CHAPTER 3

RESEARCH METHODOLOGY

3.1 Research Implementation Stage

The research stage has been carried out in a series of implementation steps from beginning to end which have been adapted to needs. In addition, there are steps, namely introduction, analysis, development, design, implementation, evaluation, feasibility test, final application, and final report. The stages of the research can be seen in Figure 3.1.
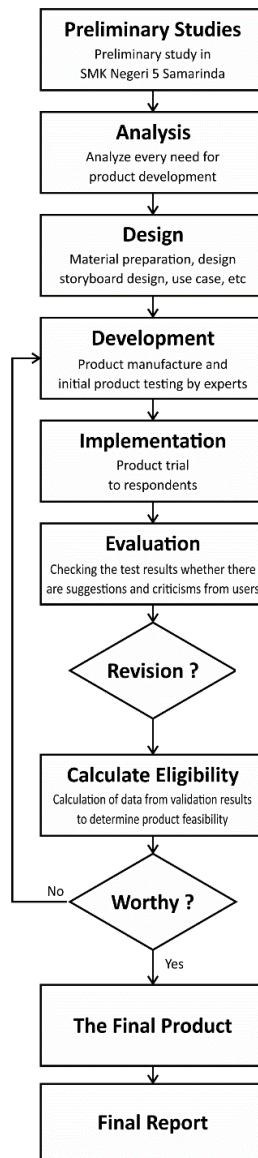

Figure 3. 1 Research Stages

Based on Figure 3.1, it can be seen that the development of learning media for the introduction of Android-based informatics in the tests that will be carried out later only reaches the final test, namely testing data based on the results of validation from experts and students. The feasibility test carried out aims to identify the application, whether it is by the objectives, content of the material, and the interactivity of applications made by developing learning media by taking into account the feasibility of learning media. The stages of developing the ADDIE model (Analysis, Development, Design, Implementation, Evaluation) are more fully explained in the ADDIE development model.

In this interactive learning media research stage, the development model refers to the ADDIE development model which was adapted from Cennamo, Abell, & Chung in 1996 in the ADDIE model development research book. (Rayanto & Sugianti, 2020)

The following are the steps for developing the ADDIE model, which can be seen in Figure 3.2.
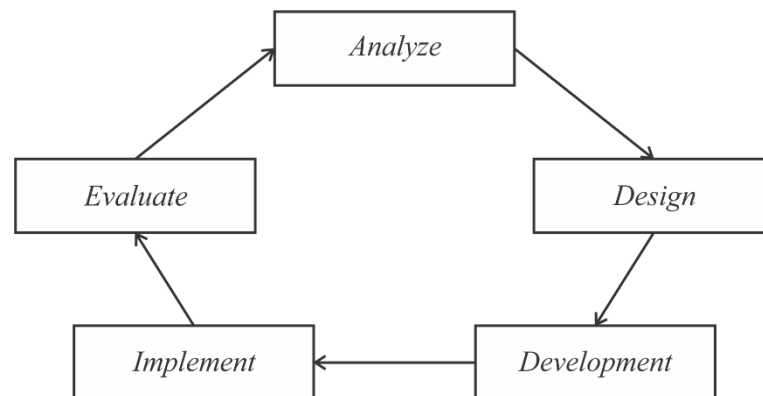

Figure 3. 2 ADDIE Development Model

Based on the ADDIE development model framework above, it can be arranged into a procedure for the stages of learning media development, namely from the stages of analysis, design, development, implementation, and evaluation by (Khoerunisa, 2018), which was adapted from Cennamo, Abell, & Chung in 1996 with the following explanation:

1. Analysis Phase (Analyze)

   At this analysis stage, there are several activities, such as identifying the problem of whether there is a performance gap that occurs during online learning. The following is a description of the activities in the analysis stage:

   a. Conduct observations or reviews of learning situations that have been carried out online, conduct interviews with computer introduction subject teachers, then analyze the competencies that must be mastered by class X students majoring in TKJ at SMKN 5 Samarinda.

   b. We conducted a characteristic analysis through the teacher's assessment of students' learning capacities, knowledge, skills, and attitudes of class X students majoring in TKJ at SMKN 5 Samarinda.

   c. Analyze of the material whether it is in accordance yves of the basic competence of computer introduction subjects which includes material for understanding computer introduction.

2. Design stage (Design)

   At this stage it is carried out with a view to verifying the required performance and then designing according to what has been considered, such as compiling materials and criteria that follow teaching materials. The following are the stages of activities at the design stage as follows:

   a. The design of this interactive learning media was shown to class X students majoring in TKJ at SMKN 5 Samarinda.

   b. Determining what goals or abilities are expected to be understood by students in the learning process, this competency can be obtained from interviews with teachers, and the school also uses Android as a learning medium.

   c. Creating designs in the form of storyboard designs, use cases, activity diagrams, and flowcharts for interactive learning media for the introduction of Android-based informatics.

d. Doing the preparation of the material will be included in the interactive learning media where the material has been determined and in accordance with language subjects regarding computer introduction material.

e. I am currently preparing an instrument that will be given to material experts, media experts, and students to test the feasibility and effectiveness of learning media for students.

3. Development Phase (Development)

At this stage, namely the development stage, the activities carried out are essential activities to develop the design stage into a simple application form. This activity produces an initial model or product that is made to be tested on the design concept that has been displayed.

The following are the steps in the development stage, namely:

a. Making the initial application following the concept or design that has been created and introduced previously.

b. Conduct initial testing using pre-prepared instruments by validating learning media in the form of responses and assessments of media experts on the feasibility of interactive learning media that have been made.

4. Implementation Phase (Implementation)

The next stage is the implementation stage, the real step or system application is carried out using an application prototype or initial application as a real test material in the field to obtain initial values or results regarding the level of feasibility, attractiveness, and efficiency. of learning media. This research was tested indirectly in the field but only by sending a link or online learning media application file due to the pandemic situation. Following are the stages of implementation:

a. the trial was conducted online by applying a learning media application that involved the subject in this study.

b. Then carry out device validation or assessment of learning media by students.

5. Evaluation Phase (Evaluate)

This stage is the last stage of the development and evaluation of ADDIE, namely the stage carried out through discussion. If there are still revisions or changes in learning media to achieve research objectives, it can be useful for students, suitable for learning media.

3.2   Data collection

The data collection stage is one of the most important stages in research. Correct data collection techniques will produce data that has high credibility and vice versa. So it is needed as a research basis to get the information needed in building a learning application. It uses 4 data collection methods which include:

1. Main data

Primary data in the form of verbal data were obtained directly from interviews with informants consisting of the head of the department and a teacher as well as direct observation of SMKN 5 Samarinda.

2. Secondary data

Secondary data in the form of books or comments regarding teacher data and competencies and Collecting the data needed in this research, by reading and searching from several books, research reports, and previous scientific articles related to interactive learning media, from basic aspects of computer introduction material using models ADDIE.

3. Observation and interview

Observation is done by observing or identifying problems that occur in students regarding the lack of learning Media. These observations resulted in an analysis needed to find the problem to be researched and used as a basis for conducting research and development of learning media.

4. List of questions

Giving a set of questions to students (respondents) to answer, here are the stages of data using a survey conducted in this survey to answer a series of questions using a google form to respondents.

a. Media expert due diligence

The instrument that will be used in this media feasibility test is in the form of a questionnaire containing statements and responses or assessments from competent experts in the multimedia field. In interactive learning, the media of the questionnaire made is reviewed from 4 aspects of feasibility, namely ease of navigation, media integration, artistic and aesthetic, overall function. The following is the Grid of Media Expert Instruments in Table 3.1.

Table 3. 1 Media Expert Instrument Grid

Not.	Aspect	Indicator	Goods
1.	Ease of navigation	Navigation structure	1, 2, 3
		Ease of use	4, 5
		Management	6, 7
		Operating system	8, 9
2.	Media integration	This program integrates affective, cognitive, and psychomotor aspects	10, 11
3.	Artistic and aesthetic	Display (audio, visual, animation, text, image)	12, 13, 14 15, 16,17
		Display increases motivation and comfort	18, 19, 20, 21
		Content-relevant views	22, 23
4.	Overall function	This program is developed according to the user's abilities	24, 25
		The program presents the learning desired by the user (student)	26, 27, 28

b. Meteorologist Due Diligence

The instruments used in the material feasibility test are in the form of response questionnaires or assessments from experts related to the material contained in the interactive learning media that will be made. The quality of teaching materials is assessed from two aspects, namely the content of cognition and the presentation of information. The material expert's instrument grid is shown in Table 3.2.

Table 3. 2 Material Expert Instrument Grid

Not.	Aspect	Indicator	Goods
1.	Cognition Content	self-taught (self-taught)	1, 2, 3, 4
		Packaged in intact media (self-contained)	5, 6
		Easy to understand material	7, 8
2.	Information Presentation	Clarity of information delivery	9, 10
		Meet the needs of users (students)	11, 12
		Systematic presentation of material	13, 14
		Make it easier for teachers to deliver material	15, 16
		Content linkage	17, 18
		Content truth and accuracy	19, 20

c. Feasibility Test Against Students

The instrument that will be used in the feasibility test shown to the user is class X Computer and Network Engineering (TKJ) students at SMK Negeri 5 Samarinda. In the form of a questionnaire related to interactive learning media that will be made, the questionnaire that will be made is reviewed from cognitive content, information presentation, ease of navigation, artistic and aesthetic, overall function. The grid of respondents' instruments is shown in Table 3.3.

Table 3. 3 Grid Instrument Respondents (Students)

Not.	Aspect	Indicator	Goods
1.	Cognition Content	Easy to understand material	1, 2
		Digestibility of matter	3, 4
2.		Clarity of information delivery	5, 6

		Meet the needs of users (students)	7, 8
	Information Presentation	Systematic presentation of material	9, 10
3.	Ease of Navigation	Navigation structure	11, 12
		User convenience	13, 14
4.	Artistic And Aesthetic	Display compatibility (audio, visual, animation, text, graphics)	15, 16, 17, 18, 19, 20
5.	Overall Function	Ease and convenience of media operation	21, 22
		The program presents the learning desired by the user (student)	23, 24

3.3 Data Design

Based on interviews conducted, to obtain data in the form of a computer introduction material syllabus for TKJ X SMKN 5 Samarinda, namely: (1) what (2) what, but the author only limits the competency material (how much?), namely: (1) what

3.4 Process / Algorithm Design

The process design stage is an advanced stage of the analysis stage, namely the design stage. At the design stage, what is made is the flow of stages or processes carried out by users on interactive learning media for computer introduction materials using the ADDIE model development model using use cases, activity diagrams, and flowcharts to help explain in detail how the flow is. of the process that will be run in interactive learning media designed according to user needs.

3.5   Use Case

Use case diagrams are diagrams that show the features that exist in the system and explain how the system interacts with the outside world. Users are expected to be able to implement or use the system correctly. This learning media use case diagram can be seen in Figure 3.3.
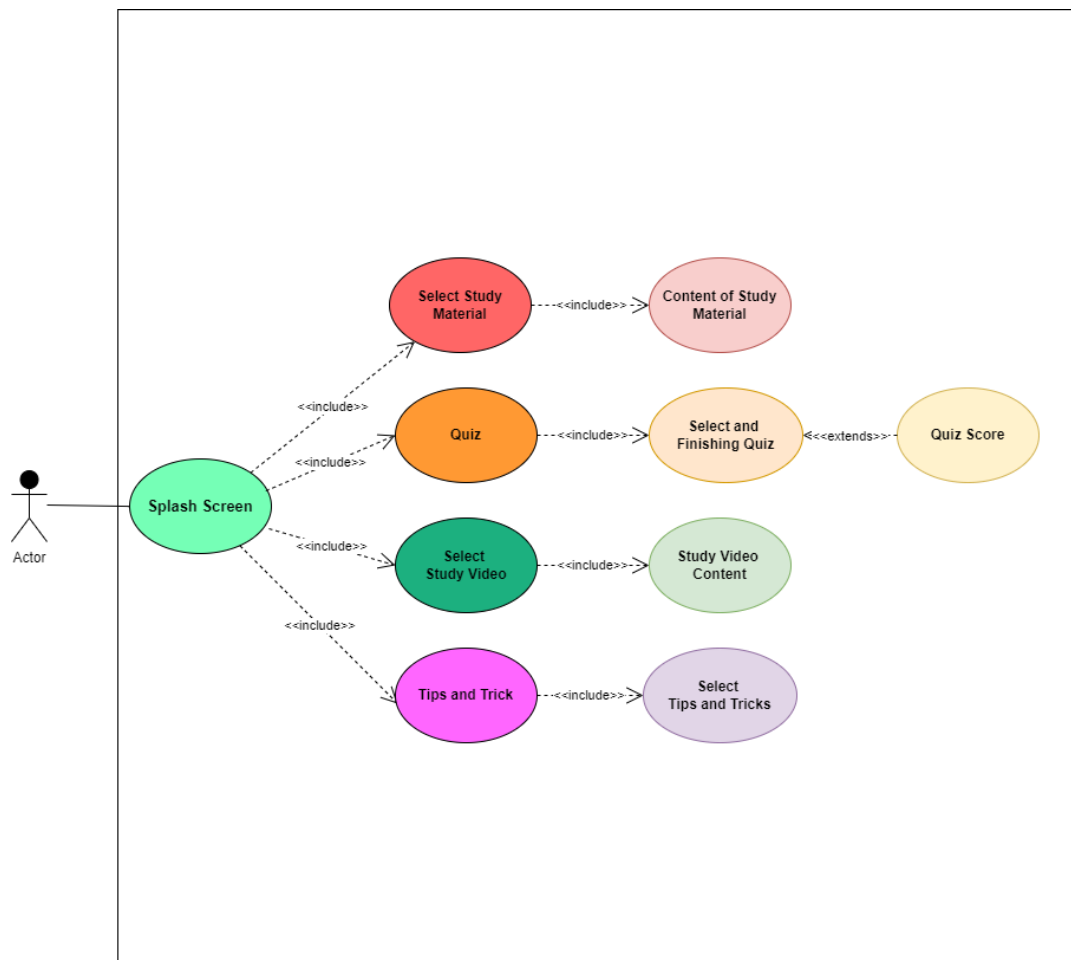

Figure 3. 3 Use Case Diagram

Based on Figure 3.3, there are several processes that can be carried out by users (students), which can be explained as follows:

1. Material focus

    In the material focus menu, users will only be faced with 1 material, namely computer introduction material. Then the user can focus on the material.

2. Learning Media

    On the learning media menu there are 2 choices, namely learning materials and learning videos. Users can access these 2 options, where the choice of teaching

materials makes several materials that are prepared to be studied according to the syllabus and existing materials. In the video option, learn to make videos from YouTube according to the ongoing material.

3. Test

Users can take tests from several existing quizzes from previously studied computer introduction materials on this quiz menu, according to the syllabus and existing materials.

4. Tips and Tricks

In this tips and tricks menu, users can access several tips and tricks about introducing computers from information on the internet.

3.6 Activity chart

Activity Diagram contains a flow of activities that describe a process carried out by users in this interactive learning media application. In this application, users can perform actions such as selecting the desired content focus menu. Users can select the learning media menu which contains a choice of learning materials, then the quiz menu and the video menu. Activity Diagram on computer recognition applications can be seen in Figure 3.4.
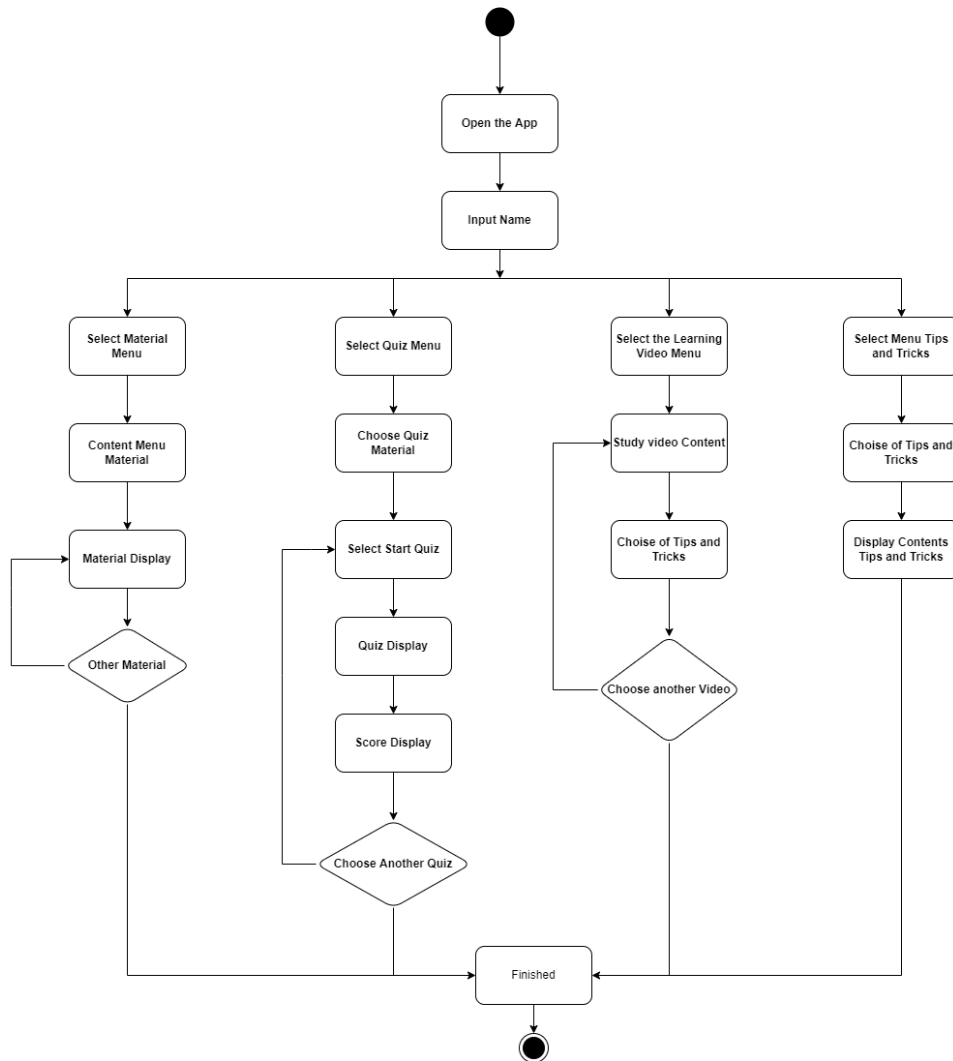
Figure 3. 4 Activity Chart

3.7 Display Design

The display design stage is the stage where the design will be implemented on the application development media.

In the display design there are several pages, namely:

1. Spalash Screen

Splash Screen is the initial screen before entering the opening page. The contents of the Splash Screen display the Unity logo and the computer introduction application logo.
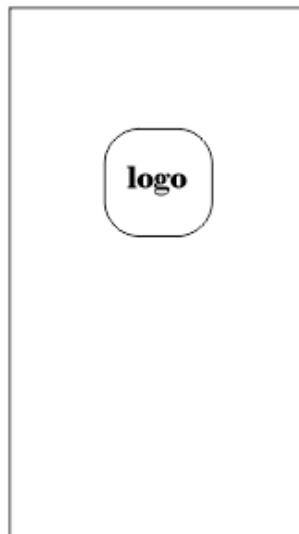
The splash screen design can be seen in Figure 3.5.

Figure 3. 5 Splash Screen

2. Welcome Page

The opening page is the initial display of the computer recognition application. To start learning in this application, the user will be given a display of 3 (three) initial speech slides from the computer recognition application. After that on the last slide there is a start button. To begin with, the user is instructed to enter a name.

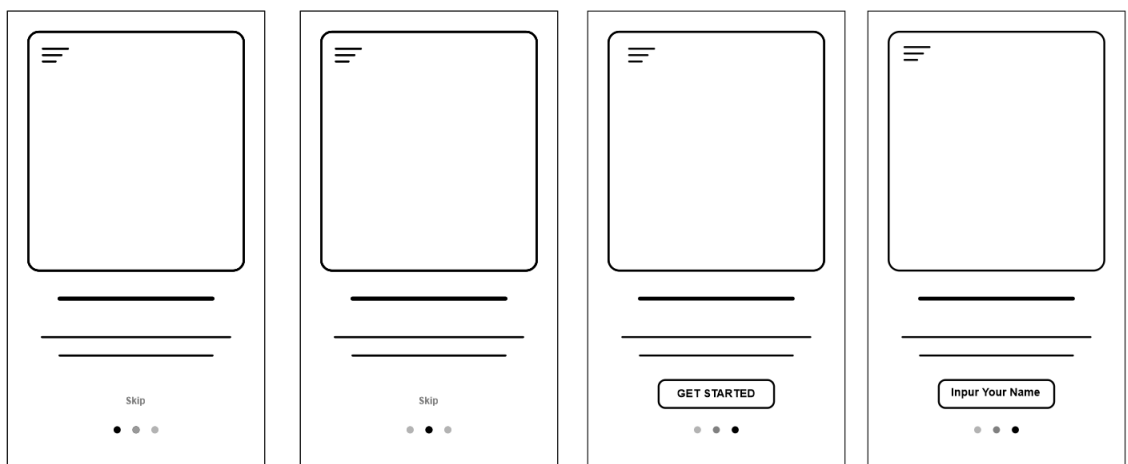The design of the opening page can be seen in Figure 3.6.

Figure 3. 6 Welcome Page

3. Main page

The main page is the main page (start) that will appear after the name entry is made. On this main page there are 4 categories to choose from, which consist of the material category, the quiz category, the Tips and Tricks category, and the learning video category.

The main page design for the categories of materials, quizzes, and learning videos can be seen in Figure 3.7.
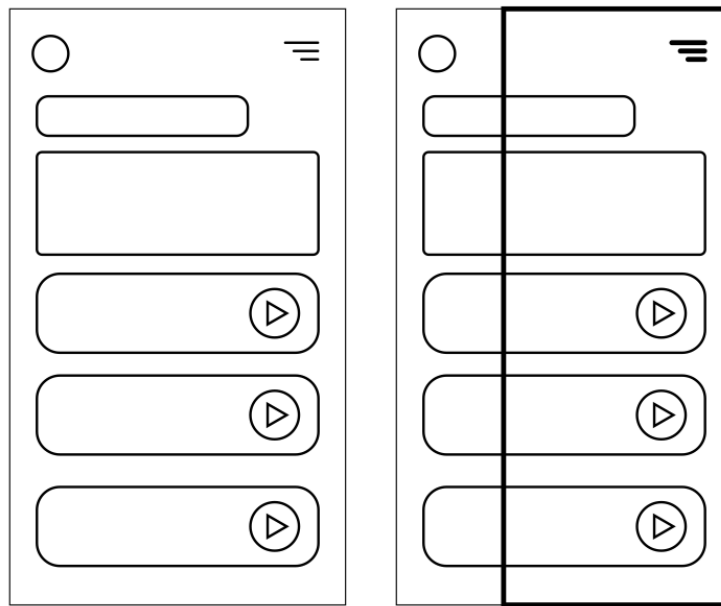

Figure 3. 7 Main page

4. Content Page

This page contains subject matter in the form of text and is given pictures that follow the material being studied and follow the existing syllabus.

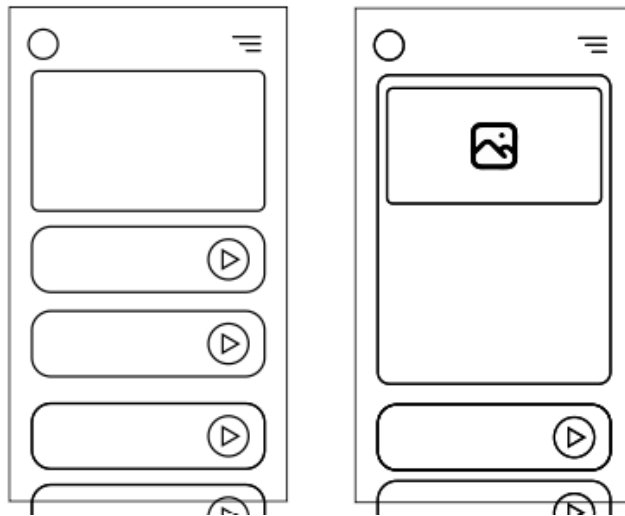The material design for this page can be seen in Figure 3.8.

Figure 3. 8 Content Page

5. Quiz page

This quiz page contains questions related to the subject matter that has been studied previously. The questions are presented in multiple choice, consisting of 5 or more questions with a predetermined time limit. After the user has answered all the questions, the user can see the value by pressing the result button.
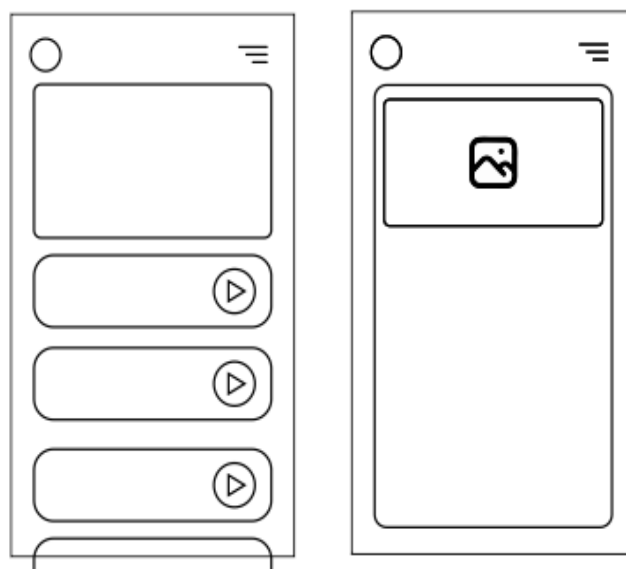
The quiz page design can be seen in Figure 3.9.

Figure 3. 9 Quiz Page

6. Study video page

   They study video pages sourced from YouTube, following the material being studied.

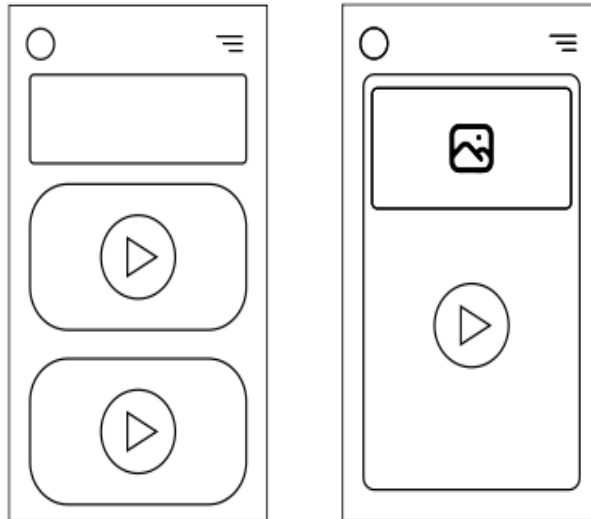   The design of a solid learning video page is shown in Figure 3.10.

Figure 3. 10 Video Page

7. Tips and Tricks Page

   On this page, tips and tricks display interesting information about Introduction to Computers. The tips and tricks page design can be seen in Figure 3.11.
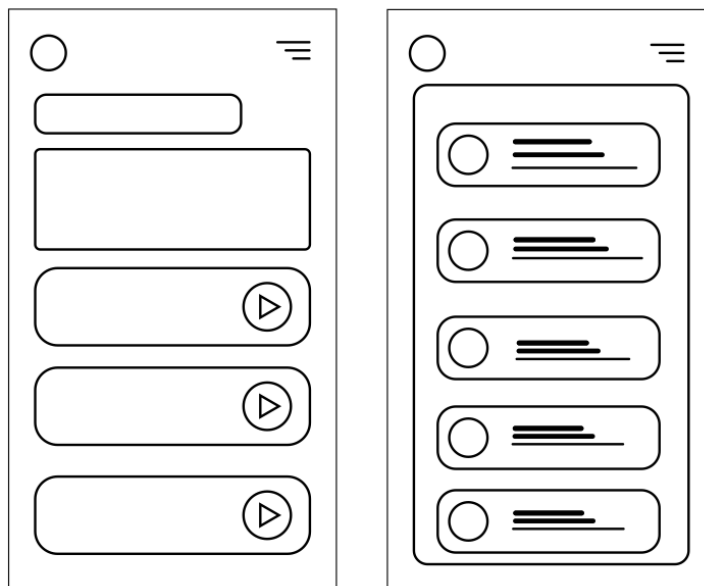

Figure 3. 11 Tips and Tricks Page

3.8 Test design

In the process of designing this test, it can be seen based on the stages of research that have been carried out, namely at the development stage, a formative validation process is carried out by each validator, material expert, and media expert. Then the next stage, namely the implementation stage, also carried out summative validation of respondents (students) using a questionnaire. The next process is to conduct a feasibility test to get the feasibility results. Then the evaluation process, which at this stage makes improvements from the suggestions that have been given by material experts, media experts, and respondents.

Next is the revision stage; if there are complex problems or unusual problems in the computer introduction learning media, it is necessary to apply the Scrum framework, namely the steps used to fix complex or urgent problems in the learning media.

The next stage at the research stage is at the development and implementation stage as well as the results of qualitative data that have been obtained from the test results by distributing questionnaires or questionnaires to media experts and material experts and respondents (students), in which the results of qualitative data will be converted into quantitative data. . Through the due diligence process, to present the results of the feasibility level test for interactive learning media. Here are some steps according to(Khoerunisa, 2018) adapted from Sugiyono in 2015 include:

1. Collect qualitative data from the questionnaire and then convert it into quantitative data using a Likert scale. The Likert scale is used to measure or assess attitudes and assess the attitudes and opinions of respondents who are asked to provide several questions. Furthermore, respondents were asked to provide answers or responses by choosing one value from the measuring scale that has been used.

2. The Likert scale used is a positive or even Likert scale. There are 4 levels, which means there is no middle value. This aims to reduce the possibility of respondents answering choices in the medium category, which applies to all

assessments from experts and respondents (students). The Likert scale used as the measurement scale is 4,3,2,1 with qualitative descriptions of Very Good, Good, Less Good, and Not Good. The Likert scale interpretation is shown in Table 3.5.

Table 3. 4 Likert Scale Interpretation

Score Interval	Sign
Very good	4
Good	3
Not good	2
Very bad	1

Source:(Anita Adesti & Siti Nurkholimah, 2020)

3. The next process is to calculate the total weight value obtained from the answers to each question item regarding the feasibility of interactive learning media. Then look for the score using a formula that can be explained as follows:

$$\bar{x} = \frac{\sum x}{n}$$

Information:

$\bar{x}$ = Average Score

$\sum x$ = Total Score of each

n = Number of question items

4. Then the next step is to find the percentage of the feasibility score by calculating the total score of all the answers to each question in the assessment aspect using a formula that can be explained as follows:

$$\text{Percentage Eligibility } (\%) = \text{X } 100\% \frac{\sum \text{Observed Score}}{\sum \text{Expected Maximum Score}}$$

5. After the percentage value of eligibility can be obtained, then proceed to the stage of determining or appointing the predicate by changing the value into the form of a predicate which is interpreted into a qualitative form based on the

measurement scale (Twig scale). Interpretation of the feasibility category of interactive learning media can be classified using the rating scale shown in Table 3.6.

Table 3. 5 Eligibility Category Based on Rating Scale

Score In Percent %	Eligibility Category
0 – 30%	Very unworthy
31 – 50%	Not feasible
51 – 75%	Decent enough
76 – 100%	Very valuable

Source:(Anita Adesti & Siti Nurkholimah, 2020)

The results of the assessment from the stage of determining the feasibility of the interactive learning media above can be used as the final determination of the feasibility of the product made, whether it is suitable for use or not. For example, the results of the feasibility assessment fall into the good or decent category. In this case the product made can be said to be feasible and is expected to be useful and used in the learning process by students majoring in TKJ at SMK Negeri 5 Samarinda.

3.9   Research time and place

This research will be carried out from January 2022 to June 2022. The place of research is carried out in an educational institution, namely SMK Negeri 5 Samarinda. Meanwhile, data analysis was carried out by observing and interviewing one of the computer introduction subject teachers at SMK Negeri 5 Samarinda and conducting library research through media such as books, journals, articles, and others.

Various activities and activities in this research can be scheduled and completed in accordance with the specified time. For this reason, it is necessary to arrange a research schedule which can be seen in Table 3.7 Research Schedule.