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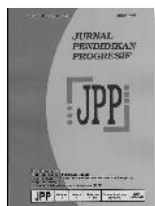


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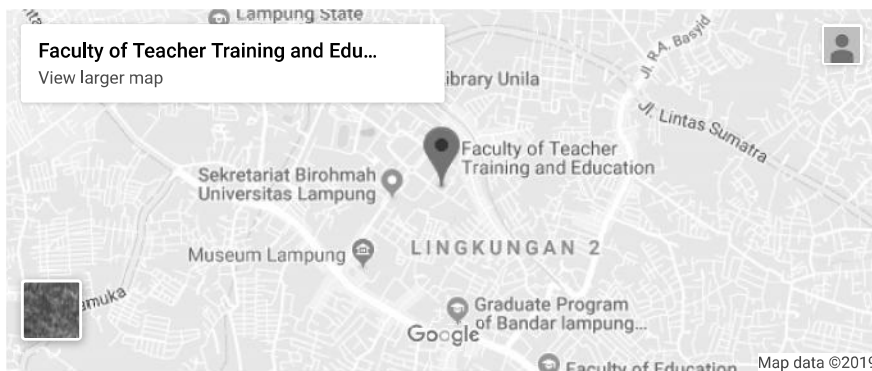
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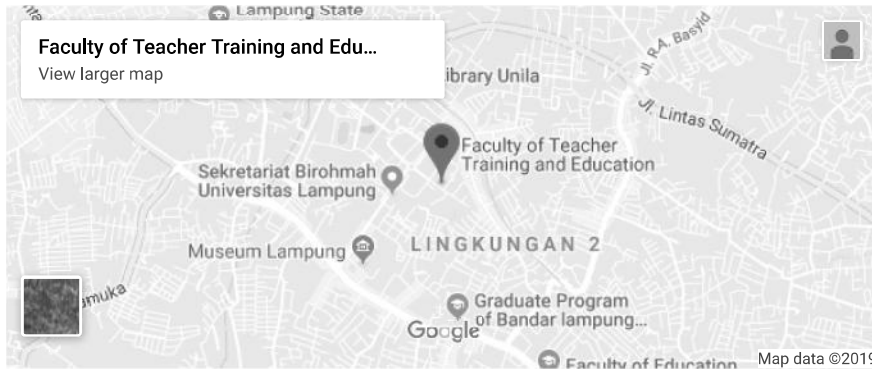
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Development of Learning Media Based on Mobile Learning Applications

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Abstract: Development of mobile learning application-based media. Objectives: The purpose of this study is to develop a more dynamic learning media by utilizing technology in the form of applications on smartphone devices to improve student learning outcomes. **Methods:** This study uses research and development methods with data collection techniques in the form of questionnaires, feasibility tests and effectiveness of mobile learning applications developed as learning media through stages designed according to the ADDHIE model. **Findings:** Product development in the form of mobile learning applications is feasible as a learning medium and effective for improving student learning outcomes with an increase in the average value of 28 students from 57.32 to 81.43. **Conclusion:** Mobile learning application is a good choice as a learning media.

Keywords: Learning media, mobile learning application, research and development

Abstrak: Pengembangan media pembelajaran berbasis aplikasi mobile learning. Tujuan: penelitian ini bertujuan untuk mengembangkan media pembelajaran yang lebih dinamis dengan memanfaatkan teknologi dalam bentuk aplikasi pada perangkat smartphone untuk meningkatkan hasil belajar siswa. **Metode:** Penelitian ini menggunakan metode penelitian dan pengembangan dengan teknik pengumpulan data dalam bentuk kuesioner, tes kelayakan dan efektivitas aplikasi pembelajaran mobile yang dikembangkan sebagai media pembelajaran melalui tahapan yang dirancang sesuai dengan model ADDHIE. **Temuan:** Pengembangan produk dalam bentuk aplikasi pembelajaran mobile layak sebagai media pembelajaran dan efektif untuk meningkatkan hasil belajar siswa dengan peningkatan nilai rata-rata 28 siswa dari 57,32 menjadi 81,43. **Kesimpulan:** Aplikasi pembelajar mobile merupakan pilihan yang baik sebagai media pembelajaran.

Kata kunci: Media pembelajaran, aplikasi pembelajaran mobile, penelitian pengembangan

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■ INTRODUCTION

Learning media is one of the important components in the learning process because it can clarify the message or information delivered, increase learning motivation, and learning outcomes. This is in accordance with the purpose of learning media that serves to facilitate communication in learning (Smaldino et al, 2005; Zhou, Z., Shin, J., Feng, R., Hurst, R. T., Kendall, C. B., & Liang, J, 2019; Jiang, S., Song, X., & Huang, Q, 2014)).

The development of information and communication technology as the direction of 21st century education is a challenge in the world of education, especially for teachers. Technology is part of learning, therefore teachers are required to be able to use it as a tool or media in the learning process (Song, L., Lau, R. Y. K., Kwok, R. C. W., Mirkovski, K., & Dou, W, 2017; Konate, A., & Du, R, 2018). The use of instructional media in schools must be in line with the challenges of industrial revolution 4.0 which is characterized by digital technology so that what is called cultural lag does not occur in teachers or students. The importance of learning media is in line with technological advances because it can be used as a graphic, photographic, or electronic tool to capture, process, and organize visual or verbal information in the classroom (Popescu, E, 2014; Bilandzic, M., & Foth, M, 2014).

In fact, the use of technology as a learning medium in the class is still low because teachers still tend to use various types of sources and learning media such as LKS, Power Point, thick textbooks or the like. Even though teachers and students in everyday life are very close to smartphone communication technology, almost all levels of society have it (Bilandzic, M., & Foth, M, 2014; Cheng, X., Su, L., & Zarifis, A, 2019) Unfortunately, the potential ownership of the smart phone has not been optimized (Zhou, Z., Shin, J., Feng, R., Hurst, R. T., Kendall, C. B., & Liang, J, 2019; Kim, K. R., & Moon, N. M, 2013).

The use of smartphones is still limited to communication tools or to access social media, although its function can be expanded as a learning media for mobile learning. Using a smartphone as a learning medium is more effective and efficient for teachers and students, because it can help overcome problems in learning (Zhou, Z., Shin, J., Feng, R., Hurst, R. T., Kendall, C. B., & Liang, J, 2019; Zhou, Z., Shin, J., Feng, R., Hurst, R. T., Kendall, C. B., & Liang, J, 2019). Among other things, overcome the shortcomings of learning tools, media, learning resources, and even overcome the difficulties of space and time (among others when discussing material that has not been understood due to time constraints).

The Mobile learning application is a medium with mobile wireless technology that allows everyone to be able to access a variety of information and learning materials at any time without limited space and time (Ally, Mohamed 2009: 1; Asabere, Nana Yaw 2013). The choice or basis for the development of mobile application-based learning media is because (a) it is owned by almost all levels of society, (b) more flexible, (c) accessible as desired, (d) facilitating students to learn independently, (e) economical, effective and efficient. The development of learning and media resources makes students better able to develop their potential without relying on classes scheduled to get information.

Based on the problems described above that the use of technology-based media in schools is still limited, the available media is less practical, so alternative and efficient media need to be developed (McClune, B., & Jarman, R, 2011; Du, J., Zhang, Y., Luo, J., Jia, Y., Wei, Q., Tao, C., & Xu, H, 2018). This development is to take advantage of the potential ownership of smart phones from teachers and students in the form of mobile applications as research objectives (in this study taking case for high school social studies subjects) in Bandar Lampung.

■ METODE

This study uses the research method and development of the ADDHIE model. In this study a product was developed in the form of a mobile application-based learning media (case in social studies subjects). Its feasibility as a media is validated by media and material experts. As a type of R & D research, the development procedure is through: Analysis, Designing, Development, Implementation and Evaluation. Data was collected through tests, questionnaires, documentation and supported by interviews. The design used in the implementation phase of this study was pre-experimental design, one-group pre-test post-test. This study uses the one sample t-test. The subjects in this research and development were carried out in two schools namely class VIII Al-Kautsar Middle School and SMP N 1 Bandar Lampung with a total of 63 people.

■ RESULTS AND DISCUSSION

Analysis Phase

This research begins with an analysis of the need for technology-based learning media that refers to the curriculum used in schools. Analysis of the need for learning media by utilizing the potential of smartphone ownership is seen from (a) aspects of the needs of students and teachers for interactive learning media that are able to accommodate learning problems, (b) IPS learning material requirements, integrative, objective formulations in accordance with the 2013 curriculum and potential analysis.

Design Phase

Analysis of this step is making interesting learning media design, determining the material in accordance with the 2013 curriculum, compiling evaluation materials according to the material including questions and answers, gathering background, fonts, images and buttons using the PhotoShopCS4 program.

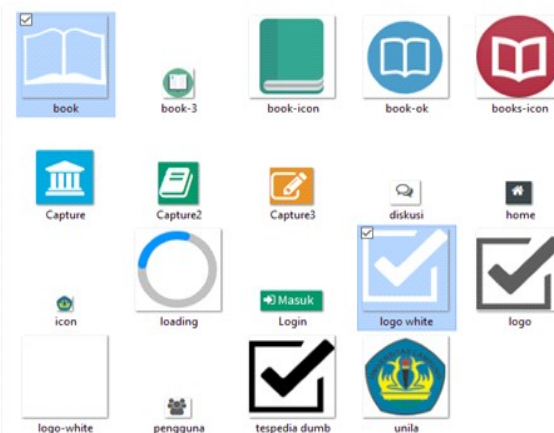


Figure 1. Collection of icons, fonts, backgrounds and main icons Png Formatted Application (Source: Product results, 2018)

Development Phase

Development and creation of learning media in the form of mobile learning applications through stages:

- (a) Preparation: The important thing in this stage is the need for hardware and software as materials needed in the manufacture of Android-based mobile learning media.
- (b) Programming: The way of programming is done by applying algorithms, choosing data structures, making variable names, writing code, and creating codes to facilitate understanding. After programming is complete, it is designed using Netbeans software. Components are arranged into one media unit according to the storyboard that has been made before.

The menu in Figure 2 works limited before the user enters/enters using the login menu in the upper right corner. The login menu is in the upper right corner of the main menu, used to enter user mode so that all menus can be used actively. The next menu (fig 3,4, 5), users can enter by using the username and password they already have. There are two roles in the choice of form, namely teacher roles and student roles.

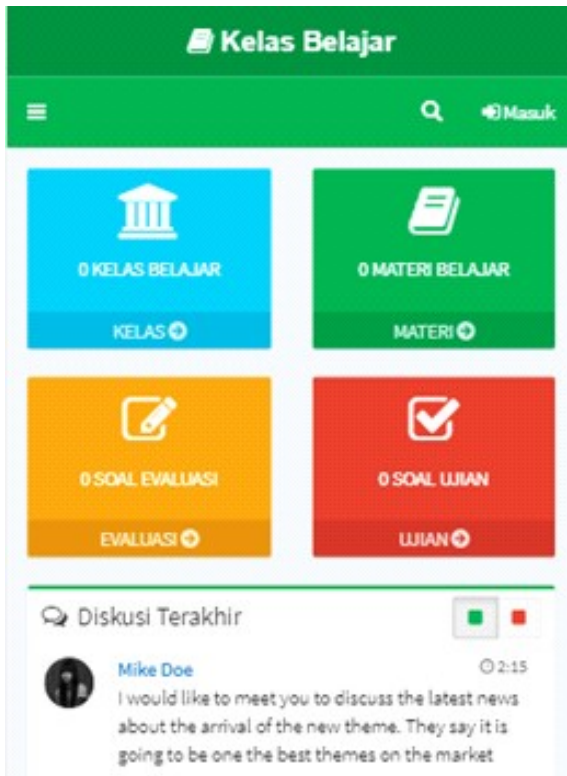


Figure 2. Application Main Menu. (Source: Product results, 2018)



Figure 4. Display the Main Menu Master Role. (Source: Product results, 2018)

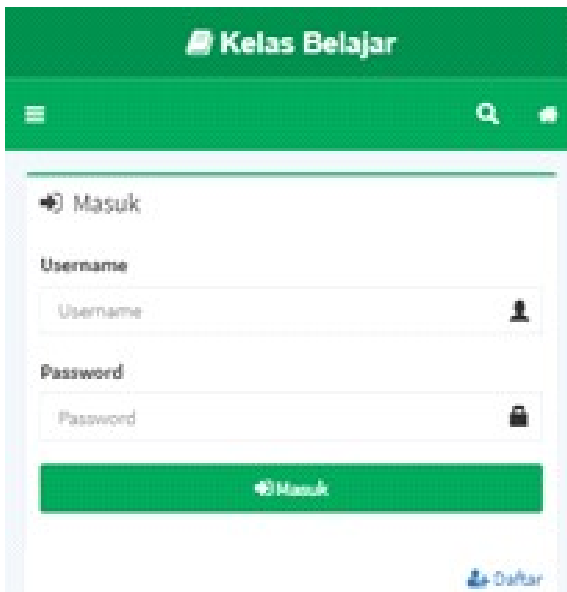


Figure 3. Display of Login Pages. (Source: product results, 2018)

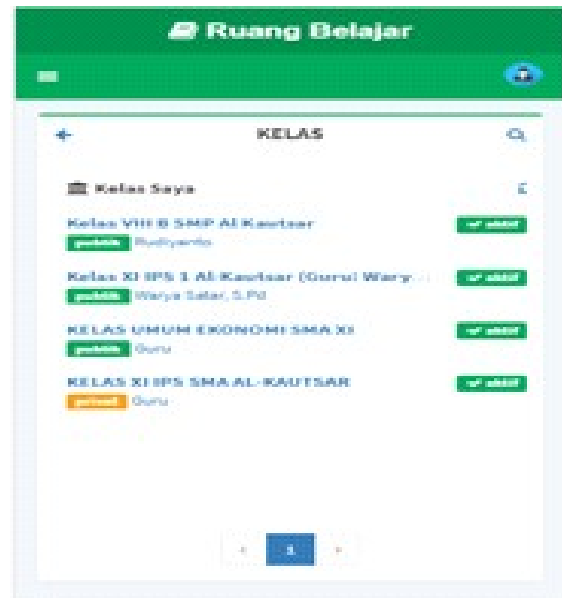


Figure 5. Display List of Active Classes on the Student Role Menu. (Source: Product results, 2018)

In addition to the teacher and student role menu, there is also a password menu to change the key entered in user mode and profile menu to see names, usernames, e-mails and change user photos (fig 6.)



Figure 6. Display of Passwords and Profiles
(Source: Product result, 2018)

(c) Validation (Media and Material)

Application testing is done by transferring an Android Package (.apk) file through a bluetooth connection or USB cable to the smartphone device and downloading it directly at Playstore. In addition to internal testing, this application has also gone through the stages of material validation experts about the feasibility of the media developed and the validation of media experts on the media used.

(d) Revision of material and media Experts

There have been two improvements in material testing and media testing to ensure

the appropriateness of the functions in the application.

Implementation Phase

Experiments are carried out by applying media to one or two students, small groups and actual groups after experts state that the media is feasible to be tested. The weaknesses found in the application trial were revised to get an effective and efficient form of learning media (Zhang, H., Gao, X., Wu, P., & Xu, X, 2016; Zhang, H., Dai, G., Tang, D., & Xu, X, 2018). According to Dick & Carey (2001: 286-295), the formative evaluation model consists of three forms: One-to-One Evaluation, Small Group Evaluation, Field Evaluation. The results of the trials conducted on teachers and students showed that the results of the calculation of the average student and teacher responses reached 98%, meaning that the media has a positive response.

Evaluation Phase

The evaluation phase is a continuation of the results of validation and trials that have been carried out, where at this stage we can identify the strengths and weaknesses of the media developed in the form of mobile learning applications.

Table 1. Strengths and Weaknesses of the “Learning Room” Mobile Learning Application

No	Strengths	Weaknesses
1.	The "learning room" application on smartphones is a practical learning media for its use	The material contained in the "learning room" application is still limited to first semester 8th grade social science subjects
2.	The "learning room" application is a media and learning resource that is easy to carry and can be used at any time	the application depends on the type of smartphone and the user's skills.
3.	User Teachers can manage classes easily and maintain privacy	The "learning room" application uses an internet connection, so the access speed depends on the available network
4.	User students can find out the results of the exam and discussion directly	The "Study Room" application is still available only on the Android platform.
5.	User teachers do not need to correct student learning outcomes manually	
6.	The "Learning Room" application is an innovation of learning media with smartphone technology and has the opportunity to be developed in accordance with the development of science and technology	

Source: results of data processing, 2018

The results of the effectiveness testing of learning media products through multiple choice tests consisting of 20 questions showed there were differences in student learning outcomes before and after using the study room application. Descriptions of differences in post-test and pretest results from each school are presented in the following diagram.

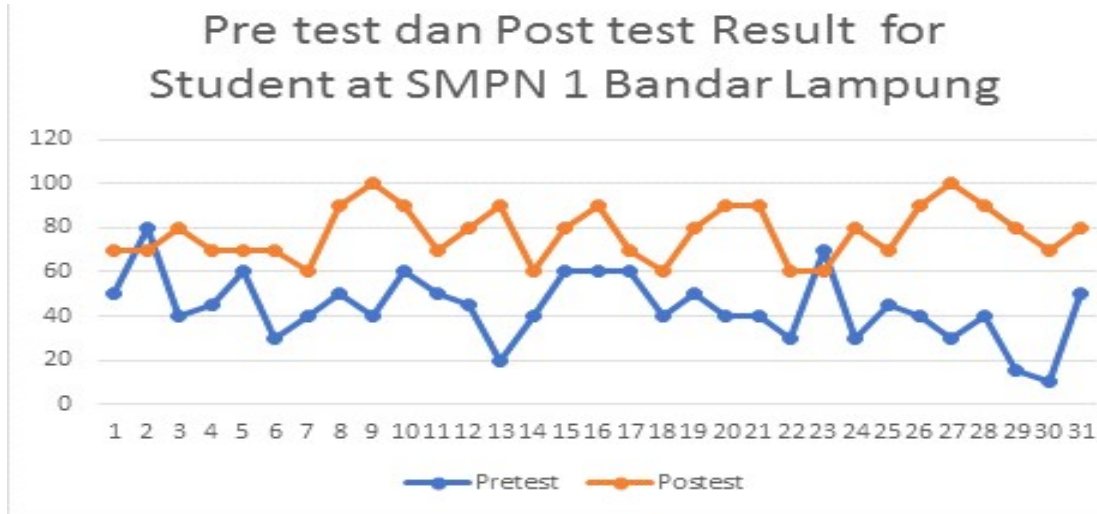


Figure 7. Comparison of Pre test and Post tests result of students at SMP 1 Bandar Lampung. Source: results of data processing, 2018

The diagram above illustrates the differences in student learning outcomes that experienced a positive increase in posttest. Student learning outcomes obtained from product trials using the design of one group pretest-posttest. This treatment was carried out on 8th grade students 3 times and the results were analyzed.

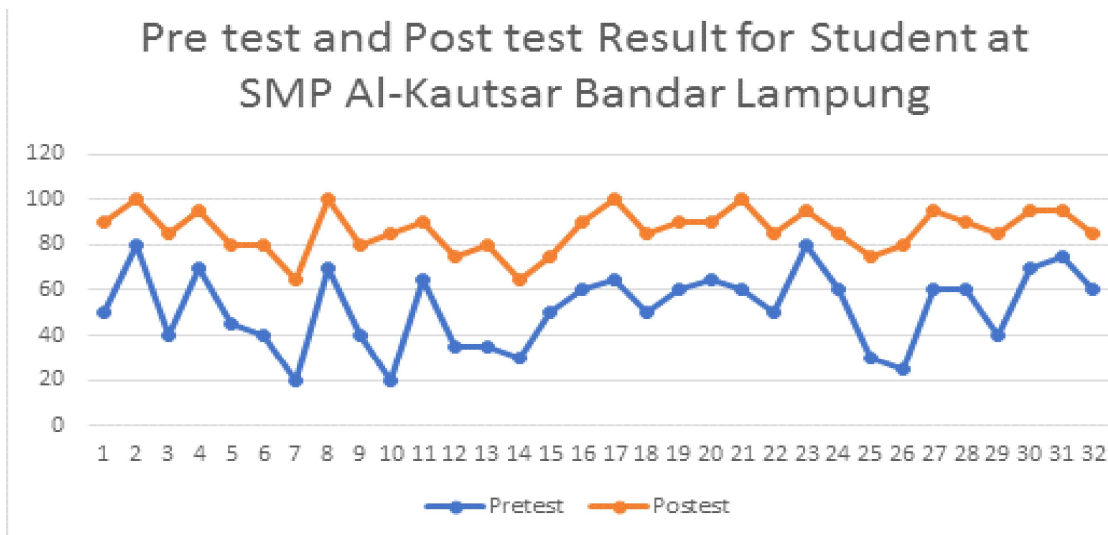


Figure 8. Comparison of Pre test and Post tests result of students at SMP Al-Kautsar Bandar Lampung. Source: results of data processing, 2018

The increase in value after being treated was also seen in the trial class of the SMP Alkautsar students. Data analysis was carried out by comparing the pre-test and post-test values of the experimental class in predetermined social studies subjects. This analysis uses one sample t test. The results obtained from data processing that the significance value (sig. 2-tailed) with the t-test are $0,000 < 0,05$ so that H_0 is accepted. The average score of students in two schools (those who participated in full learning activities) was based on the pre-test and post-test, which were obtained in junior high school with a pretest value of 57.32 and post test 81.43. Whereas in AL Kautsar Middle School the pre-test score was 51.88 and for the post-test was 86.21.

This shows that learning media in the form of mobile learning applications effectively improve student learning outcomes, provide opportunities and convenience for teachers and students to access information, or download learning materials as long as they are connected to the internet (Zhou, Z., Shin, J., Feng, R., Hurst, R. T., Kendall, C. B., & Liang, J, 2019; Tian, F., Liu, X., Liu, Z., Sun, N., Wang, M., Wang, H., & Zhang, F. 2019; Chuang, H. H, 2016). Even teachers and students can freely manage the desired learning system. Media development with mobile learning applications helps teachers overcome teaching and learning problems caused by the limitations of learning media (Zhao, H., Wang, J., Wang, Q., & Liu, F, 2019; Lee, H., Seo, H., Lee, N., & Song, M, 2018).

■ CONCLUSION

Mobile learning applications as learning media have effectiveness based on the calculation of significance values (sig. 2-tailed) with t-test ($p < 0.05$) on the ability of student learning outcomes. The feasibility of mobile

learning applications on material (IPS) has an average score of 4.2, which means that the material media is very feasible, and the feasibility score as a medium based on expert assessment criteria is an average of 4.0.

The results of this study indicate that students use mobile application learning programs in two sample schools before and after. There was an increase in SMP 1 from 57.32, increasing to 81.43 from all 28 students. This increase was also found in students at Al Kautsar Middle School from 51.88 to 86.21 out of 32 students. These results indicate that mobile learning applications effectively improve learning outcomes in schools as indicated by two schools treated using smartphone application-based media.

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