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The effectiveness of the development of multi-platforms-based disaster risk reduction learning media to manifest *Sekolah Siaga* COVID-19

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Article Info

Abstract
School closures during COVID-19 are predicted to impact the quality decrease of graduates in the future permanently. This condition is exacerbated by the lack of public awareness of disaster risk reduction (DRR). Moreover, Disaster risk reduction management must be a priority agenda for all parties. The reactive response needs to be shifted to a proactive response to make the impact more effective. Proactive management of disaster risk reduction requires more participation from various institutions, such as government, non-government and private, and public participation. This training aims to improve teachers' knowledge, skills, and attitude toward using multi-learning platforms. The training effectiveness is measured by the gain normality test of one group pre-test and post-test design applied in research syntax to 22 students. The study results in that 1) training can improve teachers' knowledge, skills, and attitude to integrate non-natural disaster risk reduction in learning with an average of 0,33 N-Gain increases in the medium category. 2) training can improve teachers' knowledge, skills, and attitude to integrate learning multi-platforms, which increases N-Gain of 0,59 in the medium category. This research, in this regard, recommends that school is likely a place to develop a sustainable, structured, and systematic COVID-19 disaster risk reduction program.

Keywords: Learning media, multi-platforms, non-natural disaster, responding to COVID-19

Introduction
The latest more than 2 years COVID-19 outbreak has caused school closures for a long period. The uncontrolled cases of COVID-19 transmission have caused some children to be vulnerable to social diseases, for which it is necessary to strengthen the coherence of various parties and use an electronic device that responsibly promotes psychosocial well-being during the COVID-19 pandemic [1]. The research results also show that the COVID-19 pandemic impacts lead to anxiety, depression, and trauma in middle school Children [2]. Resiliency and life meaning functioning as mental health protective factors [3, 4].

The school closures during the COVID-19 pandemic are predicted to impact the decreased quality of graduates in the future permanently. Even the society within a particular culture aggravates unsafe traditional practices, such as early marriage [5]. Because COVID-19 is a highly contagious disease [6, 7], the impact of this disease is predicted to run for an extended period. Even if the mitigation fails, it indicates globally that around 7 billion people are infected, and 40 million people have passed away due to COVID-19 [8]. In addition, COVID-19 can decline the student's emotional resilience. Because it significantly takes effect on learning management skills [9], student's emotional resilience decrease furthermore affects student's learning management skills.

This condition is getting worse since public awareness of disaster risk reduction (DRR) is still low, so every disaster happens, and the loss of life and property cannot be neglected [10]. The fall of victims is caused by many factors, such as follows: the constitution of disaster has not significantly shifted from hazard to vulnerability and still focuses on resilience [11], institutional failure [12], Failure to deploy the personnel to handle efficiently and effectively disaster management [13], and no partnership

among stakeholders [14]. People have a vital role in reducing the disaster risk in this Field [15, 16]. Risk reduction management becomes crucial for that risk reduction [15]. Furthermore, disaster risk reduction management must be the priority for all the related parties, either government, non-governmental institutions, and public society. Problems that still happened in disaster risk management during this time are that disaster risk reduction management mostly reactively responds to the existing disaster, not the policy that has been designed systematically and sustainably. Moreover, reactive responses must be shifted to proactive responses to appear the effective impacts. Proactive disaster risk reduction management requires more participation from various institutions, like governments, non-governmental institutions, private institutions, and public participation [16]. Supplementarily, the existing disaster risk reduction management is needed to chain the partnership with various established institutions, has a strategic role in society, and can be accessed by multiple parties. A school is an organization that is most likely being the partnership in implementing the disaster risk reduction management to have sustainable commitments [17]. Several programs have been applied by the former; for instance, O'Sullivan Field [20] attempts to provide a practical mechanism to asses and manage disaster risks by focusing on assurance and prevention. It is significantly related to the software and hardware [18]. Local public participation is essential for the success of the disaster mitigation [19]. Educational institutions are the most reasonable accommodations for developing the program of sustainable, systematic, and structured disaster risk reduction. One of the components to be essentially set currently is the development of learning media using information technology advancement by considering that the characteristics of the current students are the native digital generations in which they will have the optimal learning experience if learning is utilized digital device [20, 21, 22]. The COVID-19 disaster risk reduction requires the involvement of multi-disciplined research, planning, training, and communication [23]. It can reduce the adverse effects of COVID-19 when online learning is planned well [24]. These school-based resilient programs can still make teachers and students grow [25].

The data shows that most schools have no preparations to deal with COVID-19. Teacher resilience to deal with this is still low [26]. In Indonesia, 69 million students face the risk of significant *learning loss* during school closures [27], and are predicted to widen the gap of learning inequality. On the other side, it has been found that adequate cases that teachers solely teach throughout school closures [23]. Teachers' learning packages, the used media, and the communication run by them have affected the student learning resilience [28]. The service team focused on SD Muhammadiyah Girikerto Sleman and SD Muhammadiyah Wonokromo 1 Bantul as the partnership of the service team. These two schools are located relatively far from the urban area. SD Muhammadiyah Girikerto is located in the slope area of Mount Merapi in Sleman Regency, which is 30 KM far from Universitas Ahmad Dahlan. This school is also involved in one of the schools of disaster-safe education units in Sleman Regency. During COVID-19 pandemic, the learning was run mainly by the WA group and limited face-to-face learning. As seen from the teacher competence, they have teachers who are sufficiently motivated to learn, and the access and opportunity to learn otherwise still require to be increased

(interview with the principal). Likewise, SD Muhammadiyah Wonokromo 1 Bantul. This school is located in one of the villages on the edge of East Imogiri street, 6, 8 KM from Universitas Ahmad Dahlan. This school is one of the schools which potentially develop in Bantul Regency. Still, this school's human resources (teachers and educational personnel) need to master the skills related to information technology to conduct learning. During COVID-19 pandemic, education was mainly carried out through WA group of class, limited face-to-face learning, and assignments (interview by the principal). According to the interview results with the principals and observations of the partnered schools, it has found out the urgent issues that need to be solved are as follows:

1. Education for disaster risk reduction only focuses on natural disasters; no education for disaster risk reduction focuses on non-natural disasters (such as COVID-19).
2. It has twice conducted training related to disaster risk reduction held by BPPD and YEU, but still no follow-up assistance.
3. The interventions from other institutions have been carried out, but none has focused on DRR in schools, only if a disaster occurs, especially for natural disasters. Therefore, the education aspect has not been reached yet.
4. Education, as a transfer of knowledge and values, is moreover needed to design engaging media and methods.
5. The existing media is about disaster preparation tools and contingency plans. At the same time, the media that can be integrated into online learning does not yet exist.
6. There has not yet been training on the awareness to encounter the COVID-19 pandemic.

According to the description of analysis results toward the issues, it has obtained the situation and condition of the partnered school, which can be categorized into common issues and partner problems, as follows: Numerous DRR training has been attended by teachers at partner schools but is limited to reducing the risk of natural disasters, while non-natural DRR training, especially the handling of COVID-19, is still very limited. Meanwhile, particular issues faced by the partner school are as follows:

1. Teachers in partner schools do not yet understand the theory of multi-platforms-based DRR learning media.
2. Teachers at partner schools do not yet have the skills to integrate the COVID-19 health protocol into multi-platforms-based DRR media.
3. Teachers at partner schools do not yet have the skills to develop multi-platforms-based online learning media.
4. There has been no assistance from the experts in implementing multi-platforms-based DRR media in online learning.
5. There is no readiness of partner schools to be pilot schools for COVID-19 alerts.

Research Hypotheses
1. There are differences in the pre-test and post-test results on the aspects of teacher knowledge, skills, and attitudes in integrating Non-natural Disaster Risk Reduction in learning.
2. There are differences in the pre-test and post-test results on aspects of teacher knowledge, skills, and attitudes in integrating multi-platforms learning media learning.

Materials and Methods
Research Design
The research design uses quantitative pre-experimental one-group pre-test and post-test design. The developed model is training multi-platforms-based disaster risk reduction learning media to embody *Sekolah Siaga Bencana* (Schools based disaster preparedness) with the training syntax described in Table 1.

Table 1: Training Syntax

Training Steps	Description
Step 1	The urgency of multi-platforms learning media to embody *Sekolah Siaga Bencana* (Schools based disaster preparedness)
Step 2	The implementation of unnatural disaster risk reduction using multi-platforms learning media
Step 3	The developmental practice of Visual and Poster media
Step 4	The use of Augmented Reality integrated in multi-platforms-based learning media in the elementary schools
Step 5	The assistance in implementing multi-platforms learning media to embody *Sekolah Siaga Bencana* (Schools based disaster preparedness)

Research Sample
A sampling used a purposive sampling approach following the process of sample selection. The samples of this study were 20 teachers and 2 principals of SD Muhammadiyah Girikerto dan SD Muhammadiyah Wonokromo I. The research samples contained 2 males and 20 females under the range within 1-5 years of instructional experience.

Data Collection Technique and Instruments
The training data was collected through pre-test and post-test questionnaires, which referred to three aspects; knowledge, attitude, and skills in every item of pre-test and post-test questionnaires. A questionnaire referred to the *Likert* scale under the 1-5 scale. The items of these questionnaires are described in Tables 2 and 3.

Table 2. Item Questionnaire of Teacher Readiness in Integrating Unnatural Disaster Risk Reduction in Learning

No.	Aspects	Statements
1		I know the disaster threat potential caused by the COVID-19 outbreak
2		I know the impact of the disaster caused by COVID-19 outbreak in my school environment
3	Knowledge	I know the right disaster mitigation step to reduce the risk of COVID-19 outbreak in my school
4		I know the evacuation step while some school residents are infected by COVID-19
5		I understand the importance of the integration of COVID-19 disaster risk reduction in learning
6		I realize the importance of the integration of COVID-19 disaster risk reduction in learning
7		I accept that COVID-19 is a disaster which must be supposedly addressed properly
8		I familiarize students to have a responsive attitude to the potential transmission of the COVID-19 outbreak
9		I believe that teachers have tasks to give students an understanding on the COVID-19 disaster risk reduction
10	Attitude	I believe in the importance of improving self-capacity, as teacher to conduct learning, to be responsively to COVID-19 disaster
11		I encourage peers to integrate the COVID-19 disaster risk reduction in-class learning
12		I believe that the COVID-19 transmission potential can be reduced if teachers integrate disaster risk reduction in-class learning
13		I can develop an integrated lesson plan with COVID-19 Disaster Risk Reduction in learning
14		I can identify core Competencies-Basic Competencies in lesson contents that can be integrated with COVID-19 Disaster Risk Reduction
15		I can develop learning objectives that are integrated with COVID-19 Disaster Risk Reduction
16		I can develop learning steps that integrate COVID-19 Disaster Risk Reduction
17	Skills	I can utilize multi-platforms-based learning resources that are integrated with COVID-19 Disaster Risk Reduction
18		I can develop integrated multi-platforms-based learning media with the COVID-19 disaster risk reduction in students
19		I can disseminate the products of multi-platforms-based learning media integrated with the COVID-19 disaster risk reduction in students
20		I can conduct assessments that are integrated with the COVID-19 disaster risk reduction
21		I can arrange assessment instruments that are integrated with the COVID-19 disaster risk reduction

Table 3. Item Questionnaire of Teacher Readiness to Utilize Multi-Platforms Learning Media

No.	Aspects	Statements
1		Canva and Augmented Reality help me in teaching
2	Usefulness	Canva and Augmented Reality give the opportunity to be productive to teach
3		Canva and Augmented Reality improve digital competence according to 21st century learning
4		Canva and Augmented Reality is useful to make innovative visual media
5		I find it easy to use Canva and Augmented Reality
6		The features or menus of Canva and Augmented Reality are adequately simple to use
7		The activity on Canva and Augmented Reality menu is familiar to use
8		The utilized Canva and Augmented Reality is flexible
9	The ease of the use	No need a hard attempt to understand the use of Canva and Augmented Reality
10		Canva and Augmented Reality is still able to use though the application guidance is disappeared
11		I am delighted to use Canva and Augmented Reality for school activities inside or outside
12		I am able to adapt quickly and easily when something went wrong with Canva and Augment Reality.
13		I can utilize Canva and Augmented Reality every time without barriers

14	The ease of learning	I can immediately learn materials used in Canva and Augmented Reality
15		I can easily remember how to operate Canva and Augmented Reality
16		I can easily utilize the menu on Canva and Augmented Reality
17		I can immediately master how to operate Canva
18		I can immediately master how to operate Augmented Reality
19	Satisfaction	I am satisfying with the use of Canva and Augmented Reality
20		I can inform my friends that this application is useful for learning
21		Using Canva and Augmented Reality is interesting for me
22		With Canva and Augmented Reality, I can properly conduct the instruction
23		Canva and Augmented Reality foster interests in learning
24		I am delighted to get a training and guidance regarding the use of Canva and Augmented Reality
25		Learning with Canva and Augmented Reality is comfortable for every learning situation

Data Analysis Technique

The effectiveness of training can be measured by using the Gain normality test with one group pre-test and post-test design applied by training syntax, which is intervened to 22 students. Pre-test and post-test results are analyzed using the Gain normality test. This test is used to examine the effectiveness of the used treatment, along with the following formula:

$$N\ Gain = \frac{S_{post} - S_{pre}}{S_{maks} - S_{pre}}$$

Description

N-Gain states the results of the Gain normality test
S_{post} states pre-test scores
S_{pre} states post-test scores
S_{maks} states maximal scores

The distribution of gain scores is described in Tables 4 and 5

Table 4: The Distribution Gain Scores

N-gain Score	Category
g > 0,7	High
0.3 ≤ g ≤ 0.7	Medium
G < 0,3	Low

Source: (Syahfitri, 2008)

Table 5: The Category of N-gain Effectiveness Interpretation

Percentage	Interpretation
< 40	Not effective
40-55	Less effective
56-75	Sufficiently effective
>76	Effective

Source: (Hake, 1999)

Results

Hypothesis 1. There are differences in the results of the pretest and post-test aspects of teacher knowledge, skills, and attitudes in integrating Non-natural Disaster Risk Reduction in learning. The hypothesis test uses the Gain normality test with one group pre-test and post-test design. This test is used to examine the effectiveness of the used treatment. The results of hypothesis test 1 are described in Table 6.

Table 6: The Results of Hypothesis Test 1

Respondents [R1-R14]	Pre-test	Post-test	post-pre	Ideal pre-score	N gain score	N gain score %
1	72	73	1	33	0.03030303	3.03030303
2	72	76	4	33	0.12121212	12.1212121
3	78	80	2	27	0.07407407	7.40740741
4	84	82	-2	21	-0.0952381	-9.5238095
5	72	84	12	33	0.36363636	36.3636364
6	73	95	22	32	0.6875	68.75
7	82	87	5	23	0.2173913	21.7391304
8	79	79	0	26	0	0
9	64	93	29	41	0.70731707	70.7317073
10	66	92	26	39	0.66666667	66.6666667
11	82	94	12	23	0.52173913	52.173913
12	76	92	16	29	0.55172414	55.1724138
13	71	71	0	34	0	0
14	68	97	29	37	0.78378378	78.3783784
Average	74.2142857	85.3571429	11.1428571	30.7857143	0.33072211	33.0722114

The average results increase with an N-gain score of 0,33 under the medium category, as described in Chart 1. It shows that the first hypothesis is accepted, so it further concludes that a developed training model can improve the aspects of knowledge, skills, and attitude of teachers in integrating non-natural disaster risk reduction in learning.
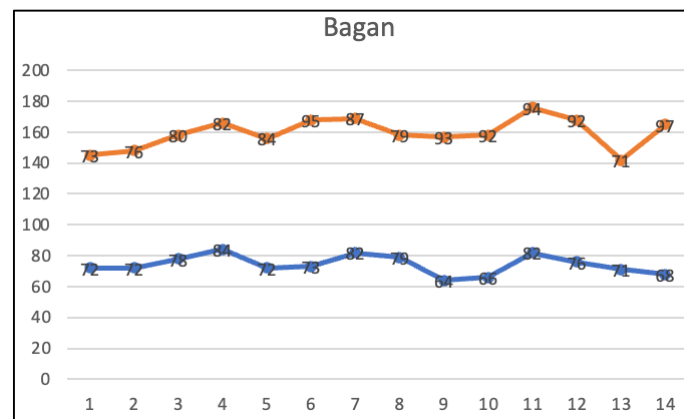
Fig 1: The results of the increase in pre-test and post-test hypothesis test 1

Hypothesis 2. There are differences in the results of the pretest and post-test aspects of teacher knowledge, skills, and attitudes in integrating multi-platforms learning media in-class learning.

The hypothesis test is conducted by using the Gain normality test with one group pre-test and post-test design. This test is used to examine the effectiveness of the used treatment. The results of hypothesis test 1 are described in Table 7.

Table 7: The Results of Hypothesis Test 2

Respondents [R1-R14]	Pre-test	Post-test	Difference Values of post-test-pre-test	Ideal Scores- pre-test-post-test	N gain score	N gain score %
R1	56	81	25	44	0.56818182	56.8181818
R2	74	100	26	26	1	100
R3	70	78	8	30	0.26666667	26.6666667
R4	54	78	24	46	0.52173913	52.173913
R5	61	83	22	39	0.56410256	56.4102564
R6	72	85	13	28	0.46428571	46.4285714
R7	56	75	19	44	0.43181818	43.1818182
R8	75	96	21	25	0.84	84
R9	64	96	32	36	0.88888889	88.8888889
R10	76	76	0	24	0	0
R11	74	84	10	26	0.38461538	38.4615385
R12	58	91	33	42	0.78571429	78.5714286
R13	75	91	16	25	0.64	64
R14	77	96	19	23	0.82608696	82.6086957
R15	50	99	49	50	0.98	98
R16	54	77	23	46	0.5	50
R17	50	69	19	50	0.38	38
Average	64.4705882	85.5882353	21.1176471	35.5294118	0.59071174	59.0711741

The average results increase with an N-gain score of 0,59 under the medium category, as described in Chart 2. It shows that the second hypothesis is accepted, concluding that a developed training model can improve teachers' knowledge, skills, and attitude in integrating multi-platforms learning media in-class learning.
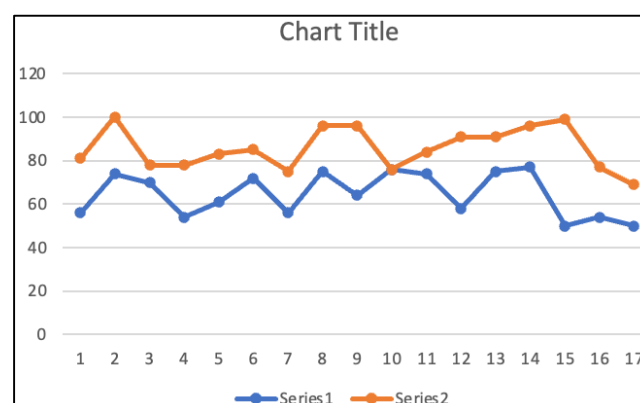

Fig 2: The results of the increase in pre-test and post-test hypothesis test 2

Discussion

Data analysis results show that a developed training model can 1) improve teacher knowledge, skills, and attitude in integrating non-natural disaster risk reduction in learning and 2) improve teacher knowledge, skills, and attitude in integrating multi-platforms-based learning media in-class learning. Both increase in the medium category. With these models, teacher knowledge, skills, and attitude effectively improve. A training model on the development of multi-platforms-based disaster risk reduction learning media to create *Sekolah Siaga Bencana* (Schools based disaster preparedness) is a model that is developed as an attempt to increase teacher competence in carrying out learning responding to the non-natural disaster.

The main target of developing this model is to improve teacher knowledge, attitude, and skills in implementing COVID-19 disaster response-based learning. With the increasing teacher competence in conducting disaster-responsive education, students in schools have a greater sense of disaster. Hence, the potential to save themselves and help others when a disaster occurs is more significant. This model is critical to offer solutions to the gaps in disaster risk reduction, either no partnership among stakeholders [13], failure to assign the personnel to respond to the disaster efficiently and effectively [12], or disaster risk reduction that solely respond reactively toward the existing disaster situations (being responsive to emergency and recovery). By involving schools, especially in improving teacher knowledge, skills, and attitude, reactive responses can be changed into proactive responses to increase management effectiveness and decrease victim falls. Proactive disaster management requires more participation from various parties, such as governmental institutions, non-governmental institutions, private institutions, and public participation [15].

Conclusion

This research aims to measure the effectiveness of the training model to develop multi-platforms-based disaster risk reduction learning media to manifest *Sekolah Siaga Bencana* (Schools based disaster preparedness). Data analysis shows that the developed model effectively improves teacher knowledge, skills, and attitude, which is signed with the post-test result increase in the medium category. Moreover, the training held by UAD Community Partnership Program Grant Team successfully improves teacher knowledge, skills, and attitude in utilizing multi-platforms-based learning to embody Sekolah Siaga Bencana (School-based disaster preparedness). The Training Model for developing Multi-Platforms-Based Disaster Risk Reduction Learning Media is highly recommended for schools to increase teacher knowledge, skills, and attitude in implementing COVID-19 disaster responsive learning. The research result also affirmed that schools would likely become an accommodation to develop sustainable, systematic, and structured disaster risk reduction programs for the COVID-19 outbreak.

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