Development of camlearn as mobile learning media for photography equipment course

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Abstract. Limited learning facilities in vocational high schools is one of the problems in vocational education. Not every schools with multimedia department have enough standard cameras. The solution and also the goal of this research is to discuss the development of Camlearn as mobile learning media that can be used in the multimedia department. Camlearn is an android-based mobile application that discusses the types of cameras and photography equipment. This research applies the steps of ADDIE research method including Analyze, Design, Development, Implementation, and Evaluation. Analysis, design and development activities are based on material requirements analysis that has been carried out using a questionnaire and interview methods for students, teachers and vice-principals of curriculum with a Likert Scale consisting of three research variables namely material aspects, media aspects, and application functionality. The results of the application product feasibility on the material suitability aspects are 80%, the media conformity aspects are 82%, and the product functionality aspects are 82%. Based on the results of the product development testing, it can be concluded that this research product has met the minimum eligibility test so that it can be declared feasible to be used as a learning media in the learning process.

1. Introduction

The development of information and communication technology (ICT) in the 21st century has even had an impact on learning and teaching activities [1,2]. This has resulted in the increasing challenge of teachers to constantly develop innovations in learning along with the development of information and communication technology (ICT) which is rapidly increasing coupled with the increasing use of smartphones by teenagers aged 14-17 years which is increasingly prevalent so that it dominates the number of smartphone users in Indonesia, namely as many 58% of 47 million people [3]. Of this amount, it can be seen that not all teenage smartphone users can use the technology appropriately, but most use smartphones only as a lifestyle [4].

Another problem that arises in learning and teaching activities occurs in Vocational High Schools, especially in the Department of Multimedia, is that the limitations of facilities and technology used by teachers to display the visualization of equipment as students' basic knowledge are still found. Coupled with the lack of matching the number and quality of equipment with the needs in the industry caused the learning of vocational high school students hampered.

To overcome the existing problems, it is necessary to develop learning media by utilizing technology that is developing in the 21st century. The application developed is an android-based application as a learning medium that is used to help teachers deliver photography learning material both in terms of

knowledge and practice. The application development adapts the Discovery Learning model so that the syntax in the learning model of Discovery Learning model will be loaded so that it is expected to be able to assist educators in achieving learning objectives and to realize learning that involves ICT in Vocational Schools. The use of ICT in learning activities will provide a positive impact [5] that will help teachers to share an information to students and will make learning activities easier to understand and more interesting.

Generally the purpose of this research is to develop the Camlearn application as a learning media, but Camlearn itself in its development has several objectives including: (1) Implementing innovative learning media development involving mobile devices that contain the syntax of Discovery Learning learning, (2) Solution to problems in media development learning in achieving learning objectives, (3) Reducing the use of mobile devices that are not useful in the school environment.

2. Mobile learning in teaching and learning activity

Mobile technology is a form of knowledge in the modern era that is transformed as a form of revolutionary technological development in society [6]. The role of mobile technology can't be avoided from teaching and learning activities, even with the existence of mobile technology, this new generation of learning will be created [7].

Implementation of mobile learning in teaching and learning activities is used to strengthen learning that is not only limited in the classroom [8] but can be done anywhere by utilizing the learning opportunities provided by portable electronic devices [9]. Some studies also explain that the application of mobile learning in the learning and teaching process can provide positive ideas and benefits, especially in motivating students to learn and understand lessons well [10]. Besides learning to use mobile learning will make it easier to help teachers in conveying information to students because the media used has interactive, collaborative characters, and is able to support private and blended learning [11], of course supported by applications that have considered adjustments between devices, materials used platform will also be used on the device that will be used in mobile learning [12].

In its implementation in the learning and teaching process, the flow of the application of e-learning and m-learning has a comparison as in the table below [13].

Table 1. Comparisons of e-learning and m-learning.

	e-learning	m-learning
Physical devices	Wired	Wireless
Computation & communication	Distinctive	Distinctive
Learning	Confined to the single desk	Confined to the single desk

Mobile learning has a uniqueness that makes it suitable to be applied in learning. The results of research into the use of m-learning and e-learning in the learning and learning process show that students prefer to use m-learning compared to e-learning because m-learning is more flexible, available anywhere, and anytime [14]. This concludes that m-learning is a picture of future learning [15].

3. Methods

3.1. Developing Camlearn

Camlearn application development is done by applying the stages contained in the ADDIE development model, including:

3.1.1. Analyze. Conducted to find out the Camlearn application development needs include learning material and analysis of the content of learning models that will be implemented in the application.

3.1.2. Design. At this step, the Camlearn application design plan starts from the application interface design as well as the program flow design and application interface design following the needs that

have been known so that at this stage the design or flow of the mobile application program will be developed.

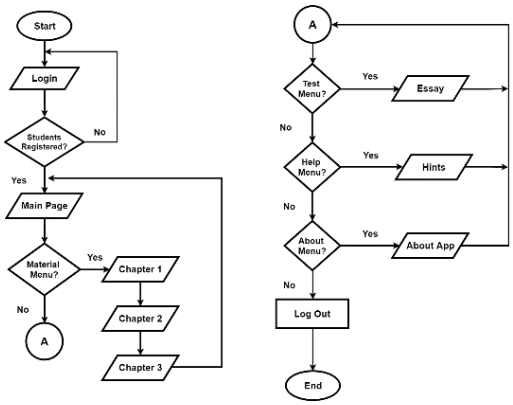

Figure 1. Flow chart.

3.1.3. Development. The results of the design are realized in the program so that it becomes an application that is ready to be run and used. Making this learning media using Android Studio, namely Integrated Development Environment (IDE) for the development of Android-based mobile applications. At this stage, the validity test is also carried out on the material expert and the media expert.

3.1.4. Implementation. Camlearn application is used in the learning process in the classroom as a learning medium by directly involving students. A usability test is also conducted to determine the level of feasibility in terms of product functionality.

3.1.5. Evaluation. At this step, the feasibility level of the application will be seen and then can be used as a medium in learning photography or need to be revised.

3.2. Measurement of Camlearn

Research on Camlearn was conducted using a descriptive quantitative approach to determine the level of media validity and functionality. Product functionality testing is carried out using the black box method that is testing the software in terms of functionality specifications without testing the design of the program code.

The subjects of this study were students at the SMK 10 Malang majoring in Multimedia who were in grade XI and were studying photography. This study involved 2 classes, each class consisting of 30 students. The class involved will use Camlearn as a learning medium.

The research instrument was a Likert scale questionnaire consisting of three forms to test the validity of the material, media, and application functionality. The questionnaire to test the validity of the material aspect consists of 18 statements, while the media aspect consists of 31 statements. The functionality questionnaire consists of 69 statements including the admin and application functionality itself.

4. Result and analysis

4.1. Development result

Camlearn is built by loading photographic learning materials including photographic equipment, how to use it, and how to arrange photography equipment. This application also implements the syntax of learning contained in the Discovery Learning model where the implementation is realized by the existence of a Pre-Test page, providing practice exercises and assignments as an evaluation.

Learning with Camlearn is supported by using images and videos about the material contained in this application so that it will further enhance students' understanding of the material being taught. This Camlearn application is also packaged using an attractive application interface design so that it is more

able to attract students' learning interests as users and make it easier for users to understand the features contained in the application when users interact with this application.

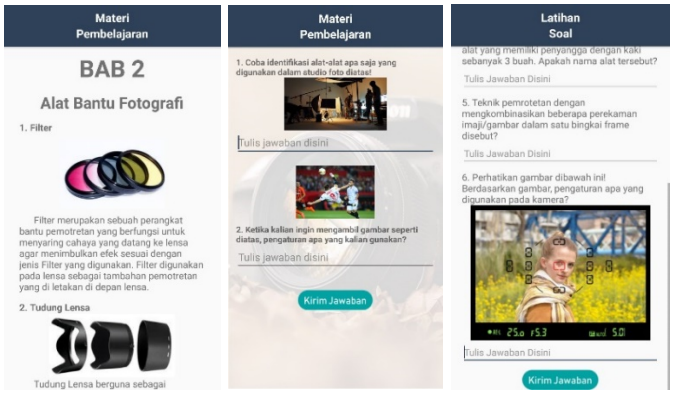

Figure 2. Camlearn mobile application.

The Realtime and Database Authentication features of Firebase are used on the Login page which will identify the status of the user's account so that users who succeed and pass identification will be taken to the main page of the application. The identification process in the Realtime and Database Authentication features is of course very closely related to the data contained in Firebase.

4.2. Measurement result

To calculate the results of the validity test, the equation used as follows [16]:

$$Va=TSe/TSh\times100\% \quad (1)$$

The validity test of material experts including aspects of the suitability of the material, linguistic aspects of the material, and aspects of supporting the presentation. The maximum value on each statement is 4, so the maximum score of Tsh is 72. The results of the material expert validation obtained a Tse score of 57. Based on the calculation of the material validity test obtained an application validity value of 80%.

Table 2. Material expert validation results.

No	Assessment Aspects	Tse	Tsh	V(%)
1	Aspects of material suitability	28	36	77%
2	Material aspects of language	19	24	79%
3	Supporting aspects of the presentation	10	12	83%
Total		57	72	240.2%
On the Average				**80%**

The validity test of the media experts including aspects of the suitability of the media being developed, aspects of completeness, communicative and interactive aspects. The maximum value in each statement is 4, so the maximum score of Tsh is 124. The results of the material expert validation obtained a Tse score of 102. Based on the calculation of the validity test of the material obtained an application validity value of 82.5%.

Table 3. Media expert validation results.

No	Assessment Aspects	Tse	Tsh	V(%)
1	Aspects of the suitability of the developed media	34	40	85%
2	Completeness aspect	30	36	83%
3	Communicative and interactive aspects	38	48	79%
Total		102	124	247.5%
On the Average				**82.5%**

Next is to test the level of application functionality and to determine the results of the application functionality test, while the guidelines used in the application functionality test to classify the results of the analysis are if the analysis results only reach less than 26% then it will be declared invalid, while a result is declared valid if it is able reaching a percentage of more than 76% [17].

Table 4. Assessment criteria.

Percentage (%)	Feasibility Level	Informations
76% - 100%	Valid	No revision needed
51% - 75%	Enough	Revision needed
26% - 50%	Less	Revision needed
< 26%	Invalid	Revision needed

The test results in table 5 show that the value obtained from the functionality test reaches 92.8%. This value means that the level of relevance of the application as a medium of learning in vocational high schools is very high. Also, the results of the validation of material and media experts are also included in the category of high relevance. Through this good functionality proves that the Camlearn application is valid for use as a learning medium in vocational high schools majoring in multimedia.

Table 5. Functional test results.

Aspects	Number of Statements	Score Percentage (%)
Admin Functionality		
Login Page	5	100%
Account Management	7	78.5%
Application Functionality		
Login Page	6	100%
Home Page	6	100%
Pre-Test	9	77.7%
Material Page	11	81.8%
Instruction for Use	5	100%
Exercise Page	12	83.3%
Operational Verbs in Application	3	100%
About Page	3	100%
Log-Out Menu	1	100%
Total	**69**	**1021.5%**
On the Average		**92.8%**

The various advantages and conveniences of the Camlearn application are also supported by interesting features that make students interested and motivated to learn the material contained therein. The running

of all features in the application shows that Camlearn is worthy of being used as an innovation in developing mobile-based learning media.

5. Conclusions

The increasing challenges of teachers in implementing the learning and teaching process in this technology era and the limitations of facilities for practice in the multimedia department make the development of instructional media by utilizing technology that is developing in the 21st century and has an interesting and motivating content that students need to do. Camlearn is an Android-based mobile application that was developed as a learning medium for multimedia students who are studying photography. This application was successfully developed wherein it contained theoretical and practical learning material for photography learning and implemented a discovery learning model.

So, the conclusion of this study is the development of instructional media by utilizing ICT which is collaborated with the implementation of learning models in it is very possible to do. In addition, the use of relevant Android-based learning media in the learning process is also very possible to help the achievement of learning objectives.

References

[1] S.Patmanthara and W N Hidayat 2018 *The Effectiveness of Learning Management System (LMS) on Computer Assisted Learning Course for Informatics Engineering Education Students* (Advanced Science Letters) Vol. 24, No. 4 pp 2642-2645.

[2] R Panangalage and A Pasqual 2008 Conf., *Impact of ICT on learning and teaching. 2008 IEEE international symposium on technology and society* (IEEE International Symposium on Technology and Society) 26-28 June, Fredericton, NB, Canada.

[3] T Heriyanto 2014 *Indonesia Masuk 5 Besar Negara Pengguna Smartphone* (*Indonesia is in the Top 5 Smartphone User Countries*) (DetikINET online) Available: http://inet.detik.com/read/2014/02/03/171002/2485920/317/indonesia-masuk-5-besar-negarapengguna-smartphone.

[4] A A Sakat 2012 *Educational Technology Media Method in Teaching and Learning Progress* (American Journal of Applied Sciences) Vol 9(6) p 874-878.

[5] W N Hidayat, S C Putro, M A Gumilang and I. Hidayah 2018 *What is Informatics Education Students' Impression of Using Metacognitive Training System at The First Time?* (ICACSIS) pp. 213-218.

[6] M Osman, El-Husein and J C Cronje 2010 *Defining Mobile Learning in the Higher Education Landscape. Journal of Educational Technology & Society, Innovations in Designing Mobile Learning Applications* (Educational Technology & Society) Vol 13(3) p 12-21.

[7] N S Alzaza and A R Yaakub 2011 *Student's Awareness and Requirements of Mobile Learning Services in the Higher Education Environtment* (American Journal of Economics and Business Administration) Vol 3(1) p 95-100.

[8] J Cheon, S. Lee, S Crooks and J Song 2012 *An Investigation of Mobile Learning Readiness in Higher Education Based on the Theory of Planned Behavior* (Computers & Education) 59, 1054–1064.

[9] M K Foti and J Mendez 2014 *Mobile Learning: How Student Use Mobile Device to Support Learning* (Journal of Loteracy and Technology) Vol 15(3).

[10] M A A Farah and A K Abu-Dawood 2018 *Using Mobile Phone Aplication in Teaching and Learning Process* (International Journal of Research in English Education) 3:2. (Palestina).

[11] F Ozdamli and N Cavus 2011 *Basic Elements and Characteristics of Mobile Learning*. (Proc. Social and Behavioral Sciences) chapter 28 pp 937 – 942.

[12] M Sarrab, L Elgamel and H Aldabbas 2012 *Mobile Learning (M-Learning) and Educational Environtments* (International Journal of Distributed and Parallel Systems) Vol 3(4).

[13] P Yeonjeong 2011 *A Pedagogical Framework for Mobile Learning: Categorizing Educational Applications of Mobile Technologies into Four Types* International Review of Research in

Open and Distance Learning (USA: Virginia Tech) Vol. 12(2).
[14] I S Malik 2019 *Learning problem solving skills: Comparison of E-learning and M-learning in an introductory programming course* (Education and Information Technologies) Vol. 24(5) (Spriger).
[15] M Sarrab, L Elgamel and H Aldabbas, 2012 *Mobile Learning (M-Learning) and Educational Environments* (International Journal of Distributed and Parallel System (IJDPS)) Vol. 3(4).
[16] S Akbar 2013 *Instrumen Perangkat Pembelajaran* (*Learning Instrument*) (Bandung : PT Remaja Rosdakarya).
[17] S Akbar and H Sriwiyana 2012 *Pengembangan Kurikulum dan Pembelajaran* (*Curriculum and Learning Development*) (Yogyakarta: Cipta Media).