention, although its effectiveness requires sustained implementation. Kristianto et al. (2025) also emphasized that SEL supports bullying prevention through emotional regulation, empathy, and social awareness. Thus, the limited trial results indicate that the developed SEL-based model using IFP can serve as an alternative anti-bullying learning approach that does not merely emphasize prohibiting negative behavior, but also trains children to understand emotions, the consequences of behavior, and appropriate action choices.

Observational findings during the limited trial also showed that children were more engaged when learning was presented through visual and interactive media. Children appeared more enthusiastic when recognizing emotions through digital flashcards, more responsive when watching animated videos, and more able to express simple opinions after listening to digital storytelling or viewing digital board books. In educational game activities, children began practicing appropriate actions, such as helping peers, apologizing, not teasing, and reporting to the teacher when they

observed unpleasant behavior. These observational findings strengthen the quantitative results, indicating that the score improvement did not merely appear as a numerical change, but was also reflected in children's responses during the learning process.

Children's engagement during learning can be linked to the characteristics of digital media that are visual, narrative, and interactive. Aisyah and Zahro (2025) showed that the use of Interactive Flat Panels in technology-enhanced play-based learning can support more interactive learning experiences in early childhood education. Widiyanto and Suprayitno (2026) also found that digital games based on Interactive Flat Panel Display with scaffolding can increase children's interest, focus, and engagement in learning activities. These findings reinforce the observations in this study that IFP helps teachers present more concrete and engaging social-emotional stimuli for young children.

In addition to the initial effectiveness on children's behavior, the practicality of the model was analyzed through teacher response questionnaires after the limited implementation trial. The questionnaire was administered to five kindergarten teachers involved in the implementation of the model in Bandung, Sukabumi, Bekasi, Karawang, and Bogor. The teacher response results are presented in Table 7.

Table 7. Practicality results of the model based on teacher responses

Teacher/School	Total Score	Percentage	Category
Bandung	49	76.56%	Good
Sukabumi	56	87.50%	Very good
Bekasi	50	78.13%	Good
Karawang	46	71.88%	Good
Bogor	59	92.19%	Very good
Mean	52.00	81.25%	Good

Table 7 shows that the model obtained an average practicality percentage of 81.25%, which falls into the good category. Individually, teachers in Sukabumi and Bogor gave very good ratings, while teachers in Bandung, Bekasi, and Karawang gave good ratings. These results indicate that the digital learning model based on Social Emotional Learning using Interactive Flat Panel was considered practical for use in early childhood learning, although teacher responses varied across schools.

When viewed based on assessment aspects, the practicality of the model covered ease of use, clarity of the model and instructions, learning implementation, and model usefulness. The summary of results by aspect is presented in Table 8.

Table 8. Practicality results of the model by assessment aspect

Aspect	Total Score	Percentage	Category
Ease of use	64/80	80.00%	Good
Clarity of the model and instructions	66/80	82.50%	Good
Learning implementation	61/80	76.25%	Good
Model usefulness	69/80	86.25%	Very good
Overall mean	260/320	81.25%	Good

Table 8 shows that the model usefulness aspect obtained the highest score, namely 86.25%, and was categorized as very good. This indicates that teachers considered the model useful for presenting social-emotional learning that is more concrete, visual, and engaging for children. The

learning implementation aspect obtained the lowest score, namely 76.25%, although it remained in the good category. This result suggests that, although the model was considered practical, its classroom implementation still requires technical refinement, particularly in relation to teacher readiness, time allocation, and the use of the Interactive Flat Panel during learning activities. Teachers' suggestions after the limited trial further support this interpretation. Teachers generally found the model guidelines clear, although they suggested that the time allocation should be more flexible. Teachers also considered the model attractive and easy to implement; however, additional examples of activities were needed so that teachers could have more learning variations. Other suggestions indicated that teachers required short training before implementation, especially to ensure the smooth use of digital media and IFP. In addition, some children still required assistance when using the media, so teachers needed to manage the learning sequence to keep children focused and prevent them from being attracted only to the visual or game elements. These inputs became the basis for refining the model before proceeding to the large-scale trial stage. Nevertheless, the consistently positive responses across all assessment aspects indicate that the model is practical for classroom use and can be implemented with only minor technical adjustments.

These practicality findings are consistent with studies on technology integration in early childhood education that emphasize the importance of teacher readiness. Jannah et al. (2026) showed that ICT integration in early childhood education has become a strategic need in developing young children's digital literacy, but its implementation requires teacher readiness and learning adaptation. Syarifudin and Muttaqin (2025) also showed that play-based interactive learning in early childhood education is related to technology-based management support, digital leadership, and teacher readiness in designing learning. Therefore, the model developed in this study should not only be assessed in terms of media feasibility, but also in terms of teacher readiness to manage IFP-based learning activities.

Based on the limited trial results, this study is currently at the product refinement stage and is being continued toward a large-scale trial. The large-scale trial is an essential part of this research and development sequence because it will examine whether the model's effectiveness remains consistent across a larger number of participants, more diverse school contexts, and a longer implementation period. The limited trial results provide the basis for revision, particularly regarding the flexibility of time allocation, the addition of activity examples, brief teacher training, children's assistance during digital media use, and technical refinement of the educational games. Thus, the limited trial is not positioned as the final stage, but as an empirical basis for improving the model before broader implementation.

Substantively, the findings of this study show that the developed model is not only feasible based on expert judgment, but also demonstrates initial effectiveness and practicality in classroom learning. The increase in children's anti-bullying behavior scores after implementation indicates that SEL-based anti-bullying learning can be strengthened through interactive digital media. Children did not merely receive verbal advice about good and inappropriate behavior, but gained more concrete learning experiences through images, videos, stories, digital books, and educational games. Hosokawa et al. (2024) and Zhao et al. (2025) support the view that SEL can help control problem behaviors and improve social-emotional skills. Meanwhile, Alotaibi (2024), Sakir (2026), Aisyah (2025), and Widiyanto and Suprayitno (2026) reinforce the argument that digital media, educational games, digital storytelling, and IFP can increase children's learning engagement when designed according to the developmental characteristics of early childhood.

Pedagogically, these findings indicate that bullying prevention in early childhood needs to be developed through structured learning that is appropriate to children's developmental

characteristics. The integration of Social Emotional Learning in this model helps children develop self-awareness, emotion regulation, empathy, relationship skills, and responsible decision-making. These five competencies are essential foundations for forming anti-bullying behavior because behaviors such as teasing, excluding, pushing, or taking objects from peers are often related to children's limited ability to understand emotions, regulate themselves, and consider others' feelings. Therefore, the digital learning model based on SEL using IFP can be understood as a learning approach that integrates pedagogical, social-emotional, and technological dimensions in a directed manner.

From the perspective of classroom practice, this model provides an alternative for early childhood teachers to integrate social-emotional learning into technology-based classroom activities. The Interactive Flat Panel does not replace the teacher's role, but serves as a supporting medium to enrich learning interactions. Teachers remain facilitators who guide children to understand social situations, name emotions, respond appropriately, and draw simple conclusions from learning experiences. Therefore, the success of the model is not determined solely by the quality of the digital media, but also by the quality of teacher facilitation, clarity of instructions, technical readiness, and the teacher's ability to connect the media content with children's everyday social experiences.

Although the limited trial results showed positive changes, these findings should still be understood within the scope of initial development. The implementation was conducted in five selected kindergartens in West Java Province with a limited number of participants. Therefore, the findings cannot yet be broadly generalized to all early childhood education institutions. This study is also still in the process of moving toward a large-scale trial; therefore, the reported effectiveness should be interpreted as initial effectiveness. Further research is needed with a larger sample size, longer implementation duration, and more diverse school contexts. In addition, future studies may compare SEL-based learning using Interactive Flat Panel with non-digital SEL-based learning to examine the specific contribution of interactive digital media to bullying prevention in early childhood education.

CONCLUSION

The digital narrative learning model based on Social Emotional Learning using an Interactive Flat Panel offers a feasible, practical, and initially effective approach for strengthening anti-bullying behavior in early childhood education. By integrating emotion recognition, empathy, prosocial interaction, and responsible decision-making into visual, narrative, and interactive digital activities, the model helps transform anti-bullying learning from verbal advice into guided and developmentally appropriate classroom experiences. Taken together, the feasibility results, children's improved posttest scores, and teachers' positive responses show that the model is relevant for supporting social-emotional learning and bullying prevention in kindergarten classrooms. Nevertheless, the findings represent initial evidence from a limited trial in selected kindergartens in West Java. A further large-scale trial is therefore needed to examine the consistency, adaptability, and broader effectiveness of the model across more diverse early childhood education contexts.

DECLARATION OF AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this work, the author(s) used ChatGPT (OpenAI) for limited language assistance. All scientific content, analysis, interpretation, and conclusions were developed and verified by the author(s), who take full responsibility for the content of this publication.

ACKNOWLEDGEMENT

The authors would like to express their deepest gratitude to the Ministry of Higher Education, Science, and Technology of the Republic of Indonesia (KEMDISAINTEK) for generously funding this research through the Beginning Lecturer Research Grant (Penelitian Dosen Pemula/PDP). Program administered under the BIMA Research Funding Scheme (Contract Number 016/7/KP.H/UPB/2026). The authors also sincerely acknowledge the Directorate of Research and Community Service (DPPM) Universitas Pelita Bangsa, for its continuous support, guidance, and facilitation throughout the implementation of this research. The authors extend their heartfelt appreciation to all members of the research team for their dedication, collaboration, and valuable contributions during every stage of the research process. Finally, the authors would like to thank the participating kindergartens, teachers, children, and parents in West Java Province for their cooperation and valuable contribution during the development and limited implementation of the digital learning model

AUTHORS' CONTRIBUTION

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

Author 2: Conceptualization; Data curation; In-vestigation.

Author 3: Data curation; Investigation.

Author 4: Formal analysis; Methodology; Writing - original draft.

Author 5: Supervision; Validation.

DECLARATION OF COMPETING INTEREST

The authors affirm that there are no financial, professional, or personal conflicts of interest that may have influenced the research, analysis, interpretation of data, or the conclusions presented in this article.

REFERENCES

- Aisyah, N., & Zahro, F. (2025). Transforming Early Childhood Education through Digital Play and Interactive Flat Panels. *MUMTAZ: Jurnal Pendidikan Agama Islam*, 5(3). <https://doi.org/10.69552/mumtaz.v5i3.3669>
- Almaziyah, A., Fitriyah, F. K., Asmara, B., Rihlah, J., & Putri, R. A. (2025). Bullying and its impact on social-emotional development in early childhood: A study in Surabaya, Indonesia. *Child Education Journal*, 7(2), 106–113. <https://doi.org/10.33086/cej.v7i2.8063>
- Alotaibi, M. S. (2024). Game-based learning in early childhood education: a systematic review and meta-analysis. *Frontiers in Psychology*, 15, 1307881. <https://doi.org/10.3389/fpsyg.2024.1307881>
- Bandura, A. (1977). *Social learning theory*. Prentice Hall.
- Branch, R. M., & Varank, İ. (2009). *Instructional design: The ADDIE approach* (Vol. 722). Springer.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press. <https://www.hup.harvard.edu/books/9780674224575>
- Cipriano, C., Strambler, M. J., Naples, L. H., Ha, C., Kirk, M., Wood, M., Sehgal, K., Zieher, A. K., Eveleigh, A., McCarthy, M., Funaro, M., Ponnock, A., Chow, J. C., & Durlak, J. A. (2023).

- The state of evidence for social and emotional learning: A contemporary meta-analysis of universal school-based SEL interventions. *Child Development*, 94(5), 1181–1204. <https://doi.org/10.1111/cdev.13968>
- Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development*, 82(1), 405–432. <https://doi.org/10.1111/j.1467-8624.2010.01564.x>
- Gaffney, H., Farrington, D. P., & Ttofi, M. M. (2019). Examining the effectiveness of school-bullying intervention programs globally: A meta-analysis. *International Journal of Bullying Prevention*, 1, 14–31. <https://doi.org/10.1007/s42380-019-0007-4>
- Gaffney, H., Ttofi, M. M., & Farrington, D. P. (2021). Effectiveness of school-based programs to reduce bullying perpetration and victimization: An updated systematic review and meta-analysis. *Campbell Systematic Reviews*, 17(2), e1143. <https://doi.org/10.1002/cl2.1143>
- Hawker, D. S. J., & Boulton, M. J. (2000). Twenty years' research on peer victimization and psychosocial maladjustment: A meta-analytic review of cross-sectional studies. *Journal of Child Psychology and Psychiatry*, 41(4), 441–455. <https://doi.org/10.1111/1469-7610.00629>
- Hosokawa, R., Matsumoto, Y., Nishida, C., Funato, K., & Mitani, A. (2024). Enhancing social-emotional skills in early childhood: Intervention study on the effectiveness of social and emotional learning. *BMC Psychology*, 12, 761. <https://doi.org/10.1186/s40359-024-02280-w>
- Jannah, H. N., Mariyana, R., & Hadi, M. S. (2026). Teachers' Challenges in ICT Integration for Early Childhood Education: A Systematic Literature Review. *Aulad: Journal on Early Childhood*, 9(1). <https://doi.org/10.31004/aulad.v9i1.1500>
- Kristianto, A., & Wakhudin. (2025). Analysis of the Implementation of Social Emotional Learning to Address Bullying Behavior in Elementary Schools. *Terampil: Jurnal Pendidikan Dan Pembelajaran Dasar*, 12(2). <https://doi.org/10.24042/terampil.v12i2.29467>
- Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). Qualitative Data Analysis: A Methods Sourcebook. In *Qualitative Data Analysis A. Methods Edisi* (3rd ed., Vol. 3). SAGE Publications.
- Pranowo, T. A., Astuti, B., & Setiawati, F. A. (2026). Social-emotional Learning for Bullying Prevention and Adolescent Mental Well-Being: A Systematic Review. *The Open Psychology Journal*, 19, e18743501427835. <https://doi.org/10.2174/0118743501427835251205065937>
- Sakir, A. (2026). The Use of Digital Storytelling in Early Childhood Education: A Systematic Review. *MIER Journal of Educational Studies Trends and Practices*, 16(1), 18–46. <https://doi.org/10.52634/mier/2026/v16/i1/2899>
- Syarifudin, A., & Muttaqin, M. A. (2025). Tech-Supported Strategic Management, Digital Leadership, and Play-Based Interactive Learning: A Multilevel Survey of Quality Improvement in Early Childhood Education. *International Journal of Educational Qualitative Quantitative Research*, 4(1), 47–60. <https://doi.org/10.58418/ijeqqr.v4i1.142>
- Taylor, R. D., Oberle, E., Durlak, J. A., & Weissberg, R. P. (2017). Promoting positive youth development through school-based social and emotional learning interventions: A meta-analysis of follow-up effects. *Child Development*, 88(4), 1156–1171. <https://doi.org/10.1111/cdev.12864>
- Tremblay, R. E. (2010). Developmental origins of disruptive behaviour problems: The “original sin” hypothesis, epigenetics and their consequences for prevention. *Journal of Child Psychology and Psychiatry*, 51(4), 341–367. <https://doi.org/10.1111/j.1469-7610.2010.02211.x>
- UNESCO. (2023). *Global education monitoring report 2023: Technology in education: A tool on whose terms?* UNESCO. <https://doi.org/10.54676/UZQV8501>
- Widianto, A., & Suprayitno, K. (2026). The Impact of Interactive Flat Panel Display-Based Digital Games with a Cognitive Scaffolding Approach on the Improvement of Early Childhood Literacy and Numeracy. *Golden Ratio of Data in Summary*, 6(2), 89–97. <https://doi.org/10.52970/grdis.v6i2.2141>
- Wulandari, F., Listiana, A., & Mariyana, R. (2026). Bullying in early childhood education: A

- systematic literature review of risk factors, contexts, and prevention strategies. *AL-ISHLAH: Jurnal Pendidikan*, 18(2). <https://doi.org/10.35445/alishlah.v18i2.9763>
- Zhao, Y., & Sang, B. (2025). The Effect of Social-Emotional Learning Programs on Elementary and Middle School Students' Academic Achievement: A Meta-Analytic Review. *Behavioral Sciences*, 15(11), 1527. <https://doi.org/10.3390/bs15111527>
- Zych, I., Farrington, D. P., & Ttofi, M. M. (2019). Protective factors against bullying and cyberbullying: A systematic review of meta-analyses. *Aggression and Violent Behavior*, 45, 4–19. <https://doi.org/10.1016/j.avb.2018.06.008>

Copyright Holder :

© Mariana Panji Ramadan et al. (2026).

First Publication Right :

© International Journal of Educational Narratives

This article is under:

