The Development of VIKOMAFA as Android-Based Disaster Learning Media for PGSD Students of Universitas Peradaban Indonesia

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Abstract: This study aims to reveal the development of Android-based video and comic application (VIKOMAFA) as a disaster learning media to improve the understanding of natural disaster preparedness for the students of the Department of Primary School Teacher Training Education (PGSD) at Universitas Peradaban and to discover the effectiveness of VIKOMAFA as the Android-based video and comic application to improve the understanding of natural disaster preparedness for the PGSD students of Universitas Peradaban. This study offers some benefits, including 1) academics benefit: to contribute to knowledge development for public education; and 2) practical benefit: to deepen the comprehension of moral development in upholding the environmental ethics through the fundamental anticipation in dealing with disaster risk prevention. This research adopted a Research and Development (RnD) model by developing VIKOMAFA application as an Android-based video and comic learning media to improve the understanding of natural disaster preparedness for the sixth-term PGSD students of Universitas Peradaban that received Social Science lecture. The study was conducted at the even term in the academic period of 2018/19, precisely from February to August 2019. It featured a Research and Development method. The utilization of VIKOMAFA as the learning source of disaster education is confirmed effective to foster the understanding of disaster preparedness of PGSD students and the understanding of disaster preparedness for the PGSD students of Universitas Peradaban Indonesia.

Keywords: development, VIKOMAFA, Android-Based, Disaster Learning Media

1. INTRODUCTION

Disaster is a familiar issue for the Indonesian people, as Indonesia is a ring of fire zone that stretches from Sumatra to Papua. Therefore, the Indonesian people should be ready to face the probability of natural disasters. The responsibility to raise public awareness about natural disasters should not only be perceived as the government's duty but also the inclusion of synergy from all components of the nation. The strategic roles of the academicians and enforcement of communal resilience are urgently demanded. In early 2018, natural disasters occurred in some regions of Indonesia, including Brebes, Central Java that experienced two types of hydrometeorological disasters, including landslides and floods. The landslides occurred in the southern part of Brebes, which precisely was in Pasir Panjang Village, Salem

District. Meanwhile, the floods occurred in several sub-districts, including Brebes, Jatibarang, and Bumiayu.

Disaster is a serious disruption that attacks the life of a society and causes major losses on people, materials, economy, and environment; exceeding the capability of the victims to deal with the damages through their resources (ADRRN, 2009). With regards to the issue conveyed by ARRN, floods and landslides were two disasters that could cause serious disturbance in Brebes. Therefore, the community must foster their understanding of disaster management through education. Disaster education can cover several strategies, including through the integration with the curricula of tertiary education. The concept of disaster education was firstly campaigned through the Hyogo Framework for Action, as part of the *use of knowledge, innovation, and education to build a culture of safety and resilience at all levels*. More recently, the 2006-7 UNISDR campaign on *Disaster Risk Reduction Begins at School* aimed to promote the integration of disaster risk reduction into the government's initiatives in organizing the education curricula and ensure the safety of school buildings from the impacts of natural hazards (W. B. UNISDR, 2009). Disaster awareness is an effort to reduce the risk and danger of disasters in the life of a community (Fahri, Sudibyakto, & Hadmoko, 2012). The implementation of disaster awareness must be carried out by all lines, including the

Higher Education (colleges, institutes, academies, and universities).

Universitas Peradaban is a Higher Education institution located in Brebes Regency, which is precisely in Paguyangan Sub-District. The institution is around four years of age, yet saves various excellent records in terms of gaits and competencies at the national level. Universitas Peradaban has several departments, including the Primary School Teacher Training Education (*Pendidikan Guru Sekolah Dasar – PGSD*) Department, which offers the focus of social studies (Susanto, 2014). The department prepares the students to develop their competencies to share their roles in society through several ways, including 1) the application of knowledge, technologies, and/or art in teaching and learning activities at the primary school level (Pramono, 2013); 2) the development of beneficial learning process for the primary school level; 3) the development of problem-solving capability based on the research, in an attempt to improve the learning quality; and 4) the responsibility to work as primary school educators. With regards to the background of the study, this research discusses a coverage related to the development of Android-based video and comic application as the disaster learning media (VIKOMAFA) for the PGSD students of Universitas Peradaban. This research highlights the following problems: 1) How is the development of the Android-based video and comic application (VIKOMAFA) as the source of disaster study, in an attempt to improve the students' understanding of natural disaster preparedness?; and 2) How is the effectiveness of the Android-based video and comic application (VIKOMAFA) to improve the students' understanding of natural disaster preparedness?.

This study aims to reveal the development of Android-based video and comic application (VIKOMAFA) as a disaster learning media to improve the understanding of natural disaster preparedness for the students of Primary School Teacher Training Education (PGSD) Department at Universitas Peradaban, and 2) to discover the effectiveness of VIKOMAFA as the Android-based video and comic application to improve the understanding of natural disaster preparedness for the PGSD students of Universitas Peradaban. This study offers some benefits, including 1) academics benefit: to contribute to knowledge development for public education; and 2) practical benefit: to deepen the comprehension of moral development in upholding the environmental ethics through the fundamental anticipation in dealing with disaster risk prevention.

2. LITERATURE REVIEW

A learning media is perceived as "a means to convey and deliver the learning messages through the organization of plans, in an attempt to create a conducive learning environment where the learners can efficiently and effectively carry out the process" (Y. Munadi, 2013). According to Cheppy, an instructional video is a media that presents the audio-visual features and contains concepts, principles, procedures, and applicative theories to raise the understanding of learning materials. In the Arabic term, media reflects an intermediary line between the sender and the recipient of the messages. The definition is in line with the Association of Education and Communication Technology (AECT) of the United States of America that defined the term as all means to disseminate the information. The use of media in the learning process aims to facilitate a more effective and efficient learning process (Cheppy, 2007). Briefly, a learning media is a means with audio-visual features that contain learning messages to facilitate the learning process, thus the students can achieve their learning objectives.

The learning media universally covers five functions, including a) in terms of attention, to attract the students' attention; b) in terms of affective function, to arouse feelings and emotions, and provoke the level of acceptance or rejection; c) in terms of cognitive function, to help the students to conceive the representation of the objects that they encounter; d) in terms of imaginative functions, to enhance and develop imagination, including the creation of new objects that reflect the future efforts; e) in terms of motivation, to encourage the students in dealing with their learning activities (Y. Munadi, 2013). In addition to the concept of learning media, researchers also took a look at the theories of video-learning media and disaster preparedness. As a learning media, videos present the audio-visual features that consist of concepts, principles, procedures, and applicative theories to raising the understanding of the learning materials (Cheppy, 2007). Based on the previous notions, disaster-based video learning media is an audio-visual media that functions to elevate the public knowledge on disaster management, as an attempt to minimize the losses.

Prastowo (2010.) emphasized the enforcement of comprehensive treatment in dealing with the social impacts caused by the earthquake, in an attempt to encourage the victims to live normally and prevent psychological trauma. The causes of disasters normally come from nature, human activities, or even a combination of both that lead to the damages of living aspects, such as tsunami, landslides, volcanic eruptions, hot mudflow, and post-disaster social riots (Priyambodo, 2009). Many factors can affect the level of disaster preparedness behavior, including a) awareness/education, as a mental preparation that directly or indirectly affects the way of surviving. Knowledge provides answers to various questions that arise in life. Each type of knowledge will answer each type of question in a particular field. To optimize the use of knowledge, people must understand where the questions address and what the exact answers to deal with the questions; b) poverty, as the social cause that leads to ignorance of the environment quality. People that live in poverty and hunger will focus on their personal needs rather than disaster prevention strategies. This factor can potentially lead to theft, robbery, murder, and other social deviations, as the rate of crime will increase in line with the rate of poverty; c) humanity, as a signature human traits, which Chiras in (Neolaka, 2007) mentioned humans as part of nature or natural cycle. As biological creatures, humans are recognized as the regulators or rulers due to their nature of greediness and egocentrism. The lack of disaster awareness also relates to the human nature that desires to be superior in their living environment; d) lifestyle, as the influencing factor to the human behavior that potentially has a damaging impact to the environment due to the consideration that environment exists as the source of joy to exploit. The deviating lifestyles that can cause environmental damages to include hedonism, materialism, consumerism, and individualism (Neolaka, 2007).

According to Prastowo, a disaster management program could cover several priorities, including a) logistics; b) psychological health; c) infrastructures; d) education; e) economic recovery; f) public administration, and g) disaster mitigation. The program is formulated through the compilation of basic public needs during the post-disaster period and consists of emergency response, reconstruction, and rehabilitation. In general, a disaster management program consists of two phases, including emergency response and recovery. The emergency response refers to the acceptance and distribution of logistics, medical and psychological treatment, and reactivation of educational activities. Meanwhile, the recovery phase includes infrastructure management, economic recovery, reactivation of public administration, and disaster mitigation.

The Indonesian Dictionary defines *readiness* as to act, which in English equivalently means *preparedness*. Meanwhile, based on Law Number 24 of 2007 on Disaster Management, the term is defined as a series of activities to anticipate disasters through the organization of appropriate and efficient steps. Differently, the UN-OCHA explained the term *preparedness* as part of pre-disaster activities in disaster risk management based on structural risk analysis. The concept includes the development of overall preparedness strategies, policies, institutional structures, warning systems, and prediction. It also highlights the management of plans in assisting the affected communities through appropriate actions in addressing imminent threats or actual disasters. Simply, communities that grow with disaster preparedness will be able to manage the disaster risks in their environment. This capability is measurable based on their disaster management plans (before, during, and after the disaster), availability of logistics, security and comfort in the community, infrastructures, and emergency systems supported by the knowledge and preparedness, standard operational procedures, and early warning system. The capability also marks by the availability of regular simulations through collective efforts with various parties and policymakers in campaigning the knowledge and practices of disaster management and disaster risk reduction to all citizens as the constituents of public institutions (Konsorsium, 2008).

Critical factors of preparedness as part of the natural disaster anticipation include the knowledge and attitudes of disaster risk management, policies or guidelines of preparedness, emergency response plans, disaster warning systems, and resource mobilization (Raja, Hendarmawan, & Sumardi, 2017). The parameters and indicators to measure the efforts made by the community in developing disaster preparedness management should be determined. A parameter is a minimum standard that qualitatively determines the minimum level of responses. Meanwhile, an indicator is a "marker" that concludes the achievement of the standard. Indicators provide a qualitative measurement to communicate the impact of the program, including its process and methodologies. Meanwhile, the parameter of communal preparedness consists of four aspects (Indiyanto & Arqomkuswanjono, 2012), including a) attitude and action, which covers perception, knowledge, and skills.

The disaster preparedness management aims to enforce the ability of the social members to collectively and responsively deal with the risks of disasters. Therefore, it targets all parts of the society; b) public policy, as a formally legitimate binding decision concurred by the community on the implementation of Disaster Risk Reduction (DRR) through the specification and integration. The public policy will become the basis and guidelines of implementation for all activities related to DRR; c) planning of preparedness, as an effort to effectively and responsively ensure the appropriate actions in dealing with disasters through the integration of regional disaster management systems and adjustment with the local conditions. The products of this plan consist of documents, such as preparedness procedures, emergency/contingency plans, and early warning systems that prioritize the accuracy and local contextuality; d) facilities and infrastructures, including human resources and financing systems in disaster management to ensure public disaster preparedness. Resource

mobilization refers to the ability of the community and stakeholders. As part of the disaster management system, mobilization also receives participation from other stakeholders.

Disaster preparedness for the PGSD students includes the pre-disaster activities in terms of disaster risk management through disaster risk analysis. It implies that all of the students' activities, attitudes, and skills are enforced through the application of disaster learning outcomes by the utilization of android-based videos and comics as the learning media of disaster management.

3. RELEVANT STUDIES

Bartolucci & Magni (2016) through their *Influence Rather than Control: A New Approach for Disaster Education in The Immediate Aftermath of Disaster* shared alternative approaches based on the flowchart of the decision in establishing an education program by considering the adaptability of survivors in increasing disaster preparedness activities. This research applied three different approaches, including two stages of disaster education and one step of disaster video screening. The learning activities that deployed the new approach regarding the disaster study succeeded in influencing the students' reaction to a particular disaster situation. This research provided an evidence-based approach to improve the effectiveness of training, education, and disaster management programs, also, to enhance the adaptability of survivors of disasters.

Havwina et al investigated the correlation of disaster experiences on students' preparedness in dealing with the threat of the earthquake and tsunami. They concluded that the students' preparedness was affected by the internal factors, namely their past experiences of disasters that eventually equipped them with sufficient knowledge about the causes of disasters, characteristics of disasters, and appropriate actions to deal with the impacts of disasters in three periods, including before, during, and after the disasters occurred (Havwina, Mariyani, & Nandi, 2016).

Wang (2016) through *Study on The Context of School-Based Disaster Management* shared the compilation of assessment framework regarding disaster management in schools, which included the concept of scenario management, disaster alertness, psychology on disaster, disaster management roadmap, as well as the integrity and validity of disaster simulations. The research evaluated 35 schools in Taiwan and concluded an adequate level of capability in investment, involvement, and readiness to deal with the disasters. However, the samples generally had yet involved external factors in improving their disaster management performance.

Tatebe & Mutch (2015) through their *Perspectives on Education, Children, and Young People in Disaster Risk Reduction* explained that the perspective of disaster education is related to 1) prevention and planning; 2) disaster management, and 3) focus on education. Their investigation implied that disaster education contributed to the dissemination of relevant knowledge and information about hazards, vulnerabilities, and capacities in dealing with disasters. Disaster education is also associated with long-term communal empowerment to foster the students' disaster preparedness in adjusting themselves to the situation during and after the disasters happen.

The MERC journal titled The Effect of Comic Strips on EFL Reading Comprehension concluded that the use of comic strips had offered a significant effect on the recall of high and low-level texts, either for high proficient and low proficient English learners. A similar study also discussed the use of comics during the learning process (Merc, 2011). Sharpe and Izadkhah through their pilot study on the *Use of Comic Strips in Teaching Earthquakes to Kindergarten Children* stated that children tended to favor the comic strips as an interesting means to help them learn the facts about earthquakes (Sharpe & I., 2014).

This research offers some exclusive features that were not carried out by other previous studies, including 1) the development of an Android-based video and comic learning media (VIKOMAFA) as a means to foster disaster preparedness for the PGSD students. The videos and comics utilized as the learning media are produced as an Android-based application that contains information about disasters, types of natural disasters, characteristics of natural disasters, disaster management, disaster risk reduction, as well as simulations and training in responding the natural disasters; 2) this research involved the PGSD students of Universitas Peradaban as the object of study. Meanwhile, the previous study devoted more focus on the primary and secondary school level; 3) the development and implementation of this research product involved the competent agencies in disaster management, namely the Regional Disaster Management Agency (*Badan Penanggulangan Bencana Daerah* – BPBD). The similarity of the current study with other previous studies is the initiative in providing disaster education and fostering disaster preparedness during and after the disasters happen.

4. METHODS

This research targeted the development of learning media in the form of Android-based videos and comics for the sixth-term PGSD students of Universitas Perdaban and Universitas Muhadi Setia Budi that received a Social Science lecture. This research was conducted during the even term in the academic year of 2018/19, from February to August 2019. It featured a Research and Development method. The Research and Development method emphasizes the creation of products and the evaluation of the products' effectiveness (Sugiyono, 2017). The current research referred to (Fenrich 1997) development model, containing several phases, such as analysis, planning, design, development, implementation, evaluation, and revision. This research developed the following products: 1) Android-based videos as the learning media of disaster management; 2) Android-based comics as the learning media of disaster management; 3) Android-based application to screen the videos and comics about landslides and floods.
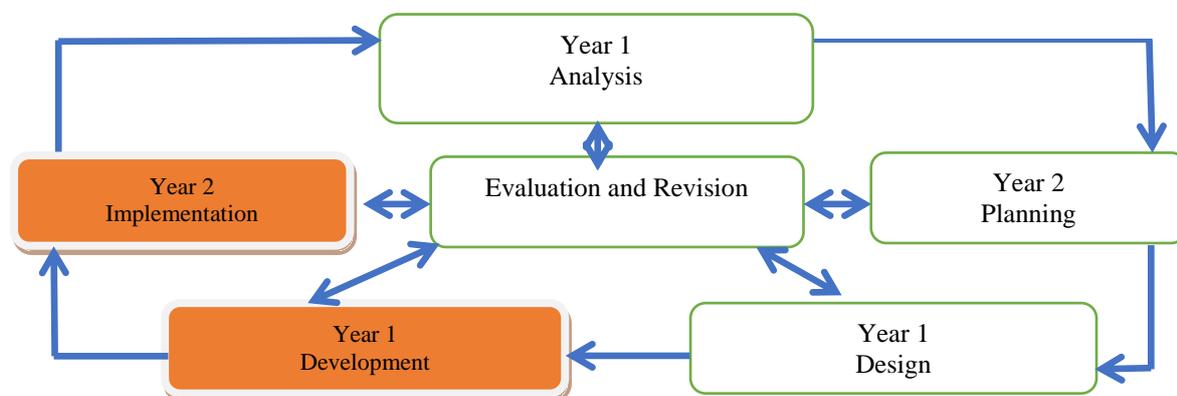

Figure 1 Instructional Development Model (Fenrich 1997)

The figure of the development model represents the development procedures of the VIKOMAFA as an Android-based learning media to foster disaster preparedness for the PGSD students. The instructional development cycle includes some phases, including analysis, planning, design, development, implementation, evaluation, and revision. The evaluation and revision reflect the sustainable activities carried out in every phase of the development cycle. The evaluation of each phase referred to the results that were then revised based on the results of the evaluation and continued to the next phases (Fenrich 1997). The research entered the development phase in the second year, which covered the arrangement of learning materials.

The implementation of VIKOMAFA as a disaster learning media for the PGSD students was expanded in the second year of the research cycle to two universities, namely Universitas Peradaban and Universitas Muhadi Setiabudi in Brebes Regency. Before the implementation phase, a small-scale trial was conducted to assure the feasibility of VIKOMAFA as an Android-based learning media for landslides and floods. The test confirmed the media feasibility for disaster learning. Following the small-scale test, the learning media entered the evaluation and revision phase to improve its quality before its wider implementation as a learning media for social studies. The research organized a trial in the second year to assure the quality of the videos and comics contained in VIKOMAFA, including the learning activities from Chapters 1 to Chapter 4. Following the small-scale trial, VIKOMAFA then proceeded to the implementation phase as a learning media in disaster education for the PGSD students. The effectiveness of the video and comic learning media on VIKOMAFA to foster disaster preparedness for the PGSD students of Universitas Muhadi Setyabudi University was statistically analyzed based on the students' learning outcomes and other relevant variables that also influenced their learning. In the second year of the research cycle, the effectiveness of VIKOMAFA was analyzed using a t-test, in an attempt to compare the gap before and after the learning treatment using VIKOMAFA.

5. RESULTS

The research took place at Universitas Peradaban and Universitas Muhadi Setiabudi. The implementation of the research involved three study groups, including a study group that earned the Social Science lecture at Universitas Muhadi Setiabudi and the other two at Universitas Peradaban. Universitas Peradaban geographically is bordered by a river in the north, the Taraban Village in the south, the paddy fields in the east, and Palm Indah Housing in the west. The institution is located at Pagojengan Street Km. 3, Paguyangan District, Brebes Regency, which the map of the location is attached in the appendix. The university once consisted of two colleges, including Bumiayu Islamic College of Teacher Training and Education and Bumiayu Islamic College of Economics. On 20 October 2015, both institutions were united with a new name, Universitas Peradaban.

Universitas Muhadi Setiabudi is a private university as well as the first university developed in Brebes Regency, Central Java. The institution was founded by Dr. (HC) H. Muhadi Setiabudi based on the Decree of Minister of Education and Culture No. 384/E/O/2012 on 2 October 2012. Universitas Muhadi Setiabudi was inaugurated by the Deputy Governor of Central Java Dra. Hj. Rustriningsih, M. Si. and the Regent of Brebes Regency Hj. Idza Priyanti, A. Md., S.E. on 20 February 2013. The campus area is located at Diponegoro Street Km. 2 Wanasari, Brebes Regency.

The respondents of this study were the PGSD students of Universitas Peradaban and Universitas Muhadi Setiabudi that received the Social Science lecture. The study aimed to measure the effectiveness of VIKOMAFA as a disaster learning media to improve the students' disaster awareness. It adopted a regression data analysis and questionnaire.

The Development of Android-Based VIKOMAFA Application
The initial stage of VIKOMAFA development utilized an offline platform. The development of VIKOMAFA in the form of an offline version was hindered due to the less flexible layout and design as well as the less efficient time of access.

Figure 2 Offline Version of VIKOMAFA

Based on the analysis, the first version (offline version) of VIKOMAFA required a simplification in its operation through the graphic pixel degradation to accelerate its loading session.

MAFA (Online Version)
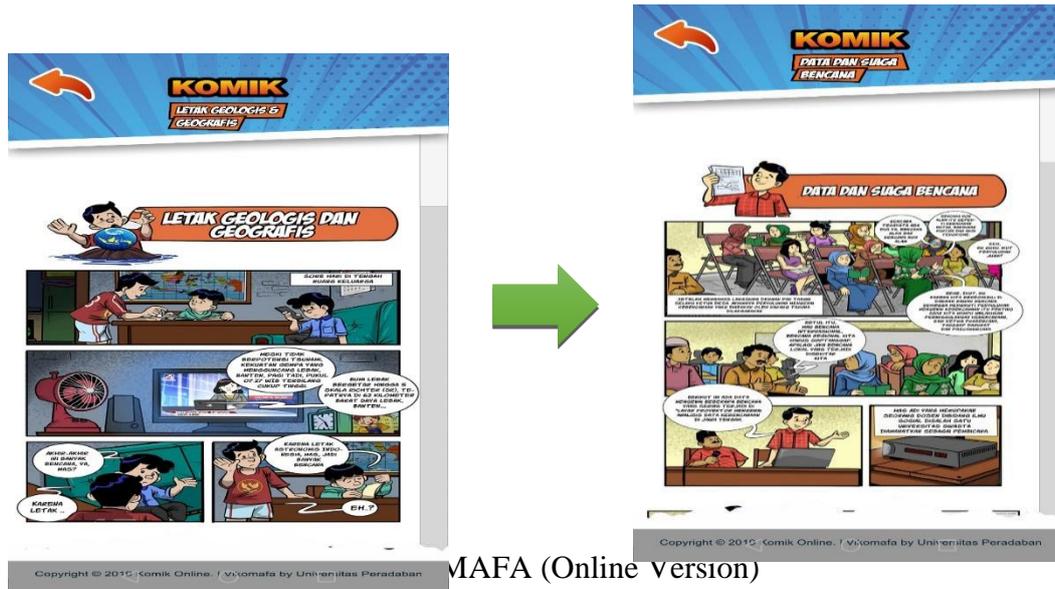
Assessment and Validation of Contents and Animation of VIKOMAFA

Based on the calculation, the value of content validity of the application reached **81.30%**, confirming the feasible utilization of VIKOMAFA without revision. The following diagrams show the content validation of VIKOMAFA.

Table 1. Validation on Contents of VIKOMAFA

| Number	Validation on Contents	Amount
1	Flexibility (major contents of the application)	4.08
2	Clarity and objectives of development	3.75
3	Clarity of the application functions	3.83
4	Coverage of learning materials	3.75
5	Cohesion	4.00
6	Language quality	4.42
7	Compatibility of the language to the target users	4.00
8	Compatibility of output to the indicators	4.08
9	Accessibility	4.67
Total		**36.58**
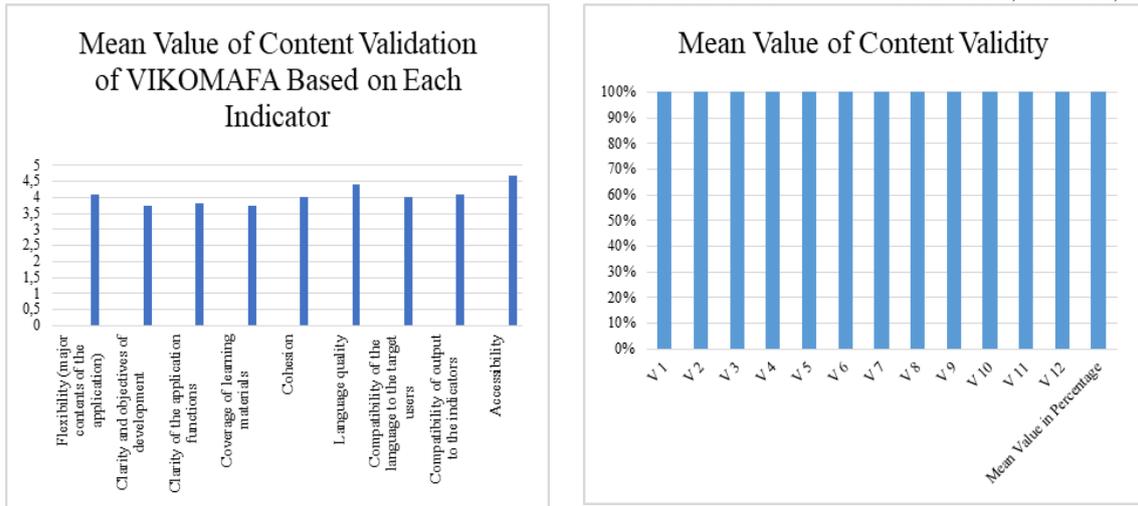
Figure 4 Content Validation of VIKOMAFA

Table 2 Validation of Design and Animation of VIKOMAFA

Mean Value of Expert Validation of Design and Animation	Value
1 Layout and key inputs	4.67
2 Comfortability of background	4.50
3 Comfortability of cover	4.67
4 Comfortability of icons and key inputs	4.58
5 Comfortability of colors	4.00
6 Attractiveness of key inputs	4.17
7 Orderliness and consistency of design	4.08
Total	**30.67**
Percentage	**87.62%**

The calculation showed that the mean value of expert validity regarding the design and animation of VIKOMAFA was **87.62**. It indicated a feasible design and animation of VIKOMAFA for use without revision. The following diagrams show the result of the validation.z

Table 3 Mean Value of Item Validity Related to Design and Animation

Mean Value of Item Validity Related to Design and Animation	
Validator	**Value**
V1	91.43
V2	80.00

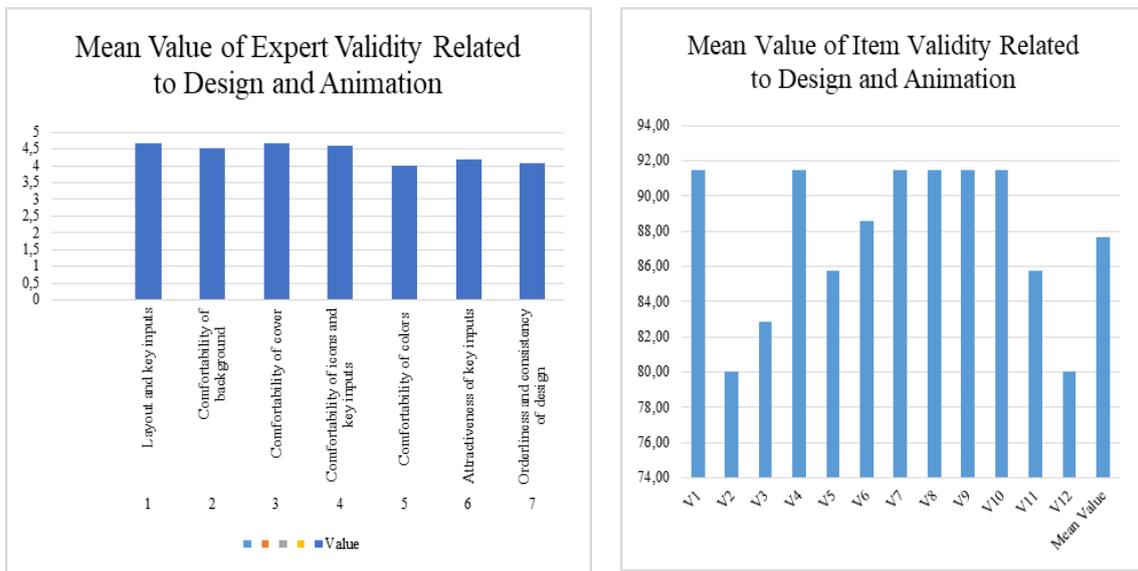| V3 | 82.86 |
V4	91.43
V5	85.71
V6	88.57
V7	91.43
V8	91.43
V9	91.43
V10	91.43
V11	85.71
V12	80.00
Mean Value	**87.62**

Figure 5 Validation of Design and Animation

Based on the Questionnaire Results of the users of VIKOMAFA, three study groups at the experimental phase recorded a mean value of 83.67 in their questionnaire scores. The result, which was higher than 81, confirmed the validity of VIKOMAFA as a learning media.

6. DATA ANALYSIS
Normality Test

Table 4 One-Sample Kolmogorov-Smirnov Test				
		Questionnaire	Pretest	Posttest
N		77	77	77
Normal Parameters[a]	Mean	79.14	75.95	79.79
	Std. Deviation	11.083	11.060	10.421
Most Extreme	Absolute	.121	.109	.141

Differences	Positive	.116	.109	.141
	Negative	-.121	-.106	-.085
Kolmogorov-Smirnov Z		1.057	.952	1.241
Asymp. Sig. (2-tailed)		.213	.325	.092
a. Test distribution is Normal.				

The data are normally distributed if the value of *Asymp. Sig. (2-tailed)* ≥ 0.05. Otherwise, the data do not have a normal distribution. The table confirmed that the data used in this study were normally distributed, as the value of *Asymp. Sig. (2-tailed)* of the questionnaire 0.213 > 0.05, the pretest score 0.325 > 0.05, and the posttest score 0.092 > 0.05.

Simple Linear Regression Test

Table 5 Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	Questionnaire	.	Enter

Notes:
All requested variables entered
Dependent Variable: Posttest
The table signified all the variables on the process, including the independent variable (X) and the dependent variable (Y). The independent variable included the scores of the questionnaire related to the use of VIKOMAFA, while the dependent variable included the posttest scores related to the students' understanding of disaster preparedness.

Table 6 Model Summary				
Model	R	R Square	Adjusted R Square	Std. An error of the Estimate
1	.888[a]	.789	.786	4.824

Predictors: (Constant), Questionnaire

The table summarized the correlation between the independent variable and the dependent variable. The value of R symbolized the correlation coefficient of 0.888. This value implied a significant correlation between the two research variables. The table also signified the value of R^2 related to the regression model based on the interaction of the independent and dependent variable, with a value of 78.9%. The value of R^2 concluded that the variable X had the contributing effect by 78.9% on the variable Y and 20.1% on the other variables. Therefore, VIKOMAFA contributed to the rate of impact by 78.9% in fostering the understanding of disaster preparedness.

Table 7 ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	6507.563	1	6507.563	279.677	.000[a]
	Residual	1745.112	75	23.268		
	Total	8252.675	76			
a. Predictors: (Constant), Questionnaire						
b. Dependent Variable: Posttest						

The table showed the linearity level of the correlation between the two variables, in addition to the significance level or the linearity of regression. The result is determined based on the f-test or significance test, in which the linear regression model is confirmed if the value of F_{calc} ≥ F_{tab}. Based on the calculation, the value of F_{calc} was 279.677, while the value of F_{tab} was 3.96. Thus, the regression model was linear or significant since F_{calc} ≥ F_{tab}. Separately, the significance level (Sig.) test aimed to discover the correlation between variable X and Y, in which the linear regression model is confirmed if the value of Sig. < 0.05. The table signified the value of Sig. (0.000) < 0.05 that implied a significant regression model.

Table 8 Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	13.715	3.989		3.438	.001
	Questionnaire	.835	.050	.888	16.724	.000
a. Dependent Variable: Posttest						

The table generated the following simple linear regression model:
Y   = 13.715 + 0.835 x X
= 13.715 + (0.835 x 0.888)
= 13.715 + 0.741
= 14.456
The calculation of the simple linear regression equation implied that every addition of 1 in the value of VIKOMAFA confirmed an increase by 14.456 in the students' understanding of disaster preparedness. It implied that VIKOMAFA could positively influence the students' disaster preparedness level.

T-Test

Table 9 Paired-Sample Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	75.95	77	11.060	1.260
	Posttest	79.79	77	10.421	1.188

The table signified the average scores of pretest and posttest related to disaster preparedness. The pretest score was 75.95, while the posttest score was 79.79.

Table 10 Paired-Sample Correlation				
		N	Correlation	Sig.
Pair 1	Pretest & Posttest	77	.941	.000

The table signified the correlation between the pretest and posttest scores related to disaster preparedness, in which the correlation value reached 0,941. It indicated a significant relationship between the pretest and posttest scores. The conclusion referred to the previous coefficient of determination table.

Table 10 Paired-Sample Test									
		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Pretest − Posttest	-3.844	3.752	.428	-4.696	-2.992	-8.989	76	.000

The table signified the value of *Sig. (2-tailed)* to define the significance between the pretest and posttest scores related to disaster preparedness. The significance is confirmed if the value of *Sig. (2-tailed)* ≤ 0.05. Based on the calculation, the value of *Sig. (2-tailed)* signified 0.000 < 0.05. It implied a significant difference between the pretest and posttest scores of the sixth-term PGSD students of Universitas Peradaban and Universitas Muhadi Setia Budi in terms of disaster preparedness.

7. CONCLUSION AND RECOMMENDATIONS

This research adopted a Research and Development (RnD) model by developing VIKOMAFA application as an Android-based video and comic learning media to improve the understanding of natural disaster preparedness for the sixth-term PGSD students of Universitas Peradaban that received Social Science lecture. The study was conducted at the even term in the academic period of 2018/19, precisely from February to August 2019. It featured a Research and Development method. The utilization of VIKOMAFA as the learning source of disaster education is confirmed effective to foster the understanding of disaster preparedness for the PGSD students of Universitas Peradaban and the understanding of disaster preparedness for the PGSD students of Universitas Peradaban Indonesia.

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