THE DEVELOPMENT OF INTERACTIVE LEARNING MEDIA APPLICATIONS FOR 10th CLASS IN MOTORCYCLE ENGINEERING PROGRAM (CASE STUDY: SMK 4 LPPM - RI PADALARANG)

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ABSTRACT

Motorcycle Engineering (known as TSM) is one of the competency of expertise in SMK 4 LPPM - RI Padalarang. Learning method that is currently in use are the learning of theory and the practicum. that used discussed about basic automotive work materials (known as PDO) in the classroom lack of its ability to provide an overall explanation on how to use the tools which resulted on students' lack of understanding on the mechanism basic work tools of motorcycle engineering. Based on the previous research (Research by Heri Prasetyo and Nurhayati, 2015) about a learning media using CAI method which employed two models including tutorial and simulation, concluded that 83,20% of learning media with CAI method are found feasible to use. Based on the problems that have been described and see previous research, a client-server-based learning media with the use of CAI (Computer Assisted Instruction) method is actually required, which includes the tutorial models, simulations, and evaluation. Result of this research is in a form of interactive learning media for the 9th class students majoring motorcycle engineering using the CAI method in which included the tutorial models, simulations, and evaluations based on a client-server, through the blackbox testing it was found that the entire functional were all in accordance with specifications on software requirements, and responses from application users, measured with the Likert scale showed a positive attitude verifying that the development of alternative media using tutorial method had helped students understand the PDO materials way easier, and the implementation of simulation learning model could convey the mechanism of tools which was less effective to be done in the learning of practicum.

Keywords: Learning Media, simulation, Motorcycle Engineering, Basic automotive work, . vocational high school LPPM Padalarang - RI

1. INTRODUCTION

Motorcycle Engineering (TSM) is one of the competency of expertise in SMK 4 LPPM RI - Padalarang which emphasizes on the skill of mechanical service of two-wheeled motorcycle, the competence of motorcycle engineering skill prepare students to work in the field of work managed by the agency, Agency or private company (entrepreneur).

Vocational High School (SMK) 4 LPPM - RI Padalarang is one vocational school that has 4 (four) competency skills. The competency of TSM skill in SMK 4 LPPM - RI Padalarang is one of the expertise that need wide room and many supporting tools.

Based on interview with motorcycle engineering teacher at SMK 4 LPPM - RI Padalarang, Mr. Gardesa Sri Ardhi ,. S.pd stated that in SMK 4 LPPM - RI Padalarang at this time school only have 1 (one) motorcycle lab, this motorcycle lab is used for giving class X practice material that all students are 125 students which divided into 4 classes. The learning method that is used is learning in theory and practically, for the giving of materials in the classroom only using the book media and for lab work done in the lab with the help of tools. The availability of practicum equipment in the lab for automotive basic job subjects (PDO) is in the hand tools, service tools, workshop equipment tools, mechanical measuring tools, electrical measuring tools, safety equipment and fire extinguishers, and in SMK 4 LPPM - RI Padalarang has one computer lab with 20 PC units.

Based on the fact that there is a book used for the giving of PDO lab materials at the time of the class can not provide an explanation of how the overall use of the tool that resulted in students not quite understand the workings of the tool of the material described by the book, and the delivery of lab work in the lab motorcycle Still less can be done because of the limitations of practicum tools.

Based on previous research conducted by (Heri Prasetyo and Nurhayati, 2015) in the development of CAI-based interactive learning media on the subjects of basic electronics technique class X in SMKN 1 Nganjuk in which there are 2 models of delivery that is tutorial, and simulation get result 83.20 % That learning media is eligible for use [1]. Based on existing problems using Computer Assisted Instruction (CAI) method, and supported by the results of questionnaire calculations taken from

sampling using the formula Issac and Michael, with the number of students of class X as much as 125 students then get a sample of 75 students. The attitudes shown in the questionnaire calculation from the sample of 75 students expressed a "Positive" attitude with a total score of 1212 against a questionnaire statement stating "Students have difficulties in understanding the basic work materials of motorcycle engineering". The result of positive attitude will be done development of interactive learning media application for class X motorcycle engineering department by using CAI method in which there is tutorial, simulation, and evaluation.

While the objectives to be achieved in this research are:

A. Build an alternative media to help students more easily understand the material on the basic work book motorcycle technique by using tutorial model.
B. Applying a simulated learning model to convey the workings of less-performing tools on practical learning.

1.3 Learning media

According to Oemar Hamalik (1986), the learning media is the interaction communication relationship will run smoothly and achieve maximum results, when using tools called communication media. In the sense of communication, media is a tool that moves information (messages) from source to recipient. According to Edgar Dale (1946), learning media is the classification of experience by level from the most concrete to the most abstract, where participation, observation, and direct experience have a tremendous impact on the learning experience that students receive. Submission of a concept to students will be well conveyed if the concept requires students directly involved in it when compared with concepts that only involve students to observe it. Meanwhile, according to Newby (2000), learning media is a medium that can convey learning messages or contain content to membelajarkan someone. From some of these opinions can be concluded that the media learning is creative media used in providing learning materials to students so that the learning process is more effective, efficient and fun. [3]

1.4 Luther Sutopo

According to Luther (1994), Multimedia development methodology consists of six stages: concept, design, collecting materials, assembly, testing, and distribution. These six stages are not necessarily sequential in practice, but the concept stage should be the first. [3]

Sutopo (2003) adopted Luther's methodology with modifications, as in **Error! Reference source not found.**

1.5 Computer Assisted Instruction(CAI)

The use of computers in Education is known as computer-assisted learning (CAI). CAI (Computer Assisted Instruction) is a microposesor-based subject delivery system whose lessons are designed and programmed into the system.

The types of CAI by Patricia Ann Brock in 1994 In the book "Educational Technology in the Classroom" is as follows.

A. Drill and Practice
B. Tutorial
C. Simulation
D. Problem-Solving. [4]

2. RESEARCH CONTENTS

2.1 Method of Software Development

The stages of the development of interactive learning media for class X majors Sepda Motor Engineering.

A. Concept

The concept stage (conceptualization) is the stage to determine the purpose and who the program user (audience identification). At this stage analysis of learning media to be built, learning media that will be built using the method of CAI (Computer Assisted Instruction) with tutorial, simulation, and evaluation model, and the scope of material that will be presented is the basic work material of motorcycle techniques with client-based Server.

And the analysis of non-functional and functional needs, the user identification program is a productive teacher of motor engineering, computer lab administrator, and X-class students majoring in motorcycle engineering. And the final result of the program that will be built is interactive learning media of class X of motorcycle engineering department.

B. Design

Stage Design is the stage of making specifications about the program architecture, style, appearance, and material needs / materials for the program. At this stage is done storyboard design, design of system architecture to be built, the design of tables, and interface design.

C. Material Collecting

At this stage the collection of materials in accordance with the needs done. These materials include clip art images, photos, animations, video, audio, and others that can be obtained for free or by creating. This stage is done in parallel with the Assembly stage.

D. Assembly

At this stage, making all multimedia materials, making the application is based on the design stage, such as storyboards, functional requirements analysis, table design and interface design, using Adobe Flash Professional CS6 application with ActionScript 3.0 programming language and for backend application using sublime text editor 3.0

And PHP programming language, for DBMS using Mysql.

E. Testing

The testing phase (testing) is done after completing the assembly stage by running the application / program and see if there is any error or not. At this stage of testing in this study using blackbox testing to test functionalities that have been designed on the analysis of functional needs, and also the response of application users.

F. Distribution

At this stage, the application will be paired in the computer lab of SMK 4 LPPM RI Padalarang based on client-server, where application users are teachers and administrators as backend application users, and students as frontend application users.

2.2 Learning Media analysis built

In the design of this system will be built an interactive learning media application in which contains subject materials of basic motorcycle engineering work in class X. This application is built using CAI (Computer Assisted Instruction) method with the concept of Tutorial, Simulation and Evaluation. The features contained in the application to be built include subject matter basic motorcycle engineering work, simulation, and evaluation in the form of multiple choice questions and lab work. The simulation concept consists of simulating the material chapter equipment and workshop equipment automotive work, and maintenance of measuring tools and safety and

A. The concept of the tutorial consists of chapter material ie.
   1. Chapter 1 Equipment and Workshop equipment automotive workshop.
   2. Chapter 2 Types - Types and Specifications of Measuring Instruments.
   3. Chapter 3 Maintenance of Tools.
   4. Chapter 4 Occupational Safety and Health
B. Concept Simulation consists of chapter material ie.
   1. Chapter 1 Equipment and Workshop equipment automotive workshop.
   2. Chapter 3 Maintenance of Tools.
   3. Chapter 4 Occupational Safety and Health
C. The concept of evaluation consists of multiple choice questions, and practical questions.

2.3 System Architecture Built

The architecture of the built system consists of learning media applications and servers for processing the value of the results of student evaluation after using the learning media, system architecture in the development of interactive learning media for the X class of Department of Motorcycle Engineering can be seen in Figure 1

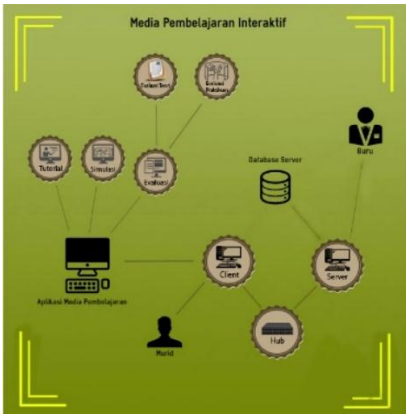


Figure 1. Arsitektur Sistem Media Pembelajaran Interaktif

Interactive is a learning media application that is already installed on the client in the computer lab, this application serves as an interface between students with interactive learning media, the construction of interactive learning media applications built using adobe flash CS6 with ActionScript 3.0 language.

Application of interactive learning media using client server network with hub. Server is as a support tool that serves as a placeholder value of the evaluation done by the student on the application of interactive learning media in the wake, the evaluation questions in the box in the form of XML that the data can be though in the database, and the client is the end -user used by students in the provision of tutorials, simulations, and evaluations in the basic work subjects of motorcycle engineering.

2.4 Software Requirements Analysis

In this non-functional requirements analysis is explained on the analysis of hardware requirements, software requirements analysis and user analysis.

2.4.1 Hardware Requirement Analysis

Analysis of hardware requirements is used to simplify the process of application design and implementation. The hardware used for implementing this application is divided into 2 specifications ie hardware specification for server, and hardware specification for client, specification obtained from observation to computer lab SMK 4 LPPM - RI Padalarang, for hardware specification for server can be Look at **Table 1**

Table 1. Server Hardware Specifications at School

No	Perangkat Keras	Spesifikasi
1	Processor	AMD A10-6790K 4.0GHz Quad-Core Processor
2	Monitor	Monitor LG dengan resolusi 1366 x 768
3	Graphic Card	1 GB
4	Harddisk	1 TB
5	Memori	8 GB
6	Mouse	Standar
7	Keyboard	Standar
8	Koneksi Internet	20Mbps

For specifications Hardware client at school can be viewed on Table 2

Table 2. Hardware Specification Client in School

No	Perangkat Keras	Spesifikasi
1	Processor	AMD A6-9210 2.8GHz
2	Monitor	Monitor LG dengan resolusi 1366 x 768
3	Graphic Card	1 GB
4	Harddisk	500 GB
5	Memori	4 GB
6	Mouse	Standar
7	Keyboard	Standar

2.4.2 Software Requirement Analysis

The software required to support the use of built-in interactive multimedia applications can be viewed on **Table 3**

Table 3. Requirement Analysis Software For Running Applications

No	Perangkat Lunak	Nama Program
1	Operating System (OS)	1. Windows XP 2. Windows 7
2	Program Pembaca Multimedia	Flash Player
3	Paket Webserver	Xampp

2.4.3 User Needs Analysis

Users of interactive learning media is intended for teachers majoring in motorcycle engineering, X-class students majoring in motorcycle engineering, and computer lab administrator SMK 4 LPPM - RI Padalarang

2.5 Functional Needs Analysis

The analysis of functional needs of interactive learning media for the X class of motorcycle engineering majors consists of ERD and context diagram

2.5.1 ERD (Entity Relationship Diagram)

ERD from interactive learning media application for class X motorcycle engineering majors SMK 4 LPPM - RI Padalarang can be seen in Figure 2

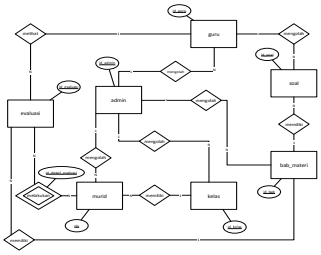


Figure 2 ERD

2.5.2 Diagram Konteks

For the context diagram Backend can be seen in Figure 3

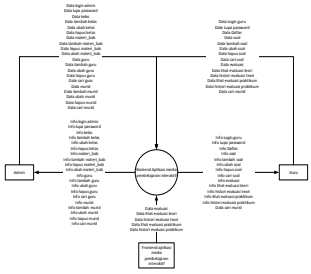


Figure 3. Diagram Konteks Backend

For Frontend context diagram can be seen in Figure 4

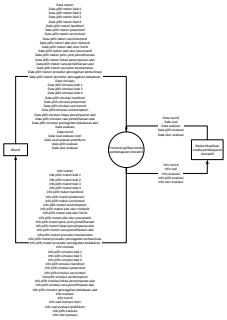


Figure 4. Diagram Konteks Frontend

2.6 System planning

System Design consists of designing Relation Scheme and menu structure design

2.6.1 Designing Relation Schemes

Relation scheme of interactive learning media application can be seen in Figure 5

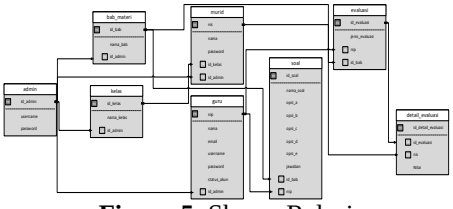


Figure 5. Skema Relasi

2.7 Interface Implementation

The interface implementation consists of an interface implementation that has been designed on the design of the system

2.7.1 Main Menu Student Interface Implementation

Implementation of the student main menu interface can be seen in Figure 6



Figure 6. Implementasi Antarmuka Halaman Menu Utama Murid

2.7.2 Interface Implementation Tool Description

Implementation of the tool description interface can be seen in Figure 7



Figure 7. Implementation Interface Tool Description page

2.7.3 Implementation of Tool Simulation Interface

Implementation of the tool simulation interface can be seen in Figure 8



Figure 8. Implementation of Tool Simulation Interface

2.7.4 Interface Implementation Enter Student Identity

Implementation of the interface to enter student identity can be seen in Figure 9

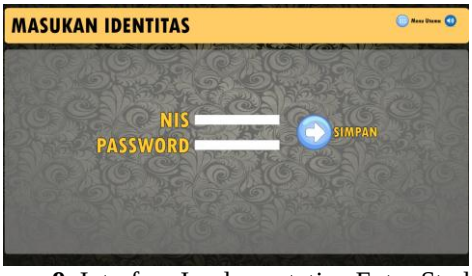


Figure 9. Interface Implementation Enter Student Identity

2.7.5 Implementation Interface Main Menu Master

Implementation of teacher main menu interface can be seen in Figure 10

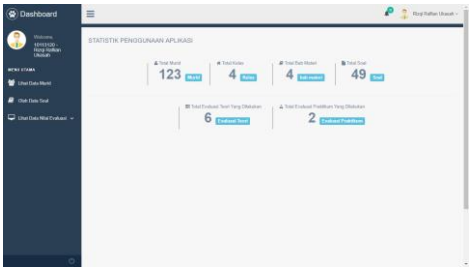


Figure 10. Implementasi Antarmuka Halaman Menu Utama Guru

2.8 System Testing

Testing the system is done that is blackbox testing and user application responses

2.8.1 Blackbox Testing Scenario

Testing scenarios on the backend application to be performed can be seen in Table 4

Table 4. Backend Application Testing Scenarios

No	Kelas Uji	Poin Pengujian	Jenis Pengujian
1	Login	Login Admin	*Black box*
		Login Guru	
2	Pengolahan Murid	Tambah data murid	*Black box*
		Ubah data murid	
		Hapus data murid	
		Cari data murid	
3	Pengolahan Kelas	Tambah data kelas	*Black box*
		Ubah data kelas	
		Hapus data kelas	
		Cari data kelas	
4	Pengolahan bab materi	Tambah data bab	*Black box*
		Ubah data bab	
		Hapus data bab	
		Cari data bab	
5	Pengolahan Guru	Tambah data guru	*Black box*
		Ubah data guru	
		Hapus data guru	
		Cari data guru	
6	Lupa password	Lupa Password guru	*Black box*
7	Daftar Akun	Daftar Akun Guru	*Black box*
8	Lihat data murid	Pencarian data murid	*Black box*
9	Pengolahan soal	Tambah data soal	*Black box*
		Ubah data soal	
		Hapus data soal	
		Pencarian data soal	
10	Lihat Nilai evaluasi	Pencarian nilai evaluasi teori	*Black box*
		Pencarian nilai evaluasi praktikum	
11	Cari histori evaluasi teori murid	Pencarian histori evaluasi teori	*Black box*
		Pencarian histori evaluasi praktikum	

Testing scenarios on frontend applications to be performed can be seen in Table 5

Table 5 frontend Application Testing Scenarios

No	Kelas Uji	Poin Pengujian	Jenis Pengujian
1	Melihat Materi	Pemilihan menu materi	*Black box*
		Pemilihan menu bab materi	
		Pemilihan menu sub bab materi	
		Pemilihan alat-alat	
2	Melakukan Simulasi	Pemilihan menu simulasi	*Black box*
		Pemilihan menu bab simulasi	
		Pemilihan menu sub bab simulasi	
		Pemilihan implementasi alat-alat	
		Pengecekan posisi *drag & drop* alat simulasi	
3	Melakukan Evaluasi	Pemilihan menu evaluasi	*Black box*
		Verifikasi identitas murid	*Black box*
		Pemilihan jenis evaluasi	*Black box*
		Menjawab soal evaluasi	*Black box*
		Menyimpan skor evaluasi	*Black box*

2.8.2 Blackbox Testing Cases and Results

Testing admin login on the backend application can be seen in Table 6

Table 6 Test Admin Login

Kasus dan Hasil Uji (Data Benar)			
Data Masukan	**Yang Diharapkan**	**Pengamatan**	**Kesimpulan**
Username : admin Password : admin	Admin dapat Masuk kedalam menu utama administrator	Admin Masuk kedalam menu utama administrator	Diterima
Kasus dan Hasil Uji (Data Salah)			
Data Masukan	**Yang Diharapkan**	**Pengamatan**	**Kesimpulan**
Username : admin Password : 1234	Dapat menampilkan Pesan "Gagal Login .. Username atau Password Tidak Terdaftar"	Pesan "Gagal Login .. Username atau Password Tidak Terdaftar" pada halaman login admin tampil	Diterima
Kasus dan Hasil Uji (Data Kosong)			
Data Masukan	**Yang Diharapkan**	**Pengamatan**	**Kesimpulan**
Username : admin Password :	Dapat menampilkan Pesan "Isi Field yang kosong"	Pesan "Isi Field yang kosong" pada halaman login admin tampil	Diterima

2.8.3 Conclusion Functional Testing

Based on the results of functional blackbox testing has been done on interactive learning media applications for class X Department of Motorcycle Engineering, it can be concluded that the functional system has been able to generate system requirements in accordance with software requirements specification designed.

2.8.4 App User Response

User application responses are made to productive teachers, computer lab administrators, and grade X students in motorcycle engineering

2.8.5 App User Response Scenario

Scenario responses to the students is by way of spreading the questionnaire (questionnaire), the content of the question is closed question using Likert scale. For Likert scale category scores can be seen in Table 7

Table 7. Category Score Attitude Attitude Likert Scale

Pernyataan	Skor Sikap Postif	Skor Sikap Negatif
Sangat Setuju	5	1
Setuju	4	2
Ragu-Ragu	3	3
Tidak Setuju	2	4
Sangat Tidak Setuju	1	5

The list of questionnaires distributed to students can be seen in Table 8

Table 8. List of Statement of Student Questionnaire

Tujuan Penelitian Pertama		**Membangun media alternatif untuk membantu murid lebih mudah dalam memahami materi pada buku pekerjaan dasar teknik sepeda motor dengan menggunakan metode tutorial.**					
No	**Pernyataan**	**SS**	**S**	**RR**	**TS**	**STS**	**Kategori Sikap Pernyataan**
1	Materi yang anda pelajari pada media pembelajaran sesuai dengan silabus mata pelajaran pekerjaan dasar sepeda motor						Positif
2	Anda kesulitan ketika memahami setiap materi yang disajikan pada media pembelajaran interaktif						Negatif
3	Anda tidak dapat menjalankan media pembelajaran interaktif jika tidak ada bantuan dari guru yang menerangkannya						Negatif
Tujuan Penelitian Kedua		**Menerapkan model pembelajaran simulasi untuk menyampaikan cara kerja alat yang kurang dapat di lakukan pada pembelajaran praktikum.**					
No	**Pernyataan**	**SS**	**S**	**RR**	**TS**	**STS**	**Kategori Sikap Pernyataan**
1	Tahapan simulasi yang ada di media pembelajaran sesuai dengan simulasi alat secara langsung pada saat praktikum						Positif
2	Ketika melakukan simulasi pada media pembelajaran anda dapat mengikuti tahapan simulasi dengan baik						Positif
3	Simulai yang ada di media pembelajaran sudah memberikan gambaran cara kerja alat alat pekerjaan dasar teknik sepeda motor						Positif

2.8.6 Results of Student Response

From the dissemination of questionnaires to 75 students, the results of the scores can be seen in Table 9

Table 9. Table Distribution of Respondents Data Collection Results

Tujuan Pertama	**Membangun media alternatif yang membantu murid lebih mudah dalam memahami materi pada buku pekerjaan dasar teknik sepeda motor dengan menggunakan metode tutorial**			
No Responden	**Pernyataan Tujuan Pertama**			**Total**
	1	**2**	**3**	
1	4	3	4	11
2	3	4	3	10
3	4	5	4	13
4	3	4	4	11
5	5	2	2	9
6	3	2	3	8
7	4	4	5	13
8	4	3	5	12
9	4	4	4	12
10	4	3	2	9
11	4	4	4	12
12	4	2	2	8
13	3	3	3	9
14	4	4	4	12
15	4	3	4	11
16	3	3	2	8
17	4	4	3	11
18	3	2	2	7
19	4	4	4	12
20	2	4	3	9
21	4	4	5	13
22	4	4	2	10
23	5	4	3	12
24	4	5	2	11
25	3	5	1	9
26	3	2	2	7
27	4	4	2	10
28	3	4	4	11
29	2	3	2	7
30	4	4	4	12
31	4	4	4	12
32	4	3	4	11
33	5	4	4	13
34	4	4	4	12
35	4	4	4	12
36	4	4	3	11
37	4	4	4	12
38	4	4	4	12
39	4	4	3	11
40	4	4	4	12
41	4	4	4	12
42	3	3	3	9
43	3	2	2	7
44	5	4	5	14
45	5	4	2	11
46	3	4	4	11
47	2	2	2	6
48	4	4	4	12
49	4	4	2	10

Tujuan Pertama	Membangun media alternatif yang membantu murid lebih mudah dalam memahami materi pada buku pekerjaan dasar teknik sepeda motor dengan menggunakan metode tutorial			
No Responden	Pernyataan Tujuan Pertama			Total
	1	2	3	
50	4	4	2	10
51	4	4	4	12
52	5	2	2	9
53	4	4	4	12
54	4	4	3	11
55	5	5	2	12
56	4	3	3	10
57	4	4	4	12
58	4	4	5	13
59	5	4	2	11
60	4	4	3	11
61	4	2	2	8
62	4	4	4	12
63	4	4	4	12
64	3	3	3	9
65	4	3	3	10
66	4	3	2	9
67	5	4	4	13
68	4	4	2	10
69	4	4	4	12
70	3	2	4	9
71	2	1	3	6
72	4	2	3	9
73	4	3	3	10
74	4	4	4	12
75	4	3	3	10
Total Skor Responden				793

To know the attitude of the respondent as a whole to the first goal can be done by following stages.

A. Determining the Score

The specified score is the minimum score, maximum, median, quartile 1, and quartile 3.

1. Determining the Score

Minimum score * Number of respondents
= 3 * 75
= 225

2. Determining the value of quartile 1

(Total Minimum score + median) / 2
= (225 + 675) / 2
= 450

3. Specifies the median value

(Total maximum + total minimum) / 2
= (1125 + 225) /2
= 675

4. Determining the quartile value 3

(Total Maximum score + median) / 2
= (1125 + 675) / 2
= 900

5. Specifies the maximum total score

Skor maksimum * Number of respondents
= 15 * 75
= 1125

B. Determining the Score Limit

Determining the score limit for each attitude, here is the category of attitudes that have been determined.

1. Category of Very Positive Attitude, ie areas that are limited by the third quartile and maximum score. (Quartile 3 ≤ x ≤ Maximum score)

2. Positive Attitude Category, which is area limited by median and third quartile. (Median ≤ x <quartile 3)

3. Categories of Negative Attitude, ie areas bounded by quartiles 1 and median (quartiles 1 ≤ x <Median)

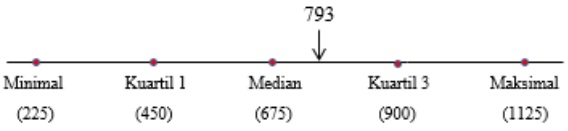
4. Category of Very Negative Attitude, ie areas limited by minimum score and quartile 1 (minimum score ≤ x <quartile 1)The Limits of Scores can be seen in Table 10

Table 10. Batas Skor

Batas Skor	Kategori Sikap
900 ≤ X ≤ 1125	Sikap Sangat Positif
675 < X < 900	Sikap Positif
450 ≤ X < 675	Sikap Negatif
225 < X < 450	Sikap Sangat Negatif

C. Determining Total Scores Of Respondents

Based on the scores obtained in Table 9 then obtained the total score of respondents is 793.



D. Conclusion Response

Based on the results of the questionnaires to the respondents, the overall attitude of the respondents has a total score of 793 respondents entered into the positive category that alternative media with tutorial method can help students more in understanding the material on the basic work book motorcycle engineering . This is the score of 675 (median) with a score of 900 (quartile 3), which is the score of the limit on the positive attitude category.

2.8.7 Conclusion Test of Application Response

Based on the results of user app responses from interviews or questionnaires to application users can be concluded that

A. Based on the questionnaire that has been spread to 75 respondents and conducted questionnaires calculations to the questionnaire of respondents have a total score of 793 which is in a positive attitude that the development of alternative media using tutorial methods to help students more easily understand the material on the basic work book motorcycle engineering,

B. Based on questionnaires that have been distributed to 75 respondents and conducted questionnaires calculations to the questionnaire respondents have a total score of 800 that is in a positive attitude that the implementation of

simulation learning model can convey the workings of the tool on learning practicum.

3. CLOSING

3.1 Conclusion

Based on the results of blackbox testing, it can be concluded that the functional system has been able to generate system requirements in accordance with the software requirements specification is designed and the response of the user application of the questionnaire or questionnaire that spread to 75 respondents found that:

A. From the results of questionnaires in the spread to the respondents are in a positive attitude that the tutorial model in the development of alternative media to help students more easily understand the material on the book the basic work of motorcycle engineering
B. From the results of questionnaires distributed to the respondents are in a positive attitude that the implementation of simulation learning model can convey how the tool works on learning practicum.

3.2 Suggestion

Based on all the results that have been achieved at this time, that the application of interactive learning media for class X motorcycle engineering majors SMK 4 LPPM - Padalarang RI have some suggestions from the School to complete the application of this learning media, among others:

A. Simulation tool should be able to display the tool in various sides.
B. Further research can be done by making multimedia learning with motorcycle engine engineering material and also motorcycle electrical engineering for class X.

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