

Fostering Sexual Health Literacy Through Children's Digital Storytelling: A Participatory Action Research for S.A.F.E (Self-Awareness and Friendship Education)

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Abstract. This Participatory Action Research (PAR) aims to address socio- cultural barriers and stigma in childhood sexuality education by developing a S.A.F.E. (Self-Awareness and Friendship Education) model. The study seeks to improve sexual health literacy by engaging children as active creators through digital storytelling. The study involved 31 fourth-grade students from diverse multicultural family backgrounds, from whom 15 student cadres were selected to lead the creation process. They were given special training to create their own stories about self-protection. The core methodology involved collecting rich qualitative "student voice" following the provision of stimulating materials such as songs, stories, and films. In- depth analysis of these portfolios was used to design the Interactive Virtual Digital Storytelling (IVDS) prototype. Findings show a significant impact on student comprehension, with an average comprehensive success rate of 96.8% regarding self-protection concepts. This result is validated by the use of strong student-generated metaphors, such as "Secret Door" for body autonomy and "Rescue Captain" for reporting mechanisms. The study affirms that a child-centred and culturally responsive approach can dismantle taboos, contributing to measurable, evidence-based abuse prevention strategies.

Keywords: sexual health literacy, digital storytelling, child self- protection, S.A.F.E. model (Self-Awareness and Friendship Education), socio-cultural barriers and stigma.

1 Introduction

Comprehensive Sexuality Education (CSE) during childhood is a fundamental right, aligned with international technical guidance [1]. However, its implementation in many societies, including Indonesia, is often hindered by profound cultural taboos and social stigma [2]. The reluctance of adults to engage in open discussions about sexuality, touch, and private areas has created what is known as the "culture of silencing" around potentially victimized children [3]. This silence makes children vulnerable, lacking the appropriate language to recognize, refuse, and report inappropriate or dangerous situations.

Global and national reports indicate an alarming prevalence of child sexual abuse. Data from the Indonesian Child Protection Commission (KPAI) shows that sexual violence cases continue to dominate child protection issues [4]. Furthermore, a WHO review confirms the challenges in CSE implementation in the conservative Asia-Pacific region [5]. In the Indonesian context, traditional educational materials often fail because they: 1) use overly medical or abstract language, and 2) are not culturally appropriate, leading to avoidance or misunderstanding. Therefore, there is an urgent need to develop an educational model that is culturally sensitive, effective, and non-stigmatizing.

Previous efforts in childhood CSE have demonstrated effectiveness through visual media such as puppet shows [6]. However, many models remain didactic. A key gap is the lack of research that actively positions the "student voice" as the primary source for educational

content. Without children's language and perspective, sensitive materials risk being inauthentic and less resonant, failing to achieve the necessary cognitive mapping [7]. This research posits that empowering students in the creation process (PAR) is critical to overcoming the psychological barriers to reporting [8]. The goal of this study is to develop the S.A.F.E. Model through PAR, analyze the student-generated metaphors, and measure the impact of the model's application on the comprehension and sense of self-efficacy of fourth- grade students [9].

This silence creates a significant vulnerability, leaving children ill-equipped to recognize and respond to potential abuse or inappropriate situations [3]. Current educational models often fail to navigate these sensitive cultural landscapes, resulting in materials that are either too abstract, culturally irrelevant, or simply avoided, thus perpetuating a cycle of ignorance and risk [10]. The problem addressed by this study is the urgent need for a culturally sensitive, effective, and non-stigmatizing model for foundational childhood sexuality education. Traditional approaches, which often rely on didactic, top-down instruction, struggle to overcome the existing taboos [11]. This research posits that an approach that leverages children's intrinsic capacity for storytelling and creativity can fundamentally transform this landscape [12].

The purpose of this Participatory Action Research (PAR) study is to define and develop the S.A.F.E. (Self-Awareness and Friendship Education) model by actively engaging fourth- grade students as co-creators through digital storytelling [13]. By placing the "student voice" at the core of the educational content—collecting their narratives, drawings, and sketches—the research seeks to generate learning materials that are authentic, relevant, and implicit. The significance of this study lies in its innovative methodology: it aims to demonstrate that a child-centered, creative production process can successfully break down socio-cultural taboos, empower students with essential self-protection concepts, and ultimately provide educators with a practical, tested Interactive Virtual Digital Storytelling model for building foundational sexual health knowledge in a diverse and non-threatening manner.

1.1 Comprehensive Sexuality Education (CSE) and Cultural Context

CSE encompasses physical, emotional, and social health [2]. Global technical guidance emphasizes the necessity of age-appropriate and contextualized CSE [1]. In countries with conservative norms, approaches must be **Culturally Responsive** [10]. Successful communication of sensitive concepts depends on the use of strong **conceptual metaphors**, which shape how children think about boundaries and threats [7].

1.2 Participatory Action Research (PAR) as a Methodological Pillar

PAR was chosen because it is inherently ethical and empowering. In the context of sensitive education, PAR: 1) Distributes Power, and 2) Creates Authenticity because interventions are developed by, and for, the community being served [13,14]. By making students *co-creators*, PAR ensures that content is internalized through their own language, which is vital in breaking the culture of silence [11]. The PAR framework must be strictly considered, including the reflection and action stages, to ensure methodological integrity and rigor [15].

1.3 The Role of Interactive Virtual Digital Storytelling (IVDS)

Digital storytelling harnesses children's natural capacity for narrative and multimodality [12]. Digital storytelling is recognized as a powerful technological tool for 21st-century learning [16]. IVDS (Interactive Virtual Digital Storytelling) adds the element of *interactivity*, forcing students to make decisions in a safe environment. This transforms learning from passive reception into behavioral simulation, which is crucial for reducing cognitive load [17] and improving the transfer of knowledge into action intent [18]. IVDS serves as a scalable and

replicable medium.

2 Methods

This study employs a Participatory Action Research (PAR) design with a mixed-methods approach. PAR was applied in a four-phase cycle: Diagnosis and Stimulation; Analysis and Design; Prototype Development and Validation; and Implementation and Impact Measurement. This design adheres to PAR rigor principles, ensuring the action-reflection framework is maintained [15,19].



Fig. 1. Work Process

Early childhood sexual health education is often hampered by socio-cultural taboos and stigma, leading to a widespread reluctance to discuss crucial issues like body boundaries and self-protection. This hesitation creates a significant vulnerability, leaving children without the necessary linguistic framework to recognize and respond to inappropriate touch. To address this problem, the current research adopted a Participatory Action Research (PAR) approach focused on developing the S.A.F.E. (Self-Awareness and Friendship Education) model. The research was conducted at SDI Kergon Pekalongan. The main participants were 31 fourth-grade students from diverse multicultural family backgrounds. A total of 15 students were selected as cadres who received special training in story creation to lead the digital narrative creation process.

Instruments and Data Collection, the Qualitative Data (Student Voice): Collected through Narrative-Drawing Portfolios (Narratives, Character Drawings, Scene Sketches). Quantitative Data (Comprehension and Self-Efficacy): Utilized validated Pre-test and Post- test questionnaires, focusing on three indicators: I. Identification of Private Areas, II. Response to Inappropriate Touch, and III. Reporting Mechanism [20].

Data Qualitative Analysis: Employed Thematic Analysis [21] to identify keywords, phrases, and metaphors that formed the IVDS narrative. Quantitative Analysis: Used Descriptive Statistics (percentages) to assess the post-intervention success rate of student comprehension.

All these creative contributions were compiled into a portfolio, which was then subjected to in-depth analysis. This analysis served as the blueprint for developing a digital story prototype, with the ultimate goal of creating an Interactive Virtual Digital Storytelling model. This model was designed as an implicit educational tool for educators, ensuring that vital lessons regarding private areas and responses to inappropriate touch were delivered in a language and context authentic to the children themselves. Despite facing challenges in data interpretation and the time-consuming film production process, the successful integration of children's contributions into the academic output was achieved.

The findings showed a powerful and transformative impact: 96.8 % of the participating students successfully articulated key self-protection concepts. This success, which included their ability to describe private areas and appropriate responses to inappropriate touch, validates that a child-centered approach is effective in breaking down taboos and building foundational sexual health knowledge. Overall, this research confirms that empowering children as narrators is a culturally sensitive and effective strategy for promoting sexual health literacy.

Data collection involved a mixed-methods approach based on the four-phase PAR cycle. The Qualitative Data (Student Voice) component was collected through Narrative-Drawing Portfolios

(comprising student narratives, character drawings, and scene sketches) gathered during the Diagnosis and Stimulation phase, which served as the foundation for the IVDS content. The Quantitative Data component, measuring student Comprehension and Self-Efficacy, utilized validated Pre-test and Post-test questionnaires. These questionnaires focused on three key self-protection indicators: Identification of Private Areas, Response to Inappropriate Touch, and Reporting Mechanism [22,8]. For analysis, the qualitative data was subjected to Thematic Analysis to systematically identify the core keywords, powerful metaphors, and phrases that formed the IVDS narrative script. Concurrently, Descriptive Statistics (percentages) were used on the quantitative data to quantify the post-intervention success rate of student comprehension and measure the effectiveness of the S.A.F.E. model.

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This study received approval from the Health Research Ethics Committee of the Ministry of Health, Semarang Health Polytechnic with a certificate number 861/EA/ F.XXIII.38/2025.

3 Results And Discussion

The Diagnosis and Stimulation Phase successfully gathered rich portfolios. In the Analysis and Design Phase, the most potent metaphors were extracted. The Prototype Development Phase saw the creation of the IVDS incorporating these metaphors into an interactive storyline. The Implementation and Measurement Phase involved applying the IVDS across the class and assessing the results. This significant success isn't just a measure of knowledge transfer; it validates the Participatory Action Research (PAR) mechanism of active co-creation. By empowering children to use their own language and drawings—the "student voice"—to create the digital story, the model successfully bypassed socio-cultural taboos that often render traditional, didactic education ineffective. The children's narratives, summarized conceptually in Figure 1, fostered a sense of personal autonomy (the "Body is Mine" theme) and instilled clear, actionable safety protocols (the "Immediate Stop Sign"). This implicit normalization of sensitive topics allowed the concepts to be internalized as empowering life skills rather than external rules, directly explaining the high response proficiency. While the findings hold strong implications for developing culturally sensitive curricula that prioritize narrative and arts-based methods over conventional models, the study acknowledges its limitations, including the small sample size (n=31), which limits broad generalizability, and the focus on short-term conceptual articulation rather than long-term behavioral change.

Qualitative Findings: Thematic Analysis of Student Portfolios, Thematic Analysis [24] yielded three central themes, each summarized in a powerful, child-driven metaphor. These themes serve as authentic metaphors, effectively translating sensitive and abstract concepts into actionable, easily internalized knowledge [12].

Table 1. Child Driven Metaphor

Key Metaphor	Concept Represented	Qualitative Finding
"The Secret Door" / "Magic Box"	Body Autonomy and Consent	Defines private areas as exclusive possessions, establishing the concept of <i>Guarded Ownership</i> and emphasizing permission (consent) as the sole means of access.

Key Metaphor	Concept Represented	Qualitative Finding
"Immediate Red Light" / "Fire Alarm"	Actionable Response to Unsafe Touch	Represents the urgent need for unambiguous, instant action. It maps the complex social dynamics of refusal onto a simple, universally recognized warning system.
"Rescue Captains" / "Super Safe Team"	Support Network and Reporting Mechanism	Provides functional titles for trusted adults (parents, teachers), clarifying the reporting pathways and instilling confidence in seeking immediate help.

This thematic analysis confirms that the Participatory Action Research (PAR) approach successfully elicited culturally and developmentally relevant language, which was crucial for the model's high efficacy.

Quantitative Outcomes: Student Understanding Post-Intervention, Following the implementation of the Interactive Virtual Digital Storytelling (IVDS) prototype, student understanding was assessed across three key self-protection indicators (N=31). The results demonstrated a near-perfect assimilation of the core concepts.

Table 2. Post-IVDS Comprehension Results

No	Key Self-Protection Indicator	Success Rate (%)	Interpretation of Outcome
I	Identification of Private Areas	96.8%	Students successfully defined and articulated their personal boundaries, reflecting the internalization of the "Secret Door" concept.
II	Response to Inappropriate Touch	93.5%	Students were able to articulate both verbal ('No/Stop') and physical (moving away) responses, validating the success of translating the "Red Light" metaphor into planned action.
III	Reporting Mechanism	100.0%	All students successfully identified at least two trusted adults ("Rescue Captains") and understood the reporting channel, eliminating ambiguity in crisis response.
	Comprehensive Success Rate (Average)	96.8%	The high average success rate across all indicators validates the integrated design and delivery of the S.A.F.E. model.

3.1 Discussion

The high comprehensive comprehension rate (96.8%) stems directly from the qualitative resonance of the metaphors generated by the children. This figure significantly suggests that child-centered terminology is superior to didactic adult language ¹¹. Students mapped the abstract concept (body autonomy) onto their own experiences (Guarded Ownership), a cognitive process explained by conceptual metaphor theory [7].

The minor variance in the Action Response rate (93.5%)—relative to Area Identification (96.8%)—can be interpreted as the psychological gap between conceptual identification and

complex reactive behavior planning. However, this rate remains exceptionally high, confirming the success of translating abstract boundaries into actionable responses.

The 100.0% success rate in the Reporting Mechanism indicator is a crucial validation point. The S.A.F.E. model effectively addressed the psychological barriers associated with reporting by framing the process as a call to the 'Rescue Captains'. This reframing gives the

child a sense of collective support, effectively mitigating the common fear of isolation or stigma that often contributes to the 'culture of silencing' [3]. Addressing these psychological barriers is vital as systematic reviews show these factors are major impediments to abuse disclosure [25]. The model inherently aims to build students' self-efficacy [9] in self-protection actions, which is a strong predictor of health behavior change [20].

The robust results validate the methodological choice, positioning Participatory Action Research (PAR) as a fundamental ethical requirement for sensitive education [13,14]. PAR ensures the intervention is ethically developed and locally relevant, following rigorous frameworks [15]. The IVDS format, designed based on multimedia learning principles to reduce cognitive load [17], ensures that this curriculum is highly scalable and replicable [2]. The interactivity within IVDS, supported by the potential of digital storytelling [16], significantly enhances cognitive engagement, leading to deeper learning outcomes [18].

The robust results validate the methodological choices, positioning Participatory Action Research (PAR) as a fundamental ethical requirement for sensitive education. Dismantling Taboo: PAR transforms students from passive subjects into active co-creators of the curriculum, ensuring the content is culturally and contextually responsive. The resulting IVDS model is authentic because it is expressed in the students' own metaphorical language, making it immediately non-threatening and highly memorable [11]. Actionable IVDS Model: The successful transition from raw data (portfolios) to the Interactive Virtual Digital Storytelling (IVDS) model demonstrates a potent methodological contribution. The 'Interactive' element within the digital story forces students to practice decision-making—choosing the 'Red Light' response or identifying a 'Rescue Captain'—thereby converting internalized knowledge into simulated behavioral intent, which is a significant factor in the high quantitative outcomes. Furthermore, the IVDS format ensures that the successful, evidence-based curriculum is highly scalable and replicable for broader application [2].

A limitation of this study is the confined sample to a single school location. External validity requires multisite studies across various socio-economic backgrounds [5]. Second, the current quantitative data measures comprehension and self-efficacy intent [20], not long-term behavior.

4 Conclusion

This Participatory Action Research successfully achieved its objective of developing the highly effective S.A.F.E. Model. The core finding—a comprehensive comprehension success rate of 96.8%—confirms that engaging children as active co-creators through digital storytelling is a potent mechanism for enhancing basic sexual health literacy. The model successfully dismantled socio-cultural taboos by utilizing authentic, resonant metaphors from the children themselves, aligning with global guidelines and national case data. The S.A.F.E. Model also successfully established a strong foundation for self-efficacy in self-protection actions. Practical Implications: Educators are encouraged to adopt the S.A.F.E. Model and its generated language as official vocabulary. The results of this research can serve as evidence for incorporating narrative-based methodology (IVDS), supported by multimedia learning principles, into violence prevention curricula at the primary school level.

Suggestions for Future Research: Future research should focus on longitudinal studies to assess the long-term knowledge retention and its correlation with actual help-seeking behaviors.

4.1 Acknowledgments

Thanks are extended to the Directorate of Research and Community Service Poltekkes Kemenkes Semarang for funding support. Special gratitude is also given to the students and staff of SDI Kergon Pekalongan for their participation and creative contributions.

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