

# Application of Learning Media for Assembling Personal Computer Based on Adobe Flash CS6 at SMK Negeri 2 Takalar

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**Abstract**— This study aims to produce (a) learning media to assemble a PC using the Adobe Flash CS6 application and (b) knowing user responses to the application of learning media to assemble PCs using the adobe flash cs6 application. This study uses research and development (R & D) research methods that use the 4D development model with stages of defining, designing, developing, and disseminating. Individual research subjects involved 3 students, small group trials involving 9 students and expanded trials were 34 students, so the total number of respondents 46 students from class X TKJ SMK 2 Takalar. Software testing is done by distributing questionnaires to users or users who have been validated by instrument experts. The results of this study produce (a) a learning media for assembling PCs, which is an adobe flash CS6 based application. This application is combined with PC assembling material including PC components, PC assembling procedures and work safety and security. In this media also contains a simulation video of PC assembling and quiz questions in it. (b) the user's response from the media developed is seen from the testing of the characteristics of the user or student, from the results of the test stated to be very good.

**Keywords**— Learning Media, Assembling PCs, Adobe Flash CS6, SMKN 2 Takalar.

## I. INTRODUCTION

The rapid development of information technology allows someone to explore data and information more broadly and practically. The utilization of computers in various fields of work can improve performance and enable activities to be carried out quickly, accurately, and precisely. Ultimately, this will increase work productivity. The advancement of computers is also closely related to the world of education. Most schools also include computers as a mandatory subject. Even computer technology provides innovation in the learning process and also enables distance learning or learning without face-to-face interaction.

Learning media is everything used in learning activities to stimulate the thoughts, feelings, interests, and attention of students so that the educational communication interaction process between teachers (or media creators) and students can take place effectively and efficiently (Arsyad, 2003).

According to Suwarna et al. (2006: 128), it is explained that in general, the benefits of media in learning are to facilitate the interaction between teachers and students, with the aim of helping students learn optimally. With the help of attractive media, students will find it easier to understand the subject matter, and this will have a positive impact on students' learning outcomes. The use of media in the teaching and learning process can help the smoothness, effectiveness, and efficiency in achieving learning objectives. Media is one of the components that cannot be ignored in developing a successful learning system. In fact, learning that is manipulated in the form of learning media can make students learn while playing and working.

One reason for using media in the teaching and learning process is related to the level of students' thinking, where the use of learning media is more closely related to the stages of thinking starting from abstract to concrete, starting from simple thinking to complex. According to Arsyad (2002: 54),

learning with computers can stimulate students to work on various exercises due to the availability of various animations, graphic illustrations, and colors that add realism. Computers can also accommodate students who are slow to receive lessons because they can provide a more effective climate in a more individual and less boring way. In addition, the utilization of computers can provide feedback to students so that errors can be corrected.

The creation of computer-based learning media can be done using hardware devices and supported by various software, such as Microsoft PowerPoint, Adobe Flash, Adobe Premier, Java Script, and PHP. Of these five software, Adobe Flash is the most effective software for creating computer-based learning media. The reason for choosing Adobe Flash software is that this software can produce presentations, games, films, interactive CDs, and learning CDs. The files produced from Adobe Flash software are small in size and can be converted into .exe type files so that they can run on all computers. Although the computer does not have Adobe Flash software installed (Shofiani, 2012: 9).

One of the media that is suitable for technological development and can be used in the learning process is Adobe Flash CS6. The Adobe Flash CS6 program is an animation program that has been widely used by animators to produce professional animations. The advantages of the Adobe Flash Professional CS6 learning media are that it can be equipped with various types of animations, sounds, and interactive animations so that users can listen to explanations while seeing animated images or reading explanations in text form (Sutopo, 2003: 60). Therefore, Adobe Flash CS6 can be used as a tool to help create interesting and interactive learning because it contains text, images, sound, and animations. All students can actively participate in the learning process with the Adobe Flash CS6 program allowing students to learn independently in understanding a concept. Thus, it is hoped

that the competency standards and basic competencies can be achieved.

The assembly of personal computers (PC) is a subject taught in the TKJ program at SMK Negeri 2 Takalar. One of its competency standards is assembling PCs. This material invites students to recognize PC components, understand the functions of each component, and be able to apply them when assembling computers. This material cannot be delivered only using lecture methods, as it requires more concrete learning experiences to avoid verbalism. However, in practice, the availability of tools and materials is not always met. In addition, this learning requires continuous practice to become skilled, but due to time constraints, this is difficult to implement. The demonstration method, as one of the methods used, becomes less efficient when shown in a sufficiently large room so that not all students can clearly follow the basics of installing PC components.

The use of Adobe Flash CS6 in the form of learning media is certainly supported by appropriate facilities such as computers, CD rooms, and flash drives. The results of observations during the KKN PPL UNM Class XV for three months at SMK Negeri 2 Takalar found that the process of learning to assemble PCs still used makeshift media such as books and blackboards, causing students to be less interested in paying attention to their teacher's explanations. The school has facilities in the form of three laboratories, each consisting of several computer units. All computers use systems that support the operation of Adobe Flash learning media, thus allowing the use of learning media. In addition to being used for information technology (IT) learning and digital simulations, this computer laboratory can also be utilized for other learning that requires computers in its implementation.

Based on the description above, research was conducted on developing a new learning media by utilizing computer technology using the Adobe Flash CS6 application, which is expected to solve existing problems. The creation of learning media in the PC Assembly learning based on Adobe Flash is expected to provide ease for users to learn PC Assembly in an interesting and easily understood manner because all information is presented with text, static images, sound, and animations that are integrated with user activity in running the application. With the combination of text, images, sound, animations, and user interaction in this application, it will maximize the learning process.

## II. RESEARCH METHOD

This research uses research and development methods, often referred to as Research and Development (R&D). The research method used is to produce a specific product and test the effectiveness of that product. In addition to developing and testing products, this research is used to discover new knowledge regarding fundamental phenomena and educational practices. It functions to discover fundamental phenomena through basic research. Then, for research on educational practices, applied research is conducted. Research and development is one of the methods that produces a specific product, one of which is in the field of education and learning.

This research develops a product in the form of learning media for assembling PCs based on Adobe Flash CS6.

The research procedure adapts the 4D development model, which consists of four stages: Define, Design, Develop, and Disseminate.

## III. RESULTS AND DISCUSSION

### A. Define

The defining stage involves analyzing the necessary needs. In this case, the researcher first collects information about users' opinions regarding good, interesting, and flexible learning media. After that, the researcher begins to look for the hardware and software needs to build this PC Assembly application. The following are some of the needs analyses conducted by the researcher.

1. Teacher Responses
  - a. Learning media about PC Assembly is usually taught using printed media.
  - b. Learning media is quickly absorbed by students but is still less interesting in its presentation.
  - c. Features that should be present in a learning media include images, audio, and video.
  - d. The selection of display colors, the use of menu buttons, and the addition of videos in the application are very much needed.
  - e. The use of learning media by adding practice questions will be very much needed by users.
2. Student Responses
  - a. Learning media about Assembling a PC is usually seen through printed media.
  - b. The learning media is quickly absorbed by students but still lacks appeal in its presentation.
  - c. Media commonly used in the learning process, such as printed books and blackboards, are not very interesting to students.
  - d. The use of learning media in the learning process is highly needed by students.
  - e. According to students, learning media should be interesting and interactive.
  - f. The features that should be included in learning media are images, audio, and video.
  - g. The selection of display colors, the use of menu buttons, and the addition of videos in the application are very much needed

### B. Design

#### 1. Design Intro

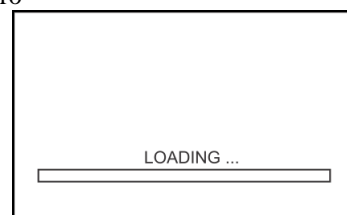


Fig. 1. Spalsh Screen

#### 2. Initial Display Design



Fig. 2. Initial Interface

3. Main Menu Design

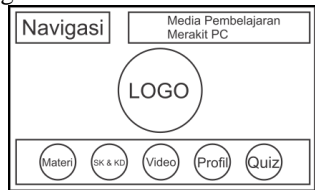


Fig. 3. Main Menu Design

4. Material Menu Design

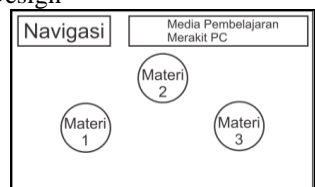


Fig. 4. Material Menu Design

5. Design of SK and KD Menu

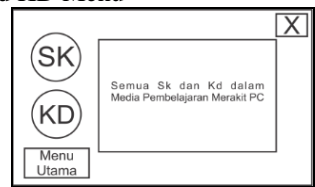


Fig. 5. Design of SK and KD Menu

6. Video Menu Design

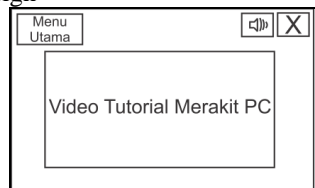


Fig. 6. Video Menu Design

7. Profile Menu Design

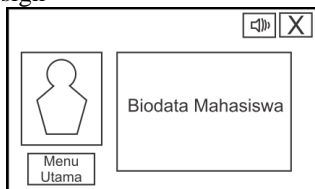


Fig. 7. Profile Menu Design

8. Quiz Menu Design



Fig. 8. Quiz Menu Design

C. Development

1. Creation of Display

Media is created using Adobe Flash CS6 software, the

creation of this PC assembly application is made per frame so that each frame contains the menu from the application display starting from Loading Screen, Main Menu, Material Menu, SK and KD Menu, Video Menu, Profile Menu, and Quiz Menu. The stages of creating the PC assembly application can be seen as follows:

a. Loading Screen Display

Figure 9 Shows the Loading Screen of the application. It appears when the application is run and serves as a marker that the application is loading into the initial display.



Fig. 9. Loading Screen.

b. Initial Display

Figure 10 is the initial display of the application, appearing after the loading splash screen. In this menu display, two buttons are shown that can be clicked by the user, namely the "START" and "EXIT" buttons.



Fig. 10. Initial Display.

c. Main Menu Display

Figure 11 is the main display of the application, in this menu display several main menu items are shown that can be accessed by the user, including the "MATERIAL," "SK AND KD," "VIDEO," "PROFILE," and "QUIZ" menus.



Fig. 11. Main Menu Display.

In the upper left corner of figure 11, there are navigation buttons including "INFO" to go to the information menu about the PC assembly application, "SOUND" to mute or play the background sound in the application, and "CLOSE" to close the application. The exit button (X) will display a dialog box as a confirmation to the user asking whether they are sure they want to exit or not, as shown in figure 12.



Fig. 12. Exit Dialog Box Display.

d. Learning Material Menu Display

Figure 13 appears when the cursor is directed to the "INFO" button, which will display information about the main buttons, and the display in figure 14 appears if the "INFO" button is clicked.

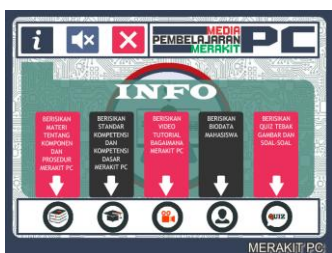


Fig. 13. Info Display.

This display shows information about the buttons available in the PC assembly media application.

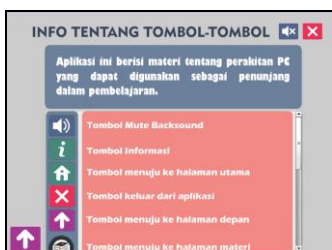


Fig. 14. Menu Display in Info.

e. Menu Display Material

The Menu Display Material shown in figure 15 will display a page containing buttons to direct users to learn more about the material for assembling a PC.



Fig. 15. Menu Display Material.

1) Menu Display Components of Assembling a PC

Figure 16 appears when clicking the "COMPUTER COMPONENTS" button in figure 15. In this display, there are 14 material menus about computer components, including "CASING," "MOTHERBOARD," "PROCESSOR," "RAM," "VGA CARD," "SOUND CARD," "HARDDISK," "CD/DVD ROM," "POWER SUPPLY," "PCI SLOT," "HEATSINK," "KEYBOARD," "MOUSE," and "MONITOR."

SUPPLY," "PCI SLOT," "HEATSINK," "KEYBOARD," "MOUSE," and "MONITOR."



Fig. 16. Menu Display Components of Assembling a PC.

Figure 17 will appear if clicking the "CASING" menu and will display material regarding casing. The same goes for the other menus; if clicked, they will display material about other components in the PC.



Fig. 17. Material Display of PC Components.

2) Menu Display Procedure for Assembling a PC

Figure 18 appears when clicking the "ASSEMBLY PROCEDURE" button in figure 15. In this display, there are 3 material menus about the PC Assembly Procedure, including "PREPARATION," "ASSEMBLY," and "TESTING."



Fig. 18. PC Assembly Procedure Menu Display.

3) Workplace Safety and Security Menu Display

The display in figure 19 appears when clicking the "SAFETY & WORK SECURITY" button in figure 4.15.



Fig. 19. Workplace Safety and Security Menu Display.

f. SK and KD Menu Interface

The SK and KD Menu display shown in figure 20 will display a page containing SK and KD of the PC assembly learning media.



Fig. 20. SK and KD Menu Interface.

g. Video Menu Interface

The Video Menu display shown in figure 21 will display a page containing a video tutorial for assembling a PC.



Fig. 21. Video Menu Interface.

The Play button functions to display how to assemble a PC through video. In Figure 22, users can see the stages of assembling a PC directly.



Fig. 22. Video Interface.

h. Profile Menu Interface

The profile menu display shown in Figure 23 will display a page containing the biodata of the developer student. This display has a scroll to facilitate navigation downwards.



Fig. 23. Profile Menu Interface.

i. Quiz Menu Interface

The Quiz menu display shown in Figure 24 will display a page containing "QUIZ" and the game "GUESS THE PICTURE."



Fig. 24. SK and KD Menu Interface.

1) Guess the Picture Menu Display

The display in figure 25 appears when clicking the "Start" button for GUESS THE PICTURE in figure 24.



Fig. 25. Guess the Picture Menu Display.

Figure 25 has an info button in the lower left corner for information about guessing the picture, the information display is as shown in figure 26. In figures 27, it will appear when the given picture has been guessed.



Fig. 26. Guess the Picture Info Menu Display.



Fig. 27. Answer Display.

2) Quiz/Questions Menu Display

The quiz menu display in figure 29 appears when clicking the "Start" button for QUIZ in figure 24. In this display, instructions for answering the questions are shown and to start the quiz there is a "START" button.



Fig. 28. Quiz Menu Instructions Display.

Figure 29 shows the questions along with answer choices that can be selected. If the answer is correct, it will appear as in Figure 30, and if the answer is incorrect, it will appear as in Figure 31.



Fig. 29. Menu Display in Quiz.



Fig. 30. Correct Answer Display.



Fig. 31. Incorrect Answer Display.

## 2. Application Testing

In the application testing stage, testing is conducted on the application that has been developed where in this application testing, instrument validation is first carried out by the appointed instrument validator expert.

### a. Instrument Validation Results

Before conducting application validation, content validation, and testing with respondents, the questionnaire used must be validated by instrument experts. This instrument validation was carried out by two instrument experts from July 13 to 18, 2024. The instrument validation consists of 10 items with 3 criteria for assessment aspects: guidance aspect, content or material aspect, and language aspect, using the evaluation criteria of very good, good, fairly good, less good, and not good. A summary of the results from the instrument validation can be seen in Table 1.

TABLE 1. Summary of Instrument Expert Assessment Results

Validator	Type of Instrument	Score	Information
Validator 1	Needs Analysis	4,3	Highly Suitable
	Student Responses	4,4	Highly Suitable
	Media Expert	4,4	Highly Suitable
	Content Expert	4,4	Highly Suitable
Average Score		4,37	Highly Suitable
Validator 2	Needs Analysis	5,0	Highly Suitable
	Student Responses	4,3	Highly Suitable
	Media Expert	4,8	Highly Suitable
	Content Expert	4,8	Highly Suitable
Average Score		4,72	Highly Suitable
<b>Total Average Score Overall</b>		<b>4,54</b>	Highly Suitable

Source: Data processing results, 2024

After the instrument is deemed suitable and has been validated by instrument validation experts, the next step is to conduct media validation by two media experts and content/material validation by two content experts and one practitioner of productive learning in TKJ.

### b. Results of Media and Content Expert Validation

Testing and assessment of the quality of the PC assembly application were conducted by two expert validators for each test on the aspects of the application or media and content or material.

### 1) Media Expert Assessment

Media validation was assessed by two media expert validators, who are lecturers from the Faculty of Engineering at UNM. The assessment used scores of 1, 2, 3, 4, and 5, adjusted according to quality.

TABLE 2. Summary of Media Expert Assessment Results

Validator	Score	Category
Validator 1	4,4	Highly Suitable
Validator 2	4,65	Highly Suitable
<b>Average Score</b>	<b>4,52</b>	<b>Highly Suitable</b>

Source: Data processing results, 2024

From the results of media validation by two media expert validators, an average score of 4.52 was obtained, categorized as very feasible for trial with students.

### 2) Content Expert Assessment

The content presented in the developed media was assessed by two content experts, namely lecturers from the Faculty of Engineering at UNM and one practitioner of productive TKJ teaching from SMK Negeri 2 Takalar. The assessment used scores of 1, 2, 3, 4, and 5, adjusted according to quality

TABLE 3. Summary of Content Expert Assessment Results

Validator	Score	Category
Validator 1	4,65	Highly Suitable
Validator 2	4,69	Highly Suitable
Validator 3	4,53	Highly Suitable
<b>Average Score</b>	<b>4,62</b>	<b>Highly Suitable</b>

Source: Data processing results, 2024

From the results of content validation by two media expert validators and one teacher practitioner, an average score of 4.62 was obtained, categorized as very feasible for trial with students.

### c. Results of Limited Trial (Users)

After making several improvements based on the suggestions and assessments from media and content experts, a trial was conducted involving students as users of this application with three types of trial methods: individual trial (one-to-one), small group trial, and expanded/field trial. All three trials utilized questionnaires.

#### 1) Individual Trial (One to One)

This individual trial involved 3 students (users). A summary of the data analysis results from the individual trial is presented in Table 4.5

TABLE 4. Summary of Student Assessment in One to One Trial

Respondent	Number of Items	Total Score	Average	Category
Respondent 1	18	64	3,55	Very good
Respondent 2	18	63	3,5	Very good
Respondent 3	18	65	3,61	Very good
<b>Average</b>			<b>3,55</b>	<b>Very good</b>

Source: Data processing results, 2024

From the results of the individual trial (One to One), an average score of 3.55 was obtained, categorized as very good.

#### 2) Small Group Trial

This trial involved 9 students (users). A summary of the data analysis results from the small group trial is presented in Table 5.

TABLE 5. Summary of Student Assessment in Small Group Trial

Respondent	Number of Items	Total Score	Average	Category
Respondent 1	18	66	3,66	Very good
Respondent 2	18	62	3,44	Very good
Respondent 3	18	60	3,33	Very good
Respondent 4	18	70	3,88	Very good
Respondent 5	18	61	3,38	Very good
Respondent 6	18	67	3,72	Very good
Respondent 7	18	65	3,61	Very good
Respondent 8	18	70	3,88	Very good
Respondent 9	18	62	3,44	Very good
<b>Average</b>			<b>3,55</b>	<b>Very good</b>

Source: Data processing results, 2024

From the results of the Small Group Trial, an average score of 3.59 was obtained, categorized as very good.

3) Expanded/Field Trial

This trial involved 34 students (users). A summary of the data analysis results from the field trial is presented in Table 6.

TABLE 6. Summary of Student Assessment in Expanded Trial

Respondent	Number of Items	Total Score	Average	Category
Respondent 1	18	62	3,44	Very good
Respondent 2	18	66	3,66	Very good
Respondent 3	18	69	3,83	Very good
Respondent 4	18	69	3,83	Very good
Respondent 5	18	64	3,55	Very good
Respondent 6	18	63	3,5	Very good
Respondent 7	18	64	3,55	Very good
Respondent 8	18	65	3,61	Very good
Respondent 9	18	69	3,83	Very good
Respondent 10	18	58	3,22	Very good
Respondent 11	18	54	3	Very good
Respondent 12	18	67	3,72	Very good
Respondent 13	18	65	3,61	Very good
Respondent 14	18	72	4	Very good
Respondent 15	18	60	3,33	Very good
Respondent 16	18	68	3,77	Very good
Respondent 17	18	68	3,77	Very good
Respondent 18	18	71	3,94	Very good
Respondent 19	18	72	4	Very good
Respondent 20	18	67	3,72	Very good
Respondent 21	18	50	2,77	Very good
Respondent 22	18	70	3,88	Very good
Respondent 23	18	66	3,66	Very good
Respondent 24	18	62	3,44	Very good
Respondent 25	18	61	3,38	Very good
Respondent 26	18	72	4	Very good
Respondent 27	18	72	4	Very good
Respondent 28	18	61	3,38	Very good
Respondent 29	18	63	3,5	Very good
Respondent 30	18	70	3,88	Very good
Respondent 31	18	65	3,61	Very good
Respondent 32	18	66	3,66	Very good
Respondent 33	18	64	3,55	Very good
Respondent 34	18	55	3,05	Very good
<b>Average</b>			<b>3,63</b>	<b>Very good</b>

Source: Data processing results, 2024

From the results of the Expanded/Field Trial, an average score of 3.63 was obtained, categorized as very good

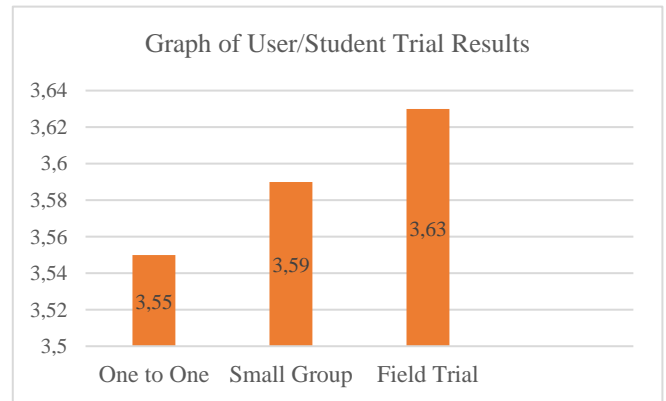


Fig. 32. Graph of User/Student Trial Results.

Based on the trials conducted above, it can be concluded that in order to obtain the final product in the form of Developing PC Assembly Learning Media for the Productive TKJ Subject for Grade X, using Adobe Flash CS6 at SMK Negeri 2 Takalar, the application meets the 'very good' feasibility criteria. Thus, the results from the three trials, starting from the one-to-one trial with a final result of 3.55, the small group trial with a final result of 3.59, and the large group trial with a final result of 3.63, give an overall average from the three trials of  $(P1+P2+P3) : 3 = (3.55+3.59+3.63) : 3 = 3.59$ , which falls into the 'very good' category.

D. Dessimination

At this stage, the dissemination of the final product of the learning media was carried out specifically for SMK Negeri 2 Takalar, both for teachers and students, by transferring the file via Flashdrive sharing from one device to another

IV. CONCLUSION

Based on the results of the research and discussion, the following conclusions can be made:

1. This research has produced a PC Assembly learning media, which is an application based on Adobe Flash CS6. This application is combined with PC assembly material, including the introduction of PC assembly components, procedures for assembling a PC, and workplace safety and security in PC assembly. The development of this application uses the 4D model and is built using Adobe Flash CS6 as the main engine. The testing and assessment of this application were conducted by media and content experts, which were previously validated by instrument experts and deemed very feasible for trial.
2. User responses to the developed media, based on user characteristic testing, involved Grade X TKJ students at SMKN 2 Takalar. The results of this testing achieved a very feasible category, indicating that user feedback on the application is in the very good range. The results of testing other characteristics have shown that the application is valid, practical, and has added value

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