

Validation of MINAPAMIMI fairy tale media to improve elementary school students knowledge and attitudes towards distater mitigation



Inge Angelia ^{a,1,*}, Sri Handayani ^{a,2}, Naufal Raid ^{b,3}, Wiya Elsa Fitri ^{a,4}

^a Sekolah Tinggi Ilmu Kesehatan Syedza Saintika, Prof. Dr. Hamka Street No 228, Padang City 25123, Indonesia

^b Sekolah Tinggi Ilmu Administrasi LPPN Padang, Seberang Padang 1 Street No 13-15, Padang City 25214, Indonesia

¹ angeliakhairita01@gmail.com; ² ririhermana388@gmail.com; ³ naufalraid29@gmail.com; ⁴ wiyaelisafitri@gmail.com

* corresponding author

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ABSTRACT

The high risk of earthquakes and tsunamis in several regions of Indonesia, with the majority of victims being children due to a lack of disaster mitigation knowledge and the scarcity of disaster mitigation learning media. This research aims to determine the validity level of the MINAPAMIMI Fairy Tale Book in enhancing the knowledge and attitudes of elementary school students. This study addresses the limitations of learning media for schools in improving earthquake and tsunami disaster mitigation among elementary school students. The subjects of this research are elementary school students in Padang City, utilizing the Research and Development (R&D) method with the IDI design model. Data collection is conducted through questionnaires and analyzed descriptively based on validation score sheets; the product is validated by three experts. The validity results will be tested using the Aiken V formula. The research findings indicate that the MINAPAMIMI Fairy Tale Book is deemed valid with an average Aiken V score of 0.82 and can be utilized to enhance the knowledge and attitudes of disaster mitigation among elementary school students. Therefore, it is recommended for elementary schools in earthquake and tsunami-prone areas to utilize the MINAPAMIMI Fairy Tale Book for enhancing disaster mitigation.



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1. Introduction

In the last few decades, natural disasters have been increasing in various parts of the world. For instance, the earthquake that struck Turkey in 2023 resulted in approximately 173,000 buildings being damaged [1], [2]. Another earthquake occurred in Japan on January 1, 2024, triggering a tsunami warning [3]. Similarly, Indonesia, as an archipelagic country located in the Pacific Ring of Fire, is prone to earthquakes and tsunamis [4], [5]. Almost all provinces in Indonesia are susceptible to earthquakes, but three provinces are particularly vulnerable: Aceh, North Sumatra, and West Sumatra. The province of West Sumatra has its capital situated along the coastal area of Sumatra Island, namely in Padang City, with a coastline spanning 68,126 km². The coastal area of Padang City lies at the convergence boundary of two tectonic plates, known as a subduction zone, characterized by the major fault lines of Sumatra and the activities of mountains in West Sumatra such as Mount Marapi, Mount Tandikat, and Mount Talang, which can generate significant vibrations or cause earthquakes. This condition makes the West Sumatra region, especially Padang City, not only susceptible to earthquakes but also highly prone to tsunamis. During the earthquake of 2009, Padang City experienced a powerful tremor measuring 7.6 on the Richter Scale, resulting in 1,115 casualties and material losses amounting to 4.8 trillion rupiahs [6]. The high number of casualties due to earthquakes is attributed to the lack of

knowledge about earthquake and tsunami disaster preparedness. Research findings also indicate that, on average, disaster victims are predominantly women and children [7],[8].

Based on these phenomena, disaster mitigation needs to be provided to vulnerable communities at risk during disasters, including elementary school-age children. They tend to spend most of their time at school, thus the possibility of earthquakes and tsunamis occurring while they are at school is significant. However, based on literature studies, interviews, and observations, it has been found that elementary school students have low knowledge and attitudes towards disaster mitigation [9], [10], [11]. This is due to the lack of disaster mitigation education for elementary school students. According to the researcher's survey of 20 schools, only 6 schools have ever conducted disaster mitigation training. Therefore, to address this issue, a media that supports learning about earthquake and tsunami disaster mitigation in elementary school students is needed, which can be integrated into the Indonesian language subject for elementary school students. Based on the literature review conducted, many researchers have developed disaster mitigation learning media. Melina and her colleagues conducted research by developing an illustrated storybook on Disaster Mitigation [12]. Armelia & Mirza conducted research on increasing disaster mitigation literacy using Booklets [13], [14]. The next study is on Pop Up Book-based disaster mitigation media [15]. Research on interactive media using the role-play method was also conducted [16]. However, these studies need further development to create more interactive media that aligns with the characteristics of elementary school children. Therefore, the researcher innovated by developing a fairy tale book on earthquake and tsunami disaster mitigation, abbreviated as the MINAPAMIMI fairy tale book.

Fairy tale books have their own allure for children because the stories are more imaginative and engaging. Storytelling or reading fairy tales can capture the attention of students and make the learning atmosphere more enjoyable [17], [18], [19]. Additionally, fairy tale books are suitable for the characteristics of young elementary school children [18]. They also make it easier for students to understand concepts [20], [21]. This research aims to validate the MINAPAMIMI fairy tale book media in the context of enhancing disaster mitigation knowledge and attitudes among elementary school students. The validation of this media is crucial because the use of fairy tale books as an effective learning tool can influence students' understanding and attitudes towards disaster mitigation. The results of this research are expected to make a significant contribution to the development of disaster mitigation-oriented learning methods at the elementary school level and as a response to the insufficient media that can enhance disaster mitigation knowledge and attitudes according to the characteristics of elementary school-aged children. Additionally, the findings of this research are expected to provide deeper insights into the effectiveness of using fairy tale books as learning media in the context of disaster mitigation. Thus, this research is expected to serve as a foundation for the development of more innovative and effective learning strategies to enhance the preparedness of elementary school students in facing disaster threats.

2. Method

This type of research is Research and Development (R&D) using the Instructional Development Institute (IDI) model development procedure, which consists of: Define, Develop, Evaluate. The development study is at the prototype stage, specifically product validation [22]. The product is validated using instruments that adhere to the standards set by the National Education Standards Agency (BSNP), with assessment components consisting of Content Feasibility, Presentation Feasibility, and Language Feasibility. The validation of the MINAPAMIMI fairy tale book is conducted by experts in their respective fields, namely disaster experts, educational technology experts, and language experts. Before testing the validity of the MINAPAMIMI fairy tale book, the instruments used are first evaluated by experts to determine their validity. The validity analysis uses a Likert scale as follows: (a) assigning scores to each response: strongly agree (4), agree (3), disagree (2), and strongly disagree (1); (b) summing the total scores for each assessment from the experts for all indicators; c) calculating the validity value using the Aikens V formula [23].

$$V = \frac{\sum S}{[n(c-1)]} \quad (1)$$

The equation formula can be explained as follows; V is the Aiken V Validity Index; S is $r-lo$; r is the Rating given by the validator; lo is the lowest rank; n is the number of validators, and r is the number of categories selected by validators. The level of validity of the product being developed can

be seen in Table 1. Based on Table 1, the validity agreement criteria are determined by the obtained validity Aiken's V value. Validity is assessed using the Aiken's V formula and categorized as valid and usable when the Aiken's V value is ≥ 0.600 . If it is ≤ 0.600 , then it is categorized as not valid.

Table 1. Validity Criteria

Aiken's V Value Range	Validity Level
0.80 -1.00	Very High
0.60-0.79	High
0.40-0.59	Medium
0.20-0.39	Low
0.00-0.19	Very Low

3. Results and Discussion

The result of this development research is a learning media product for disaster mitigation called the MINAPAMIMI Fairy Tale Book (Disaster Mitigation for Earthquakes and Tsunamis), which was developed based on the stages of the Instructional Development Institute (IDI) model and has undergone testing and revisions based on feedback and input provided by experts. The development process of the MINAPAMIMI Fairy Tale Book media product is based on the IDI stages, which consist of 3 stages: Define or needs analysis, development, and evaluation. However, for this article, it only covers the development stage, as it only goes up to the validation testing stage of the product. The initial phase of this research is the discovery (define) phase, aimed at identifying and analyzing key issues, which include: (1) conducting a literature review to find articles related to media that enhance disaster mitigation knowledge and attitudes among elementary school students; (2) analyzing the characteristics of elementary school students. Findings suggest that elementary students tend to prefer game-based learning and enjoy listening to stories from adults. Based on this analysis, storytelling media can be used effectively for elementary school students. Storytelling is an effective medium for instilling attitudes and values in elementary students [24]. Additionally, according to literature, illustrated storybooks can attract students' interest in reading, which can positively impact their knowledge and attitudes [25]. Storybooks can also enhance the character development of elementary students [26], [27], [28]; (3) conducting interviews with teachers and colleagues. This define phase is crucial for developing an understanding of the needs for addressing these issues [29].

The second phase is the development phase. Based on the analysis results from the first phase, the second phase involves developing a prototype by designing the MINAPAMIMI fairy tale book, which includes a guide containing the background, concept, and characteristics of the fairy tale book. The draft of the MINAPAMIMI fairy tale book was first reviewed through an FGD with experts. Following this, feedback was solicited from three lecturers from the Syedza Saintika College of Health Sciences to provide input, resulting in a prototype of the MINAPAMIMI Fairy Tale Book that will be validated by experts according to their areas of expertise. This phase begins with the selection of media, specifically educational media developed to enhance knowledge and instill disaster mitigation attitudes in lower-grade elementary school students. The creation of the fairy tale book involves using needs analysis results and literature review related to earthquake and tsunami disaster mitigation content for elementary school students. Following the determination of material and content, appropriate illustrations are selected to match the content on each page. The MINAPAMIMI fairy tale book is an illustrated storybook designed to engage students' interest in reading. This aligns with previous research indicating that illustrated storybooks can captivate students' interest and improve their reading skills [8], [30]. Additionally, illustrated books are effective in instilling disaster mitigation attitudes in students [31], [32]. For further clarification, please see the following:

3.1. The results of the validation of the validity instrument

The instrument for validating the prototype of the MINAPAMIMI Fairy Tale Book was first evaluated by three experts using a validity instrument assessment sheet. The components of the validity instrument assessment cover the content validity of the instrument to assess the quality of content, language, and media construction, as well as the clarity and ease of use of the instrument. The results obtained from the validation of the MINAPAMIMI Fairy Tale Book validation instrument yielded an average Aiken's V score of 0.814. Based on these results, the validation instrument for the MINAPAMIMI Fairy Tale Book is categorized as having Very High Validity. Consequently, the validity instrument for the MINAPAMIMI Fairy Tale Book can effectively validate the MINAPAMIMI Fairy Tale Book itself.

3.2. The results of the validation of the MINAPAMIMI Fairy Tale Book prototype

The MINAPAMIMI Fairy Tale Book prototype was validated by three experts in their respective fields: a Disaster Expert, a Learning Technology Expert, and a Language Expert. The validity results from the experts can be seen in Table 2.

Table 2. Validity of the MINAPAMIMI Fairy Tales Book

The Assessment Aspects	The Aiken's V Score
<i>Content Validity</i>	
Relevance of Content	0.81
Strength of Content	0.75
Currency of Content	0.80
Encourage Curiosity	0.83
<i>Suitability of Presentation</i>	
Technique	0.88
Supporter	0.82
Learning	0.82
Continuity of the flow of thought	0.85
<i>Language</i>	
straightforwardness	0.81
communicative	0.78
Dialogical and interactive	0.82
suitability	0.88
Language rules	0.85
Average	0.82

Based on the results of Table 2, it can be seen that the average validity score (Aiken's V) given by the validators is 0.82. This indicates that the material can be used for elementary school students to improve their knowledge and attitudes towards earthquake and tsunami disaster mitigation, with minor revisions suggested by the validators. Table 3 shows the recommendations from the validators and the corresponding revisions.

Table 3. Validator's Suggestions

Validator	Validators' Recommendations	Revision Actions
SH	Provide examples of nearby evacuation routes around the school to make it easier for students to understand and recognize evacuation symbols.	This text ensures that the instructions are clear and useful for implementing evacuation information in educational materials.
	Provide some examples of disaster mitigation, such as hiding under a table, according to the conditions when students are at school	Include additional guidance that, while telling the story, the teacher should simply simulate how to perform disaster mitigation while at school.
	Add content that emphasizes the importance of disaster mitigation in the storybook	Add a section to the storybook about the importance of disaster mitigation
SGH	Add a guide for using the storybook within the storybook itself to make it easier for teachers to use	Add a guide for teachers or parents on how to use the MINAPAMIMI storybook at the beginning of the book
	Add more diverse colors to make it more attractive to elementary school students	Providing colors that attract students' attention.
	Add interactive features such as questions, games, or puzzles related to the material that can enhance students' understanding	Adding some questions that can enhance students' understanding.
AGN	Change the storybook cover to be more attractive and reflective of the story	Designing an attractive cover that represents the story content.
	replace some terms that are difficult for students to understand with simpler sentences	Replacing difficult-to-understand terms
	Adding sentences that can engage students to participate in the storytelling	Adding some questions that can enhance students' understanding

Based on the suggestions provided by the validator, this MINAPAMIMI fairy tale book has been revised and has become a final prototype that can be used in Earthquake and Tsunami Disaster Mitigation education for elementary school students to enhance their knowledge and attitudes. The book cover of MINAPAMIMI Fairy Tales is part of the suggestion given by the validator to incorporate Disaster design on the book cover. Fig 1 are the MINAPAMIMI book covers before and after being improved according to the validator's suggestion.



Fig. 1. Cover of the MINAPAMIMI Fairy Tale Book before (a) and after (b) revision

The content in the MINAPAMIMI Fairy Tales book depicts situations when children are in a school environment and during earthquake incidents while they are engaged in school activities. For more details, please refer to Fig. 2.



Fig. 2. Pages 1 and 3 of the MINAPAMIMI Fairy Tale Book

Furthermore, in accordance with the validator's suggestion, the MINAPAMIMI Fairy Tales book also features evacuation symbols for earthquake and tsunami disasters, as exemplified in Chapter 18 of the MINAPAMIMI Fairy Tales book as Fig. 3.



Fig. 3. Page 18 of the MINAPAMIMI Fairy Tale Book showing an example of an Evacuation Symbol

Based on the assessment by content experts or material validated by disaster mitigation lecturers/experts, an average Aiken's V score of 0.80 was obtained with a very high validity category. The aspects evaluated include the suitability, strength, and currency of the material, as well as its ability to stimulate students' curiosity. In creating media, it is crucial that the material presented stimulates students' curiosity, thus fostering their interest. A good educational medium is one that can attract students' attention [33]. Educational media also plays a crucial role in transferring and instilling attitudes in students [34]. In the subsequent validation aspect assessed, the feasibility of presenting the MINAPAMIMI fairy tale book was evaluated based on presentation technique, supporting presentation, instructional presentation, coherence, and logical flow. An average Aiken's V score of 0.86 was obtained with a very high validity category. A good medium is one that can increase students' interest in the material it contains, and one way to do this is through its presentation. The better the presentation of the media, the more it will enhance someone's interest in reading and studying it. Based on literature studies, illustrated storybooks can increase students' reading interest [35], [36], [37]. The next aspect evaluated is language, reviewed in terms of language. The validity result of developing the MINAPAMIMI Fairy Tale Book obtained an Aiken's V score of 0.83 with a very high validity

category. This indicates that the language used in the MINAPAMIMI fairy tale book adheres to effective and efficient Indonesian language rules, thus achieving the goal of obtaining accurate information. Language aspect is closely related to students' comprehension [38], [39], [40]. Overall, the average validity score, averaged from Aiken's V scores, is 0.82 with a very high validity criteria. This indicates that the MINAPAMIMI fairy tale book for elementary school students is appropriate and meets the requirements as a tool to enhance disaster mitigation knowledge and attitudes.

4. Conclusion

Based on the Validity Results of the MINAPAMIMI Fairy Tales book, which have been validated by three experts from various fields, namely Disaster Management, Learning Technology, and Linguistics, the MINAPAMIMI Fairy Tales book can be categorized as Valid. This can be concluded because according to the validators, the content in the MINAPAMIMI Fairy Tales book is relevant and can stimulate the curiosity of elementary school children, especially lower grades, regarding how to conduct Disaster Mitigation for Earthquakes and Tsunamis. Similarly, in terms of the technical feasibility of presenting the MINAPAMIMI Fairy Tales book, it is also technically sound, with supportive presentations that greatly aid learning, and linguistically it is suitable for elementary school children. It is hoped that the MINAPAMIMI Fairy Tales book can serve as a means for elementary school teachers in Indonesian language subjects to simultaneously increase knowledge and attitudes towards earthquake and tsunami disaster mitigation among elementary school students. Other researchers can also test and innovate with other forms while considering the conditions and characteristics of schools.

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