

Development of Mobile Learning to Improve Students Visual Literation in Vocational High School

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Abstract: This study aims to produce products in the form of mobile learning media for tenth grade students of the Department of Multimedia at State Vocational High School One Sukasada. This research applied the Research and Development (R and D) research model of Analysis, Design, Development, Implementation and Evaluation (ADDIE) models. The validation of media products was carried out through the expert review stage of the contents of the study field, the learning design expert review, the learning media expert review, individual trials, small group trials and field trials. The instruments which were used in data collection were questionnaires and study results tests. This study utilised three data analysis techniques, namely qualitative descriptive analysis, quantitative descriptive analysis and inferential statistical analysis. Based on the results of data collection, the average percentage of respondents obtained for products has developed for above 80%. The results of this study indicated that mobile learning based learning media is incredibly significant for improving visual literacy in simulation and digital communication.

INTRODUCTION

The development of information technology is developing in a rapid way, hence that it encourages the creation of innovation in all fields; one of them is the field of education. The development of technology requires teachers to utilise a variety of forms of media in learning^[1], stated that the learning process is a communication process and takes place in a system, where without any media, communication will not take place and the communication process cannot take place optimally as well. In the learning process, the teacher needs learning media to deliver the materials, thus that the

material which are delivered can be well presented and an effective and efficient learning atmosphere would be created as well. Hitherto, many teachers have used learning media, however, the media which are used are print-based media in the form of books and worksheets^[2]. There are several teachers who use learning media in the form of software such as PowerPoint. Those learning media are less supportive in student's comprehension in receiving lessons. Therefore, students necessitate media which are representative, portable and that can be used by students at any time in learning. One of the media that can assist students in learning which are student-centred is mobile learning media.

Literature review: The basic concept of mobile learning (m-learning) is learning that utilises technology and mobile devices. In this case, the device can be in the form of a PDA, mobile phone, laptop, tablet or personal computer, etc. With mobile learning, users can access learning contents anywhere and anytime without having to visit a certain place at a certain time. Hence, users can access educational contents without being tied by time and space^[1, 3-5] entail that e-Learning is a concept of distance learning using telecommunications and information technology. Based on this definition, mobile learning is a learning model which utilises information and communication technology. The concept of mobile learning brings the benefits of the availability of teaching materials which can be accessed at any time and visualisation of attractive materials^[6]. Some important abilities which must be provided by m-Learning tools are the ability to attach to other equipment (especially computers), the ability to present learning information and the ability to realise communication when there is instruction between teachers and students.

Mobile learning is a learning media that utilises technology and mobile media. The concept of mobile learning has the benefit of the availability of teaching materials that can be accessed at any time and making interesting material. Mobile learning is learning with PDAs, mobile phones, laptops and tablet of personal computers^[7]. With the existence of mobile learning media, the learning process can be carried out well. In addition, when it is compared between conventional learning and mobile learning, it allows more opportunities for collaboration and informal interaction among the students. Mobile learning combines several aspects including technological devices, social aspects and students. Based on the supporting aspects of mobile learning, it can be concerned in various learning materials and various levels of education. The purpose of learning using mobile learning media can make it easier for students to learn wherever and whenever that is not limited by space, time and place^[8].

The usage of mobile learning media can have positive impact on students which can encourage students and improve visual literacy and make students feel enthusiastic in learning. It is hoped that it can also attract students in understanding something abstract to be more concrete and simplify the teaching and learning process. Visual literacy is an ability which is owned by the students in listening, speaking, writing, reading and thinking. Visual literacy abilities which are possessed by students can improve student learning outcomes^[9] states that learning outcomes are a measure or level of success that can be achieved by a student based on experience gained after evaluating in the form of tests and usually manifested with certain values or particular numbers and cause changes in terms of cognitive, effective and psychomotor aspects.

Based on the description which has been stated above, the researchers make alternative learning media using mobile devices that can present more interesting simulation and digital communication learning by utilising information technology. The aim is to overcome student's difficulties in understanding digital communication and simulation materials and can make learning simulation and digital communication more interesting^[10].

Mobile learning-based learning media acts as a supplement for simulation and digital communication that presents more interesting simulation and digital Communication learning. The main objective of the writer to research this development is to create a learning media based on m-Learning as a supplement to learn simulation and digital communication by describing the attractiveness, convenience and effectiveness^[11].

MATERIALS AND METHODS

This research uses the Research and Development (R and D) research model of Analysis, Design, Development, Implementation and Evaluation (ADDIE) models. The research design is divided into two parts, namely planning research design and the effectiveness of the Mobile learning model (Fig. 1).

The research design in this learning plan refers to a learning model based on mobile learning. The research flow planning learning model is illustrated in the following chart (Fig. 2).

Product trials in this research development include trial design; trial subjects; data types; data collection instruments and data analysis techniques. The trial was carried out in several stages namely a review of the experts individual test; small group test and field test. Product trials are reviewed by content experts, media experts and design experts; individual trials consist of three students consisting of one person who has high learning achievement, one person who has moderate achievement and one person who has low achievement. Small group trials consisting of nine students consisting of three people who have high learning achievement, three people who have moderate achievement and three people who have low achievement. For the field trials which was taken as a sample is one class of 32 students. The instruments which were used to collect data in this development research were a questionnaire and test of learning outcomes. The questionnaire was used to collect the results of expert reviews, individual trials, small group trials and field test students. The learning independence test is used to collect student's learning independence before and after using mobile learning in the field test.

This study uses three data analysis methods, namely qualitative descriptive analysis, quantitative descriptive analysis and inferential statistical analysis. Qualitative descriptive analysis is used to process data from trial results from experts, individuals, small groups and field

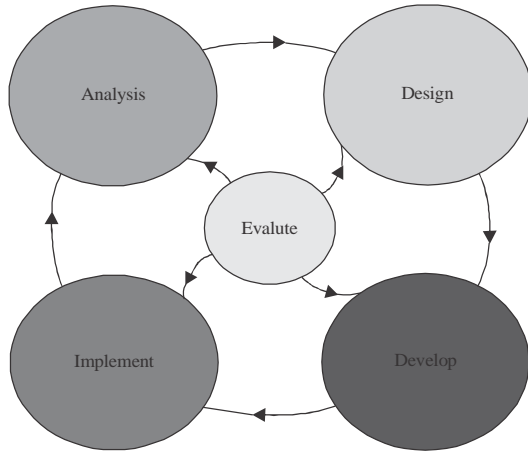


Fig. 1: ADDIE development model

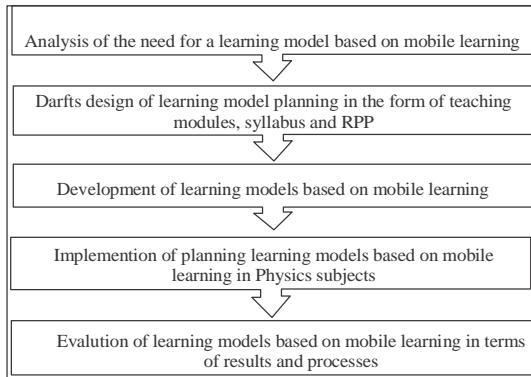


Fig. 2: Development chart

Table 1: Guidelines for conversion of achievement levels with a scale of 5

Achievement level (%)	Qualifications
90-100	Very good
75-89	Good
65-74	Enough
55-64	Less
0-54	Very less

Tegeh and Kirna^[12]

tests while quantitative descriptive analysis is used to process data obtained from questionnaires in the form of descriptive percentages.

Inferential statistics in the form of t-test are used to analyse differences in the pre-test and post-test scores obtained during field trials. The data processed in the field test is the data of the pre-test and post-test results. Pre-test is given to students before using mobile learning and post-test is given to students after students use mobile learning. The research hypothesis was tested by t-test (paired samples t-test). The conditions are as follows if the probability >0.05 then H_0 is accepted and if the probability is <0.05 then H_0 is rejected (Table 1).

RESULTS

The results of this study are in the form of mobile learning. The innovative aspect of teaching materials is mobile learning which can be read via. smart phones, laptops and computers. This mobile learning can also be called a digital book. The results of the expert review stated that the developed mobile learning was appropriate. 85% content expert test results good qualification, 90% media expert test very good qualification and 90% design expert test very good qualification. Individual test results of 88.67% are positioned in good qualifications (Table 2 and 3). The small group test results of 83.56% are positioned in good qualifications.

Evaluation results from the field test showed that 42.85% of respondents (14 people) gave very good responses, 57.15% of respondents (18 people) gave good responses and 0% of respondents gave sufficient, less and very good responses (Fig. 3).

Field test results of 87.41% are positioned in good qualifications. Based on the 32 student's pre-test and post-test scores, a paired sample t-test was performed with the assistance of SPSS 16.0 for Windows Evaluation Version. The t-test output using SPSS 16.0 for Windows evaluation version shows that the average pre-test value is 57.39 and the average post-test value is 87. The probability value is $0.001 < 0.05$, then H_0 is rejected. This means that the average value of learning outcomes before and after using mobile learning media based learning I is not the same. Hence, it can be said that there are differences in the average value of student learning outcomes after using learning media based on mobile learning with the students before using learning media based on mobile learning. Judging from the conversion of learning outcomes at state vocational high school one Sukasada, the average post-test value of 87 students is in very good qualifications and is above the minimum completeness criteria or passing grade value of simulation subjects and digital communication of 75. Seeing the mean value or mean of post-test which is greater than the mean value or the mean of pre-test, it can be said that learning media based on mobile learning can improve student's learning outcomes in simulation and digital communication.

Based on the 32 student's pre-test and post-test scores, a paired sample t-test was performed with the help of SPSS 16.0 for Windows Evaluation Version. The t-test output using SPSS 16.0 for Windows Evaluation Version shows that the average pre-test value is 57.46 and the average post-test value is 64. The probability value is $0.001 < 0.05$, then H_0 is rejected. This means that the average value of visual literacy before and after using

Table 2: Individual test assessment data

Respondents	Score	Qualification
R1	89	Good
R2	85	Good
R3	92	Very good
Total	266	Good

Table 3: Small group test assessment data

Respondents	Score	Qualification
R1	81	Good
R2	80	Good
R3	83	Good
R4	90	Very good
R5	87	Good
R6	81	Good
R7	83	Good
R8	87	Good
R9	80	Good
Total	752	Good

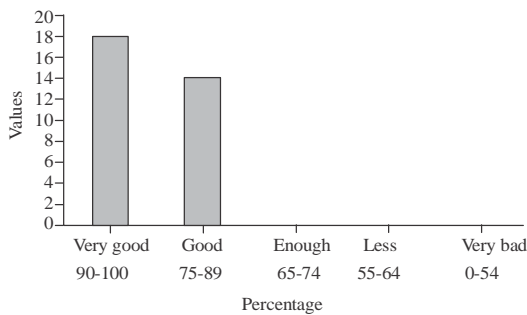


Fig. 3: Field test results

mobile learning based learning media is not the same. Hence, it can be said that there are differences in the average value of visual literacy of students after using learning media based on mobile learning with the students before using learning media based on mobile learning. Seeing the mean value or mean of post-test which is greater than the mean value or mean of pre-test, it can be said that learning media based on mobile learning can improve student's visual literacy on simulation subjects and digital communication.

DISCUSSION

This development product is mobile learning using the Analysis, Design, Development, Implementation and Evaluation (ADDIE) Model^[13]. The results of research according to Arsyad^[14] science learning based on online learning resources must still be followed by informal face-to-face communication models with the students to obtain more optimal results. The advantages of this electronic mobile learning are increase the motivation and

independence of students because every time they work on a lesson task which is clearly defined and is in accordance with their abilities; after evaluating, the teachers and students know well in mobile learning of which part that the students have succeeded and in which part of mobile learning where they have not succeeded yet; students achieve the results in accordance with their abilities; subject matter is divided more evenly in one semester; the education is more efficient because learning materials are arranged according to the academic levels and it is practical because it can be accessed through electronic media, computers, tablets, etc. In addition, it is also equipped with job sheets, audio video tutorials and evaluations. The use is uncomplicated, one of which can be directly opened through the swf format. If you want to go to the particular destination page, you can click the desired page number directly^[7]. If students are connected to the internet, the addresses of reference sources can be accessed directly as well. Mobile learning is equipped with various buttons, for example, its function is to turn on the music that is already in mobile learning or to open the next page.

The development of this product requires quite a long time and process so that there are possibly some mistakes and deficiencies in some parts. To optimise the product which is being developed, it needs to be addressed through expert reviews and product tests consisting of individual tests, small group tests and field tests. From the experts, there are several suggestions for the product being developed, namely the results of expert evaluations; things that need to be improved include: mobile learning so that it can be opened in all mobile phones including OS, not only for Android) Individual test evaluation results, small group test and field tests; things need to be improved, among others images in the material are unclear, the evaluation section should be completed by the back button and video examples should be added to each material.

There are four factors that lead to very good qualifications in the individual test, small group test and field test. First, the presentation of the contents of mobile learning is clear. Second, the technical quality especially the aspect of the display is considered attractive. Third, the presentation of clear material can make the students not getting bored to learn mobile learning. Fourth, the presentation of learning content is systematic and can be understood easily which can attract student's interest in learning. Based on these factors, mobile learning is effectively used and can significantly improve learning independence^[15] in his research stated that it is very effective to be used in e-Learning. The use of mobile learning is very interesting for the students in the learning process.

Weaknesses of this product are it can only be operated on Android, not all students have devices that support mobile learning media, the appearance of mobile learning media is influenced by the quality and type of smart phone, so that, sometimes it cannot perform optimally. For ordinary people, it is expected that there are other users who understand well about mobile learning, so that, ordinary people can have better understanding about the material contained in products which have been developed.

Researchers realize that a quality product requires many supporting factors to be more optimal. Many things emerged in the field when the research was carried out. It is hoped that the product being developed could be optimised better through the time. From these various things, researchers hope this development can be useful and can be expanded for further aspects.

CONCLUSION

This study is a research and development which aims to produce certain products and examine the effectiveness of learning products based on mobile learning. Learning media based on mobile learning is sufficient and effective to be used in improving visual literacy and learning outcomes in simulation subjects and digital communication in class XI Multimedia 2 State Vocational High School One Sukasada. This study has several limitations including: not all students have devices which support mobile learning media; the appearance of mobile learning media is influenced by the quality and type of smart phone, so that, sometimes it cannot perform optimally.

RECOMMENDATIONS

For teacher mobile learning continue to scale up to learning process. The mobile learning requires students to be active, so, they can build their own knowledge, subjectively, dynamically and develop. For learners mobile learning as a learning model that with online learning constructive approaches that as being able to improve learning outcomes and relevant to learners. Take stock of stakeholders needs before you develop and Embrace program flexibility.

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