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SOCIOTAGGING: PARTICIPATORY DESIGN AS FLOOD DISASTER MITIGATION CAMPAIGN IN BOJONGSOANG DISTRICT DURING THE COVID-19 PANDEMIC

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ABSTRACT

This article discusses about disaster education for protagonist community in Bojongsoang District, Province of West Java. The district is prone with a high number of hydrometeorological disasters; Disaster Risk Reduction (DRR) campaign conduct to raise awareness about these potential disasters is required, in the period of the covid-19 pandemic. The design was develop by utilizing Sundanese idioms, and then developed into a specific-site design idea for the current generation. Participatory action research method conducted to promote educational media that are close to the daily life of the flood-prone community. Community was involved in design stage to produce disaster literacy. Educational tools design concept developed to deliver the contents through the educational tools, to build knowledge and to educate the community about disaster. The common media using physical platform like information graphic creates the possibility to use virtual content for specific devices. The development of idioms that related to the culture of audience will help the acceptance of information, and use the community as the information agent as well. The communication reaches the affective level; that would enable to build the culture and habitual attitude to deal with disaster or emergency situation.

INTRODUCTION

The natural disaster that occurred in Indonesia affected to infrastructure damage, transportation obstacle in land and sea, insecurity of energy, fluctuation in food production, and declination of economy stability. According to Badan Nasional Penanggulangan Bencana (BNPB/ The National Agency for Disaster Countermeasure), 92% of disaster in Indonesia recorded from 1815 to 2017 are hydrometeorology disaster. The number predicted to be increase following the phenomenon of climate change and the raise of severe climate on Earth. The hydrometeorology disaster known as disaster that occurred by the parameters of meteorology such as flood, drought, typhoon or landslide.

According to Indeks Resiko Bencana Indonesia (Indonesia Disaster Risk Index) 2013, there are 205 million people of Indonesia lived in disaster-prone area (Maarif, 2014). That was more than 80% of the whole citizen.

Citarum River is known as a source of living water in West Java, but it is also known as one of the most polluted rivers in the world. Educational media has been developed by utilizing a cultural approach to the speech of local communities such as traditional songs or folk games as an awareness of their living space. Some areas have traditional mitigation patterns and are not always in line with the methods of modern disasters, including communities on the banks of the Citarum River. This study aims to explore the possibilities of educational media for mitigation in disaster-prone area by the Citarum River.

Environmental ethics we do not just offset the rights and obligations to the environment, but also limit our behavior and efforts to control various activities so that they remain within the limits of our environmental resilience (Anies, 2017). Environmental communication is inspired by General System Theory which states that living systems carry three important functions namely (1) exchange of matter with the environment and with other living systems; (2) energy exchange with the environment and other living systems; and (3) exchange of formations with their environment and other living systems (G. Flor, Alexander, 2018). Motivation clarified the purpose of each disaster education media that was created in order to leave a long-lasting understanding. Audio and visual media were used as educational tools, since then many parties consider the effectiveness of multimodal media raises because it can stimulate the audience's visual and auditory at the same time and make teaching materials easier to understand (Dale, 1946). The education media for disaster mitigation has actually been widely available in a wide range media and technology. The media range from text-based such as books, picture books, comics, multimedia - such as web comics, internet pages, interactive media, to 2D and 3D animation. Evaluation of which media has an impact on the process of inculcating disaster response has not really been proven. Education about disaster mitigation can be linked to one's motivation to be able to save themselves and others in the event of a disaster. This study reviews the media used in disaster mitigation education with the characteristics of print media with media that generally uses paper and is distributed both indoors and outdoors. The media can be printed media or compiled information in the form of books or booklets. Theoretically, the review on the print media can be done using mass communication theories aimed at educational purposes, campaigns and propaganda, including theories of symbolic activity, the theory of mass communication and communication in the community (Wood, 1997). In line with print media, multimedia is also viewed from various communication activities as the purpose of the media.



Figure 1.Flood periodically occurred in rainy season in Bojongsoang District

MATERIAL AND METHOD

Previous research conducted to the educational media of disaster mitigation were highlighted the multicultural problem and attempt to develop media based on those differences using game model (Clerveaux et al., 2008); An integrated curriculum to help the teacher in teaching using virtual technology to support this process (Mantasia & Jaya, 2016) and the disaster risk reduction is something manageable (Conde, 2020); analyzing the level of visual literacy ability of the people that has no awareness of the dangers of natural disasters with case studies on tsunami (Danang et al., 2012); It also found that the system that has been running so far has been ineffective. Kentongan is no longer effective because disaster comes immediately, requires public understanding and awareness of disaster risks. Disaster management must be carried out comprehensively by set the priority strategies for mitigation actions which are: construction, social action, training & education actions, economic actions, agency & management actions (Indah, 2009); People who lived in disaster-prone area mostly have their own traditional way and local wisdom of mitigation that are passed on for generations and are not always in line with modern disaster management (Lakoro et al., 2018). The impact of the study is expected (1) to provide an adequate explanation of disaster education media that associated with the characteristics of living space of the Indonesian people; (2) achieving knowledge and technology transfer from universities and R & D institutions to overcome national problems that related to disaster education; (3) to encourage concepts and strategy related to disaster education in product development, innovation and technology that are competitive and sustainable; and (4) to encourage the creation of creative content related to disaster education problems in indigenous Indonesian communities with the approach of Visual Communication Design. The paradigm in design as research, which the feasibility of testing and reproduction in design research is not more important than its sensitivity to the social context and cultural moments that make the results of the design research resonate with the public or market. Design research can strengthen the ability of designers to form popular culture and subtly transmit values through design. This is important for designers who want to show their good side in transforming consciousness from conditioned responses to active participation (Lunenfeld, 2003).

DESIGN INQUIRY IN BOJONGSOANG DISTRICT

The school and educator usually perceive disaster as something that has to be and it happen naturally. The involvement in participatory art methods would be more interesting because the audiences are setting up to get involve with art making process. Education with art activities is able to deliver almost every possibility of educational contents in various vernacular art and design approach. The content also describe the recovery process and how the people resilience with disaster (Lakoro et al., 2018). Image theory as a representation theory becomes a theoretical foundation given that there is always a distance between object and representation during the interpretation process, for example cultural distance. Interpretations that are not free and are closely related to the accumulation of knowledge and experience provide a gap to be studied as a design medium. Disaster-related representations must minimize the range of different interpretations because of their nature related to safety, urgency and immediacy. Local wisdom found in Citarum River, or Sundanese people in general, holds many messages about mitigation, preservation and the sustainability of life with nature, like the proverb "*leuweung ruksak, cai beak, manusa balangsak*" (damaged forests, depleted water, miserable humans). In 2003, Masyarakat Peduli Sumber Air (MPSA/ Community of Water Resource Care) held campaign of topographic-based land arrangement by using local wisdom of Sundanese people (Kurniawan, M., 2018).The campaign used Sundanese proverb: *gunung kaian, gawir awian, lebak caian, legok balongan* (mountain forestation, rock plantation with bamboo, keep the water in reclining soil, watering the pond). The campaign found effective since deforestation at Cisanti, the community built 1,847 ponds and provide water. This local wisdom could be revitalizing in contemporary problem and context.

PARTICIPATORY DESIGN CREATION IN BOJONGSOANG

Participatory art creation provides various educational media using various approaches that enable to deliver message and information effectively. The content of disaster education founded in the samples deliver the message of disaster using the first person view. Media is one aspect that needs to be considered in the dissemination of knowledge to provide education related to disaster. Utilization of Information and Communication Technology provides opportunities to spread massively and simultaneously. Some alternatives are also made by institutions dealing with disaster crises for education efforts for people living in disaster-prone areas can be started early.

Educational tools design concept aim to deliver the contents through the media that build knowledge and at the same time, involve the user. The common media using physical platform like information graphic for social media platform. It also creates the possibility to use virtual content for specific devices. The participant as protagonist community encouraged to co-create design with professional designer and use the design for their community.

RESULTS

The participatory design process planned at this stage was hampered by the condition of the Covid-19 pandemic so that researchers developed a participatory method that allowed interaction with participants to continue. Through the group chat platform, researchers and participants continue to communicate so that the design goals to find a model of knowledge production and disaster literacy in communities affected by hydro-meteorological disasters can be achieved. The concept of *Sociotagging* refers to giving a sign of involvement / notification by the protagonist community to participants who want to be involved in the task according to research goals. These tasks are the result of researchers' observations on critical aspects that are urgent for

hydrometeorological disaster mitigation at different stages in the disaster cycle. The samples of existing educational media for disaster mitigation demonstrate the using of informative design, but it also shows the lack of strategy to create awareness. It also shows the needs of literacy in the audience according to disaster mitigation. Participatory art creation provides various educational media using various approaches that enable to deliver message and information effectively. The content of disaster education founded in the samples deliver the message of disaster using the first person view. Media is an aspect that needs to be considered in the dissemination of knowledge to provide disaster education. Utilization of Information and Communication Technology provides opportunities to spread the knowledge massively and simultaneously. Alternatives are also made by institutions dealing with disaster crisis for education efforts for people living in disaster-prone areas can be started earlier.



Figure 2. Sociotagging process that involved participant as co-designer

The Sociotagging #1 gave an open challenge through the participants via group chat platform, when participants asked to map the vulnerable points in their homes. Based on mitigation guidelines published by the National Disaster Management Agency (BNPB, 2019) there are several things that can be done at home to reduce the impact of flood disasters. Researchers also conduct virtual interviews with participants to understand how these conditions are in their perspectives.

The Sociotagging #2 offers participants the opportunity to manage domestic waste in their homes. Based on knowledge about making environmentally friendly bricks or eco-bricks that were shared by researchers on a visit the school before the Covid-19 pandemic, each participant was asked to make 2 eco-bricks. Sociotag #2 was confirmed to be followed by 10 participants, but in its journey 1 participant could not send data in the range of days determined by researchers.

The Sociotagging #3 is a response to the Covid-19 pandemic situation and testing the flexibility of the sociotagging participatory design method, researchers invited participants to confirm themselves to Sociotag #3 with the challenge of making education about Covid-19. Based on several health protocols issued by the government of the Republic of Indonesia through ministries and local governments, universities and independent institutions,


compiled some information regarding (1) how the transmission of Covid-19, (2) symptoms that occur in patients with Covid-19, (3) mitigation measures to prevent transmission of Covid-19, (4) patient status in the Covid-19 case, and (5) actions that need to be taken during the environmental disinfection process from Covid-19.

The Sociotagging #4 is social experiment to reflect on the dangers faced by participants in their area, and present various views and attitudes of participants towards disaster, including values that are influenced by the family and social environment. The media displayed in the form of video by presenting several questions to the participants. In this 11-minute 55-second video participants express their thoughts, feelings and reflections on what they have been experiencing and how the process of the protagonist community is learning together. Also revealed habits, values that are applied both by individuals and instilled in the family in dealing with disaster situations.

DISCUSSION

The involvement in participatory art and design methods would be more exciting since the audiences are setting up to get involve with art making process. Education with art activities is able to deliver the disaster educational contents in various vernacular art and design approach. The content also describe the recovery process and how the people resilience with disaster. Design results from the *sociotagging* process recreated as paper-based mitigation method. As a disaster contingency plan that is close to participants' daily lives, this work is inspired by inexpensive media that is easy to obtain.


Table 1. Media analysis of Tas Siaga (Emergency/ Bug Out Bag) Poster

Media	Design Variable	Content
 <p data-bbox="188 1550 496 1697">Informational poster of the preparation of emergency bag or also known as Bug Out Bag</p>	<p data-bbox="550 1133 919 1352">Compositions use centrifugal layout and compositions with several icons to emphasize the category of things to put on the bag</p> <p data-bbox="550 1352 895 1610">Colors predominantly dark blue with yellow accents and different color of icon's background and some text for legibility and emergency indicators</p> <p data-bbox="550 1610 890 1756">Typography text from a palette of sans serif that have high readability</p> <p data-bbox="550 1756 911 2007">Illustrations apply only to icons, the character (taken from hansip/ civil defense) and a few pieces of disaster illustration on background. The icon design are</p>	<p data-bbox="941 1133 1402 1426">Message The Hansip (Pertahanan Sipil/ Civil Defense) use as the mascot of communicator message, deliver the content and show the familiarities of the information. As a persuasion message, the poster call for action to prepare the bug out bag</p> <p data-bbox="941 1426 1394 1644">Categorized icons designed in simplified illustration and color tone., Color in the background guides the audience to understand the categories and deliver relevant information.</p> <p data-bbox="941 1644 1362 1827">Designer's role The media prepared by designer and completely using as given design to the community as informational media</p>

	simplified from the realistic style but it doesn't have any vernacular elements of design	


The use of local spoken language and idiom would help the information delivery and increase the memory and experience. As the emotional elements, it could use as idea to develop educational material to the most of visual and or audio visual media and involve the participants to create them.

Table 2. Media analysis of instagram carousel

Media	Design Variable	Content
 <p>digital poster series based on instagram carousel platform about preparation of emergency bag</p>	<p>Compositions use zig-zag layout and compositions with the grouping of information based on the category of things to put on the bag</p> <p>Colors predominantly dark blue with violet accents and different color of icon's background and some text for legibility and emergency indicators</p> <p>Typography text from a palette of sans serif that have high readability as headline and body text</p> <p>Illustrations apply only to icons. The icon design are simplified from the realistic style</p>	<p>Message The content delivery shows the familiarities of the information. As an instructional message, the digital poster call for action to prepare the bug out bag</p> <p>Categorized content The content separated by the categories of things, designed in simplified illustration and color tone, color in the background indicate the familiarities of each slide.</p> <p>Designer's role The media prepared by designer after discussed the poster (Table 1) with the participant. The media platform also refers to what social media platform they used in daily life.</p>

Disaster brings the uncomfortable memory, but with the development of idioms that related to the culture of audience will help the acceptance of information. The information is not only adding knowledge in the audience's cognitive, but also enriches their emotional experiences. As the communication reach the affective level, it would be easier to build the culture and habitual attitude to deal with disaster or emergency situation. Media is one aspect that needs to be considered in the dissemination of knowledge to provide education related to disaster. Utilization of Information and Communication Technology provides opportunities to spread massively and simultaneously. Some alternatives are also made by institutions dealing with disaster crises for education efforts for people living in disaster-prone areas can be started early.

Table 3. Media analysis of Sociotagging content generation

Media	Design Variable	Content
 <p>digital poster and instant messenger sticker series based about covid-19 information in Sundanese language</p>	<p>Compositions use 3X3 grids layout and compositions with the grouping of information based on the category of information</p> <p>Colors predominantly white with light blue accents and different color of outlines and some red text to highlight the messages</p> <p>Typography text from a palette of sans serif that have high readability as headline and body text</p> <p>Illustrations Involved the participants to send their response of the information that sent to them. Encourage them to draw from it.</p>	<p>Message The content delivery shows the familiarities of the information of covid-19 pandemic, which are the symptoms, the protocols, patient status and how it will spread</p> <p>Categorized content The content separated by the categories of information, designed in simplified illustration and color tone, color on specific text indicate the emphasis. Content wrote in Sundanese as the participant's daily language</p> <p>Designer's role The information prepared by designer after discussed with participants and encourage them to response visually. The media platform also refers to what social media platform they used in daily life.</p>

CONCLUSION

Art and design activities that are applied participatory methods will not directly build the awareness about disaster potential. The knowledge of disaster could manage as a comprehensive curriculum that could be implemented gradually, but the attitude of facing disaster will develop in social field. The research found that the utilization of local wisdom with oral culture elements in past mitigation education from the sample of sites should start from the values that already have been exposed to the communities. Participatory design that involved communities could be used to introduce specific kind of disaster, how to deal with it and take the right action. The fact is none of the participants ever heard about local wisdom related to their spoken culture. The characteristics of the community that is the subject of participants in Bojongsoang District, it is important to make a more integrated strategic step on disaster education. A diverse target group can be started from determining the group of participants who become the Protagonist Community. Early disaster education in this group can help understand disaster so that it becomes an adult who is better equipped with these risks. Even though Indonesian culture is different, it needs an integrative step that is implemented in all regions so that all communities get the same portion of education, even though technically and operationally it will be highly adapted to their culture and disaster characteristics.

a. Discovering the Protagonist Community

Examining the characteristics of the community that is the subject of participants in Bojongsoang District, it is important to make a more integrated strategic step on disaster education. A diverse target group can be started from

determining the group of participants who become the Protagonist Community. Early disaster education in this group can help understand disaster so that it becomes an adult who is better equipped with these risks. Even though Indonesian culture is different, it needs an integrative step that is implemented in all regions so that all communities get the same portion of education, even though technically and operationally it will be highly adapted to their culture and disaster characteristics.

b. National Disaster Making Curriculum

National disaster curriculum is urgently to begin to be designed. This curriculum is to instill the concept that even though the earth has the ability to improve itself, if it is exploited and polluted massively and will continue to suffer damage as well. The disaster curriculum can be made at all levels of school / education. Knowledge about disaster risk reduction, preparedness, minimizing the effects of disaster hazards and disaster risk reduction become important information for the community. The national disaster curriculum in its implementation can contain local cultural wisdom content to be more easily understood by people with certain cultures and have certain disaster characteristics. The Bojongsoang people who are exposed to floods will certainly be more appropriate if they are educated a lot about hydrometeorological disasters.

c. Site-specific Disaster Education Planning

Rehearsal disaster education design (simulation) is able to bring the communicator closer to the community being trained. In addition, the message can also be adjusted to local conditions. However, in massive numbers, media is needed as a means of educating widely and simultaneously. Disaster messages related to symptoms, responses that should be given, indeed exist at the cognitive level of the community. Disaster-related communication design planning requires quick responses because disasters come unexpectedly. In addition, it is also necessary to build independence to realize their living space in disaster prone areas by learning from previous disaster events. The character of the place and type of disaster faced certainly require different communication approaches.

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