Creative Digital Worksheet Base on Mobile Learning

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Abstract. The student is required to understand and act in the classroom and it is very important for selecting the media learning to determine the learning outcome. An instructional media is needed to help students achieve the best learning outcome. The objectives of this study are (1) to make Android-based student worksheet, (2) to know the students’ response on Android-based student worksheet in multimedia subject, (3) to determine the student result using Android-based student worksheet. The method used was Research and Development (R&D) using post-test-only in controlled quasi-experimental group design. The subjects of the study were 2 classes, a control class and an experimental class. The results showed (1) Android-based student worksheet was categorized very good as percentage of 85%; (2) the students’ responses was categorized very good as percentage of 86.42%; (3) the experimental class results were better than control class. The average result on cognitive tests on the experimental class was 89.97 and on control class was 78.31; whether the average result on psychomotor test on the experimental class was 89.90 and on the control class was 79.83. In conclusion, student result using Android-based student worksheet was better than those without it.

1. Introduction

The information technology recently has been developed quite rapid [1]. Those development change the society paradigm especially both in searching and obtaining information, which is not only taken from newspapers as well as audio-visual or electronic devices, but also gathered from internet. One of the areas significantly impacted by the information technology development is education in which it is an important aspect of human life and a major aspect in improving human resource quality.

Research and Development (R&D) used to collect reviewer sheet media, test results, and questionnaire responses as data [2]. The objective of this research format for development of tutorial video of massage techniques on the scalp and hair care (cream bath) based on android mobile phone.

Cellular phone was utilized in supporting classroom activity [3], about the use of cell phone in the classroom to support the learning that learn how Judy Pederson, a language arts teacher from California, uses Web 2.0 tools in conjunction with student cell phones, and how Jarrod Robinson of Victoria, Australia, incorporates student cell phones into his physical education classes. Student worksheet (LKS) is used to improve the knowledge and skills of students in the standard of competence in the basics of animation stop motion. LKS based on Android is made by utilizing a web editor with App Inventor. App Inventor is an application provided by Google Labs to create applications that run on the Android operating system. The presence of Android-based student worksheet provides an opportunity for students to learn the material that is less dominated anywhere
and anytime as well as providing a means of questions and practical procedures that must be done by the students. Users response expressed good in terms of sheet questionnaire responses, the second shown that the average value of the results of the feasibility validation of applications by two expert lecturers multimedia was 89.5%, the results of the feasibility validation by three expert lecturers makeup was 88.7%.

Educational research and development is a process used to develop and to validate educational products [4] describes four main features in research and development. There are four features described in R & D, namely:

1.1 Studying research findings pertinent to the product to develop, that is, conduct a study or preliminary research to find research findings related to the product to be developed.
1.2 Developing the product base on these findings That is, developing a product based on the research findings.
1.3 Field testing it in the setting where it will be used eventually That is, do field test in setting or actual situation where the product will be used
1.4 Revising it to correct the deficiencies found in the field-testing stage. That is, make revisions to correct the weaknesses found in the field test stages
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Based on observations conducted in the multimedia department, lack of instructional media that utilize Android smartphone for learning. Students use laptop or manual book to support their learning activities as well as teachers apply conventional teaching methods which cannot ignite the students interest in the classroom and make them prefer to ignore the lessons by chatting with peers or playing their phones.

2. Methods

2.1 Research and development approach

In experimental research in education, participants are randomly selected and each of them has opportunity to be the subject of the research, in which the researcher has ability to manipulate the subject according to his design and it was unlike quasi-experiment where the researcher does not have an ability to manipulate the subject meaning the group is randomly used as the basis of the treatment and control group.

The four features of R & D become the preliminary steps in conducting the study. From the preliminary steps, the products would be designed and developed for later tested and improved/revised), the research and development (R & D) approach in education has ten steps which can be seen in figure 1 below:

![Figure 1: Research and Development (R&D) steps [4]](image)

As result, the study produced Android-based student worksheets based using six of the ten steps of the R &D model. Referring to 6 steps of R&D model in figure 1, the Android-based student worksheet were designed into:

a) Analysing potential problems phase; before selecting and developing a media, analysis on the potential and problems should be undertaken first. At this step, observations and interviews to
analyse the potential problems occurring in the learning process in class XI multimedia skills program should be done.

b) Data collection phase; after determining the potential problems collecting various information and literary resources possibly used as materials for particular product planning are done. In the data collection phase is done in three steps, namely a field survey with interviews and questionnaires spread, literature studies to determine the concepts or theories related to the manufacture Android-based student worksheets, and needs media property that needs software and hardware.

c) Product design phase, next stage is to design products that will be developed in accordance with the problem to be solved. At this stage of the products produced in the form of flowchart and storyboard in Design Graphical User Interface (GUI) steps to make LKS Android use App Inventor web editor.

d) Design validation phase, the design validation process to assess whether the activities of the product design student worksheets based on Android in this new work in a rational system would be more effective than the old one or not. Results from product development design will be consulted to subject matter experts and media experts.

e) Stage design revisions, after the design of the product, validated through discussions with expert’s materials and media experts. It will be known weaknesses. The weakness was further tried to be reduced by improving the design.

f) Test phase, the next step after the validation and revision of products to be developed that is testing the product to determine the feasibility and effectiveness of the media worksheet developed Android-based students. The products will be tested to the multimedia second-grade students as a class experiment that follow subjects in the multimedia productive Vocational High School.

The research design was post-test-only using control group. It involved two groups, one named as experimental class received treatment (using Android-based student worksheet) and another named control group did not receive any treatment. The result of post-test on both groups determined the learning outcomes Thus, the experimental design is described in table 1 [2]:

| Table 1. Design Post-test Only Control Group Design |
|---------------------------------------------------|
| Treatment group         | R | X | O |
| Control group           | R | C | O |

The random post-test-only control group design involves two groups, both of which are formed by random assignment. One group receives the experimental treatment while the other does not, and then both groups are post-tested on the dependent variable. As before, the symbol X represents exposure to the treatment and O refers to the measurement of the dependent variable. R represents the random assignment of individuals to groups. C now represents the control group.

Data collection technique was interview, validation, questionnaires, and tests. Interviews were conducted to obtain information directly from the Multimedia teachers. Validation is the evaluation determining the validity of the data managed by the validator. Questionnaires are a number of written questions used to determine the students' responses to the media. Tests in the form of post-test sheet were done by the students after receiving treatment to determine the effectiveness of the media in the learning process. Data analysis technique used is the validator assessment analysis, analysis of student responses, and analysis of learning outcomes. This is the formula used to analyse the response of the validator and respondents.

\[
\text{Validation Percentage (\%)} = \frac{\text{jumlah skor total}}{\text{skor kriterium}} \times 100\% \tag{1}
\]

Description:
Score = Score the ultimate criterion of each item \( \times \Sigma \text{validator} \)
Table 2. Interpretation Validator Score & Students Response Score

| Percentage (%) | Criteria       |
|----------------|---------------|
| 0 – 20         | Not valid     |
| 21 – 40        | Less valid    |
| 41 – 60        | Enough valid  |
| 61 – 80        | Valid         |
| 81 – 100       | Very valid    |

The next step is to calculate the percentage of students' response to the quality of the media. Scores are calculated by using a formula seen in the table 2 to determine whether there is any difference in the p-value of both control class and experimental class. Independent sample t-test to would be used to determine the normality and homogeneity.

3. Results and discussion

This study takes a standard of competence mastering the basics of stop-motion animation (flat area). In media student worksheets based on Android is provided with a booklet to be done student practicum. This worksheet consists of 5 labs contains steps to create a stop motion animation with a variety of techniques that engineering drawings or text, live actors engineering, cut out technique and technique clay puppet, but before students starting the exercise, students should learn the material in the media and execute matter to know the cognitive ability of students after the study material.

![Figure 2. Home(Cover) Media](image)

Front page (cover) featuring the initial appearance of the media or the cover of the media with the title to see the material to be studied multimedia class XI and loading for 10 seconds, which was then headed to the main menu page.

Figure 3. at the page contains menus contained in the media. Menus are available in the user menu, material, videos, exercises, worksheets and profiles. Equipped with the exit button to exit the media. Base on figure 3.b that user guide contains instructions on using the worksheet student learning based on Android. This page describes the use of buttons in the media, making it easier for students to operate media. Figure 3.c contains examples of stop motion animation videos that help students understand the material. Also equipped with instructional video making stop motion animation post-production stage.
Figure 3. (a) Main Menu page (b) Instructions page (c) Home Video

Figure 4. Home Exercises page of exercises used to help and train students in the hope that students can easily understand material. Questions on this page about the form of text consisting of 10 questions.

Figure 4. Home Worksheet

on page, handy to train students psychomotor ability. Page of this worksheet contains about 5 practicum contains steps to create a stop motion animation with a variety of techniques to be done coherently.

The analysed data is data validation result of media, materials, learning devices (RPP and items), as well as the student's response. The data captured is used to determine the validity of media, materials and learning tools as teaching material in the learning activities.

Media validation results calculated to determine the quality of the media. The result of the acquisition value of the first validator is 82.5%, the second validator is 87.5% and the third is 85%. On average these values will result in a value of 85%, which meet the criteria of very valid. Validator validation results of the first material are 87.78% and the second validator is 88.89%. On average these values will result in a value of 88.33%, which meet the criteria of very valid. The results of the validation of RPP first validator is 85.71% and the second validator is 87.14%. On average these values will result in the value of 86.42%, which meet the criteria of very valid. The results of the validation of an item from the first validator are 89.09% and the second validator is 85.45%. On average, these values will result in the value of 87.27% which meet the criteria of very valid.

Media that has been validated and revised then tested on students in the learning process. Tests performed on the experimental class XI MM 2 with the number of 30 students, with the aim to determine the students' response to the media in order to know their assessment of the media. Each item indicators if averaged would result in a value of 86.42%, which included in the excellent category.

Student learning outcomes are taken in this study a test of cognitive and psychomotor tests. The results of this study are used to determine whether the value of students who use the media better than
students who did not use media. Data obtained hypothesis testing will be done with the help of Minitab software. Test this hypothesis using Independent sample t-test to the prerequisite test for normality and homogeneity.

Normality test is performed to determine whether the data obtained normal distribution or not. Type of normality test used in this study is the Kolmogorov-Smirnov. The basic concept is to compare the distribution of the data that will be tested for normality with the standard normal distribution. As different test in general, if the significance value below 0.05 means that there is a significant difference, and if the sign did not occur above 0.05 then a significant difference, which means the normal distribution of data. The results of the normality test of cognitive tests and psychomotor tests show on figure 5:

![Figure 5. Test Normality Test Results Cognitive Control Class](image)

The value of significance of the test class that controls on cognitive tests XI MM 1, can be seen from the P-Value is > 0.05 (above 0.05). This means that data from a normal distribution control class.

![Figure 6. Cognitive Test Normality Test Results Class Experiments](image)

The value of significance of normality testing an experimental class on cognitive tests can be seen from the results of the P-Value. P-Value data experimental class is > 0.150 (above 0.05), which means the data is normally distributed.
The value of significance of the test class that controls the psychomotor test class XI MM 1, can be seen from the P-Value is 0.06 (above 0.05). This means that data from a normal distribution control class.

The significance value of normality test on experimental class for psychomotor are seen from the p-value. In the experimental class, p-value was 0124 (more than 0.05), which means the data was normally distributed [5].

Homogeneity test is performed to determine whether the data obtained by both control group and experimental class is homogeneity or not. This test is carried out by comparing the variance of the two groups [6,7]. Homogeneity test results on both student cognitive and psychomotor tests are seen in the figure below:

![Figure 7. Normality Test Results Tests Psychomotor Experiment Class](image7)

![Figure 8. Normality Test Results Tests Psychomotor Experiment Class](image8)

![Figure 9. Result of Homogeneity Test Cognitive](image9)
Homogeneity test using F-Test shows that p-value on F-Test determine whether or not the two data is homogeneous. If the p-value on F-Test is more than 0.05 (p > 0.05) then both groups have the same variance or homogeneity. In figure 12, p-value on F Test was 0.0478 (more than 0.05), which means both group control and experiment class are homogeneity [8].

![Figure 10. Test Results Homogeneity Tests Psychomotor](image)

For psychomotor tests, p-value on F-Test is seen in figure 13, which shows that p-value was 0.142 (more than 0.05), which means both experimental group and control class are homogeneity [9,10].

From the prerequisite test both groups showed normal distribution and homogeneity, so hypothesis using parametric independent sample t-test could be carried out. The results of hypothesis test on both student cognitive and psychomotor are seen in the figure below:

![Figure 11. Test Results-T Test Cognitive](image)

Figure 12 shows that t value was -7.52 with 56 of degree of freedom (df) and p value was less than 0.05 (p<0.05) meaning H0 was rejected and Ha was accepted or there was difference between the control group and the experimental class.
In Figure 14, it shows that t value was -8.95 with 53 of the degree of freedom (df) and p-value was 0.000 (p< 0.05) meaning H0 was rejected and Ha was accepted or there was difference between the control group and the experimental class.

4. Conclusion
Based on the results and discussion shown that (1) Android-based student worksheet was categorized very good as percentage of 85%; (2) the students’ responses was categorized very good as percentage of 86.42%; (3) the experimental class results were better than control class. The average result on cognitive tests on the experimental class was 89.97 and on control class was 78.31; whether the average result on psychomotor test on the experimental class was 89.90 and on the control class was 79.83. In conclusion, student result using Android-based student worksheet was better than those without it.

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