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Development of Mobile Learning-Based Learning Resources to Improve Multimedia Student's Creative Problem Ability as Details Fieldwork Practice

Elyana Frisca Monica[1], Widiyanti[2], Marsono[3]
[1,2,3]*Universitas Negeri Malang, Indonesia*
freezfico@gmail.com, widiyanti.ft@um.ac.id, marsono.ft@um.ac.id

Abstract

Currently, the world is being hit by an outbreak of coronavirus disease (covid-19), including in Indonesia. Covid-19 entered Indonesia in December 2019 with 4,231,046 positive cases as of October 13, 2021. Major changes occurred in various fields, both economic, social, and social politics and education. Vocational High School is a secondary education unit that is prepared to enter the form of employment and develop a professional attitude. One of the SMK programs is the Field Work Practice (PKL). One of the obstacles experienced by students in the multimedia field is when street vendors do not deliver materials and practices that are following DUDIKA's needs. Seeing the current condition of the covid pandemic, the debriefing is carried out online, therefore it is necessary to have a mobile learning-based learning resource that is considered more attractive, effective, and efficient, especially in the current new normal era. The development of learning resources based on mobile learning uses the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model. The results of this study indicate that a mobile learning-based learning resource for the debriefing of street vendors is appropriate to be used as a supporting medium for independent learning, according to the tests carried out on material experts, media experts, small group trials, and large group trials. From the two material experts, the presentation results were 81.67% with a very decent category without the need for revision. From the three material experts, the percentage results were 80% with a decent category without the need for revision. The results of the small group test got a presentation of 81% and for the large group, it was 81.58% which was very feasible without the need for revision. Improved creative problem-solving skills were improved using pretest and posttest by testing using paired sample t-test. The results of the test showed that the output pair sig (2-tailed) value was 0.000 > 0.05, so it can be said that there is a difference between the experimental class pretest data and the experimental class posttest data, which means that the application of mobile learning-based learning resources affects the results student learning before the learning resource is given and after it is given.

Keywords
learning resources based on mobile learning; ADDIE; creative problem solving; street vendors

I. Introduction

Development is a systematic and continuous effort made to realize something that is aspired. Development is a change towards improvement. Changes towards improvement require the mobilization of all human resources and reason to realize what is aspired. In

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addition, development is also very dependent on the availability of natural resource wealth. The availability of natural resources is one of the keys to economic growth in an area. (Shah, M. et al. 2020)

Current technological developments encourage all fields to create something innovative. Today's technology has changed the way students learn, the way students obtain various information, and of course the way they interpret that information. In the 21st century, the learning resources that are most in-demand by students are learning resources based on mobile learning. According to Arumsarie (2018), mobile learning is the use of mobile technology, especially the type of smartphone that is used in the field of education. Mobile learning-based learning resources have become increasingly popular in Indonesia since the COVID-19 pandemic in March 2020. With mobile learning, teachers can package learning resources to facilitate students' independent learning in the form of text, audio, and video in one smartphone device (Juniarti, 2019).

In the Decree of the Minister of Education and Culture of the Republic of Indonesia Number 0490/U/1992 concerning Vocational Schools, it is explained that Vocational Schools are a form of secondary education unit organized to continue and expand basic education and prepare students to enter the workforce and develop professional attitudes. One of the SMK programs is the Field Work Practice (PKL). Following the results of interviews with the head of the multimedia expertise program, it was found that the implementation of street vendors at SMK Negeri 1 Boyolangu was carried out in class XI in odd semesters and class XI in even semesters.

One of the obstacles experienced by students majoring in multimedia when street vendors are the lack of delivery of materials and practices that are following DUDIKA's needs. This is because when they are in class X they have not received competent subjects in their field of expertise. Based on the background of the problem above, it can be concluded that the main problem is the lack of synchronization of the timing of the delivery of material at school with the material needed at DUDIKA so that there is a need for debriefing before multimedia students leave for street vendors. The debriefing is carried out outside school hours, namely on Saturdays and Sundays. Seeing the current condition of the covid pandemic, the debriefing is carried out online, therefore it is necessary to have a mobile learning-based learning resource that is considered more attractive, effective, and efficient, especially in the current new normal era. Learning resources based on mobile learning are expected to be able to improve students' problem-solving abilities and creativity when faced with a problem, students have creative ways of solving problems independently with the help of the developed mobile learning. Students not only use memorization without thinking processes but use problem-solving skills that develop thinking processes. The material chosen in the development of the media is moving pictures, where the material is a multimedia skill competency material (C3).

II. Research Method

The development that will be carried out is the development of learning resources based on mobile learning to improve problem-solving skills and students' creativity by using the ADDIE model. The ADDIE approach model has 5 stages, namely: (1) Analysis (2) Design, (3) Development, (4) Implementation, and (5) Evaluation. The advantage of the ADDIE development model is that there is an evaluation at each stage so that it can minimize the error rate or product shortage at the final stage of the model (Tegeh, 2014).

After the initial product is made, it is then validated by media experts and material experts. Validation is carried out to provide an assessment of the learning resources

developed based on the feasibility aspect, as well as to provide suggestions and comments which will later be used as a benchmark for revision of the improvement and refinement of the learning resources developed before the design is produced and tested in small groups. The initial trial was carried out by a small group with a total of 10 students in class XI Multimedia.

The next stage is product revision after the initial trial results are used as a reference in improving the media. In addition, this stage is carried out if during product validation by media experts and material experts have not provided valid criteria for the developed media, so the product must be revised again.

After product revision, the next stage is field trials or large group trials. In the field trial phase, the implementation of the product involved all students of class XI majoring in multimedia at SMK Negeri 1 Boyolangu with a total of 74 trial subjects. The results of this implementation are in the form of the posttest and pretest results which are used to measure the problem-solving ability and creativity of students. The aim is to determine the effectiveness of learning resources developed as a debriefing of students before leaving for street vendors in the multimedia expertise program. The test implementation design is shown in Table 1.

Table 1. Test Implementation Design

Class	Group	Pretes	Treatment	Postes
XI MM 2	Experiment	O1	X	O2
XI MM 1	Control	O1	-	O2

Data collection techniques in this development research are through questionnaires and written tests. In this research and development, there will be three types of questionnaires, namely: a questionnaire for material experts, a questionnaire for media experts, and a questionnaire for class XI students of the multimedia expertise program. The following are criteria for reviewing learning resources based on quality developed by Walker & Hess, namely: (1) quality of content and objectives, (2) quality of instructional and, (3) technical quality.

The level of feasibility of the developed product is expressed by the score presentation. The greater the score presentation of the data analysis results, the better the level of feasibility of the product being developed. Criteria for making decisions in the validation of learning resources based on mobile learning can be seen in Table 2 (Arikunto, 2008).

Table 2. Eligibility criteria for learning media

No	Percentage	Qualification	Description
1	81% - 100%	Very good	Very decent, No need to revise
2	61% - 80%	Good	Decent, No need to revise
3	41% - 60%	Pretty good	Inadequate, Needs to be revised
4	21% - 40%	Not good	Not Eligible, Needs to be Revised

Analysis of pretest and posttest data were analyzed with the help of SPSS (Statistical Product and Service Solutions) V.24 program with 95% significance. The data analysis technique used normality test, homogeneity test, t-test (paired sample t-test), independent t-test. The data normality test aims to detect the distribution of data in one variable that will be used in the study. The normality test used is the Kolmogorov-Smirnov test. A homogeneity test is used to determine whether the variance of several populations is the same or not. The level of significance used is = 0.05. Paired t-test is a test conducted to test whether there is a significant difference in mean between two paired samples. An Independent sample t-test was conducted to determine the difference in the improvement of students' creative problem solving between the experimental class and the control class with the application of mobile learning-based learning resources in the provision of street vendors.

III. Result and Discussion

The development stage is the realization stage of the developed product. At this stage, the development of mobile learning-based learning resources is carried out according to the design (storyboard) that has been made at the design stage. The cover page of the learning resource contains the title of the material, class, and the school logo. The cover page display can be seen in Figure 1.

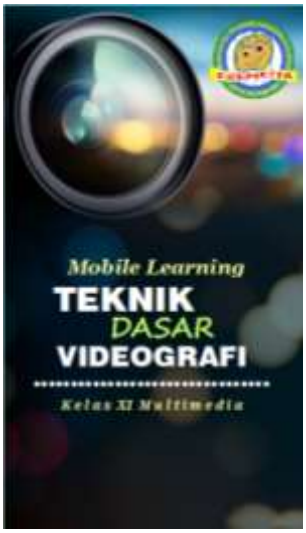

Figure 1. *Display Cover of Learning Resources Based on Mobile learning*

The home page has 4 main menus developed, namely: materials, videos, modules, and evaluations. At the bottom, there are 3 buttons, namely: (1) the back button to go to the previous page, (2) the home button is the button to go to the main page, (3) the next button to go to the next page. The display of the home page can be seen in Figure 2.

Figure 2. *Display of the Home Page of Learning Resources Based on Mobile learning*

In the material menu, there are three sub-menus, namely: (1) camera operation procedure material, (2) camera movement technique material, and (3) lighting material. The display of the material menu can be seen in Figure 3. On each sub-menu page displayed there are navigation buttons to go to other main menus, and on each page, there are also home, next, and back buttons, making it easier for users to return to the previous page or go to the next page.

Figure 3. *Menu Page Display of Learning Resources Based on Mobile learning*

The next menu of the learning resources developed is the video tutorial menu. In this mobile learning-based learning resource, there are 7 videos, namely: (1) Video camera parts, (2) Video camera operation, (3) Angle of shooting (angle), (4) Size of the field of view (frame size), (5) Video camera movement, (6) Lighting equipment, (7) Three-point lighting. The video tutorial display can be seen in Figure 4.

Figure 4. *Video Menu Display on Mobile Learning Based Learning Resources*

In this developed learning resource, there are three modules, namely: (1) camera operating procedures, (2) camera movement techniques, and (3) lighting. The existence of the module aims to enable students to learn independently without having to always be accompanied by a teacher. In the evaluation menu, there are three materials tested, namely: (1) camera operating procedures, (2) camera movement techniques, and (3) lighting. Each material tested has 15 questions in it. The questions are made with indicators to improve students' problem-solving abilities. The test is used for pretest and posttest, the results of posttest and pretest are used to measure the problem-solving ability and creativity of students. The pretest is carried out before the media is given to students, while the posttest is carried out after the media is given to students. The aim is to determine the effectiveness of learning resources developed as a debriefing of students before leaving for street vendors in the multimedia expertise program. In each question, there is a score and at the end of the test, students will immediately know the score or total value. The evaluation menu display is shown in Figure 5.

Figure 5. *Display of the Evaluation Menu on Mobile learning-Based Learning Resources*

After the product is produced in the form of a mobile learning-based learning resource, the next stage is expert validation and small group trials. Validation was carried out by two experts, namely media experts and material experts. While the small group trial was tested on 10 students of class XI Multimedia

Validation by media experts was carried out on September 20, 2021. Validation data by media experts were taken using an instrument in the form of a questionnaire consisting of 20 statement questions along with criticism and suggestions for learning resources developed. The results of the validity test carried out by media experts got the results of the feasibility percentage, namely media expert 1 by 75% with a decent category and without needing to be revised, while material expert 2 by 85% with a very decent category and without the need for revision. From the two experts, the percentage of feasibility is 80%, which means it is feasible without the need for revision. The results of data processing validation by media experts can be seen in Figure 6.

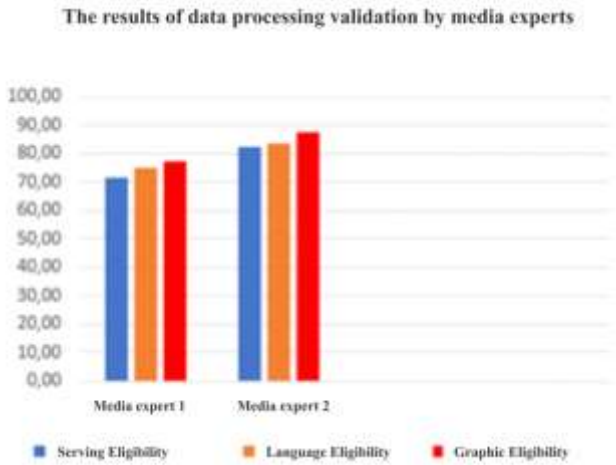

Figure 6. *Graph of Data Processing Results by Media Experts*

Validation by material experts was carried out on September 23, 2021. Validation data by material experts were taken using an instrument in the form of a questionnaire consisting of 20 statement questions along with criticism and suggestions for material on the developed learning resources. The results of the validity test carried out by material experts get the results of the feasibility percentage according to Table 1 (Arikunto, 2008), namely material expert 1 at 83.3% with a very decent category and without the need for revision, from material expert 2 getting a percentage of 80%% with a very decent category, and from material experts 3 by 81.3% with a very decent category. From the three material experts, the percentage of feasibility is 81.67%, which means it is very feasible without the need for revision. The results of the validation data processing by media experts can be seen in Figure 7.

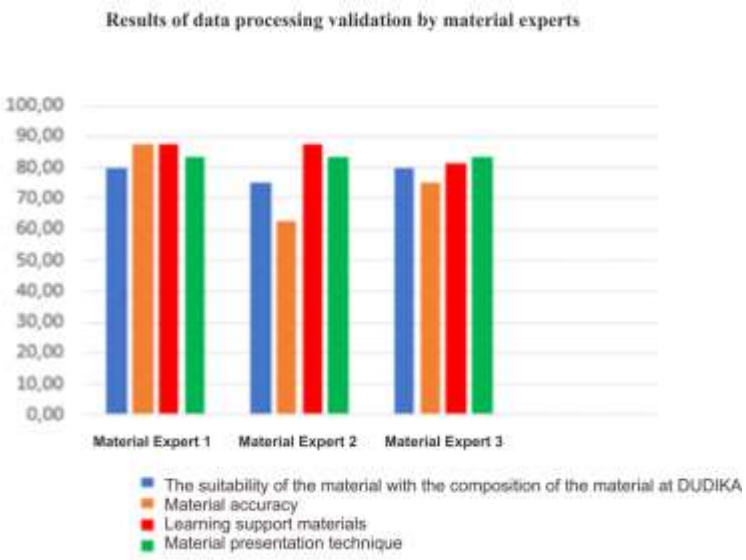

Figure 7. *Graph of Data Processing Results by Material Experts*

The initial trial or small group trial was held on September 27, 2021, at SMK Negeri 1 Boyolangu. Small group trials by testing the product in small groups consisting of 10-15 students, and field trials involving test subjects on a wider scale (Benny, 2009). The experimental subjects of this small group were 10 students of class XI MM1 and XI MM2. Small group validation data were taken using an instrument in the form of a questionnaire consisting of 15 statement items equipped with criticism and suggestions. From the small group test, it was concluded that the total score of all learning resources based on mobile learning obtained from the small group trial of 10 students of class XI Multimedia was 486 with a validity percentage of 81%. From the small group test, it was concluded that the media was valid or feasible to use without the need for revision. The results of the small group trial data processing can be seen in Figure 8.

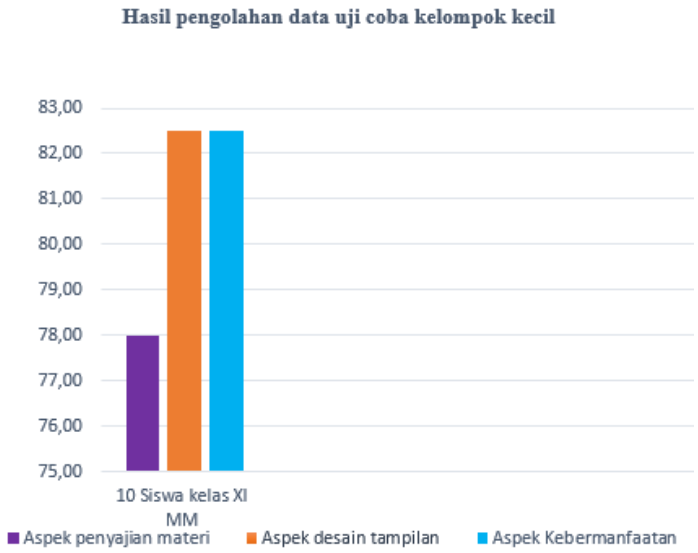

Figure 8. *Graph of Small Group Trial Data Processing Results*

The product revision stage is carried out after the results of the initial trial are used as a reference in improving the imperfect media. Product revisions are carried out if there are deficiencies in use in real conditions, the product is repaired (Sugiyono, 2013). Starting from

the design, the content of learning resources, as well as the trial phase. This stage is carried out if the product validation by media experts and material experts has not provided valid criteria for the learning resources developed, so the product must be revised again. Apart from obtaining a percentage of the validity of the product revision, it was also taken from criticism and suggestions from experts and from small group tests which were to improve learning resources to make them more interesting and useful when field trials were used.

After conducting validation from experts, small group trials, and product revision, the next step is field testing or large group testing. Field trials were carried out with the object of validation of 37 students which was carried out on October 4, 2021, at SMK Negeri 1 Boyolangu. The validation data retrieval uses an instrument in the form of a questionnaire, where the instrument is the same as the small group trial instrument, which uses a questionnaire with 15 statements in it. The result of the percentage of validity obtained is 81.58%, which means it is very feasible and does not need to be revised. The results of the small group trial data processing can be seen in Figure 9.

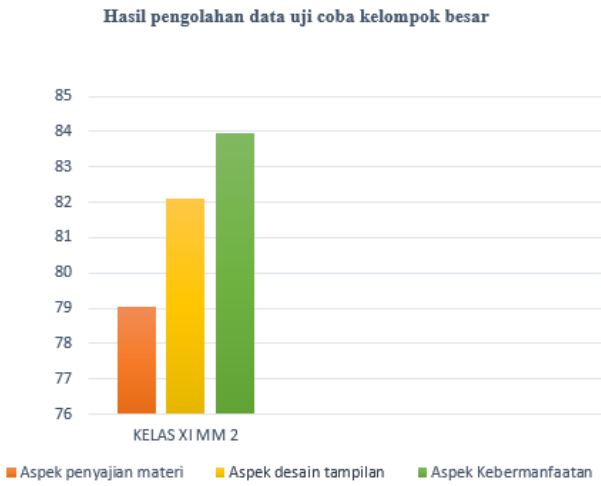

Figure 9. *Graph of Large Group Trial Data Processing Results*

From the results of the pretest and posttest, the following results were obtained. The normality test can be seen in Table 3. The normality test is used to see whether the data is normally distributed or not. From the test results, the value of sig> 0.05 so that the data is said to be normal. The basis for decision making based on probability according to Sugiyono (2013) is: if the probability value is > 0.05 then it is said that the population is normally distributed, and if the probability value is </= 0.05 then it is said that the population is not normally distributed. In Table 3 all the experimental and control groups are normally distributed so that the data calculation can be continued to the homogeneity test stage.

Table 3. Normality Test Results

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	KELAS	Statistic	df	Sig.	Statistic	df	Sig.
HASIL	PRE_EKS	.124	37	.160	.956	37	.156
	POS_EKS	.118	37	.200*	.944	37	.062
	PRE_KONT	.124	37	.160	.956	37	.156
	POS_KONT	.077	37	.200*	.972	37	.454

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

The homogeneity test was carried out using the Homogeneity of Variance test, the data was said to be homogeneous if the sig value Based on Mean > 0.05. The results of the homogeneity test of the two groups can be seen in Table 4. Based on Table 4, the sig Based on Mean value is 0.17 > 0.05, so it can be concluded that the data variance of the experimental posttest group and the control posttest group is the same or homogeneous.

Table 4. Homogeneity Test Results

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
HASIL_BELAJAR	Based on Mean	1.920	1	72	.170
	Based on Median	1.739	1	72	.191
	Based on Median and with adjusted df	1.739	1	59.922	.192
	Based on trimmed mean	1.930	1	72	.169

The paired sample t-test or two-sample paired test aims to determine whether there is a difference in the mean (mean) of the two paired samples. In this study, two paired sample t-tests were conducted, namely: experimental class pretest data with experimental class posttest data, and control class pretest data with control class posttest data. The calculation results can be seen in Table 5. In Table 5 it can be concluded that based on the output pair 1, the sig (2-tailed) value is 0.000 > 0.05, so it can be concluded that there is a difference in the mean between the experimental class pretest data and the experimental class posttest data. , which means that the application of mobile learning-based learning resources has an effect on student learning outcomes before and after learning resources are given. While the results of the output pair 2 sig (2-tailed) value of 0.295 > 0.05, it can be concluded that there is no difference between the mean of the pretest control class and the posttest control class.

Table 5. Paired Sample T-Test

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	PRE_EKS - POS_EKS	-13.216	5.329	.876	-14.993	-11.439	-15.086	36	.000
Pair 2	PRE_KON - POS_KON	-1.432	8.204	1.349	-4.168	1.303	-1.062	36	.295

The last test is the Independent sample t-test which aims to determine the difference in the improvement of students' creative problem solving between the experimental class and the control class with the application of mobile learning-based learning resources in the provision of street vendors. The data used in this test is the experimental class posttest data and the control class posttest data. The data from the test results can be seen in Table 6. In Table 6 it is clear that the mean of the posttest experimental class is 81.51 while the posttest control class is 70.73, where the mean posttest of the experimental class is higher than the mean posttest of the control class, so it can be concluded it was concluded that the application of mobile learning-based learning resources was able to improve students' creative problem solving abilities compared to the control class that did not use it.

Table 6. Paired Sample T-Test

Group Statistics

	KELAS	N	Mean	Std. Deviation	Std. Error Mean
HASIL_BELAJAR	POST_EKS	37	81.51	3.716	.611
	POST_KONT	37	70.73	5.015	.824

IV. Conclusion

Overall, this mobile learning-based e-learning resource is said to be valid and feasible to use, but a revision of this learning resource still needs to be done. Revisions are made based on constructive criticism and suggestions from material experts, media experts, and student respondents.

This mobile learning-based learning resource was developed not to replace the teacher's role in teaching in the classroom but was developed to help improve students' creative problem-solving abilities independently anytime and anywhere before leaving for street vendors at DUDIKA to achieve learning goals.

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