



Development of Android-Based E-Moding with Codular Applications to Improve Learning Outcomes of Class Xi Digital Business Students at SMK Negeri 2 Tuban

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Abstract. Research and Development as follows 1) Producing Android-based E-Modules with Coded Applications on Digital Branding elements for class Android with a Kodular Application based on validation from material experts and media experts, and 3) Knowing the differences in learning outcomes before and after using the E-Module. E-Modules can be accessed offline and can be used after downloading the application on the Android system. This research uses the ADDIE research method using 5 steps, namely analysis, design, development, implementation, and evaluation. The results of this development research, namely an Android-based E-Module with a Kodular Application, were declared very valid and feasible by material expert validators and media experts. And in the media trial on a small group of 9 people in class BD 4, it was stated that the E-Module that had been developed in this research was very valid and suitable for use as a learning medium for class XI BD 4 students at SMK Negeri 2 Tuban. In assessing learning outcomes after using this media there were still 3 students who did not meet the KKM. It is hoped that future researchers will be able to create an E-Module in the form of an application that is not limited to just one element, namely Digital Branding and can be downloaded via Playstore.

Keywords: Research and development, Android, E-Module, Modular, Digital Branding.

1 Introduction

The Indonesian education system is currently experiencing a number of problems which result in low quality education. Factors such as students, educators, facilities and infrastructure, environment, and many other factors influence the success of the education system [1]. Education in Indonesia is still far behind, a lot of learning in schools is not in line with current developments. These factors cause the quality of education in Indonesia to be currently low. The quality of the people produced really depends on the quality of education. On the other hand, the quality of education greatly influences student learning outcomes. Intrinsic motivation has emerged as an important issue for educators because it results in high quality learning. In this respect, self-determination theory investigates factors and forces that stimulate or undermine interest [1].

As a result of interviews conducted with the Digital Business teacher at SMK Negeri 2 Tuban, researchers obtained information that there were problems at the school, namely student learning outcomes which showed that 50% of students had not completed their learning outcomes under KKM 78. Another problem encountered was learning media tends to be low, educators still use whiteboards as a medium for delivering learning, so that the learning delivered is limited. Ease of getting data access and information in electronic or digital form currently very necessary and also level higher influence in life [2]. Weaknesses and these conventional limitations have produced new education and learning methods [3]. The use of technology in schools has also not been utilized optimally by educators, thus making students less enthusiastic about participating in the learning process.[4]This is based on previous research which states that if a person has motivation, it functions as a driving force for achieving high learning outcomes. Someone will carry out activities because there is motivation from within [5]. One of the uses of media learning in the learning process teaching can awaken new desires and interests [6]. There is high motivation in learning will achieve optimal results [5].

In the world of education today, technological developments have a very significant influence, one example of which is the use of technology in facilities to support students' learning, namely learning media [4]. Media has a very big influence in the world of learning process goals in the world of education and as a supporting tool in achieving certain activity goals [7]. The learning process grows with constructions and ideas that emerge from various media. As technology and information develop, one way to meet these challenges is with digital-based learning, thereby creating the use of innovative, effective and efficient learning media. Therefore, in order for digital-based learning media to be used to improve student learning outcomes, students must be able to utilize it [7]. Learning media functions to improve student learning outcomes to prevent students from feeling bored during learning activities. The use of media in education helps the learning process in the classroom [7]. The use of media in the world of education is one effort to improve student learning outcomes.

The existence of cellular is one of the influential aspects in the field of educational technology [8]. This learning media product was developed with Android-based modular software. The reason for choosing Android is because it is open source which allows developers to develop applications for smartphones so that users can easily access applications on Android [9]. Nearly 90% of students use Android, because Android is easier to change or customize according to taste. From some data last year, Android has a number biggest users because it's easy used and have several excellences in its operating system [10]. This cannot be achieved when using an iPhone. Applications developed on an Android system are supported by application software, one of which is Kodular. Kodular is a website that uses drag-drop block programming, so there is no need to type program code manually [11]. Not only that, the results of [11]. States that the learning process using the help of modular learning media is more effective than not using the help of modular learning media [12]. So by developing e-modules using modular, student learning outcomes can be improved. Seeing this potential, development learning media using cell phones is by creating e-modules intended for all Android platform mobile phones [13].

Current technological developments should be optimized by educators support and maximize learning activities [11]. Electronic modules as one of the innovations in the field of education make the learning process more flexible not only in the classroom and teachers, but learning allows students to learn independently and is not limited to teachers and classrooms [14]. E-modules can be an alternative way to improve student learning outcomes, because most modules are made in printed form which tends to look monotonous and less attractive to students. One way to make a module interesting for students is to create a product that contains images, animation, audio and video [15]. Electronic modules are teaching materials that are systematically designed to achieve student competency, and contain methods, materials, limitations and assessment methods [16]. Because it can be accessed anywhere and at any time, E-Modul is very easy for users to use. Instructional Media innovative ones can arouse students' thoughts, feelings, attention and interest so that earning runs optimally [16].

This research is important to carry out to help learning activities in schools. Researchers innovate to develop learning media for the E-Module Digital Branding (E-Moding) application for the digital branding elements of class XI Digital Business at SMK Negeri 2 Tuban. E-moding can help educators in developing material that is delivered to students. E-moding can improve student learning outcomes with material that has been organized and equipped with learning videos as well as providing practice questions to control students as a solution to maximize the learning process. In line with development [17] utilizing Kodular programming as Android-based learning media [17].

2 Method

This research and development uses the Research and Development type of research method. The method used to develop media and test product effectiveness is the Research and Development research method [18]. The research and development model uses the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) developed by [18]. There are 5 stages used by researchers in this research.

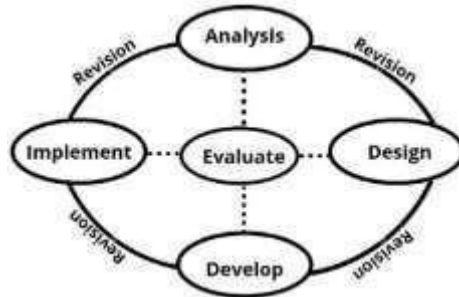


Fig. 1. Research and Development Stages

The ADDIE model was chosen because the stages are simple and systematically structured. [19]. The ADDIE model also guides developers to carry out continuous

evaluation and revision so as to produce quality and viable products. As stated by [18], interactive multimedia module products developed using the ADDIE model show that the results are useful and can improve student learning outcomes.

The results of this research and development data are qualitative data and quantitative data [20]. Quantitative data is obtained from validation data from material experts, media experts and small groups. Meanwhile, qualitative data is obtained from comments, namely criticism and suggestions and validators. Quantitative data in this research was obtained from a questionnaire which was calculated using a Likert scale with the following formula:

$$V_{ah} = \frac{T_{se}}{T_{sh}} \times 100\% \quad (1)$$

Explanation:

V ah = Expert Validation

T se = Total empire value

T sh = Maximum number of values

100% = Konstanta

Table 1. Learning Validation Criteria

No	Kriteria Validasi	Validity Level
1	81,00% -100,00%	Very valid, or suitable for use without revision
2	61,00% - 80,00%	Sufficient, or can be used but needs minor revision
3	41,00% - 60,00%	Not valid, it is recommended not to use it because it needs major revisions
4	21,00% - 40,00%	Invalid, or may not be used
5	00,00% - 20,00%	Very invalid, or absolutely should not be used

Source: [20]

Data analysis of learning outcomes in this research was measured through a posttest before using the media and a posttest after using the media. This data analysis aims to determine differences in learning outcomes after using E-Moding. Normality results and Paired Sample T-Test using the assistance application, namely SPSS version 25.

3 Results and Discussion

3.1 Analysis

At this initial stage, the researcher carried out an analysis stage to find out the field situation that occurred at SMK Negeri 2 Tuban and the stages to obtain a problem in the learning process so as to obtain data regarding the teaching materials being developed, whether the E-Module being developed would be needed and necessary. developed or not and find out learning outcomes in Class XI BDP 4, namely by observing

school conditions and interviews conducted at the SMK Negeri 2 Tuban school. Interviews were conducted with BD teachers to find out the basic problems in the learning process, regarding the Digital Branding elements for future E-Module development.

3.2 Design

The second stage of the ADDIE development model is Design. At this stage, researchers begin to design the appearance of the E-Module which will later be developed. At this stage the researcher creates a concept, namely a storyboard design which will later be developed into an application. At this stage, researchers also prepare the materials and equipment needed for the E-Module being developed, such as modular software which will later be used as a tool for making learning media.

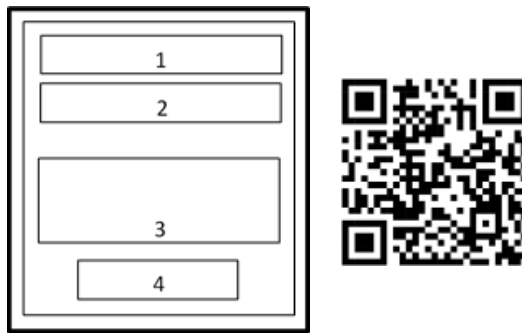


Fig. 2. Storyboard Cover E-Moding

3.3 Development

The third stage of developing the ADDIE model is the Development stage. This stage is the production stage of Android-based learning media with a modular application. After the media takes the form of an application, namely E-Moding, the next step is to determine feasibility which aims to determine the feasibility of the learning E-Module that has been designed. Testing of these products will be carried out with testing by experts and product trials[21]. After conducting a feasibility assessment with the expert validators, the learning module was revised according to criticism and suggestions from the expert validators. The validators consist of media expert validators, namely Eko Pramono, S.IP., M.Si. and BD teacher material expert namely Qurotul A'yuni, S.Pd.

Table 2. Validation Results Data

No	Validasi	Prsentase	Criteria
1	Media Expert	96,40%	Very Valid
2	Materials Expert	91,66%	Very Valid
	Average	94,04%	Very Valid

Source processed by researchers

3.4 Implementation

The next fourth stage is the implementation stage. After the E-Module was declared feasible by the validator, the E-Module was tested on small groups in class XI BD 4. Researchers collected data on December 2 2023 involving 9 students from class BD 4 at SMK Negeri 2 Tuban. The purpose of this small group trial is a trial that aims to determine the feasibility of E-Moding learning media. The results of this trial are then used as a reference for making improvements to the product before it is used by all class XI BD 4 students in trial use. Based on the results of trials in a small group of 9 students, the results showed 88.89%, which concluded that the E-Moding learning media developed by researchers was declared very valid and suitable for use in the classroom learning process.

3.5 Evaluation

This evaluation stage is the final stage in the ADDIE development model. This stage is the revision of learning media and the evaluation stage is to find out whether student learning outcomes have improved with the presence of this E-Moding media. The following is a media image that has been revised and is ready to be used by all class XI BD 4 students at SMK Negeri 2 Tuban.



Fig. 3. Learning Materials and E-Module Learning Videos

Figure 3 is the learning material which contains all the ATP Digital Branding that will be studied by students. Next, in the video menu, you can connect directly to YouTube according to the selected material, namely as in ATP 5.1 Scope of Digital Branding. Here there are several videos such as the importance of digital branding in a business, etc.

In the posttest assessment for class BD 4 there were still 3 students whose learning results were still below the KKM. After approaching students, the problem that occurs is that they lack enthusiasm due to lack of motivation from people around them such as parents, so they do not focus on reading the material that is already in E-MODING. (add references for media that do not have optimal results).

3.6 E-Module Digital Branding (E-Moding)

This development produces an Android-based E-Module with a Modular Application for Digital Branding elements for class XI Digital Business. This e-Module is in the form of an application that can be used via smartphone with the Android operating system. The use of learning media can help students understand teaching material [22]. E-Moding can help teachers convey information, so that learning material can be distributed well. Apart from that, this media also helps students when studying independently in line with research [1]. This e-Module is equipped with several features, namely connecting to Google Form to answer practice questions and the score results from working on the questions will immediately appear. So this G-form is directly in the E-Moding application. The E-Module developed is equipped with pictures and videos to help students understand the material in the E-Module in accordance with research results [23].

Learning media on Android-based E-Modules using the help of the Kodular application called E-Moding, users can access it offline and can be used anywhere for those who have downloaded the application on the Android system [24]. This is supported by research [25] which explains that the use of E-Modules is not limited by time or space, so they can control the intensity and ability of learning [25]. This E-Moding learning media can help students to learn anytime and anywhere [26]. Apart from the several benefits and advantages of E-Moding that have been explained, there are several weaknesses in the media, namely the size of the application for downloading the E-Moding application is quite large so students need a large enough memory to install it on their respective Androids. Another weakness is that the video and question menus have to use the internet because they are connected to YouTube and Google Forms. Apart from that, E-Moding can only be installed on Android, iOS users cannot install it yet, but this application cannot be installed via Playstore, so later for further research you can upload the application on Playstore so that users can easily install it [27].

3.7 Feasibility of Android Based Digital Branding E-Module with Kodular Application

The results of the suitability of Android-based E-Modules with modular applications can be seen based on Table 1, the percentage of assessments from Media Experts and assessments from Material Experts. It can be concluded that the learning media that has been developed by researchers, namely E-Module Digital Branding (E-Moding) is declared Valid and suitable for use in learning Digital Branding elements at SMK Negeri 2 Tuban. This level of suitability can be determined through the expert validation stage [28].

Apart from validation from Material Experts and Media Experts, the product to be developed in this research has also been tested on a small group, namely 9 students in class BD 4 at SMK Negeri 2 Tuban. The aim of this small group trial is to see whether the E-Module developed can be used by all BD 4 class students. Based on the results of the small group trial of 9 students, the results were 88.89% which can be concluded that the E-Moding learning media which was developed by researchers after carrying

out assessments from validator experts was declared very valid and suitable for use in the classroom learning process. According to criticism and suggestions from users, the E-Modul product is quite attractive in terms of language, images and writing is quite good. The material presented is easy to understand and can help the learning process.

This E-Module also displays several videos according to the selected material so that it can support students' enthusiasm. With these videos students can understand directly, not just read the material. The existence of this E-Module can make students learn Digital Branding material more easily [29]. After carrying out a small trial, the results of the trial were used as material for improvement by previous researchers applied in a lesson to determine the effectiveness of the E-Module product in improving student learning outcomes. Comments and suggestions from small groups will later be analyzed to make them better and more appropriate than before. The feasibility of a module was tested [29].

3.8 Differences in Student Learning Outcomes Before and After Using E-Moding Media

Data analysis of learning outcomes from students was obtained by working on posttest questions before and posttest after using the media. According to Muhajir et al. (2019) this research can improve student learning outcomes which can be seen from the results of the posttest before and after. In this way, researchers compare students' learning outcomes, namely before and after using the media [30]. The normality test used by researchers is the Shapiro-Wilk test with the help of SPSS 25. The normality test uses data from the results of students' posttest assessments.

Table 3. Posttest value normity test results

Test of Normality		Shapiro-wilk	
	statistic	df	sig
Prettest	.944	35	.073
Posttest	.945	35	.082

Source; SPSS version 25 data processing

The results of the normality test show that the Prettest and Posttest have sig values of 0.073 and 0.082, which is a value more than 0.05, which can be concluded that the Prettest and Posttest data are normal. In this research, a paired sample T-test was also carried out to test whether there were differences in learning outcome scores between the Prettest and Posttest.

Table 4. Paired Samples Statistics

learning outcomes		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Prettest	75.8571	35	6.91181	1.16831

Posttest 87.0000 35 7.09183 1.19874

Source; SPSS version 25 data processing

In the spss output, a summary of the statistical results of the sample Pretest and Posttest scores is shown, for the mean Pretest score of 75.86 and the mean Posttest score of 87.00. The number of respondents used in this research sample was 35 people. Because the mean value on the Posttest > Pretest, it can be stated descriptively that there is a difference between the average learning outcomes of the Pretest and Posttest.

Table 5. Result paired sample T-test

Paired sample T- test			
	t	df	Sig (2- tailed)
Pretest - Posttest	-9.597	34	.000

Source; SPSS version 25 data processing

It is known that the value of the sig (2 tailed) Pretest and Posttest results is $0.000 < 0.5$, then according to the benchmark for decision making in the paired sample t-test, it can be concluded that H_0 is rejected and H_a is accepted, meaning that there is a significant difference in the average learning outcomes before and after using the E- Moding application can effectively improve participant learning outcomes. students in class BD 4 at SMK Negeri 2 Tuban.

Based on the normality test and Paired Sample T-Test, it can be concluded that using the E-Module Digital Branding (E-Moding) student learning outcomes on digital branding elements can increase. This has been proven by the paired sample T-test showing that there is a significant improvement in the learning outcomes of class XI BD 4 students at SMK Negeri 2 Tuban.

4 Conclusion

This product, which has been developed in accordance with the ADDIE model in research and development, produces learning media, namely Android-based E- Modules with Kodular Applications, named E-Moding. This learning media is used for the Digital Branding element of class E-Module products can be used by teachers as teaching materials and used by students as learning resources. This product is packaged in the form of an application that can be used via smartphones with the Android system. The validation results from media experts, material experts, and small group trials from product trials obtained very valid scores, thus the Kodular-based E-Module learning media was declared feasible and can be used as a learning media on Digital Branding elements by class XI BD students 4 at SMK Negeri 2 Tuban.

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