



Development of Digital Pocket Book for Disaster Mitigation Materials *Coronavirus Disease 2019 (COVID-19)* to Increase Student Resilience to Disasters

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Received: 5 Januari 2022 Revised: 10 Februari 2022 Accepted: 18 April 2022

Abstract

Entering the beginning of 2020 there was an extraordinary phenomenon, namely the outbreak of the *Coronavirus Disease* (COVID-19) which attacked almost all parts of the country in the world. The COVID-19 pandemic disaster causes mild respiratory infections to severe respiratory infections such as pneumonia and the greatest risk can cause death and other negative impacts, including increasing stress and anxiety in individuals. The individual's capacity to deal with and reduce stress and anxiety can arise from having resilience. The importance of increasing student resilience in efforts to mitigate the COVID-19 disaster through education is very necessary because schools are an effective means of conveying information. Submission of learning about the dangers of COVID-19 mitigation can be delivered through a learning process with innovative learning media. Based on the results of observations in one high school in Bogor City, it was found that the level of student resilience is still relatively low, namely 56%. The purpose of this study was to determine the effect of digital pocket books on COVID-19 disaster mitigation materials in increasing student resilience to disasters and to determine the effectiveness of digital pocket books on COVID-19 disaster mitigation materials. The research was conducted using the *Research and Development* using the ADDIE model (*analyze, design, development, implementation, evaluation*). The population in this study were students of class XI MIPA 2 with a sample of 29 students. The population in this study were students of class XI MIPA 2 with a sample of 29 students. The results showed that digital pocket books were able to increase students' resilience to disasters included in the medium category. In conclusion, that based on the responses of teacher and student, the learning media has an effectiveness that is included in the high category.

Keywords: Digital Pocket Book; COVID-19 Disaster Mitigation; Resilience;

INTRODUCTION

Entering the beginning of 2020 there was an extraordinary phenomenon, namely the outbreak of the *Coronavirus Disease* (COVID-19) which attacked almost all parts of the country in the world (Hairi, 2020). The virus that causes COVID-19 is *Severe Acute Respiratory Syndrome*

Coronavirus 2 Sars-CoV-2 originating from Wuhan, Hubei Province, China (Ciotti *et al.*, 2020). WHO (*World Health Organization*) or the World Health Organization on March 12, 2020 announced that COVID-19 became a global pandemic disaster after the number of infected individuals worldwide reached more than 121,000 cases. pandemic is an epidemic that spreads simultaneously over a large geographic area. Indonesia reported its first case of COVID-19 on March 2, 2020, starting with 2 positive cases and the number continues to grow to date. In response to the increase in COVID-19 cases, the government issued Presidential Decree Number 12 of 2020 concerning the Designation of Non-Natural Disasters for the Spread of *Coronavirus Disease 2019* (COVID-19) as a National Disaster (Kemenkes RI, 2020). According to Al-Quteimat & Amer (2020) there are various negative effects caused by the spread of COVID-19 in various countries. The typical symptoms of COVID-19 are fever, cough, shortness of breath, muscle aches, acute respiratory distress, pneumonia and the highest impact can cause death.

Disasters are events or series of events that threaten and disrupt people's lives and livelihoods caused by natural factors or non-natural factors as well as human factors that result in human casualties, environmental damage, property losses and psychological impacts (Noor, 2014). Disaster is a phenomenon that occurs because the components that trigger threats and vulnerabilities work together systematically, so that the risks that will be faced can be estimated (Yudiawan, 2020). Natural disasters are events caused by nature such as earthquakes, tsunamis, volcanic eruptions, and others. Meanwhile, non-natural disasters are disasters caused by events or a series of events caused by non-natural causes, among others; failed technology, epidemics, pandemics, failed modernization and disease outbreaks. Disasters in this case are emphasized on non-natural disasters, namely the COVID-19 pandemic outbreak. impact on the deteriorating level of public health (Wekke, 2021).

Disaster mitigation is a series of activities carried out before a disaster occurs and focuses on reducing the impact and readiness in an effort to minimize the impact of disasters in the long term. Disaster mitigation aims to improve community preparedness and reduce disaster risk such as reducing the number of fatalities (Hasanah *et al.*, 2016). Mitigation is a disaster risk prevention and management action taken to minimize the risk of a disaster occurring. Prevention actions are oriented towards efforts that can be taken before a disaster occurs (pre-disaster). Countermeasures are oriented towards efforts that can be taken when a disaster occurs and after the disaster has passed (post-disaster) (Darmawan & Sukmawati, 2020). According to Rusilowati & Binadja (2012), disaster mitigation is an effort to minimize or limit the adverse impacts caused by a hazard or disaster.

Resilience is the resilience possessed by individuals, groups, or communities that allow them to face, prevent, minimize and even eliminate the adverse effects of unpleasant conditions, or even change the conditions that include them into something natural to overcome. Resilient individuals will be able to take a positive meaning from the events they experience and even be able to make themselves better (Mayasari, 2014). This is in accordance with the theory of Sari *et al.*, (2019), resilience is an individual's ability to face and cope with the difficulties and pressures of life adaptively and be able to survive in difficult conditions and be able to learn from them. Resilience is very much needed for students because by having high resilience, students will be able to manage themselves and be able to survive and adapt even though they are faced with various difficult conditions such as facing the COVID-19 pandemic disaster. According to Voropai & Rehtanz (2019), resilience is an individual's adaptive ability to deal with disruptive changes or events by reducing the negative impacts that can occur.

Resilience is an individual's capacity to respond to everything in a healthy and productive manner when facing difficulties or trauma, where it is important to manage the pressures of everyday life and a set of thoughts that allow for seeking new experiences and viewing life as progress (Satria & Sari, 2017).). The importance of increasing student resilience in efforts to mitigate the COVID-19 disaster through education is very necessary because schools are an

effective means of conveying information. To provide students' understanding of COVID-19 disaster mitigation, it can be done through integrated learning in several subjects. One of the subjects that can be integrated with the COVID-19 disaster material is Biology lessons on respiratory system material. Submission of learning about the dangers of COVID-19 mitigation can be delivered through a learning process with innovative learning media. Based on the results of observations in one high school in Bogor City, it was found that the level of student resilience is still relatively low, namely 56%.

Based on the results of observations in a private high school in the city of Bogor, it was found that the level of student resilience is still relatively low, namely 56%. Teachers have used various learning models, but in using learning media the teacher only develops *power point slides* so that it does not support learning in the digital era. Efforts regarding COVID-19 disaster mitigation materials have also never been conveyed by teachers to students. The solution that can be done to overcome these problems is to utilize technology. One of the learning media that can support learning in the digital era is a digital-based pocket book. The digital pocket book is attractively designed with various supporting features such as pictures, videos, and audio. The selection of pocket book media in digital form is adapted to the development of science and technology (IPTEK) in the world of education which aims to improve the quality of 21st century education (Hafizhasando et al., 2021).

This study aims to determine the effect of digital pocket books on COVID-19 disaster mitigation materials in increasing student resilience to disasters and to determine the effectiveness of digital pocket books on COVID-19 disaster mitigation materials.

METHOD

The research was carried out in a private high school in Bogor City from June to July 2021. The population in this study were class XI students and the sample selected was class XI MIPA 2, totaling 29 students. This research method is Research and Development. The research model used is ADDIE (Analyze, design, development, implementation, evaluation).

1. Analyze

The analysis phase is carried out to analyze the requirements and feasibility that need to be considered in developing learning media. The analysis process is carried out by asking questions about: (1) whether the learning media used are able to overcome the problems encountered, (2) whether the existing facilities support the learning media to be applied, (3) whether the educators are able to apply the new learning media, (4) is there any enrichment regarding COVID-19 disaster mitigation? After finding answers to these questions, the requirements and feasibility of developing learning media will be obtained.

2. Design

At this stage, it begins by designing the initial format of a digital pocket book as a learning medium which is dominated by attractive images and colors and is equipped with various supporting features such as an info corner which is designed systematically and attractively in order to achieve the expected goals.

3. Development

At this stage, design the initial format and attractive layout to make it easier for students to understand the material in digital pocket books. Each material in the digital pocket book is equipped with supporting images to support the material presented. The result of this initial design stage is a draft digital pocket book that will be tested on a team of validation experts (material experts and media experts). The media validation test was carried out by one expert and the material content validation test was carried out by two experts. Expert validation aims

to determine the feasibility of digital pocket book learning media for COVID-19 material to be used in research in the field.

4. Implementation

At this stage, design the initial format and attractive layout to make it easier for students to understand the material in digital pocket books. Each material in the digital pocket book is equipped with supporting images to support the material presented. The result of this initial design stage is a draft digital pocket book that will be tested on a team of validation experts (material experts and media experts). The media validation test was carried out by one expert and the material content validation test was carried out by two experts. Expert validation aims to determine the feasibility of digital pocket book learning media for COVID-19 material to be used in research in the field.

5. Evaluation

At this stage students and teachers were given a questionnaire to find out the responses of students and teachers regarding the digital pocket book media that had been used. The results of the questionnaire function to determine the effectiveness and practicality of the digital pocket book learning media that has been developed by distributing student response questionnaires and teacher responses to learning media.

RESULT AND DISCUSSION

Digital pocket book that will be tested is validated first by experts. The results of the validation test by media experts can be seen in table 1:

Table 1. Media Expert Validation Results

Indicator	Score for Each Indicator	Maximum Score	Percentage	Criteria
Image in digital pocket book	4	4	100%	Very
Appropriate Use of sentences	7	8	87.5%	Very
Appropriate Conformity font size	4	4	100%	Very Eligible
Image size suitability	3	4	87.5%	Very
Appropriate layout	4	4	100%	Very
Appropriate Use of attractive images	4	4	100%	Very Eligible
Easy-to-read typeface	12	12	100%	Very Eligible
Combination of text	3	4	87.5%	Very Eligible
Color match	4	4	100%	Very Eligible
Overall Score	(45:48) x 100% = 94%			
Criteria	Very Eligible			

Based on the results of media expert validation, it is known that the nine digital pocket book assessment indicators have very decent criteria because has a percentage value of > 80%, meaning that the digital pocket book learning media is feasible for field trials.

Aspects assessed by material experts are aspects of language, feasibility and presentation. The results of the material expert validation can be seen in table 2.

Table 2. The results of the Validation of the Material Expert

Validator	Aspect assessed		
	Content	Language	Presentation
1	12	18	7
2	12	18	7
Total Score	24	36	14
Maximum Score	32	40	16
Percentage	75%	90%	87.50%
Criteria	Sufficiently Eligible	Very Eligible	Very Eligible
Overall Score		(74:88) x 100% = 84%	
Criteria		Very Eligible	

To determine the value of students' resilience to disasters, an assessment was carried out using a questionnaire. The results of the student resilience questionnaire can be seen in table 3.

Table 3. Result of Student Resilience Questionnaire Against Disaster

Aspect	Number of Items	Total Score Obtained	Maximum Score for Each Aspect	Percentage	Category
1. Emotional regulation	3	259	435	60%	Moderate
2. Drive control	5	503	725	69%	Moderate
3. Optimism	4	395	580	68%	Moderate
4. Empathy	4	423	580	73%	Moderate
5. Self-efficacy	6	618	870	71%	Moderate
6. Achievement	4	302	580	71%	Moderate
7. Causal Analysis	4	378	580	65%	Moderate
Total Score	30	2878	4350		
Overall Score				(2878:4350) x 100 % = 69%	
Criteria	Medium				

From table 3 it can be seen that the resilience value of students after using digital pocket books is in the medium category, with a percentage of 69%. The highest percentage is found in the aspect of empathy by 73% and the lowest aspect is found in the regulation of emotions by 60%.

To find out the effectiveness of digital pocket book learning media, it can be seen through teacher response questionnaires and student response questionnaires after using the developed learning media. The results of the teacher's response questionnaire and student responses can be seen in Figures 1 and 2.

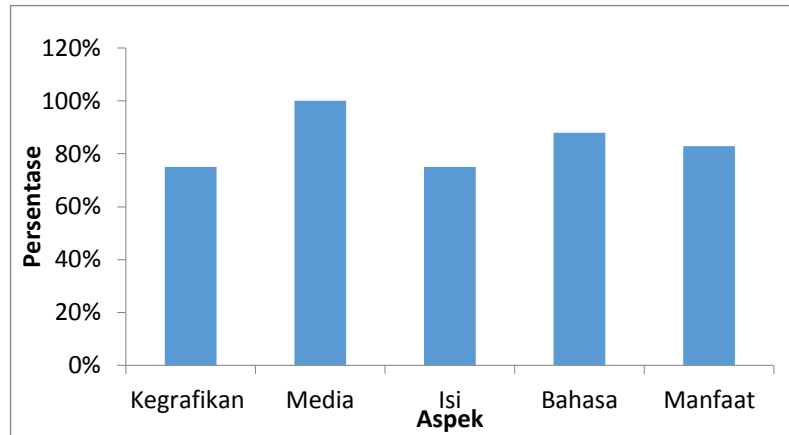


Figure 1. Teacher Response Questionnaire Results

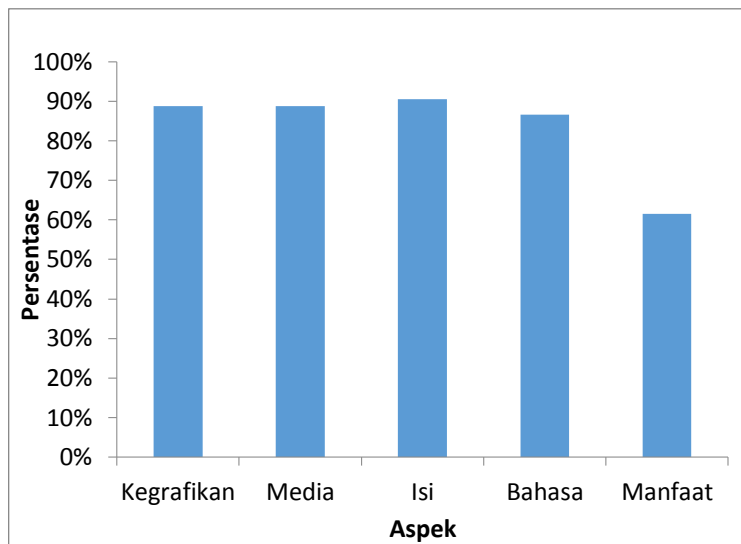


Figure 2. Results of Student Response Questionnaires

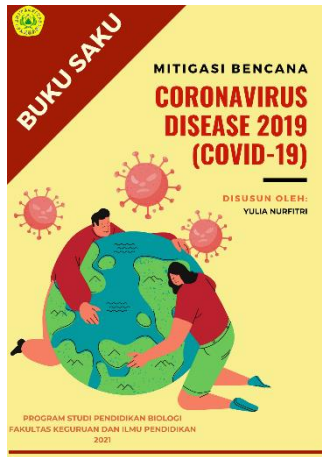
Pandemic outbreak *Coronavirus Disease* is a new type of disease that has never been previously identified in humans. The virus that causes COVID-19 is called Sars-CoV-2 which originated from Wuhan, Hubei Province, China (Ciotti *et al.*, 2020). The COVID-19 pandemic is associated with a very significant level of psychological distress such as causing stress and anxiety for individuals (Xiong *et al.*, 2020). Resilience is an individual's adaptive ability to deal with disruptive changes or events by reducing the negative impacts that can occur (Voropai & Rehtanz, 2019). Resilience is a very important thing for every individual to have, because the impact of the COVID-19 pandemic has been felt in all aspects of human life. In addition, the condition of the

COVID-19 pandemic affects the mental health of individuals because each individual is required to adapt to conditions that continue to change. High resilience can be a stress protective factor, so that resilient individuals are able to adapt and face the challenges experienced (Sari et al., 2019).

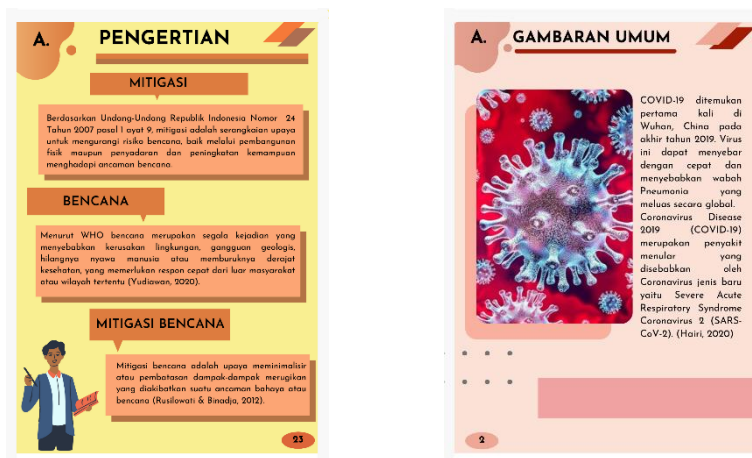
Research on the development of digital pocket book learning media on COVID-19 disaster mitigation enrichment materials to increase student resilience to disasters uses the ADDIE (*Analyze, Design, Development, Implementation, and Evaluation*) model. The first stage is starting from analysis (*Analyze*) with field studies and literature. In a field study conducted by interviewing Biology teachers at SMAIT Plus Bina Bangsa Sejahtera and the results showed that student resilience to disasters was still relatively low with a percentage of 56% and the use of learning media was only through *power point slides* so that it did not support learning in the digital era. Efforts to introduce the COVID-19 disaster mitigation have also never been conveyed by the teacher at the time of learning. Based on the questionnaire given to students, information was obtained that students' resilience in dealing with the COVID-19 pandemic is relatively low.

The second ADDIE stage is design (*design*). At this stage, it begins with product design, namely the formulation of the structure and content of the material. The digital pocket book contains the content of the COVID-19 pandemic disaster, which begins with an introduction to material in the form of an introduction to the general description of COVID-19, history, distribution, transmission, risk groups and the impacts caused by the COVID-19 pandemic. Students are then introduced to the COVID-19 disaster mitigation materials and various mitigation efforts that can be done. Next, design an *layout* that makes it easier for students to understand digital pocket books and is equipped with an info corner feature that contains interesting information about COVID-19 and a discussion corner to support the learning materials presented.

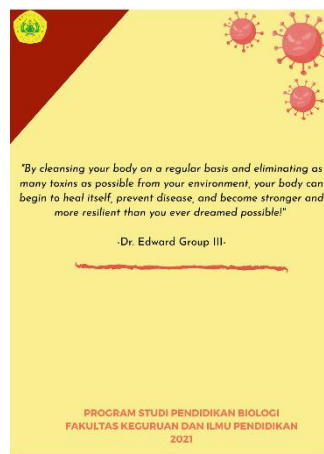
The third ADDIE stage is the development *process*. The development stage is carried out after *the draft* digital pocket book learning media on COVID-19 disaster mitigation materials has been completed, then the validation of learning media which includes media and material validation carried out by three experts. Expert validation serves to determine the feasibility of digital pocket book learning media for COVID-19 disaster mitigation materials before being used in field research so that their use can be more effective and of high quality. The results of the media expert validation are 94% and the material expert validation results are 84% with a very feasible category. This is in accordance with the opinion of Arikunto (2013) if the percentage value ranges from 81%-100% then the media developed is included in the very feasible category. At this stage, validation of the research instrument is also carried out. Instrument validation is done by distributing questionnaires to students who are not research subjects. The validation of the research instrument was analyzed using the *Pearson product moment formula*, from the validation results obtained the 30 items of the research instrument were declared valid. The final results of the developed digital pocket book are as follows:



Gambar 3. Digital pocket book front cover



Gambar 4. Digital pocket book



Gambar 5. Digital pocket book back cover

The fourth ADDIE stage is *implementation*. The digital pocket book learning media that has passed the expert validation stage is ready to be tested in the field. Limited trials were conducted with the experimental class. The number of students in the class was 29 students. After conducting field trials, the results of student resilience to disasters were 69% and included in the medium category (Azwar, 2012).

Based on the results of research conducted on students of class XI MIPA 2 in one of the private high schools in the city of Bogor, the results were 69% of students had moderate resilience, meaning that students were individuals who were able to adapt and were able to make decisions when in difficult or difficult situations. stressed by the COVID-19 pandemic. The individual is able to maintain positive feelings and energy even though it is not as good as individuals who have high resilience (Uyun, 2012).

In the aspect of emotional regulation, the lowest percentage was obtained with a percentage of 60% which was included in the medium category, meaning that students were still nervous in facing the COVID-19 pandemic disaster. Based on the results of the study after using digital pocket book learning media, students have not been able to control emotions, feel anxious and be able to remain calm when facing the COVID-19 pandemic disaster. After conducting interviews with several students, this was caused by the circulation of information regarding the increasing number of COVID-19 cases and other information that made students feel panicked in the face of the COVID-19 pandemic. This is in accordance with the theory of Vinkers *et al.*, (2020) that the alarming information about COVID-19 with the number of new cases and deaths every day can cause anxiety, depression, worsening health conditions and post-traumatic stress disorder. The aspect of emotional regulation needs to be improved so that students are able to face the COVID-19 disaster calmly. According to Buana (2020) states that someone who has positive emotions can adapt well in traumatic situations. To be able to be in a positive emotional state during the COVID-19 pandemic, several things that can be done are doing entertainment activities at home and communicating with the surrounding environment.

In the aspect of impulse control or impulse control, a percentage of 69% is included in the medium category. Based on the results of the study after using digital pocket book learning media, students have been able to control themselves to comply with health protocols because they can protect themselves from COVID-19 transmission and students already know what to do when family or friends are exposed to COVID-19. The low value is found in controlling boredom and boredom during the COVID-19 pandemic. After conducting interviews with several students, this was due to *online* during the COVID-19 pandemic which according to students was less effective because they could not interact directly with friends and the limited activities that could be done. According to Kurumbatu & Sukurudarji (2018) , impulse control is important for every individual to have during the COVID-19 pandemic because impulse control is the ability to control the desires, urges, likes, and pressures that arise within a person. Individuals with low impulse control often lose their temper, become irritable, impulsive and act aggressively, resulting in social relationship problems.

In the aspect of optimism, it has a percentage of 68% which is included in the medium category. Based on the results of the study, after using the digital pocket book learning media, students felt optimistic that the COVID-19 pandemic could end soon if every individual complied with health protocols and students were optimistic that they could achieve their goals despite being in a COVID-19 pandemic situation. Values that are still low in confidence to be able to adapt to activities during the COVID-19 pandemic. After the interview, it can be seen that this is due to the many activities carried out by students outside the home when the COVID-19 pandemic has not occurred so that when the COVID-19 pandemic occurs today, students feel that they are not optimal in carrying out activities that are much restricted. According to Masten & Motti-Stefanidi (2020) the adaptability of individuals in disasters depends on many systems and adaptive capacities within individuals. This is in accordance with the theory of Roellyana & Listiyandini (2017)

optimistic individuals have the belief that things will get better and have control and hope over their lives.

In the aspect of empathy, there is a percentage of 73% which is included in the medium category. The empathy aspect has the highest percentage in the other six aspects. Based on the results of the study, after using the digital pocket book learning media, students already have quite good empathy because they are able to understand the feelings of others, have awareness of the importance of helping others in the COVID-19 pandemic situation, and are able to support/encourage friends or relatives who are exposed to COVID-19. 19. According to Ebuenyi *et al.*, (2020) empathy is the ability to better understand the circumstances and situations of others and as a result gain insight into building interpersonal skills and increasing sensitivity to the feelings of others.

In the aspect of self-efficacy obtained a percentage of 71% which is included in the medium category. Based on the research results after using digital pocket book learning media, students have confidence in themselves to be able to complete their goals even though they are delayed due to the COVID-19 pandemic. According to Yildirim & Güler (2020) self-efficacy is a general concept that refers to the extent to which individuals believe that they have the competence to overcome or complete their goals. This requires not only skill but also a strong belief in the individual's ability to exercise control over motivation and behavior. Individuals' beliefs about their abilities have a direct influence on what they do. Self-efficacy influences how individuals think and act about risk-taking behavior.

In the aspect of achievement obtained a percentage of 71% which is included in the medium category. Based on the results of the study after using learning media, most students were able to overcome the fear and panic that threatened during the COVID-19 pandemic situation. The low value is the courage to carry out activities outside the home by complying with health protocols. After the interview, it can be seen that this is because there are still many people who carry out activities without complying with health protocols such as often taking off masks and not keeping their distance, causing students' fear to do activities outside the home. According to Nufus & Husna (2017) achievement describes an individual's ability to improve the positive aspects in his life which includes the individual's courage in overcoming the fears that threaten his life.

In the aspect of causal analysis obtained a percentage of 65% which is included in the medium category. Based on the results of the study after using learning media, students' attitudes in accepting problems, namely students were able to think positively and were able to self-reflect when facing problems in the COVID-19 pandemic situation. The value that still exists is the ability to recognize the root of the problem and the ability to make solutions to the problems faced in the COVID-19 pandemic situation. After the interview, it can be seen that this is caused by students having the belief that the cause of the problem comes from within the student, this always happens and existing problems cannot be changed, and existing problems tend to affect all aspects of their lives so that students are unable to seek clarity from an event or not being able to analyze the problem at hand and not finding a solution to the problem. This is in accordance with Mayasari's theory (2014) that resilient individuals are individuals who are able to identify all the causes of problems that befall them but can focus and take full control on problem solving, slowly they begin to overcome existing problems, direct their lives and rise to success.

The last stage in the ADDIE model is the evaluation stage (*evaluation*). This stage is seen from the responses of students and teachers given after the use of digital pocket books. The average value obtained from the results of student responses received a positive response of 90%. This is in accordance with the research of Magfirah *et al.*, (2016) which states that the practicality and effectiveness of the learning media used can increase students' interest in learning media which can be assessed by a student response questionnaire with a positive response. Meanwhile, in the teacher's response, the overall percentage value obtained is 84% with a very decent category. Then it is known that the five aspects of the assessment have a fairly high percentage level. The highest percentage is obtained in the media aspect, which is 100% in the very feasible category. The

language aspect has a percentage of 88% and the usefulness aspect is 83%. Meanwhile, in terms of the feasibility of content and graphics, the percentage is the same with a not too high percentage, which is 75%, this is due to the placement of writing which according to the teacher is not proportional.

CONCLUSION

Based on the results of the study, it can be concluded that digital pocket books on COVID-19 disaster mitigation materials are able to increase student resilience. This can be seen from the preliminary assessment of 56% (low category) and after using digital pocket book learning media it increased to 69% (medium category). The digital pocket book learning media that has been developed also received a validation assessment of media experts by 84% and material experts by 94% with a very decent category. In terms of the effectiveness of the digital pocket book, it is categorized as very practical as a learning media which is seen based on the teacher's response questionnaire with a percentage of 84% and student response questionnaires with a percentage of 90%. The suggestions that can be given in this study are adding supporting features such as *games*, videos and interesting articles in order to increase students' resilience to disasters, re-adding information regarding COVID-19 disaster mitigation measures according to the latest findings and further research is recommended to conduct a wider trial.

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