



Development of Digital Comic Media to Prevent Bullying in Early Childhood

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ABSTRACT

This study aims to produce a Batam Malay culture-based digital comic media that is feasible, practical, and effective in preventing bullying in early childhood. This research adopted a Research and Development (R&D) framework using the ADDIE model, comprising the stages of analysis, design, development, implementation, and evaluation. The digital comic was developed using the Ibis Paint X application and tested with 60 children aged 5–6 years at TK Victoria Batam. The data collection techniques included expert feasibility questionnaires, teacher and parent practicality questionnaires, and pretest and posttest observations of children's empathetic behavior. The research results showed that the digital comic media had a feasibility level of 91.42%, categorizing it as very feasible. The practicality assessment by teachers and parents reached 94.61% and 91.76%, respectively, with a very practical category. In addition, the effectiveness test results showed an N-Gain of 82, indicating a high category. Thus, the Batam Malay culture-based digital comic media was stated to be feasible, practical, and effective as a character education tool in preventing bullying in early childhood.

Keywords: development, media, comic, digital, bullying

INTRODUCTION

The implementation of early childhood education is essentially an organized effort to foster all children's potential to develop optimally, so that behaviors are formed in accordance with their stages of growth and development [1]. Based on the Child Development Achievement Standards (Indonesian: Standar Tingkat Pencapaian Perkembangan Anak; STPPA) stipulated in Regulation of the Minister of Education, Culture, Research, and Technology of the Republic of Indonesia Number 5 of 2022, child development represents an integrated whole encompassing religious and moral values, Pancasila values, physical-motor development, cognitive development, language development, as well as social-emotional aspects [2]. Considering that the world of children is a world of play, social interactions during play with peers are a crucial space for their emotional development. In this process, children learn to adjust themselves, understand their surrounding conditions, and imitate the feelings of people around them [3].

However, the early childhood period is highly vulnerable to complex external influences that can hinder optimal growth and development. One of the real threats that is currently becoming increasingly concerning is bullying behavior. Bullying is an act of using power to harm someone verbally, physically, or psychologically, which has now extended to the early childhood education level, as it is the most crucial

period for the formation of children's character [4]. Psychological factors and the school environment, including aggressiveness and low social skills, become the main determinants of bullying behavior [5] which has been proven to exert serious impacts on children's social-emotional development, such as low self-esteem and a tendency to withdraw from the social environment [6]. This condition is further aggravated by the intensity of social media technology use, which has a significant impact on the decline of character values, as well as students' self-confidence in the educational context [7]. Children who become victims of bullying are likely to experience emotional disturbances, withdrawal from the social environment, and a decline in learning motivation. This condition is often exacerbated by the silent culture within the school environment, where acts of bullying are not detected at an early stage because they are perceived as ordinary interactions among children.

This problem was found empirically in the field, particularly in the early childhood education environment of Batam City. Children often have not yet realized that teasing or excluding peers constitutes a form of bullying that can have negative impacts on their emotional development. Bullying behavior is influenced by various factors, including family, peers, social and school environments, mass media, as well as children's self-esteem; therefore, its management needs to be carried out preventively from an early stage [8].

Empathy education is regarded as a key strategy in preventing bullying, because low levels of empathy are closely associated with the emergence of aggressive and violent behavior in the school environment [9]. There is also a strong correlation between empathy and prosocial behavior in early childhood, underscoring the importance of empathy stimulation in children's education [10]. Unfortunately, the existing learning activities have not focused on visual literacy activities specifically designed to prevent bullying. Most bullying prevention media are still oriented toward verbal approaches and teacher-directed instruction; thus, they have not fully leveraged the potential of visual literacy aligned with the developmental characteristics of early childhood. The media used in schools are generally still generic, provide limited representation of children's daily situations, and have not closely integrated Batam Malay cultural values into learners' lived experiences. As a result, the moral messages conveyed are often difficult to understand and less memorable for children in early childhood, even though children in this age range more easily comprehend messages through visualization, story characters, and narrative plots closely connected to their world of play.

This condition indicates an urgent need for innovative learning media that are not only informative but also capable of stimulating children's empathy and social awareness engagingly and sustainably. Digital learning media have been proven effective in stimulating early childhood development and can be implemented optimally in Early Childhood Education institutions (PAUD) [11]. Character-based digital comics have also been proven effective in reducing bullying behavior and improving students' learning outcomes through the ADDIE development model [12], [13], and have been proven feasible for use as a preventive tool based on the results of expert and practitioner validation in the field of guidance and counseling [14]. Digital comics, which are defined as text-based cartoon images, can convey messages in an enjoyable and easy-to-understand manner; through their characters, digital comics can motivate children to learn and shape the character of children in early childhood [15]. Digital comics have been proven effective in increasing students' understanding of the impact of bullying and in supporting the reinforcement of information retention through visual experiences and contextual stories [16], while also contributing to the improvement of speaking skills and children's ability to express positive ideas [17]. In addition, the development of digital learning media for early childhood is considered feasible and effective in supporting children's moral and social-emotional development during the golden age period, based on the results of expert validation [18].

To address these problems, this study proposes the development of a Batam Malay culture-based digital comic media specifically designed as a preventive instrument against bullying in early childhood. The development of this media is grounded in the cognitive-social perspective by Albert Bandura [19], which emphasizes that human behavior is the result of

accumulated experiences of observing models in the social environment, and is reinforced by the urgency of emotional intelligence, according to Daniel Goleman [20], which highlights children's ability to recognize their own feelings as well as those of others and to manage emotions effectively when establishing social relationships. Thus, the integration of emotional stimulation within digital comics not only provides behavioral models that can be imitated but also trains children's emotional intelligence from an early stage to foster empathy and prevent bullying behavior [19], [20]. The Ibis Paint X application was selected as the development tool due to its capability to produce expressive character visualizations, accompanied by template features and the addition of text in balloon format [21], thereby facilitating concrete early childhood identification of emotions and empathetic behavior.

The novelty of this study lies in three key aspects that have not previously been integrated in a single research framework. First, this study develops a digital comic that specifically integrates everyday Batam Malay culture of Batam City, such as distinctive social situations and local wisdom, into the story to foster children's emotional closeness to the characters and the messages conveyed. This differs from previous research that generally used generic or national story contexts [14], [22]. Second, the orientation of this media development is exclusively directed toward the prevention of bullying and the cultivation of empathy from an early age, differing from most digital comic research in Early Childhood Education (PAUD), which focuses on increasing learning interest, reading skills, or general life skills [17], [23]. Third, the use of the Ibis Paint X application as a digital comic production tool in the Early Childhood Education context constitutes a technical innovation that produces media that are flexible, visual, and adaptive to the learning characteristics of early childhood. Education based on local wisdom has been proven effective in shaping children's cultural identity and in supporting social and cognitive development from an early age [26], and the results of research on the development of local wisdom-based comics using the ADDIE model show that the developed media were stated very valid by experts and effective in improving students' abilities based on the increase in pretest and posttest scores [24].

Based on the description of the problems, urgency, and novelty above, this study aims to produce a Batam Malay culture-based digital comic media product through the Ibis Paint X application that is feasible, effective, and practical as a preventive effort against bullying in early childhood at TK Victoria Batam.

RESEARCH METHOD

This study was a development research (Research and Development/R&D) to produce a digital comic media based on Batam Malay culture as a preventive instrument against bullying in early childhood. The development model used was the ADDIE model, which comprises five systematic stages: Analysis,

Design, Development, Implementation, and Evaluation [25]. The ADDIE model was selected because it was developed systematically based on instructional design theory, had stages aligned with the learning process, and has been proven to support the quality and effectiveness of the resulting product [26]. These stages

were specifically designed to address learning problems that were adjusted to the needs of children in early childhood. The ADDIE model development flow implemented in this study is presented in Figure 1 below.

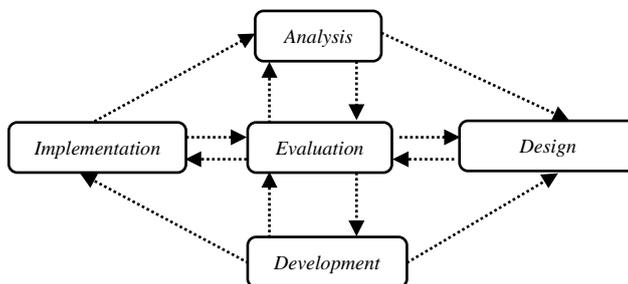


Figure 1. Steps of the ADDIE Model [25]

In general, the research design flow included: the analysis of needs and bullying problems in early childhood; the design of a Batam Malay culture-based digital comic media; the development and validation of the product by material experts and media experts; the implementation of the media to the research subjects; as well as evaluation to determine the feasibility, practicality, and effectiveness of the product. The results of each stage served as the basis for product revisions until the digital comic media was deemed feasible, practical, and effective for use in early childhood learning.

This study was conducted at TK Victoria Batam, with children aged 5–6 years as the research subjects. The selection of the location was purposive, given that TK Victoria is an institution actively engaged in character development; however, it still requires innovative digital media to prevent bullying. The digital literacy competence of Early Childhood Education (PAUD) teachers became an important factor in optimizing the use of digital-based learning media [27]. The implementation stage and primary data collection were conducted on 10 May 2025 at 09.00 WIB, which was considered prime time for children in early childhood, as children’s concentration levels were still optimal. The implementation process included pretest activities before reading the comic, intervention through the digital comic, and posttest activities to measure children’s learning outcomes.

1. Data Collection Techniques

The research data were collected through two main methods. First, questionnaires were used to obtain validity data from material experts and media experts, as well as practicality data from teachers and parents, using an instrument with a 1–4 Likert Scale [28]. Second, observation was used to measure the initial condition pretest and the final condition posttest of children’s behavior related to empathy and bullying prevention. The observation instrument was developed based on indicators of empathy and bullying prevention, including children’s ability to recognize their peers’ feelings, refuse teasing or pushing behavior, and demonstrate attitudes of mutual care and sharing.

The observation was conducted by the classroom teacher using a simple rating scale adjusted to the characteristics of children in early childhood.

2. Data Analysis Techniques

The data analysis techniques in this study used a mixed methods approach [29]. Quantitative descriptive analysis was used to process numerical data obtained from the feasibility, practicality, and effectiveness questionnaire instruments, while qualitative descriptive analysis was used to process data in the form of suggestions or feedback from experts as the basis for revision and refinement of the media.

a. Feasibility Data Analysis Techniques

The feasibility analysis was conducted to determine the level of feasibility of the digital comic media, based on assessments by material and media experts. The feasibility data were obtained from a questionnaire instrument using a 1–4 Likert Scale, where a score of 4 = very good, 3 = good, 2 = poor, and 1 = very poor [28]. The feasibility value was calculated using the following percentage formula:

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

Description:

P = Percentage of feasibility

$\sum X$ = Total score obtained

$\sum X_{maks}$ = Maximum ideal score

The media were deemed feasible for use if they met the minimum threshold in the feasible category ($\geq 71\%$). Previous research showed that digital comic media were found to be very feasible for use in learning as a means of increasing students’ awareness of the dangers of bullying [30], and the development of digital comic media in early childhood was considered feasible and effective in supporting children’s moral and social-emotional development based on the results of expert validation [18]. The percentage calculation results were then interpreted based on the criteria in Table 1 below.

Table 1. Criteria for Interpreting Media Feasibility [28]

Percentage (%)	Category
86 - 100	Very Feasible
71 - 85	Feasible
56 - 70	Moderately Feasible
< 55	Less Feasible

b. Practicality Data Analysis Techniques

The practicality analysis was conducted to determine the ease and usability of digital comic media for learning, based on teachers' and parents' responses. The practicality data were obtained from a questionnaire instrument using a 1-4 Likert Scale with the same assessment criteria as the feasibility instrument [28]. The practicality value was calculated using the following percentage formula:

$$V_p = \frac{\sum S}{\sum S_{maks}} \times 100\%$$

Description:

V_p = Practicality percentage

$\sum S$ = Total score obtained

$\sum S_{maks}$ = Maximum ideal score

The percentage calculation results were then interpreted based on the criteria in Table 2 below. The media were stated as practical if they fell into the practical or very practical category ($\geq 71\%$). Previous research showed that the R&D of digital comic media was stated to be very feasible and practical as an educational tool for bullying prevention in early childhood [31], and digital comics were proven feasible and practical as informational media to assist students in understanding and preventing bullying behavior [32].

Table 2. Criteria for Interpreting Media Practicality [28]

Percentage (%)	Category
86-100	Very Practical
71-85	Practical
56-70	Moderately Practical
<55	Less Practical

c. Effectiveness Data Analysis Techniques

The effectiveness analysis was conducted to determine how far digital comic media could improve children's understanding of empathy and anti-bullying behavior. Effectiveness was measured through a comparison of the results of observations of children's empathetic behavior at the pretest stage (before the use of the media) and the posttest stage (after the use of the media). The pretest and posttest data were subsequently analyzed using the Normalized Gain (N-Gain) formula developed by Hake [33] as follows:

$$g = \frac{S_{post} - S_{pre}}{S_{maks} - S_{pre}}$$

Description:

g = normalized gain value (N-Gain)

S_{post} = score obtained after the media intervention

S_{pre} = score obtained before the media intervention

S_{maks} = maximum achievable score

The N-Gain calculation results were then interpreted based on the criteria in Table 3 below. The media were considered effective if the N-Gain value fell into the moderate or high category ($g \geq 0.30$). Research on the development of character-based digital comics demonstrated that the media were effective in reducing children's bullying behavior and improving learning outcomes based on pretest-posttest and N-Gain analysis [22].

Table 3. Criteria for Interpreting N-Gain Scores and Media Productivity Level [33]

N-Gain Score Range	Effectiveness Category	Productivity Level
$g > 0.7$	High	Very Effective
$0.30 \leq g \leq 0.70$	Moderate	Effective
$g < 0.30$	Low	Less Effective

d. Qualitative Data Analysis

Qualitative data analysis was conducted on the suggestions and feedback obtained from experts during the media validation process. This analysis was carried out through three systematic steps, namely: grouping the suggestions and feedback based on the predetermined assessment aspects; describing the findings narratively to obtain a comprehensive overview of the weaknesses and strengths of the media; and using the

analysis results as the basis for revising and refining the digital comic media until it was stated feasible for implementation.

RESULTS AND DISCUSSION

The development of this digital comic media was a response to sociocultural challenges in Batam City, where cases of bullying among children in early childhood were often not detected at an early stage, thereby hindering learning motivation. As described in the introduction, this challenge was exacerbated by the

limited availability of character education media contextualized for children's environments. Therefore, the digital comic titled *Bersama Kita Cegah Bullying: Indahnya Berbagi dan Saling Menyayangi* (Together We Prevent Bullying: The Beauty of Sharing and Caring for One Another) was developed by incorporating the setting and Batam Malay culture to create emotional closeness with children. The integration of Malay cultural values into Early Childhood Education learning has been shown to strengthen children's character and create a friendly, contextually relevant learning environment [34].

1. Analysis Stage

At the analysis stage, the researchers identified field needs through observation and interviews with teachers and parents at TK Victoria Batam. The main finding at this stage was that teachers and parents still experienced limitations in engaging with and easily understandable educational media for children in early childhood in conveying anti-bullying values. The available materials were generally verbal and lacked visual elements; as a result, children had difficulty understanding forms of bullying and how to respond to them. In addition, the phenomenon of silence culture was also found in the school environment, namely a condition in which children had not yet realized that teasing or excluding peers constituted a form of bullying that is harmful.

These findings had significant implications for the direction of media development. The absence of contextual visual media made it difficult for children in early childhood to internalize anti-bullying moral

messages, as they were still at the pre-operational stage and processed information more easily through visualization and concrete narratives than through abstract verbal instruction. This condition indicated that the urgent need was not only for bullying prevention content but also for a mode of delivery aligned with the developmental characteristics of children in early childhood. The findings of this analysis stage were aligned with Apriliani [35], which stated that illustrated story media are more effective in instilling social values and empathy in children in early childhood compared to lecture methods, and were reinforced by research that emphasized that games and local wisdom-based media are effective in shaping various character values in early childhood through the concept of learning while playing [36]. The implication of this analysis stage was the need for learning media that were not only informative but also emotional and contextual, so that children could identify and understand bullying behavior from an early age.

2. Design Stage

Based on the results of the needs analysis, the researchers designed a digital comic with a simple storyline, child characters, and language that was easily understood. The story setting was taken from environments familiar to children, particularly the schoolyard atmosphere and distinctive icons of Batam City. At this stage, an initial design (prototype) was produced, including the storyboard, character selection, color palette, and panel and speech balloon layout.

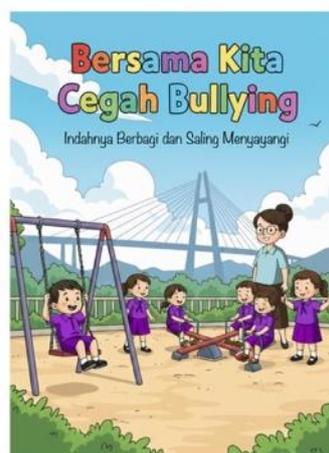


Figure 2. Main Cover of the Anti-Bullying Digital Comic

Based on Figure 2, the main cover of the digital comic was designed with bright colors and friendly, warm character expressions to attract children's attention and build emotional closeness from the first time the media were viewed. The selection of a cheerful visual design with clear color contrast was based on the principle that children in early childhood are more responsive to positive and non-threatening visual stimuli. The cover background, which represents the theme of togetherness and affection, was deliberately designed to convey the impression that this story

features experiences close to and relevant to children's daily lives.

The findings at this design stage indicated that visual decisions were not only aesthetic, but also pedagogical. The selection of expressive characterizations and the use of familiar settings were concrete strategies to facilitate children's self-identification with the story characters. This aligns with Bandura's cognitive-social perspective [19], which emphasizes that children learn through observing models they recognize and trust in their environment. The closer the model is to the child's

world, the greater the likelihood that positive behavioral messages are absorbed and imitated. The success factor of this design lies in the principle of contextual design: media designed by considering the users' social and cultural context will be more widely accepted [34]. The advantage of this stage was the production of a directed, systematic design. However, its limitation was that children's responses to the initial design had not yet been tested before the full development process began.

3. Development Stage



Figure 3. Character and Background Development Stage of the Digital Comic

Based on Figure 3, the characters were visualized with clear, easily readable facial expressions, including sad, angry, and happy expressions, thereby facilitating children's recognition and identification of the emotions of the story characters. The background was developed by presenting visual elements characteristic of the school environment in Batam City.

An important finding at this stage was that visualizing simple yet realistic conflicts facilitated children's understanding of the forms of bullying behavior and their emotional impacts. This was due to the characteristics of children in early childhood who were at the preoperational stage of development. According to Piaget, abstract concepts such as "empathy" or "bullying" can be effectively understood only when they are linked to concrete visual representations that are close to real-life experiences. The capability of Ibis Paint X to produce expressive character expressions became a technical factor that supported the achievement of this pedagogical objective [21]. This finding was consistent with research stating that digital comics have been proven effective in enhancing students' understanding of the impact of bullying and in strengthening information retention through visual experiences and contextual stories [16]. The advantage of this stage was that the media could convey moral messages without being didactic through a flowing narrative structure. However, its limitation was that the story still focused on one type of bullying (mild physical and verbal forms), so further development should include variations in bullying forms, including cyberbullying, which is

At the development stage, the concept was realized as a complete digital comic using the Ibis Paint X application. This process included several sub-stages, namely character sketching, digital coloring, development of panel backgrounds, arrangement of dialogue in speech balloons, and finalization of the sequence of story pages. Bullying conflicts were visualized lightly, for example, through scenes of pushing peers or excluding them from play groups, in order not to create fear, while still providing a concrete understanding to children.

increasingly relevant in the digital era. The implication of this stage was the confirmation that investment in the quality of character and background visualization constitutes a determining factor in the effectiveness of digital comic media for children in early childhood.

4. Implementation Stage

The implementation stage involved trialing the digital comic media with 60 children aged 5–6 years at TK Victoria Batam, with teachers and parents as facilitators. The implementation activities were carried out on 10 May 2025 at 09.00 WIB, an optimal time for early childhood learners, as their concentration levels were still at a prime condition. This process included pretest activities before reading the comic, an intervention using the digital comic, and posttest activities to measure improvement in children's understanding.

The implementation results were very positive. The children appeared more active in asking questions, spontaneously mentioned examples of bullying behavior, and understood the importance of apologizing and sharing with peers. Teachers and parents found the media easy to use, requiring no special training, and helpful in explaining concepts that were previously difficult to convey verbally to children.

The findings at this implementation stage showed that digital comic media could serve as an effective conversation starter among children, teachers, and parents on the topic of bullying. This constituted a significant achievement, given the phenomenon of silence culture identified during the analysis stage, in which the topic of bullying had

previously been difficult to introduce naturally in conversation. The factors that led to this result were the combination of content that was contextually relevant to children’s lives in Batam, expressive visualization, and the use of simple language, so that children felt comfortable and open to discussing the story’s content. Adequate digital literacy competence of Early Childhood Education (PAUD) teachers also became a supporting factor for the successful implementation [27]. This finding was consistent with research proving that animation media based on R&D were categorized as very feasible for use as an educational tool for bullying prevention in early childhood [31], and that anti-bullying comics, which were categorized as feasible and practical, helped students understand and prevent bullying behavior [32]. Furthermore, character development in early childhood constitutes an important effort in addressing moral challenges in the digital era [37]. The implication of this stage was the confirmation that the digital comic media based on Batam Malay culture were not only technically feasible but also socially accepted by all learning stakeholders, namely children, teachers, and parents.

5. Evaluation Stage

The evaluation stage was conducted through three main analyses, namely feasibility analysis by experts, practicality analysis by teachers and parents, and effectiveness analysis through the comparison of pretest and posttest scores using N-Gain. In addition, suggestions and feedback from expert validators were analyzed qualitatively as the basis for product revision.

a. Results of Qualitative Analysis (Recapitulation of Expert Validator Suggestions and Revisions)

Qualitative data in the form of critiques and suggestions from expert validators were used to ensure that the digital comic media were not only technically feasible, but also materially relevant and contextually aligned with the sociocultural conditions of Batam City. All feedback was analyzed and followed up on to refine the initial product draft into a final version ready for trial implementation. A summary of the suggested revisions and the corrective actions taken is presented in Table 4 below.

Table 4. Recapitulation of Expert Validator Suggestions and Revisions Based on the Batam Context

Expert Validator	Suggestions and Feedback	Corrective Actions (Revisions)
Expert Validator 1	The background setting did not adequately reflect Batam City’s identity as the research location.	Added iconic visual elements, such as the Bareleng Bridge landmark and the school atmosphere in Batam, in the opening panel.
Expert Validator 2	Some speech balloons obscured the characters’ facial expressions, so the bullied child’s emotions were not conveyed effectively.	Rearranged the layout of the speech balloons and adjusted the text size; thus, facial expressions remained clearly visible and dominant.
Expert Validator 3	The heterogeneous sociocultural diversity of Batam needed to be highlighted through character variation, even though all characters wore school uniforms.	Revised the character visualization by providing variation in character names reflecting different ethnic groups in Batam, as well as natural physical differences such as skin tone and hair type to represent tolerance within diversity.

Based on Table 4, the media revision process did not focus solely on visual aspects but also on strengthening the local context and the clarity of character emotional expression. The three main suggestions from the validators consistently led to the same scientific conclusion: that the authenticity of the local context and the readability of visual expressions are the primary determinants of media acceptance among children in early childhood. The revision involving the addition of the Bareleng Bridge landmark, for example, was not merely a decorative change, but a pedagogical decision that consciously strengthened children’s emotional identification with the story. Children who recognize the environment depicted in the story will feel that the message conveyed is relevant to their lives, making the moral message more easily internalized. This is aligned research

emphasizing that the integration of local wisdom in fostering a positive school climate has been proven to be an effective preventive strategy in reducing bullying behavior in educational settings [38], and that local wisdom-based education is effective in shaping children’s cultural identity and supporting social and cognitive development from an early age [34]. The advantage of this validation process was that the media became more inclusive, contextual, and representative of Batam’s social diversity. Its limitation lay in the still-limited number of characters; thus, it did not yet fully represent the social dynamics and cultural diversity of Batam. The implication of this finding was that in the development of Batam Malay culture-based learning media, the involvement of expert validators who understand the local sociocultural context

constitutes a prerequisite that cannot be ignored.

b. Results of Quantitative Analysis (Feasibility, Practicality, and Effectiveness)

The following is a recapitulation of the quantitative data obtained from the feasibility

Table 5. Recapitulation of Media Feasibility, Practicality, and Effectiveness Data

Assessment Aspect	Respondent Group	Percentage (%)	Criteria
Kelayakan	3 Expert Validators	91.42	Very Feasible
Assessment Aspect	3 Teachers	94.61	Very Practical
	5 Parents	91.76	Very Practical
Effectiveness	60 Children	82	Very Effective
Average	Overall Media Quality	89.95	Very Practical

Based on Table 5, the digital comic media based on Batam Malay Culture showed very good quality across all assessment aspects. The feasibility score of 91.42% from three expert validators exceeded the threshold for the “Very Feasible” category ($\geq 86\%$), indicating that the media have met the academic and pedagogical standards required for implementation in early childhood learning. The practicality scores given by teachers (94.61%) and parents (91.76%) showed that the media were not only feasible theoretically but also easy for users to operate in real learning contexts, without requiring complex technical training. Meanwhile, the N-Gain value of 0.82, which fell into the “High” category ($g > 0.70$), proved that there was a very significant improvement in children’s understanding and empathetic attitudes between the condition before and after the use of the media, namely from a pretest score of 45% increasing to 90% on the posttest.

The high level of effectiveness did not occur by coincidence, but was caused by at least three mutually reinforcing factors. First, the story content that presented social situations characteristic of the Batam environment created strong emotional resonance in children, so that the anti-bullying message did not feel unfamiliar but was perceived as relevant to their daily experiences. Second, the visualization of expressive emotions, such as sadness, anger, and happiness, helped children recognize and relate the characters' emotional states to emotional states they had previously experienced, which, in turn, naturally stimulated empathetic responses. Third, the use of brief dialogues focused on key empathy-related words such as “sorry,” “thank you,” and “caring for friends” strengthened the message without overburdening the children’s reading abilities, which were still in the developmental stage. These three factors collectively reflected the successful implementation of Bandura’s cognitive-social theory [19], in which children learn prosocial behavior through observation of relevant and trustworthy models, as well as Goleman’s theory of emotional intelligence [20],

test by expert validators, the practicality test by teachers and parents, and the effectiveness test through N-Gain analysis of 60 students at TK Victoria Batam, as presented in Table 5 below.

which emphasizes that fostering empathy from an early age lays a resilient foundation for character development that resists aggressive behavior.

The results of this study were in line with and strengthened several previous studies. In line with research demonstrating that character-based digital comics were validated by experts and effective in reducing bullying behavior and improving learning outcomes based on N-Gain analysis [22], this study confirmed that the ADDIE model produced a product that was validated and demonstrated measurable improvement.

This study was also aligned with findings stating that ADDIE-based electronic comic media were feasible for use as a bullying prevention tool for children in early childhood education. [37], and that the development of the ADDIE model for digital comics was proven to be feasible and effective in significantly improving learning outcomes [39], [40]. The novelty of this study compared to previous studies lies in the explicit integration of Batam Malay culture, which had not previously been applied in the context of anti-bullying media for Early Childhood Education, and which was proven to produce feasibility and practicality scores that were even higher than similar studies that did not integrate the local context.

The advantages of this media were its ease of use, whether used independently by teachers or accompanied by parents, its flexibility as a digital medium that could be accessed at any time, and its ability to stimulate active discussion between children and facilitators about empathy and anti-bullying values. However, this study also had limitations that need to be acknowledged scientifically, namely: the media were still one-directional and had not yet been equipped with interactive digital features such as quizzes or animated elements; the scope of bullying types visualized was still limited to mild physical and verbal bullying; and the trial was conducted in only one Early Childhood Education institution, so the generalization of the results requires replication in more diverse contexts. The

practical implication of this study was that digital comic media based on Batam Malay Culture can be used as an alternative character education medium, concrete and standardized in kindergarten, particularly to build early anti-bullying awareness as part of the social-emotional development curriculum for children in early childhood.

CONCLUSION

Based on the results of the research on the development of digital comic media at TK Victoria Batam, which aimed to produce learning media that are feasible, practical, and effective as a means of socializing the prevention of bullying behavior among children in early childhood, the following conclusions can be drawn:

1. Achievement of Media Effectiveness Objectives

This study successfully achieved the objective of determining the effectiveness of the digital comic media as a tool for bullying prevention. The results of the effectiveness test showed a significant improvement in children's understanding, with an N-Gain value of 0.82 in the very effective category, indicating that the digital comic media were effective in enhancing children's understanding and empathetic attitudes toward anti-bullying behavior.

2. Achievement of Media Feasibility Objectives (Sociocultural Context)

The research objective of producing media that are feasible in terms of content and visual aspects was achieved through the feasibility test results, with 91.42% in the very feasible category. The research findings showed that integrating Batam Malay cultural context and social situations close to children's lives was the main factor contributing to the media's success, as it helped build emotional closeness and reduce the silent culture around teasing and exclusion.

3. Achievement of Theoretical Objectives (Behavior Formation)

Theoretically, this study achieved its objective of examining the effectiveness of visual media in shaping children's behavior in early childhood. The research results confirmed Albert Bandura's theory that learning through visual observation of positive behavioral models is more effective in modifying children's behavior. In addition, this media successfully concretized the concept of empathy as proposed by Daniel Goleman, making it easier for children to understand and apply in their daily social interactions.

4. Achievement of Practicality Objectives and Practical Contribution

The research objective of determining the practicality of the media was achieved through teacher and parent assessment results, with a combined score of 89.95%, indicating that the digital comic media were Very Practical for use in learning activities and in home guidance. This media contributed as an alternative educational

instrument that supports the development of collective awareness in creating a tolerant and child-friendly school environment.

Based on the overall results, the developed digital comic media are recommended for integration into character education in Early Childhood Education institutions, particularly in multicultural urban areas, as a preventive measure to create a safe, inclusive, and bullying-free school environment.

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