PASMINA: Arts-based tsunami education with an Islamic theme adopted from *Nandong Smong*

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Abstract. Indonesia is highly tsunami-prone country. People have difficulty maintaining awareness of the tsunamis. It is therefore very important to build a social system to ensure awareness of disasters and to transfer the lessons future generation. This study aim at developing PASMINA (literally meaning in Indonesia *Paket Kesenian untuk Mitigasi Bencana*), an arts-based package for disaster mitigation which can be used to educate students about tsunami preparedness. The concept of PASMINA was adopted from *Nandong Smong*, a local wisdom from Simeulue which also consist of Islamic messages. The PASMINA concept was implemented at one of islamic boarding school in Banda Aceh to obtain students’ feedback and to gain specific ideas and recommendation for changes that lead to improvements to the concepts that were developed. This study used Research and Development approach which consist of: i) Preliminary study, ii) Model’s development, and iii) Model’s testing. The development of PASMINA adapted from Nandong Smong provides benefits for students. PASMINA provide a solution in sustaining the traditional knowledge for disaster risk reduction, and at the same time improving the preparedness towards the tsunami hazard.

1. Introduction
In Indonesia, tsunami has become an extremely serious problem. Since tsunami 2004 which more than 165,700 people deaths [1], there have been several fatal tsunamis in Indonesia, including the tsunamis in Mentawai, October 2010 with total of 408 people deaths [2], tsunami Pangandaran, West Java in July 2006 with 668 fatalities [3] and tsunami Nias-Simeulu in March 2005 which the number of killed had reached more than 915 people, most of which arise from an earthquake [4].

Two other tsunami catastrophes that occurred in 2018 also added to the list of records of tsunami events in Indonesia. On September 28, 2018, more than 1300 people were killed following the Mw 7.5 strike-slip earthquake which generated extreme deadly tsunami waves in Central Sulawesi, whereas such earthquake usually does not generate large tsunamis [5,6]. Three months later, another tsunami...
struck the coasts of the Pandeglang, Serang and South Lampung regions in Indonesia. There were 431 people killed, 7,200 more injured, and 46,646 displaced [7].

Despite the serious impact of the tsunami and extensive damage once for several decades or hundreds of years, the frequency of tsunami occurrence is lower than earthquakes and floods [8]. Disaster experiences and awareness are maintained immediately following the catastrophe. However, as time passes, people gradually lose their memory, lessons and awareness [8,9].

Whenever the level of people’s preparedness for tsunami decreases, they have suffered repeatedly from massive disaster. This reflects that awareness of the tsunamis is difficult for people to maintain. Therefore, building a social system is very important to ensure disaster awareness and to transmit on lessons to the future generation [8,10].

One example of how important the community to understand, has an awareness and to mitigate for future tsunami risk can be seen in the case of Simeulue Island, Aceh, Indonesia. This island is situated 50 km south of the epicenter of the M9.3 earthquake and tsunami on 26 December 2004. The people of Simeulue Island evacuated to the surrounding mountains immediately. As a result, only seven deaths occurred of a total population of 83,000 people on Simeulue Island. This knowledge (known as Smong in the local language) were transferred through the deadly tsunami of 1907 from generation to generation. Since then, tsunami knowledge has been handed down by cultural practices, such as songs and poems [11,12].

This study aim at developing PASMINA (literally meaning in Indonesia Paket Kesenian untuk Mitigasi Bencana), an arts-based package for disaster mitigation which can be used to educate students about tsunami preparedness. The concept of PASMINA was adopted from Nandong Smong, a local wisdom from Simeulue which also consist of Islamic messages. The PASMINA concept was implemented at one of islamic boarding school in Banda Aceh to obtain students' feedback and to gain specific ideas and recommendation for changes that lead to improvements to the concepts that were developed.

2. Methods
This preliminary study used a qualitative method through an extensive literature review to investigate the concept of Smong, Nandong Smong, arts with islamic theme as well as to develop the concept of PASMINA. The PASMINA concept testing was conducted at Dayah Terpadu Inshafuddin, an islamic boarding school located at tsunami-prone area. Ten students from Dayah were taught dance, didong, drama, poetry, and singing to perform the PASMINA. After students performed the drama, they were asked several questions through interviews. The questions were related to knowledge and action taken for earthquake and tsunami mitigation.

Research and development approaches of Borg and Gall (1989) were used in the process of developing PASMINA [13]. This study involved only three (see Figure 1) of the total 10 steps proposed by Borg and Gall, namely: i) Preliminary study, ii) Model’s development, and iii) Model’s testing.

![Figure 1. Research and development process of the study](Source: Modified from Borg and Gall, 1989)
3. Results and Discussion

In the first section we reviewed some related studies on the Smong from scientific literature. The concept of Nandong Smong then described in the Section 3.2. We introduced the new concept of PASMINA in Section 3.3 and followed by the discussion of testing implementation in Section 3.4.

3.1. Smong in Scientific Literature

After 2004 Indian Ocean tsunami, the success story of Smong has attracted various researchers at the international level to take lessons and analyze further the role of the Smong in reducing the risk of deaths caused by tsunamis. There are at least 16 articles written by authors from various countries and have been published in reputed international journals, as described in table 1 below.

**Table 1.** Publications about SMONG written by international researchers

| Authors            | Year | Key messages of Smong                                                                                   |
|--------------------|------|----------------------------------------------------------------------------------------------------------|
| Rahman et al.      | 2018 | In order to increase community resilience, Smong history could effectively be integrated when it manages tsunami risk through linking and changing the lessons learned from the analyzes of Smong history development into another range of DRR efforts such as knowledge, disaster management, policy, etc [14]. |
| Sakurai et al.     | 2018 | Smong ws disconnected from formal education activity in schools, even though Smong has the opportunity of being integrated into intra and extracurricular activities [15]. |
| Gadeng et al.      | 2018 | People in Simeuleu transmitted the local wisdom of Smong through the poetry that has been brought into their family from the cradle to their age, such as manangana-nanga (child lullaby), Nandong (humming) and manafi-nafi (folklore) [16]. |
| Suciani et al.     | 2018 | Smong as local wisdom has an important role in reducing the tsunami disaster risk [17]. |
| Syamsidik et al.   | 2017 | The Smong is a great example of how intergenerational disaster awareness can help reduce losses for low frequency hazards such as tsunamis coupled with return migration [9]. |
| Rahman et al.      | 2017 | Smong's story encourages a new interest in the indigenous knowledge concept for DRR [18]. |
| Oktari et al.      | 2015 | Smong implies how the use of knowledge management in disaster situations can motivate someone to take appropriate action to save themselves from disaster [10]. |
| Husin & Alvisyahrin| 2014 | A warning for a tsunami in a form of poetry serenaded by parents at bedtime to their young children [19]. |
| Syafwina           | 2014 | The future of human security can be improved by providing valuable indigenous knowledge to reduce disaster risks such as Smong [20]. |
| Supprasi et al.    | 2012 | Smong showed how important it is to understand, to be aware of and to mitigate tsunami risk in the future [11]. |
| Sugimoto et al.    | 2010 | The Simeuleuans have maintained Smong their own local knowledge, so that many lives can be saved in the 2004 tsunami [8]. |
| Lassa              | 2008 | The installation of tsunami sirens on the Simelue islands can be scientifically challenged today because it is at risk of eroding the local knowledge (Smong), which has already had a strong social roots [21]. |
| Morin et al.       | 2008 | Smong created a very helpful acronym: SeMu Orang Naik Gunung (Everybody move up on the hills) helped to increase national awareness of tsunami hazards [22]. |
| Gaillard et al.    | 2008 | Smong had similarly been remembered by the people of Simeuleu and passed down from generation to generation, as precursory signs (earthquake or linon, marine withdrawal, fleeing animals, sky being darkened, rumbles or blasts) [12]. |
| Kurita et al.      | 2007 | Smong has been transmitted to explains the tsunami characteristics and teaches people what to do if tsunami occurs [23]. |
| McAdoo et al.      | 2006 | The word Smong, which means “the ocean coming onto the land,” remains in the local lexicon today and save the people of Simeule during the 2004 tsunami [24]. |
3.2. The concept of nandong smong
Nandong Smong is a genre of Simeulue folk songs, it is folklore in the form of explanations or multi-indexical narratives about the natural disaster known as a tsunami [25]. The song is about how to deal with earthquakes that cause big waves in the ocean or tsunami. The waves could drown the village, so it is advised that if there is a strong earthquake and the sea water recedes, then the entire community should immediately evacuate to a higher place to survive. Aside from learning about what a tsunami is, Nandong Smong also contains religious elements, such as praying to be saved from the disaster. Although the term “Smong” has been coined as a term for tsunami in Bahasa Indonesia, the art itself is gradually disappearing.

Nandong Smong as a local wisdom is transmitted based on the oral-based tradition, which refers to the basis of the Simeulue’s traditional culture and syarāk (Islamic religion). In this case the local wisdom contains is a tsunami-related knowledge, tsunami mitigation, and the recognition of the existence of God which reduces disaster and provides knowledge to deal with it. This is an opportunity to preserve Nandong Smong by integrating into the disaster preparedness education curriculum and Disaster Risk Reduction (DRR) at the community level, through the adaptation of Nandong Smong and combination of various arts and languages.

3.3. Results of model development: PASMINA
A number of activities have been carried out at the stage of PASMINA development, including discussion with teachers and students, small-scale group trials, review of test results, large-scale testing and product improvement.

The PASMINA which adapted from Nandong Smong consists of dance, didong, drama, poetry, and singing. Guel dance and didong as the opening and attention gatherer is adapted from Gayo traditional art, which combined with lines from Nandong Smong. Followed by a drama describing the culture of the Simeulue community telling the past tsunami events from grandfather to grandchildren and mother to child through stories, illustrating how tsunami preparedness indirectly has been implanted since early childhood. Then the final session of the drama depicted the condition of the Simeulue community when it was hit by earthquake and tsunami in 2004 which only killed 7 people. The drama ends with a poetry which is translated from Nandong Smong in Simeulue language to Bahasa Indonesia, and finally end with Nandong Smong sung by a vocal group.

Through the art adapted and inovated from Nandong Smong we hoped that it can promote Nandong Smong, and educate people as an evidence that disaster preparedness disseminate early will have a major impact. Detail of depicted scene of the drama illustrated in Tabel 2.

3.4. Test of the model: PASMINA
A team of 10 male and female students was formed to obtain insights from the development of the PASMINA model. The team was then trained for 2 months, in order for them: I) to play the traditional instrument as an accompanie for the drama and for the songs, ii) to sing the adaptation songs of Nandong Smong and iii) to master the drama accompanied by the musical adaptation of Nandong Smong. The team then performed in front of all students and teachers at the school’s anniversary event and the graduation ceremony of the final students in April 2019. The audience is expected to remember moral messages related to disaster mitigation through the performance of the PASMINA team (see Figure 2).

The development of PASMINA adapted from Nandong Smong provides benefits especially for students involved in performance. One of the students who joined the team said:

"I was living on North Aceh's coast during the 2004 tsunami but at that time I was very young and therefore I was not able to remember clearly the terrible event, although my parents told me about the 2004 tsunami catastrophe.... After joining this arts team I got a clear picture about the conditions during the earthquake and the tsunami at that time ..."

In addition, the school principal also grateful for the PASMINA performance so that the students can have better knowledge about local wisdom Smong to increase their preparedness towards tsunami risk.
Table 2. Depicted Scene in PASMINA

| Scene | Depiction | Type of art | Message |
|-------|-----------|-------------|---------|
| I     | A dancer and poet performed accompanied by acoustic music | Guel Dance & Didong (Gayo) + a line from Nandong Smong (Simeulue) | |
| II    | A grandfather told his grandchildren the story of the earthquake and tsunami 1907 along with the signs and actions that must be taken if one day something similar happened. | Drama | Past events are passed down through generations in the form of advices and songs |
| III   | A mother sings Nandong Smong and salawat (prayer) as a lullaby for her child | Drama + Nandong Smong (adapted) | Stories in the form of songs delivered since early childhood contain advice and prayer |
| IV    | The community runs daily activities and earthquakes occur, residents protect themselves while praying, then a young man runs to the sea to check the sign of tsunami, the sea water recedes, then runs back and yells the word "Smong" to all villagers who then immediately save evacuate to the mountain | Drama | Tsunami preparedness has been formed to the subconscious level so that people know what to do when an earthquake and tsunami occur. A traditional Early Warning System is formed, the term "Smong" as a sign that a tsunami will occur and an order to save ourself to a higher place. |
| V     | After the disaster, the community returned to the village and found only a few (one) fatalities even though the damage to the building was quite severe. | | Only a small number of people become a victim, proving that the advice delivered has decreased and has made the community ready and prepared for the tsunami |
| VI    | A person rise up and reads a poem which is the lyrics translation of Nandong Smong | Poetry+ Nandong Smong | Past events are written in the form of art to make sure that it will be disseminated to future generation |
| VII   | The residents rise up and sing Nandong Smong in a cheerful manner | Nandong Smong | Even though the disaster had taken place, the spirit to rise again must be maintain as the first steps to conduct the rehabilitation and reconstruction process |
Figure 2. The performance of PASMINA by students

4. Conclusion
The resulting model has theoretical and practical implications. Theoretically, the findings of PASMINA which adopted from Nandong Smong can be used as indicators to foster the role of local wisdom, art and religious theme in disaster education model. Practically, PASMINA provide a solution in sustaining the traditional knowledge for disaster risk reduction, and at the same time improving the preparedness towards the tsunami hazard. This research is the initial phase of PASMINA development using a qualitative approach. Quantitative evaluation of PASMINA development's effectiveness is a study that will be carried out in the next step.

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