DEVELOPMENT OF ANDROID-BASED INTERACTIVE LEARNING MEDIA IN BASIC GRAPHIC DESIGN SUBJECTS AT VOCATIONAL SCHOOLS

Aisyah Putri¹, Dasminar Dasminar², Delfa Delfa³, Levi Levi⁴, Mawar Mawar⁵, Yadika Yadika⁶
Information Technology and Computer Education Study Program, Faculty of Engineering, Medan State University Jalan William Iskandar

Abstract. The problem in this study is that students do not understand the material as a result of which many students score low, lack of interest in learning and student motivation in the teaching and learning process, there is no android-based interactive media. The purpose of this study was to design interactive android-based learning media in the class X Basic Graphic Design subject at SMKN 1 X Koto Above using the smart app creator application, as well as knowing the quality of the media in designing Android-based interactive learning media in the Basic Graphic Design class. X at SMKN 1 X Koto Above. The method used in this study is MDLC (Multimedia Development Life Cycle) which consists of 6 stages namely Concept, Design, Material Collecting, Assembly, Testing, Distribution. By using alpha and beta testing. Alpha testing is carried out using the Black Box method, while beta testing includes material validity, media validity and user feasibility testing. The results of the Black Box test properly, beta test results on material validation 0.95% with the valid category, 0.94% media test results with the valid category, user feasibility test 88.8%, with very good category.

Keywords. Learning Media, Androids, MDLC Information Correspondence

INTRODUCTION

The development of science and technology in the world of education is very rapid, thus encouraging every human being to follow it, including the world of education. According to Kuswanto (2020: 79) the current development of information technology, the learning process can be done anywhere and anytime, such as Android-based learning.

Trianto et al., (2019:216) Android is a mobile operating system that modifies Linux. Initially developed with the same name, namely Android Inc. With Android-based learning media, it can generate student learning motivation and students can study independently anywhere and anytime. Now that students are able to use Android-based technology, every educator must be more initiative and creative in conveying material learning process. Android-based technologies such as smartphones are a tool in conveying material by educators to students using interactive multimedia.

In a learning process there are two interrelated elements, namely learning methods and learning media. According to Ahyat (2017: 30) learning methods are several ways, models, or a series of learning activities that educators will apply to students in the learning process to increase students' learning motivation in order to achieve teaching goals. Meanwhile, media according to Agustiar (2020: 23) Learning media is an important tool for the world of education in the current digital era in order to achieve success in the learning process at school. In addition, there is what is called the teaching method, namely the way the teacher teaches material to students
face to face or orally. These two aspects are the main parts that really support the success of a learning process.

Vocational high school (SMK) is one of several forms of vocational secondary education, which prepares students to work and develop a professional workforce according to their program of expertise (Zulfa, 2019: 27). If in SMA it is limited to science, social studies, and language, it is different from SMK which does have many majors, according to the interests of the students. Vocational high schools (SMK) do more practice than material during the learning process, one of which is in Basic Graphic Design subjects at SMK. Basic graphic design is one of the vocational subjects. The basic subject of graphic design is more towards competency-based practicum which has the aim of equipping students' skills with a realistic theoretical basis for students (Cholifah, WN, Yulianingsih, Y., & Sagita, SM 2018).

Based on the results of observations and interviews with teachers of basic graphic design subjects. In the basic subject of graphic design there are 12 basic competencies (KD) which will be studied in 2 semesters. When the learning process takes place the level of understanding of students towards the material provided by the teacher is still lacking. Based on other observations the researchers made at Vocational Schools that all students already have Android smartphones and students are allowed to bring smartphones to school, but many of them use them for things that are not useful, such as viewing social media, and seeing other things.

In basic graphic design learning there is also no Android-based interactive learning media to assist the learning process, then learning is not optimal and learning does not vary used by the teacher. Many of the students still lack motivation and interest in learning so that students forget the learning steps, so the teacher has to repeatedly explain the same material. In addition, there is still a lack of student activity and creativity during the learning process. Many of the students said that the basic subject of graphic design was a difficult subject to understand, as a result they did not like learning basic graphic design. Because researchers make interactive learning media based on Android (Kuswanto, J. 2020).

Suitable assistive media is Android-based interactive learning media that can attract and motivate students to be more active and enthusiastic about learning in class, as well as during independent learning. This Android-based interactive learning media displays and conveys information which is a combination of text, images and video. One of the software used in making Android-based interactive learning media is the Smart App Creator. Besides being able to operate on Android devices, this application can also be operated on computers or laptops in the Windows system.

Android-based learning media needs to be used because every student wants learning that is effective, efficient, and fun in accordance with developments in science, technology and art (IPPTEKS). Therefore it is necessary to design good interactive learning media, so that real steps are needed in making learning designs that have been well prepared and balanced. Thus good learning can make learning more effective and efficient. (siti komariah, et al (2018)

The purpose of this study is to design interactive android-based learning media in Basic Graphic Design subjects at Vocational High Schools using the smart app creator application, as well as to determine the quality of media in designing Android-based interactive learning media in Basic Graphic Design subjects at Vocational High Schools.

Benefits of Research for students: With this learning media it is hoped that it
can increase students' interest in learning, be able to learn independently, improve skills in the Basic Graphic Design learning process and easily understand learning material. For educators: For Educators With the existence of Android-based interactive learning media as a tool in learning, it makes it easier for subject teachers in graphic design to explain material. For Researchers: By creating interactive learning media based on Android, it can increase understanding for researchers. As well as add insight to prospective educators.

**Relevant Research**

Research that is a reference source in designing Android-based interactive learning media is as follows: In the research study by Mapicayanti et al., (2018) entitled "Designing Video Tutorial-Based Learning Media for Designing Local Networks/LANs for TKJ Students in Vocational High Schools, (2) the feasibility level of the developed learning media. This research is a Research and Development study with the ADDIE development model. The video tutorial-based learning media assessment instrument is in the form of a scale 5 questionnaire. The results of the due diligence media expert in terms of 2 aspects are included in the Very Eligible category (87%). And the test results from the Material Expert fall into the Very Eligible category (95%).

Based on the responses to media use by 33 students majoring in TKJ, they were included in the Very Eligible category (83%). Aftori et al's research (2019) entitled "Interactive Media Design Space Building Formulas Using Android-Based Augmented Reality Technology". This study aims to design interactive media geometric formulas using Android-based Augmented Reality technology and find out how Augmented Reality technology works and apply it to interactive media geometrical formulas based on Android. This study uses the Multimedia Development Life Cycle design model. This application requires a main image or called a marker to display 3-dimensional objects in real-time. In making the application, a tool or software called Unity3D and Vuforia are used to display the 3D objects that have been made. This application is equipped with an Augmented Reality view of Building Space, Calculator, Application Guide and an About display.

And research by Toha & Khasanah Research (2020) entitled "Interactive Learning Media for Mathematics Subjects". The development model in this study uses the Multimedia Development Life Cycle (MDLC). Multimedia Development Life Cycle (MDLC) with the development model stages namely concept, design, obtaining content material (collection of materials), assembly (preparation and manufacture) and testing (trial). The results of the research show that the application of interactive learning media in helping students to understand Mathematics goes according to its functionality (Qomariah, S., Nasir, M., & Rahmadani, R. 2022).

The difference between the three relevant studies is that this research was conducted for tkj students at SMK in basic graphic design subjects. The design of this interactive media uses Smart App Creator3 Software, with UML (Unified Modeling Language) modeling, this media can help teachers of basic graphic design subjects in delivering material, and also students more easily accept material, because they can study anywhere and anytime. Testing this application uses alpha and beta testing, beta testing is in the form of Black Box testing, beta testing is in the form of a questionnaire to students x tkj on basic graphic design subjects (Kuswanto, J. 2020).
METHOD

The methodology used in the development of Android-based interactive learning media in the Basic Graphic Design subject uses the Multimedia Development Life Cycle (MDLC) Method Afthori et al (2019). Multimedia development is carried out based on six stages, namely concept, design, material collecting, assembly, testing, and distribution.

a) Concept
At this stage the developer determines the purpose of the application, the identification of the user, the duration of the application, what content will be included in the application, then to whom the target application is given. In this section the researcher carries out concepts, including:
1) The development of this Android-based interactive media is to attract student learning interest and a varied learning process.
2) The use of Android-based interactive learning media is specifically for students of the TKJ expertise program at Vocational Schools in basic graphic design subjects. hardware and software will be useless in the presence of users.

b) Design
At this stage, the development and display of the application program is carried out. In this stage, several design processes are carried out to describe the storyline of the application program and activities in the application program with existing features. To do so, it will use UML (Unified Modeling Language). Design specifications regarding interactive media, as well as the software used by the smart app creator software.

c) Material (Material Collection)
At this stage the researcher collects materials or supporting data for research. The materials used for interactive media based on Android include images in PNG format, photos, animations, audio videos, backgrounds made using the CorelDraw x7 application, as well as basic graphic design subject matter.

d) Assembly (Manufacturing)
At this stage the design that has been designed in the previous stage is then carried out according to the design. Making applications is based on the design stage, such as using UML (Unified Modeling Language) models, use case diagrams, activity diagrams, sequence diagrams. Making this interactive media uses the smart app creator application.

e) Testing
According to Cholifah et al., (2018: 207) Testing is an activity that is planned systematically to test or evaluate the desired truth. This test activity consists of a set or groups of steps which can put the design of specific test cases in place. This stage is carried out after completing the assembly stage. During testing, the application is run and checked further to ensure that the development carried out is in accordance with what was planned. Testing is done using alpha testing and beta testing.
   a. Alpha Testing
Setiawan et al., (2016: 32) Alpha testing is a test carried out by looking for whether there are errors or not in Android-based interactive media. On a system that focuses on the functional requirements of the software being built. This test uses black-box testing.
b. Beta Testing
According to Shebastian et al., (2020: 14) Beta testing is a direct test for users to try the application that has been made. The purpose of this beta test is to find out the user's assessment of the learning media that has been made. For beta testing, it is done by calculating the survey results from the questions filled in by respondents using a Likert scale, such as testing students at SMK above.

c. Distribution
The last stage in developing the application of this method. At this stage, Android-based learning media is applied to students at SMK.

RESULTS AND DISCUSSION
In this section, the results of the research and discussion of the results of the research will be described. The learning media that we use is an Android-based interactive learning media that has been designed and created, students or readers can study independently anywhere. This application was designed using the Smart AppCreator 3 software. The design of this Android-based interactive learning media uses the MDLC (Multimedia Development Life Cycle) method which has 6 stages. Researchers use Use Case Diagrams in designing Android-based interactive learning media (Delfiza, A., Pratama, A., & Kurniawan, H. 2023).

Use case diagrams

![Use case diagrams](image)

The provided Use Case diagram illustrates the sequence of actions available to students within the system. As depicted, students have the capability to access a range of pages, beginning from the main menu page and extending through various stages including the menu page, basic competency page, materials page, profile page, evaluation page, instructions page, and ultimately the practice page. This step-by-step breakdown showcases the user journey, enabling students to navigate through these pages to engage with the content, resources, and interactive learning experiences offered by the platform. The diagram essentially serves as a visual representation of
the comprehensive user interaction possibilities, highlighting the seamless flow from one page to another, designed to enhance their overall learning and engagement on the platform (Zhelmico, H. A., & Wibawa, S. C. 2020).

**Main Page Display**

![Main page](image)

*Figure 2. Main page*

The main page is the gravitational center of a website, often being the first point visited by users. The design and content of the main page play a crucial role in delivering a strong initial impression and directing visitors to relevant content. The main page should combine visually appealing elements with intuitive navigation, so that visitors feel compelled to explore further. Typically, key elements such as a prominent title, images or videos that depict the essence of the site, and clear call-to-action buttons to direct visitors to specific goals, are all situated on the main page. Relevant and up-to-date content can also be placed here, providing an overview of what the site offers.

Furthermore, SEO optimization is also important in designing the main page. Using appropriate keywords and relevant hashtags can help the website rank higher in search results, increasing visibility and visitor traffic. In conclusion, the main page serves as the primary gateway of a website, depicting the identity, purpose, and unique offerings of the site to the outside world. Therefore, the design of the main page should be strategic and inviting, creating a positive experience for every visitor who steps into it.

![Menu page](image)

*Figure 3. Menu page*

The menu page provides quick access to various sections, offering KD menus, materials, profiles, evaluations, instructions, and exercises. Users can easily navigate through these distinct categories, each serving a specific purpose. The KD menus section showcases a variety of culinary choices, while the materials section houses
relevant resources. Additionally, profiles offer insights into individuals involved, evaluations provide feedback, and instructions guide users through the platform. Lastly, exercises offer interactive learning opportunities. This organized menu structure enhances user experience by ensuring easy and efficient exploration of different facets of the platform.

The presence of KD menus, materials, profiles, evaluations, instructions, and exercises on the menu page reflects a comprehensive approach to catering diverse user needs. The inclusion of KD menus enables users to explore culinary options, while the materials section provides educational resources. Profiles offer insight into contributors, evaluations gather valuable feedback, and instructions guide users. Furthermore, exercises facilitate interactive learning experiences. This multi-faceted menu layout optimizes user navigation, allowing them to effortlessly access and engage with the various offerings available on the platform.

In this section of the evaluation page Android must be connected to the internet in order to work on evaluation questions.
This workout score display displays the score and time remaining, and on this part of the page is a button to try again. The design of Android-based interactive learning media in the basic subjects of graphic design is carried out using an alpha and beta testing process. Alpha testing is carried out using the Black Box method which consists of 26 question scenarios, namely:

<table>
<thead>
<tr>
<th>Description</th>
<th>Testing Procedure</th>
<th>Expected results</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intro Page</td>
<td>Open the app</td>
<td>Will go to the intro page</td>
<td>Valid</td>
</tr>
<tr>
<td>Main Page</td>
<td>Automatic entry to main page</td>
<td>The user enters the main page</td>
<td>Valid</td>
</tr>
<tr>
<td>Menu Page</td>
<td>Click the main page start button</td>
<td>The user will enter the menu page where the menus are available. options menu User will enter.</td>
<td>Valid</td>
</tr>
</tbody>
</table>

Figure 7. Material menu page

On the material menu page students can choose which material to study. To be able to do the exercises students press the play button.

Figure 8. Display of the training start page

Figure 9. Display of practice questions page

Figure 10. Exercise value display

Table 1. Black Box Testing
<table>
<thead>
<tr>
<th>Menu Ki and Kd Indicators</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Click the kd indicator button 1</td>
<td>System displays kd indicator 1 √</td>
</tr>
<tr>
<td>Click the kd indicator button 2</td>
<td>System displays kd indicator 2 √</td>
</tr>
<tr>
<td>Click the Content Menu button</td>
<td>User will enter the materials menu page √</td>
</tr>
<tr>
<td>Click the Material menu button</td>
<td>The system displays material on √</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material Menu</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Click the Material menu button</td>
<td>The system displays material on √</td>
</tr>
<tr>
<td>3.1.1</td>
<td>3.1.1</td>
</tr>
<tr>
<td>Click the Material menu button 3.1.2</td>
<td>The system displays material in 3.1.2 √</td>
</tr>
<tr>
<td>Click the Material menu button 3.1.3</td>
<td>The system displays material on √</td>
</tr>
<tr>
<td>3.2.1</td>
<td>3.2.1</td>
</tr>
<tr>
<td>Click the Material menu button 3.2.2</td>
<td>The system displays material on √</td>
</tr>
<tr>
<td>3.2.2</td>
<td>3.2.2</td>
</tr>
<tr>
<td>Click the videos button</td>
<td>The user goes to the video page √</td>
</tr>
<tr>
<td>Click the profile button</td>
<td>System displays profile design √</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Profile Menu</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Click the mentor button</td>
<td>System displays mentor profile √</td>
</tr>
<tr>
<td>Click the evaluate button</td>
<td>The user will enter the page evaluation menu 1 and 2 √</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaluation Menu</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Click the evaluation button 1</td>
<td>The system displays evaluation questions 1 √</td>
</tr>
<tr>
<td>Click the evaluation button 2</td>
<td>The system displays evaluation questions 2 √</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Help Menu</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Click the hint button</td>
<td>The system displays the page instruction √</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exercise Menu</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Click the practice button</td>
<td>The user enters exercise 1 and exercise 2 pages √</td>
</tr>
</tbody>
</table>
After testing the Black Box, the results are declared "Valid" which indicates all buttons work properly. Furthermore, beta testing was carried out with several tests including testing material experts and questionnaire media used in this test questionnaire scale (five). With the results of the material validation test 0.95 with the valid category, the results of the media validation 0.94 with the valid category. Furthermore, a feasibility test was also carried out with the user using a 4 (four) scale questionnaire, the user being a student then got a result with a percentage of 88.0 including the very good category.

**CONCLUSION**

The design of Android-based interactive learning media for class X at SMKN 1 X Koto above uses the MDLC (Multimedia Development Life Cycle) method. Which consists of the concept (concept), design (design), material collection (material collecting), manufacture (assembly), testing (testing), and distribution (distribution). From this research has been done black box testing and beta testing. Beta testing is carried out with several tests including testing material validation, media validation, and feasibility. The results of material validation with a percentage of 0.95 are valid categories, the results of media validity are with a percentage of 0.94 valid categories, from the feasibility test, namely 88.0 with very good information. Then the Blackbox Test states that all buttons and pages that are executed in the learning media application are valid.

**REFERENCES**


Development of Android-Based Interactive Learning Media in Basic Graphic Design Subjects at Vocational Schools

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