

Multicultural Education

Research Article

Homepage: www.MC-caddogap.comEFFECTIVESS MOBILE LEARNING FOR EMERGENCY LEARNING
IN DISASTER AREA

Sugiharto, DYP

Rafika Bayu Kusumandari

Guidance and Counseling, Educational Technology, Faculty of Education and Psychology, Universitas Negeri Semarang

ABSTRACT

This research aims to develop mobile learning program products to optimize learning and reduce post-disaster trauma. Referring to its objectives, this research program is designed with an 'RnD' approach. This means that a research program is followed by a development program for improvement or refinement. As a result, the results of the validity test conducted with material experts obtained results, namely validator 1 (91), validator 2 (92), which belong to the valid category. The results of the validity test conducted with design experts obtained results, namely validator 1 (90), validator 2 (89), which are included in the valid category. Practicality is related to the ease of use of the developed mobile learning. Practicality data was obtained through a questionnaire filled out by two teacher practitioners. Practicality test results based on teacher responses with average 93. Based on the results of the practicality analysis of teacher and student responses to the practicality of mobile learning, it can be concluded that the mobile learning developed is in the very practical category, meaning it makes it easier for students to learn and can reduce trauma.

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1. INTRODUCTION

Indonesia is a country located on a fire ring territory because Indonesia is located in a geographical area surrounded by volcanoes. This condition leads to Indonesia frequently being hit by natural disasters, so many school facilities and infrastructure are damaged. While school facilities are damaged children must continue their school, especially in primary schools. To overcome this, the media is needed for effective learning. In addition to overcoming the limitations of facilities and infrastructure, can also cope with children traumatized by the disaster. Personal trauma of resisting, witnessing, or confronting an event, physical or otherwise, that involves death, severity, or resistance to oneself can exacerbate feelings of fear and despair and can be very It promotes destructive emotions and can sometimes harm physical and mental health. It can even restore life itself (Everly et al, 2008:11; Bryce, 2001:7; APA, 1994). Furthermore, Shaw et al (2007:18) Says: trauma always affects not only individuals, but also the families and social systems in which individuals live. The impact of trauma on children is modified by the fact that children have limited life experiences. Children are still developing cognitively and emotionally and may struggle with issues such as separation, individuation and identity formation.

One solution used is the use of mobile learning-based games using computer programs. Various computer programs have been offered, one of which is with the program Adobe Flash. The program can produce animated cartoons, interactive animated drawings, presentations, video clips, movies, web animations and, other

animation applications according to our needs. The rapid development of mobile technology has accelerated the transition from traditional peer-to-peer interactions to digital immersion in virtual scenarios (Erhel & Jamet, 2013; Rhu & Parson, 2012). Learning that uses mobile learning allows students to access learning materials through mobile devices such as smartphones and tablets, or any device that is connected to the internet network, so that students can access learning wherever they are regardless of space and time (Tolawo, Lumenta, & Karouw, 2014).

The term Mobile Learning refers to the use of handheld devices and mobile information technology, such as mobile phones. Woodill (2011: 11-12) says: the introduction of various new learning methods has also influenced training methods. With the rapid spread of personal computers at the end of the 20th century, at the turn of the 20th century, the explosion of mobile phones over the last decade has begun to see a shift from classroom training models to classroom training models. A mixture of different learning approaches in different environments. Goksu & Bunyamin (2013: 689) pointed out that The presence of cellular technology or handphone promise of opportunity is considerable potential for the development of a new model, given the high level of ownership of the device and the device as well as tariff rates are getting cheaper and increasingly sophisticated features. However, since the boom in recent decades, the use of mobile phones is still limited to communication and entertainment. Until now there is still a bit of research and development that is focused to take advantage of this cellular technology as a means of education. Using Mobile Learning is expected to be an alternative model of socialization that is effective, attractive, interactive, and fun. Besides the things mentioned above, other uses of Mobile Learning can create variations in the delivery of information to avoid boredom for the user (society). Mobile learning is very easy to propagate, ie, with some found on mobile devices such as Bluetooth, and data cables.

The program is applied to a mobile phone and can be used by children with ease. Mobile learning can help reduce the trauma caused by play. A game is a type of activity in which participants are bound by established rules to achieve a goal (Kusumandari, et all. 2019). The learning game developed was used as a learning supplement and to reduce trauma to children after the disaster. As stated by Cahyana, et al (2017: 7038) that learning on cellular devices leads to the use of cellphones as a learning medium. Programs that are formatted in the form of games will be favored by children. They will be fun to play and without them knowing it, they're learning. This solution is in addition to cheap, easy, and fast creation and can be applied to any mobile phone that has a bluetooth facility. Many game features are not only for playing entertainment, but there are many games to hone thinking and logic that can introduce material to be more interesting to be accepted and understood especially by children (Kusumandari, et all. 2019). This program can also be used in all regions affected not only Indonesia. Using Adobe Flash 8 program because this program is easy to use and has complete facilities than the program before. The material will be formatted with interactive games, so children can evaluate themselves. A teacher just guides how they use this program.

Mobile learning programs can be used in emergency learning in every damaged area, not only in Indonesia. This program is new because never a program like this is used in emergency learning. It can be a good solution to answer the problem of limited facilities in damaged areas because of disasters. Furthermore, there are unique to this program. First, to make this program is cheap, easy, fast, and can be applied to every mobile phone who has bluetooth facilities. Second, every child can use this program and they will happy to operate the program. Third, this program can decrease the trauma of children that are affected by disasters. Utilization of smart phone to optimize learning in disaster area after the disaster can be a solution to the problem of limited education facilities and infrastructure destroyed after the disaster (Kusumandari, et.all. 2019)

2. METHODOLOGY OF RESEARCH

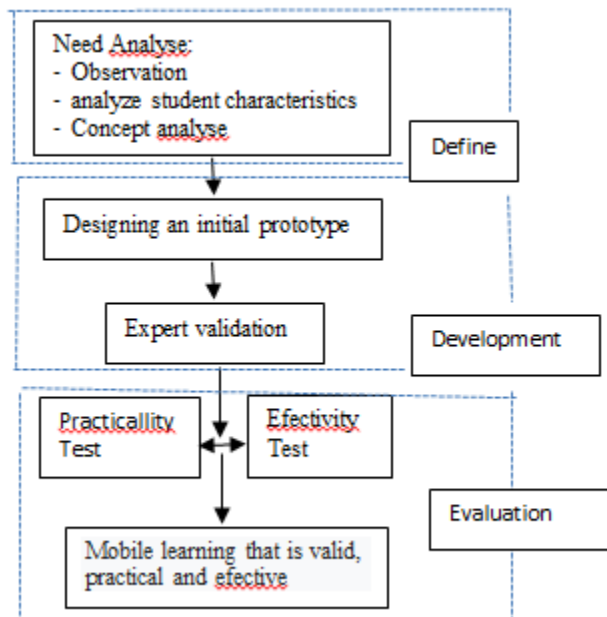
Referring to the objectives to be achieved, this research program is designed with an 'RnD' approach. This means that a research program is followed by a development program for improvement or refinement (Kusumandari & Istyarini, 2022). To produce a prototype mobile-based learning games using Adobe Flash 8 to improve learning in the damage field, steps taken in the form of a systematic process of action, reflection, evaluation, and innovation by applying qualitative research methods, descriptive, development, experimentation, and evaluation. Therefore, in the case of scientific research steps are taken by the researchers to conduct assessments (exploration) of the object being studied. In this connection, methods of qualitative research are one method that offers exploratory research aimed at design. Qualitative descriptive analysis analyzes the information obtained from preliminary research using survey methods and expert model design and modeling development processes (Kusumandari and Sukirman, 2017). The reason for the use of qualitative methods is the

lack of empirical evidence for research findings specifically regarding the development of the product for children (Sugiharto and Kusumandari, 2016). Unlike in experimental research designs such as qualitative researchers, the study design does not start from a certain frame of mind, but lets the research setting naturally / as they are and seek to understand the phenomenon by putting yourself on the object under investigation (empathy). Another reason is that the use of qualitative methods with qualitative methods of ideas, concerns, attitudes, and values of a number of the people being investigated can be easily understood.

Data were collected from an experienced background (natural setting) as a data source directly. Meaning of the data obtained can only be done if the depth of the facts is obtained. The study is expected to construct a theory inductively from the abstractions of data collected about the learning-based mobile games using Adobe Flash 8 to improve learning in damaged fields based on the findings of experienced meaning in the background. The principles of qualitative research findings emphasize that any (temporarily) based on the data, so the findings were more valid before being named as a theory. Qualitative research design focuses on specific phenomena that do not have generalizability and comparability, but have internal validity and contextual understanding. What to do (action) research to achieve the research goal was to outline four, namely (1) build familiarity with the respondent, (2) determination of the sample, (3) data collection, and (4) data analysis. This study is not just about knowledge that can be discussed (proportional knowledge), but also about the knowledge that cannot be discussed (tacit knowledge), which is almost impossible to obtain through the rationality approach (Lincoln and Guba in Alwasilah, 2003:103).

In this research, development uses the Instructional Development Institute (IDI) model (Grabowski, 2003, p. 3) which consists of several stages, namely the stages of determination, development, and evaluation. The IDI development flow can be seen in Figure 1.

Figure 1. Mobile Learning Development Design



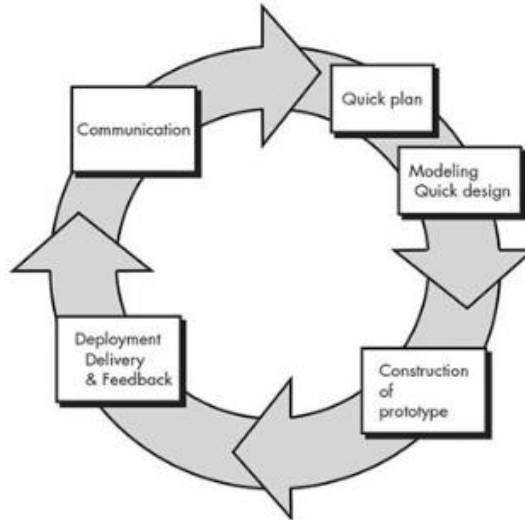
Stage of Define

Implementation of research begins with the stage of define. Based on observations and interviews of researchers with teachers and students, data was obtained, namely for learning in digital simulation subjects, learning media in the form of mobile learning was needed. At this stage analysis activities are carried out which aim to determine the requirements in learning, such as concept analysis and analysis of student characteristics. In concept analysis with the aim of identifying, detailing, and systematically compiling the main concepts of digital simulation which will be used as the content of mobile learning development. Lesson material is arranged according to the skills or knowledge that students learn. These materials are in the form of text, images, animations, videos, and exercises that can increase student motivation and interest in learning (Chatwattana & Nilsook, 2017). Analysis of student characteristics was from the age of students' experience in using smartphones, hobbies, student preferences, and motivation in learning based mobile learning.

Development Stage

After the determination stage, the results obtained are used for the next stage, namely the development stage. The development stage includes the prototype design and validation stage. The development stage flow can be seen in Figure 2.

Figure 2. Design Model Prototype Stages in development



The stages in the development in this research are in this study namely: 1.) Gathering needs, namely by preparing teaching materials from the results of discussions with teachers; 2.) Design, namely by making Android-based mobile learning using Macromedia Flash Animate CC software; 3.) Evaluation, namely the evaluation of mobile learning by the validator, if there are deficiencies then it is repeated according to the previous process, so that mobile learning can optimally support the learning process.

Validation Stage

At the validation stage, mobile learning that has been developed is validated by experts or experts. Validation is carried out on material aspects as well as aspects. The criteria used to assess the validity of the developed mobile learning can be seen in Table 1.

Table 1. Mobile Validity Categories learning

No	Achievement Level	Category
1	0 – 1,00	Valid
2	< 0	Not valid

Sources: Azwar (2014)

Evaluation Stage

At the evaluation stage the focus is on evaluating the mobile learning design so that later it can be used according to expectations as a supporting media for student learning which includes product trials, practicality stages, and effectiveness stages. Testing the ease of use of Android-based digital simulation learning media uses the validity test formula. The data obtained through the questionnaire was then analyzed descriptively. The results of this analysis serve to assess the quality of mobile learning from the aspect of validity. The results of the analysis of practicality by teachers and students are grouped into the categories presented in Table 2.

Table 2. Practicality category

No	Level Achievement (%)	Category
1	81 – 100	Very Practical
2	61 – 80	Practical Quite
3	41 – 60	Practical
4	21 – 40	Less practical
5	0 – 20	Not practical

Source: Riduwan (2010)

The effectiveness of mobile learning is obtained from the differences in student learning outcomes in the control class and the experimental class. The difference in question is the difference between the learning outcomes of the experimental class and the control class, if the increase in student learning outcomes of the experimental class is higher than that of the control class, then mobile learning can be said to be effective. For significant testing, it can be done by conducting a t-test. Before carrying out the t-test, normality and homogeneity tests were first carried out.

Normality test

Normality test to determine whether the two sample groups come from normal populations or not. For the normality test using SPSS software to see the significant value of Kolmogorov Smirnov, the decision making for the normality test in this study is:

If the Sig value > 0.05 , then the data is normally distributed

If the Sig value < 0.05 , then the data is not normally distributed

Homogeneity test

The homogeneity test aims to find out whether the several groups of research data have the same variance or not, for the homogeneity test using SPSS software. The decision-making criteria for the homogeneity test in seeing the significant value in this study are:

If the Sig value > 0.05 , then the data is homogeneous If the Sig value < 0.05 , then the data is not homogeneous.

t-test

The t-test serves to find out significant differences between the test results of the control class and the experimental class. For the t-test conducted with SPSS software, to see a significant comparison in the learning outcomes of the control and experimental classes, if significant < 0.05 means that there is a significant difference between the learning outcomes of the experimental class and the control class.

3. RESULT OF RESEARCH

Design

Mobile learning design is made using Macromedia Flash Animate CC software. The Home page is the front page or the main page for the initial appearance of mobile learning which contains an introductory speech for Let's Count on the mobile learning application. The home page is the page that first appears when the mobile learning application is opened. Students click MULAI to start the game contained in the APK.

Figure 3. Start Page view



There are 3 types of games that are made, namely selecting numbers, finding numbers in the form of children walking to the correct number using the navigation buttons, filling water in buckets, and shooting balloons.

Figure 3. Selecting numbers type



Figure 4. Findings number type



Figure 5. Filling water in buckets

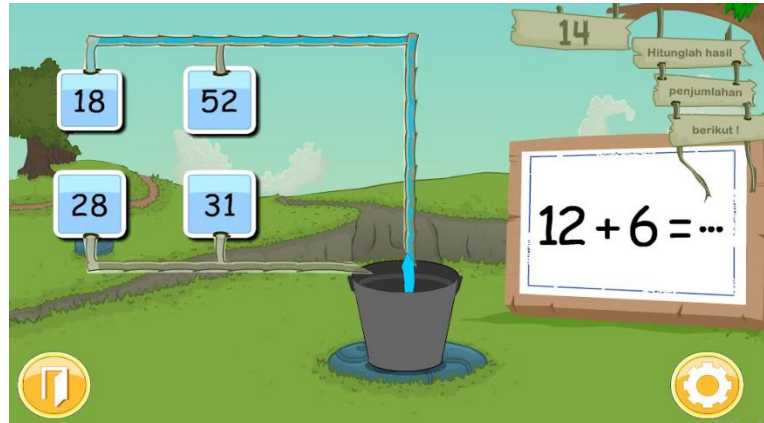


Figure 6. Shooting balloons

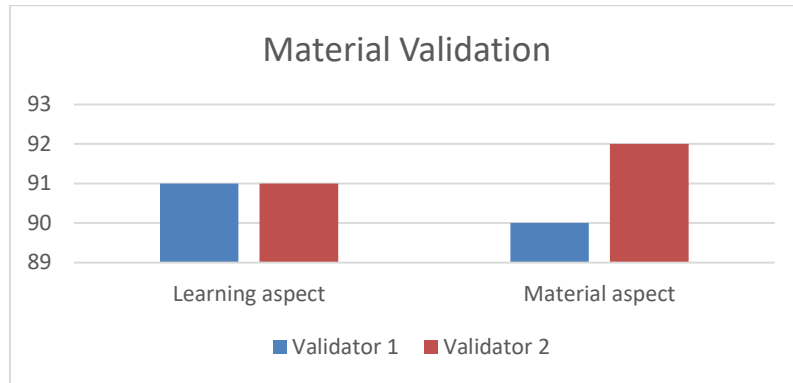


Figure 7. The Result



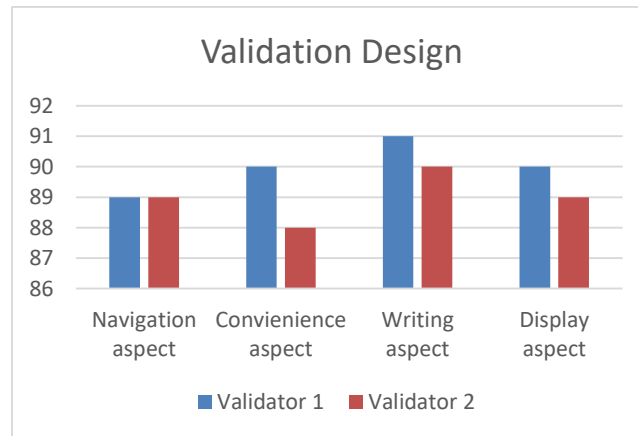
Based on the results of the validity test with experts for material experts and design experts as many as 4 validators. The results of the validity test conducted with material experts obtained results, namely validator 1 (91), validator 2 (92), which belong to the valid category. the assessment on the results of the material validity test is based on the criteria: learning aspects and material aspects with a total number of 20 questions. The results of the material validity test can be seen in the results of data processing in the form of a frequency distribution diagram which can be seen in Figure 8.

Figure 8. Material Validation Result



The results of the validity test conducted with design experts obtained results, namely validator 1 (90), validator 2 (89), which are included in the valid category. The assessment on the results of the design validity test is based on the criteria: aspects of navigation, convenience, writing and display with a total number of questions as many as 20 pieces. The results of the design validity test can be seen in the results of data processing in the form of a frequency distribution diagram which can be seen in Figure 9.

Figure 9. Validation Design



Practicality Test Research Results

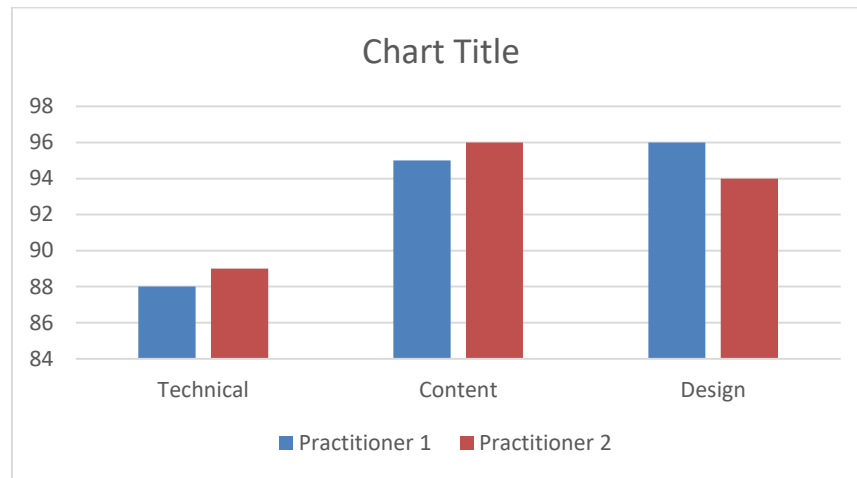
Practicality is related to the ease of use of the developed mobile learning. Practicality data was obtained through a questionnaire filled out by two teacher practitioners. Practicality test results based on teacher responses. Can be visualized in Table 3.

Table 3. Data on practical results based on teacher responses

No.	Evaluation Aspect	V1	V2	Average	Category
1	Technical	88	89	88,5	Very Practical
2	Content	95	96	95,5	Very Practical
3	Design	96	94	95	Very Practical
Average		93	93	93	

The practicality test results can be seen in the results of data processing in the form of a frequency distribution diagram which can be seen in Figure 10.

Figure 10. Frequency distribution diagram



The practicality of mobile learning also requires input in the form of responses from students. This data is obtained after learning is carried out, through a questionnaire given to students. Students respond to the practicality of mobile learning through a questionnaire which includes aspects of convenience, motivation, usefulness and attractiveness of the developed mobile learning. The average percentage of student responses is a reference in determining the practicality category of mobile learning developed in digital simulation subjects. The practicality test results based on student responses are shown in Table 4.

Table 4. Practicality Result Data Based on Student Responses

No.	Evaluation Aspect	Percentage Evaluation	Category
1	Convenience	90	Very practical
2	Motivation	92	Very practical
3	Attractiveness	90	Very practical
4	Usefulness	91	Very practical

Based on the results of the practicality analysis of teacher and student responses to the practicality of mobile learning, it can be concluded that the mobile learning developed is in the very practical category, meaning it makes it easier for students to learn and can reduce trauma.

Results of Research Effectiveness Test

The results of the effectiveness test were obtained by calculating the learning outcomes of the control class and experimental class students. The learning outcomes of the control class of 16 students obtained an average score of 65, while the learning outcomes of the experimental class of 15 students obtained an average value of 85. Furthermore, to find out the significance of the difference in the learning outcomes of the two classes, a t-

test was carried out by carrying out the normality test and homogeneity test.

From the results of the normality test that was carried out with the SPSS software, a significant value was found for the control class of 0.176 and for the experimental class of 0.782, so it can be concluded that the data is normally distributed because > 0.05 .

Homogeneity Test

The results of the homogeneity test of control and experimental class learning outcomes are as follows:

- levenestistic = 2.078
- df1 = 5
- df2 = 20
- sig = 0.110

From the significant results of 0.110 which is greater than 0.05, then between the control and experimental classes have a homogeneous variance.

t test

Based on the normality and homogeneity tests of the posttest variants, it was found that the two classes were normally distributed and had homogeneous variants, so the two-class difference test can be seen as follows:

- Mean = 9.089
- Std. Deviations = 6.761
- Std. Error Mean = 1.099
- t = 7.437
- df = 31
- sig(2-tailed) = 0.000

Based on the data obtained from the results of the mobile learning effectiveness test, the researcher can explain that there is a significant difference in the results of the control and experimental classes.

4. DISCUSSION

Today, the development of information technology permeates every aspect of people's lives. A form of information technology application that is currently in high demand among the public is the smartphone. A smartphone is a mobile device with an operating system similar to a computer (Kusumandari & Istyarini, 2023). The development of learning through mobile devices increases the effectiveness and efficiency of student learning. A big advantage of her mobile device is its portability. In other words, learning need not be confined to the classroom, especially when it comes to discovering areas. People cannot adapt to their surroundings without leaving the classroom (Pérez Sanagustín et al. 2012) The development of mobile learning in digital simulation subjects is carried out in a series of processes to produce a valid, practical, effective and efficient mobile learning. This mobile learning development model uses the IDI (Instructional Development Institute) model which includes three stages, namely define, develop, and evaluate. At the define stage, a needs analysis is carried out which consists of an analysis of student characteristics and an analysis of concepts (content and learning materials). The develop stage is carried out by designing mobile learning products and the validation stage. At this stage there is an iterative process so that mobile learning is obtained in digital simulation subjects

which are declared valid. Finally, in the evaluate stage, limited trials are carried out on the products being developed, practicality tests and effectiveness tests.

At the define stage, an analysis of mobile learning needs is carried out in the form of student characters and the concept of digital simulation subject matter. Based on observations and interviews of researchers with teachers and students, data was obtained, namely for learning in digital simulation subjects, learning media in the form of mobile learning were needed. Mobile learning is designed by considering the content and design contained therein. In terms of content, mobile learning is adapted to the existing curriculum and syllabus in digital simulation subjects. Meanwhile, the mobile learning design is more emphasized on the appearance of the mobile learning design. After making mobile learning products, then the stages are carried out validation by experts to determine whether or not mobile learning is appropriate.

Mobile learning validation is obtained from the response given by the validator about the validity of mobile learning development. The material validator consists of 2 people to assess the material in mobile learning. The results of the material assessment obtained from validator 1 were 91 and for the validator 2 is 92, so it is categorized as valid, while the design validator consists of 2 people to assess the material in mobile learning.

The results of the design assessment for validator 1 were 90 and for validator 2 it was 89 and entered in the valid category. From the results of the design and material validation tests, it can be concluded that the mobile learning developed in terms of material and design is in the valid category. Data on the practicality of mobile learning were obtained from trials on 31 students aged 8-10 years. This trial aims to see the implementation of learning using mobile learning.

An assessment of the practicality of mobile learning was obtained from a questionnaire filled out by teachers or practitioners. The first practitioner assessed that the developed mobile learning was in the very practical category with an average percentage of 90%, while the second practitioner gave a very practical assessment with an average percentage of 92%. In addition to teacher/practitioner assessments, the practicality of mobile learning was also assessed based on student responses via questionnaires and the results revealed that the ease of mobile learning aspect obtained an average score of 90%, motivational aspects 92% and attractiveness aspects 90%, the usefulness aspect is 91%. Based on the percentage of the average value mentioned above, it can be concluded that the developed mobile learning is categorized as very practical.

This research is seen from the ability of mobile learning to make it easier for students to understand the material. The effectiveness of mobile learning development can be seen directly after students finish the games being played. Based on the data obtained from the results of the mobile learning effectiveness test, researchers can explain that there are significant differences in the results of the control and experimental classes. With this mobile learning application, it can be used for learning in disaster areas and at the same time to reduce trauma in post-disaster children. Kusumandari et al. 2019 says that the use of learning games can also reduce trauma to children affected by disasters after the disaster.

5. CONCLUSION

The conclusions of this study are:

1. Mobile learning can be applied to post-disaster optimized learning, where children enthusiastically play by answering questions on the program.
2. Mobile learning can be applied to reduce the trauma experienced without them knowing.

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