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SAFE ME Multimedia for Early Childhood Body Safety

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ABSTRACT

Child sexual abuse prevention in early childhood remains a multidimensional educational challenge, particularly in contexts where children have limited understanding regarding personal boundaries, safe touch, and unsafe touch situations. This study aimed to develop and evaluate the effectiveness of interactive multimedia-based body safety education for children aged 5–6 years. The research employed a Research and Development (R&D) approach using the ADDIE model consisting of Analysis, Design, Development, Implementation, and Evaluation stages. The product developed was an interactive multimedia application named SAFE ME, integrating animation, audio narration, visual storytelling, and interactive learning activities tailored to early childhood cognitive characteristics. The research subjects consisted of children aged 5–6 years in two kindergartens in South Tangerang. Product validation involved experts in early childhood education, child psychology, and instructional media. Data collection techniques included observation sheets, validation instruments, teacher response questionnaires, and pretest-posttest assessments. Data were analyzed using Aiken's V, Cronbach Alpha, N-Gain analysis, and paired sample t-test. The findings indicated that the multimedia product achieved a highly valid category based on expert assessments. Furthermore, implementation results demonstrated significant improvement in children's self-protection competence after using the multimedia intervention. Children showed better ability to recognize private body parts, distinguish safe and unsafe touch, reject inappropriate touch, and report unsafe situations to trusted adults. The study concludes that interactive multimedia body safety education effectively supports early childhood protection learning through engaging visual-audio experiences and contextually meaningful interaction

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1. Introduction

Child sexual abuse remains a significant global concern that threatens children's psychological security, emotional development, and long-term social well-being. The vulnerability of early childhood children becomes particularly critical because children aged 5–6 years are still developing cognitive awareness regarding personal boundaries, body autonomy, and risky interpersonal situations (Mathews & Collin-Vézina, 2019; Sanjeevi et al., 2018). At this developmental stage, children often rely on adults to interpret social situations, while simultaneously lacking the verbal confidence and protective understanding needed to recognize and report unsafe interactions. Consequently, prevention efforts should not be positioned merely as reactive protection after abuse occurs, but rather as preventive educational experiences integrated into early childhood. learning environments. Previous studies also emphasize that school-based preventive education may strengthen children's protective awareness and reduce vulnerability to unsafe situations (Walsh et al., 2018; Kenny & Wurtele, 2019). Nevertheless, discussions concerning body safety and child protection in many educational settings remain constrained by cultural discomfort, limited pedagogical strategies, and the assumption that children are "too young" to receive protective body safety education. This condition creates a paradoxical situation in which children are expected to protect themselves despite having limited opportunities to learn how to do so appropriately and safely.

According to data from the Indonesian Child Protection Commission (KPAI) and the Ministry of Women Empowerment and Child Protection (KemenPPPA), cases of violence and sexual abuse against children in Indonesia continue to increase annually, with early childhood children representing one of the most vulnerable groups. This condition highlights the urgency of strengthening preventive educational approaches through developmentally appropriate learning environments in early childhood education settings.

Furthermore, educational efforts addressing child safety in early childhood institutions are often implemented through verbal explanation and conventional instruction. Such approaches may not optimally accommodate the cognitive and learning characteristics of children aged 5–6 years, who generally learn more effectively through concrete visual representation, interactive engagement, repetition, and multimodal stimulation. Consequently, body safety education requires instructional strategies capable of translating abstract protective concepts into child-friendly learning experiences.

In the Indonesian context, discussions regarding body safety and child protection are often influenced by socio-cultural sensitivity and communicative discomfort. Consequently, body safety topics are still rarely discussed openly in families and early childhood institutions, despite the increasing vulnerability of children to unsafe situations (Farida et al., 2019). This condition indicates the importance of developmentally appropriate educational approaches capable of introducing body safety concepts in child-friendly ways.

Early childhood teachers frequently experience difficulties when introducing body safety topics because they are uncertain about appropriate language, instructional strategies, and emotional boundaries for young children. Consequently, body safety learning is often limited to verbal reminders and incidental classroom discussion, which may not sufficiently support children's understanding and protective readiness.

From an experiential learning perspective, children understand protective concepts more effectively when actively involved in interactive learning situations. Therefore, multimedia learning may help children observe situations, respond to scenarios, and rehearse protective behavior through concrete and engaging educational experiences. Experiential and play-based learning activities are considered important in early childhood education because children construct understanding more effectively through active exploration and contextual interaction (Nicolopoulou, 2021).

Interactive multimedia may support body safety learning through animation, narration, visual simulation, and interactive activities that encourage children's attention and participation. According to Mayer's Cognitive Theory of Multimedia Learning (2009), children process information more effectively when verbal explanations are integrated with relevant visual representations through dual-channel processing. Recent studies also indicate that multimedia-assisted learning environments may strengthen children's conceptual retention and engagement through integrated visual-verbal interaction (Fiorella & Mayer, 2021; Edwards, 2021). Therefore, SAFE ME was developed to translate abstract body safety concepts into concrete, child-friendly, and developmentally appropriate learning experiences.

Previous studies reported that interactive multimedia may improve children's engagement, participation, and learning experiences in early childhood classrooms (Hasanah & Deiniatur, 2020; Nopiana & Suryana, 2022; Munawaroh et al., 2022; Rahmawati & Suryana, 2024). Other studies also demonstrated that child-centered digital learning environments may strengthen children's emotional engagement and classroom interaction (Aisyah et al., 2023; Hidayati & Fauziddin, 2023; Pratiwi & Fauziddin, 2023). Similar findings were also reported in international studies demonstrating that multimedia-assisted learning may enhance children's classroom interaction, attention, and learning motivation in early childhood educational settings (Sung et al., 2016; Edwards, 2021).

However, most multimedia studies still focus on literacy, language learning, and academic achievement, while body safety education remains underexplored within multimedia-based early childhood learning contexts. Meanwhile, child sexual abuse prevention studies tend to emphasize parental education, school campaigns, teacher preparedness, or verbal safety instruction without sufficiently integrating child-centered multimedia grounded in early childhood developmental characteristics. Therefore, limited research has examined how interactive multimedia may strengthen self-protection competence among young children in kindergarten settings, particularly within Indonesian educational contexts.

This study offers a contribution through the development of SAFE ME, an interactive multimedia product designed for body safety education among children aged 5–6 years. The novelty of this study lies in integrating body safety education with interactive multimedia learning through child-friendly animation, guided narration, and contextual simulation activities. Finally, this study aims to: (1) develop the SAFE ME interactive multimedia product for body safety education, (2) examine the validity and feasibility of the product, (3) evaluate its effectiveness in classroom implementation, and (4) analyze the improvement of self-protection competence among children aged 5–6 years.

2. Method

This study was conducted in two kindergartens located in South Tangerang, Indonesia, namely TK Islam Assalamah and TK Melati. These institutions were selected purposively based on several considerations, including the availability of children aged 5–6 years, the schools' willingness to participate in multimedia-based learning activities, and the need for body safety educational media within classroom learning practices.

The participants of this study consisted of children aged 5–6 years enrolled in kindergarten B classes. A total of 40 children participated in the implementation process, consisting of 20 children in the experimental group and 20 children in the comparison group. The experimental group participated in learning activities using the SAFE ME interactive multimedia product, while the comparison group received conventional body safety learning through

verbal explanation and storytelling activities. The number of participants was considered adequate for small-scale multimedia implementation research in early childhood educational settings. The implementation process was conducted over six learning sessions during classroom activities.

Purposive sampling was used in determining research participants because the study focused specifically on children within the developmental stage targeted by the multimedia product. Children aged 5–6 years were selected considering that this age period represents an important stage for the development of self-awareness, social understanding, communication skills, and early protective behavior.

In addition to child participants, this study also involved three expert validators consisting of one early childhood education expert, one child psychology expert, and one instructional media expert. The validators were involved to assess the feasibility, appropriateness, and developmental suitability of the SAFE ME multimedia product before classroom implementation. The validation process assessed media appearance, language appropriateness, interactivity, developmental suitability, learning content, and emotional safety aspects.

Furthermore, kindergarten teachers participated during the implementation process by assisting learning activities, observing children's responses, and providing feedback regarding multimedia usability within classroom settings. The involvement of teachers was important to ensure that the multimedia product remained pedagogically appropriate, emotionally safe, and compatible with early childhood learning characteristics.

Before data collection and implementation activities were conducted, the researchers communicated the objectives and procedures of the study to school administrators and parents. Children participated in learning activities in supportive classroom environments designed to prioritize emotional comfort, child safety, and developmentally appropriate interaction throughout the implementation process.

The data analysis technique in this study used descriptive quantitative analysis to determine the feasibility and effectiveness of the SAFE ME multimedia product. The analysis results were obtained from expert validation sheets, teacher response questionnaires, observation instruments, and children's pretest-posttest scores. The data obtained from validators and participants were analyzed systematically to identify the appropriateness of the multimedia product before classroom implementation.

The collected quantitative data were analyzed descriptively to determine product feasibility and implementation effectiveness. The average score of each assessment aspect was calculated using the following mean formula:

$\bar{x} = \Sigma x / n$

Description:

- $\bar{x}$ = average score
- Σx = total score obtained
- n = number of respondents or validators

Furthermore, the feasibility percentage of the multimedia product was calculated using the following formula:

Percentage = (Total Score Obtained / Maximum Score) × 100%

The percentage results were then interpreted using feasibility qualification criteria adapted from educational product assessment guidelines.

Score Percentage	Interpretation
81–100%	Highly Feasible
61–80%	Feasible
41–60%	Fairly Feasible
21–40%	Less Feasible
0–20%	Not Feasible

Instrument reliability was analyzed using Cronbach Alpha to determine internal consistency of the assessment instruments. Instrument reliability analysis using Cronbach Alpha is commonly applied to determine the internal consistency of educational assessment instruments (Cronbach, 1951). The statistical analysis was conducted using paired sample t-test to identify differences between children's pretest and posttest scores after using the SAFE ME multimedia product.

This study adopted the ADDIE development model consisting of Analysis, Design, Development, Implementation, and Evaluation stages. The ADDIE model was selected because it provides systematic instructional development stages suitable for multimedia-based educational product development (Branch, 2009). During the analysis stage, researchers identified classroom learning needs, children's body safety understanding, and existing instructional limitations through observation and teacher interviews. The design stage involved preparing multimedia flowcharts, storyboards, learning scenarios, and visual interaction structures appropriate for early childhood learners. During the development stage, the SAFE ME multimedia product was created by integrating animation, narration, interactive activities, and body safety simulation content. The implementation stage involved classroom trials conducted in kindergarten settings, while the evaluation stage focused on assessing product feasibility, effectiveness, and children's learning responses throughout multimedia implementation activities.

3. Result And Discussion

The findings of this study indicate that the SAFE ME interactive multimedia product effectively supported children's self-protection competence through interactive and developmentally appropriate learning activities. The implementation results demonstrated improvements in children's ability to recognize private body parts, distinguish safe and unsafe touch situations, communicate refusal responses, and seek help from trusted adults. In addition, the multimedia product showed high feasibility and practicality based on expert validation and classroom implementation results.

3.1. Need Analysis

The initial needs analysis was conducted through classroom observations and informal interviews with kindergarten teachers in TK Islam Assalamah and TK Melati. The findings indicated that body safety education had not been delivered systematically within classroom learning activities. Teachers generally introduced body safety concepts through verbal explanations, storytelling, and spontaneous classroom reminders without using structured interactive media

Classroom observations and teacher interviews revealed that body safety education had not been delivered systematically in kindergarten learning activities. Teachers generally relied on verbal explanation, storytelling, and spontaneous reminders without using structured interactive media. As a result, children demonstrated limited understanding of body safety concepts and showed lower attention and participation during conventional verbal instruction sessions. Teachers also reported difficulties in explaining sensitive body safety topics using age-appropriate language and learning media. These findings indicate the need for interactive multimedia capable of presenting body safety concepts through concrete visual representation, guided interaction, and child-friendly learning experiences.

Based on these findings, the SAFE ME multimedia product was developed as an interactive educational medium integrating animation, narration, interactive quizzes, body safety simulations, and child-friendly learning activities.

3.2 Product Design and Development

The SAFE ME multimedia product was developed using child-centered learning principles by integrating animation, narration, interactive simulation, educational games, and body safety activities appropriate for children aged 5–6 years. The multimedia interface was designed using simple navigation, colorful visual representation, and audio guidance to support children's engagement and comprehension during learning activities.



Figure 1. ADDIE Development Model

The development process involved storyboard preparation, multimedia interface design, animation integration, and classroom-oriented body safety simulation activities.

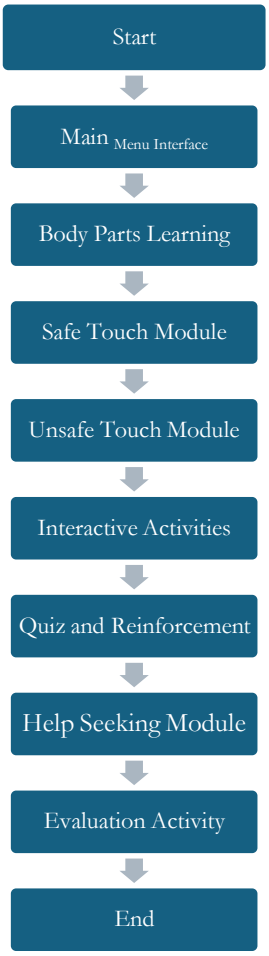

Figure 2. SAFE ME Multimedia Flowchart

The multimedia interface was designed using colorful visual elements, simple navigation systems, large icons, and short instructional sentences to facilitate children's interaction during learning activities. Audio narration and animated characters were designed to create emotionally supportive learning environments while reducing children's anxiety when discussing body safety topics.

The development process also emphasized emotional safety aspects by avoiding frightening visuals, threatening language, and excessive verbal explanations related to violence. Instead, the multimedia product focused on self-awareness, protective behavior, communication confidence, and help-seeking strategies appropriate for early childhood learners.



Figure 3. SAFE ME Multimedia Interface

The multimedia interface was designed using colorful visual elements, simple navigation systems, and child-friendly interaction to support children's participation during learning activities.

3.3 Expert Validation Results

The SAFE ME multimedia product was validated by three expert validators consisting of an early childhood education expert, a child psychology expert, and an instructional media expert. The validation process assessed media appearance, language appropriateness, interactivity, developmental suitability, learning content, and emotional safety aspects.

The validation results indicated that the SAFE ME multimedia product achieved high feasibility scores across all assessment aspects.

Table 1. Expert Validation Results of SAFE ME Multimedia Product

Assessment Aspect	Average Score	Percentage	Interpretation
Media Appearance	4.8	96%	Highly Feasible
Language Appropriateness	4.7	94%	Highly Feasible
Interactivity	4.9	98%	Highly Feasible
Developmental Suitability	4.8	96%	Highly Feasible
Learning Content	4.7	94%	Highly Feasible
Emotional Safety	4.9	98%	Highly Feasible
Average	**4.8**	**96%**	**Highly Feasible**

The overall feasibility percentage of the multimedia product reached 96%, indicating that the SAFE ME multimedia product was highly feasible for classroom implementation in early childhood educational settings.
The validators also provided several suggestions for product improvement, including simplifying several instructional sentences, increasing audio clarity, and adding more interactive reinforcement activities. These revisions were implemented before classroom trials were conducted.

3.4 Classroom Implementation Results

The implementation process was conducted over six learning sessions involving 40 children aged 5–6 years. During classroom implementation, children demonstrated high levels of enthusiasm, participation, curiosity, and engagement while interacting with the SAFE ME multimedia product.

Observation findings demonstrated that children in the experimental group showed higher participation intensity during multimedia-assisted learning activities compared to conventional verbal instruction sessions. Children became more active in answering questions, responding to body safety scenarios, and participating in simulation activities presented through SAFE ME multimedia interaction.

Several children who initially demonstrated hesitation during pre-implementation sessions became more confident in expressing refusal responses such as "No," "Stop," and "I will tell my teacher or parents" during body safety simulations. Children also demonstrated improved ability to identify private body parts, distinguish safe and unsafe touch situations, and communicate protective decisions during classroom interaction.

During multimedia-assisted learning sessions, children demonstrated increased verbal participation, stronger curiosity, and more confident responses during body safety simulation activities. Several children actively repeated protective expressions such as "No," "Stop," and "Tell trusted adults" while interacting with animated scenarios presented in SAFE ME multimedia. Teachers also observed that children became more responsive when discussing private body parts and unsafe situations compared to previous storytelling-based learning activities.

Classroom observations further indicated that children maintained longer attention spans during multimedia learning sessions and responded more actively to visual simulation activities compared to storytelling-based instruction. Teachers also reported increased classroom interaction and stronger child participation during guided body safety discussions.

Table 2. Teacher Response Results toward SAFE ME Multimedia Implementation

Assessment Aspect	Average Score	Percentage	Interpretation
Ease of Use	4.7	94%	Highly Feasible
Classroom Engagement	4.8	96%	Highly Feasible
Learning Effectiveness	4.6	92%	Highly Feasible
Child Participation	4.8	96%	Highly Feasible
Average	**4.7**	**94%**	**Highly Feasible**

The teacher response results demonstrated that the SAFE ME multimedia product was considered practical, engaging, and appropriate for classroom learning implementation in early childhood educational settings.

3.5 Product Effectiveness Results

The effectiveness of the SAFE ME multimedia product was analyzed using paired sample t-test to compare children's pretest and posttest scores after multimedia implementation.

The pretest results indicated that many children initially demonstrated limited understanding of body safety concepts, particularly regarding:

- identifying private body areas,
- recognizing unsafe situations,
- expressing refusal responses, and
- seeking help from trusted adults.

After participating in multimedia learning activities, children's posttest scores increased significantly.

Table 3. Pretest and Posttest Results

Assessment	Mean Score	Standard Deviation
Pretest	61.25	8.14
Posttest	86.40	6.21

The statistical analysis demonstrated significant differences between pretest and posttest results, indicating that the SAFE ME multimedia product contributed positively to children's body safety understanding and protective behavior awareness.

Table 4. Paired Sample t-Test Results

Variable	t-value	Sig. (p)	Interpretation
Pretest–Posttest	8.52	0.000	Significant

The paired sample t-test results showed that there was a statistically significant difference between children's pretest and posttest scores after using the SAFE ME multimedia product. The significance value of $p < 0.05$ indicated that multimedia-based body safety learning effectively improved children's understanding of self-protection concepts and safe behavioral responses.

Table 5. N-Gain Analysis Results

Variable	N-Gain Score	Category
Self-Protection Competence	0.65	Moderate

The N-Gain analysis demonstrated a moderate improvement in children's self-protection competence after participating in multimedia-based body safety learning activities. This finding indicates that the SAFE ME multimedia product contributed meaningfully to children's understanding of body safety concepts and protective behavioral responses.

Overall, the findings indicate that SAFE ME interactive multimedia effectively improved children's body safety understanding, participation, communication confidence, and self-protection competence through interactive and developmentally appropriate learning experiences.

4. Discussion

The findings of this study demonstrate that interactive multimedia-based body safety learning may strengthen children's self-protection competence through developmentally appropriate visual interaction, guided simulation, and emotionally supportive learning experiences. The significant improvement in children's posttest scores and N-Gain results suggests that SAFE ME multimedia effectively facilitated children's understanding of private body parts, unsafe touch situations, refusal responses, and help-seeking behavior.

Furthermore, the findings of this study are consistent with previous studies emphasizing the effectiveness of multimedia-based learning in early childhood education. Interactive visual and audio stimulation has been reported to improve children's attention, motivation, and conceptual understanding during classroom learning activities. In the context of body safety education, multimedia learning environments may help children understand sensitive concepts through more concrete, engaging, and emotionally supportive learning experiences.

These findings are also consistent with Fiorella and Mayer (2021), who emphasized that multimedia learning environments may strengthen children's retention and conceptual understanding through integrated visual-verbal processing. In the context of body safety learning, animation, narration, visual simulation, and repeated interaction may help children retain protective concepts more effectively than conventional verbal instruction alone. The multimedia environment provided opportunities for children to connect abstract safety concepts with concrete visual situations, thereby strengthening conceptual retention and behavioral understanding simultaneously.

From an experiential learning perspective, multimedia-assisted activities enabled children to observe situations, rehearse responses, and participate actively in protective decision-making processes. This experiential interaction may explain why children demonstrated stronger communication confidence and more active participation during body safety simulation activities. Rather than functioning solely as information recipients, children became active participants who interpreted scenarios, responded verbally, and practiced protective behavior within emotionally supportive classroom situations.

The classroom implementation process also revealed several interesting pedagogical dynamics. During multimedia-based learning activities, children appeared more willing to participate actively compared to conventional verbal instruction sessions. Several children who initially demonstrated hesitation during discussion activities gradually became more confident in answering questions, identifying body safety situations, and expressing protective responses after interacting with animated simulations and guided multimedia activities. This condition suggests that interactive multimedia may help reduce children's communication anxiety when discussing sensitive topics within classroom environments. This finding aligns with Denham's (2018) perspective that emotionally supportive classroom environments may strengthen children's confidence and participation during sensitive social-emotional learning activities.

In addition, teachers reported that the multimedia product assisted them in explaining body safety concepts using more developmentally appropriate language and visual representation. Concepts that were previously considered abstract or difficult to communicate verbally became easier for children to understand through visual scenarios, character interaction, and repeated simulation activities. Interestingly, teachers also observed that multimedia learning encouraged children to ask spontaneous questions related to personal safety, indicating the emergence of reflective engagement during classroom interaction. From a pedagogical perspective, this finding demonstrates that interactive multimedia may facilitate not only conceptual understanding, but also dialogic learning experiences capable of strengthening children's participation and emotional involvement. This finding also supports digital play pedagogy perspectives emphasizing that interactive digital environments may facilitate more meaningful and participatory learning experiences for young children (Edwards, 2021).

The findings also reflect child-centered pedagogical principles because learning activities were designed to encourage active participation, visual exploration, play-based interaction, and contextual understanding rather than one-way instructional delivery. The SAFE ME multimedia product allowed children to learn through guided interaction, repetition, and simulation activities appropriate to their developmental characteristics and cognitive readiness. Similar perspectives were reported by Marsh et al. (2017), who emphasized that young children learn more meaningfully when digital interaction supports exploration, participation, and contextual engagement. Similar findings were also reported in recent JPUD studies emphasizing that child-centered digital learning environments may strengthen children's participation, exploration, and classroom interaction during early childhood learning activities (Fauziddin & Hidayati, 2024).

This finding also supports Denham's (2018) perspective that emotionally supportive learning environments are essential for strengthening children's communication confidence and emotional participation during sensitive educational interaction. Multimedia environments designed with supportive narration, child-friendly visual representation, and non-threatening simulation activities may reduce children's communication anxiety when discussing sensitive protective topics. This condition suggests that emotionally safe learning environments may strengthen children's willingness to participate, respond verbally, and communicate uncomfortable situations more openly during classroom interaction.

From a developmental perspective, children aged 5–6 years are highly responsive to visual and interactive learning experiences. Therefore, multimedia-based educational approaches may provide stronger learning engagement compared to conventional teacher-centered explanations. The findings of this study demonstrate that interactive multimedia learning not only supports cognitive understanding but also encourages children's confidence in expressing protective behaviors and communicating uncomfortable situations. Interactive multimedia may therefore function as a bridge connecting children's visual attention, emotional engagement, and conceptual understanding during early learning processes (Kirkorian, 2018).

Practically, the SAFE ME multimedia product may assist early childhood teachers in introducing body safety concepts using more developmentally appropriate communication strategies and interactive learning approaches. The multimedia product may also support schools in integrating preventive child protection education into classroom learning activities more systematically. In addition, the findings indicate potential implications for early childhood curriculum development, particularly in strengthening children's self-protection competence through multimedia-assisted learning environments. Parental involvement may also become an important extension of body safety education because multimedia learning activities can encourage continuity between school-based learning and home-based protective communication.

Nevertheless, this study has several limitations. The implementation process was conducted over a relatively short duration and involved a limited number of participants from only two kindergarten institutions. Consequently, the findings may not fully represent broader educational contexts with different socio-cultural backgrounds, technological readiness, and institutional characteristics. In addition, observational assessment during classroom implementation may contain subjective interpretation from teachers and researchers. Therefore, the generalization

of findings should be interpreted cautiously, particularly when applied to different early childhood educational environments.

Therefore, future studies are recommended to involve larger participant groups, longer implementation periods, and wider geographical coverage to examine the long-term effectiveness of interactive multimedia in promoting children's body safety awareness and protective behavior. Future multimedia development may also integrate parental involvement features and digital home-learning activities to strengthen children's safety learning experiences beyond classroom settings.

Overall, the findings indicate that SAFE ME interactive multimedia may function as an effective pedagogical medium for strengthening children's body safety understanding, communication confidence, and self-protection competence through interactive, emotionally safe, and developmentally appropriate learning experiences

5. Conclusion

This study concludes that the SAFE ME interactive multimedia product is feasible and effective as a body safety educational medium for children aged 5–6 years in kindergarten settings. The multimedia product fulfilled pedagogical, developmental, emotional, and technological requirements appropriate for early childhood learning environments. Furthermore, the implementation results indicated improvements in children's body safety understanding, learning engagement, participation, and protective behavior awareness during multimedia-based learning activities.

The findings demonstrate that interactive multimedia learning may support more meaningful and developmentally appropriate body safety education compared to conventional verbal instruction. Through visual interaction, audio narration, interactive simulation, and child-friendly activities, the SAFE ME multimedia product helped children recognize private body parts, understand safe and unsafe situations, and communicate protective responses more confidently.

Overall, the SAFE ME multimedia product demonstrates strong potential as an innovative educational medium for supporting body safety education in early childhood classrooms. Nevertheless, this study involved a limited number of participants and a relatively short implementation duration. Therefore, future studies are recommended to involve broader participant groups and longer implementation periods to examine the long-term effectiveness of multimedia-based body safety learning.

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