OPEN ACCESS

Indonesian Journal of Elearning and Multimedia ISSN: 2830-2885

Vol 1 No 2 2022 (42-51)

Analysis of Needs Response to the Development of Digital Comic on Straight Motion Kinematics Materials

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Abstract

The purpose of this research is to analyze the result of the response to the needs of development digital comics for students. This research is a descriptive research part of R&D research using the ADDIE model. The instruments used are observation sheets, interview sheets, and questionnaire sheets. The subjects consisted of physics teachers and class X students with 147 students and 4 teachers. The instruments used in this study are valid and reliable, students and teachers in 3 high schools in Bengkulu City strongly agree and need digital comic-based learning media with a result obtained being 83,45%.

Keywords: *Straight Motion Kinematics, Digital Comics, Learning Media, Learning Motivation*

A. Introduction

As an entity that is related to human culture and civilization, education in various parts of the world is experiencing fundamental changes in the era of globalization. There are many advances in science and technology that can be enjoyed by mankind [1]. This technological progress is something that we cannot avoid, besides that technological progress goes according to the progress of scientific development [2]. Due to the existence of a global resolution, the need for adjustments in the world of education to technological developments with efforts to improve the quality of education ot self, especially in aligning every use of information and communicaton technology into the world of education during the learning process [3].

At present the curriculum that applies in Indonesia is the 2012 curriculum where the role of students in learning activities is highly prioritized [4]. The 2013 curriculum emphasizes technology-based learning in accordance with the regulation of the Minister of Education and Culture Number 69 of 2013 concerning the basic framework and structure of the senior high school (SMA) or Madrasah Aliyah (MA) curriculum, that in general the 2013 curriculum was developed based on three factors, namely internal challenge factors, external challenge factors and mindset refinement factors. The external challenge factors are related to ICT (information and communication technology) which is developing rapidly so that it influences the world of education which cannot be separated from the use of assisted technology tools in learning activities [5]. ICT stands for "Information and Communication Technology" which refers to the technology of providing access to information through telecommunication [6].

Physics is a branch of science that focuses on discussing natural phenomena and phenomena [7]. Departing from this fact, the effectiveness of learning science (physics) in schools is of course a factor that cannot be separated. For this reason, an effort is needed to optimize the effectiveness of physics learning in class, so that it can develop students' thinking abilities to become more active learners [8].

The misconception that most often arises and is experienced by students in learning is a misunderstanding when studying straight motion material [7]. The concept of motion that is taught is often not in accordance with scientific concepts, so students have difficulty both reading graphs, analyzing problems and applying them in equations of motion [9]. Other causes are also seen when educators teach physics only through classroom learning and are not equipped with experimental and practicum learning processes in the laboratory or can utilize other media such as the use of technology-based learning media [10]. This supports the results of previous interviews with 9 students at 3 Bengkulu City High Schools that 7 students still find it difficult to understand physics, especially straight motion material.

Learning media are all forms of things that can be used to convey messages and content from lessons that are expected to stimulate the minds and attention of students so that they can encourage the teaching and

learning process [11]. Learning media can be said to be interesting if it raises further curiosity and curiosity.

Digital comics are a visual-based media that can support learning because they contain storylines [12]. Digital comics were chosen because they have advantages that are suitable for use as learning media, such as creating student interest, presenting material more attractively, and being able to help students understand abstract concepts through storylines that cover the entire material [13].

Based on the results of observations and interviews at 3 Bengkulu City Public High Schools, it was found that the media used was less interactive and tended to be boring because they still used worksheets, printed books, power points and interactive videos. Resulting in students being less motivated and not enthusiastic in participating in the learning process. Even though the role of motivation in learning is very important, where motivation is a foundation to be able to produce maximum learning results [14]. That is, the intensity of this motivation determines the potential achievement of students in learning. In addition, students tend to prefer learning that contains pictorial conversations and requires learning media that can be accessed anytime and anywhere via smartphones and links. This is evidenced by the results of filling out the questionnaire in response to the needs analysis of students. Because the use of interesting, efficient and effective learning media can be the basis that it is necessary to develop learning media in the form of digital comics.

Analysis of responses to digital comics has been carried out by [15] with the result that students and teachers strongly agree and need E-Comic-based learning media and the instruments used are valid and reliable. The difference between this study and previous research lies in the material used, namely in the previous study using magnitude and unit material, while in this study digital comics were developed using straight motion kinematics material.

From some of the problems above, an alternative solution is needed in the learning process to overcome these problems, one of which is by developing learning media that are in accordance with the characteristics of the material presented. Before deciding to make this learning media, first analyze the needs of students for the development of digital comic learning media as an alternative that can be used later. Based on the explanation above, the formulation of the problem in this study is whether it is necessary to develop digital comic learning media on straight motion kinematics material? So based on the formulation of the problem this research aims to conduct a needs analysis of the response to the development of digital comic learning media on straight motion kinematics material.

B. Reseach Methods

This research is a descriptive research from the research and development division of R&D (Research & Development). The research procedure used uses the ADDIE model with 5 stages, namely Analysis, Design, Development, Implementation, and Evaluation [16]. However, in this study it was only limited to the analysis stage, because the purpose of this study was only to analyze the response to the needs of digital comic learning media, especially straight motion kinematics material.

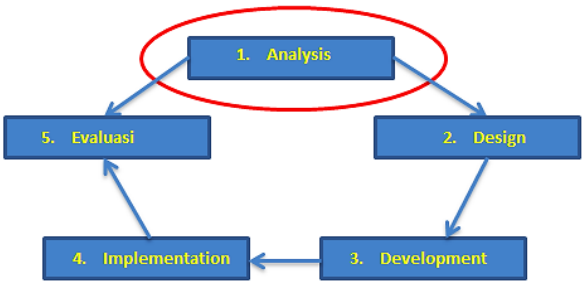

Figure 1. Research Design

Description:

: Research focus section

This research was conducted at SMAN 1 Bengkulu City, SMAN 6 Bengkulu City, and SMAN 7 Bengkulu City. The time of the study was July-August 2022. The population taken was students in class

X IPA and physics teachers at 3 high schools in Bengkulu City. The goal is to determine the number of samples used and limit the generalization area [17]. Meanwhile, the sample is part of the population which includes quantity and characteristics [18]. The sample taken in this study was 147 X IPA students and 4 physics teachers using a purposive sampling technique. Data collection techniques used in this study used observation data collection techniques, interviews, and questionnaire data. The research instruments used in this study were observation instrument sheets, interview instrument sheets, and questionnaire instrument sheets for analyzing students' needs for digital comic learning media which were filled out offline in the form of printouts. The data analysis technique used is a quantitative analysis technique because the needs questionnaire analysis data obtained in this study were analyzed using a measurement scale that refers to the Likert scale. The Likert scale was used with the aim of gaining confidence and measuring the attitudes, responses, and perceptions of respondents in choosing answers to the statement items written on the questionnaire sheet [19]. The form of the answer sheet given the liker scale can be seen in table 1

Table 1. Likert Scale Value Score [20]

Statement	Score
Srongly Agree	4
Agree	3
Don't Agree	2
Totally Disagree	1

The use of 4 scales on the liker scale aims to decide on the selection of answers that refer to neutral answers which make respondents feel doubtful about the selected answer choices.

In this study, each item from the student's answers was processed using the questionnaire data management formula by means of data intervals and the results were made with a graphical chart. Percentages are used to calculate the answers to each question/statement using the following equation using the following equation (1)

$$\%X_{in} = \frac{\sum s}{S_{maks}} \text{ x } 100\% \quad (1)$$

Description:

$\%X_{in}$ = Percentage of statement answare scores

$\sum s$ = Total score

S_{maks} = Maximum score

The resulting percentage value is analyzed and used as a reference to determine the scale interpretation criteria in order to make it easier to read the data from the validation results of the needs questionnaire percentage for the development of digital comics as shown in table 2

Table 2. Likert Scale interpretation Table [21]

Persentage	Interpretation
76% - 100%	Srongly Agree
51% - 75%	Agree
26% – 50%	Don't Agree
0% - 25%	Totally Disagree

Each decision on each questionnaire item obtained in this study is based on the decision rules taken in research that has been conducted by [22], namely
Reliable: then the rcount value is greater than the rtable value ($r_{count} > r_{table}$).
Not reliable: then the rcount value is smaller than the rtable value ($r_{count} < r_{table}$).

Each item answer item in the questionnaire statement used in this study in the feasibility test using SPSS in the validity test and reliability test. SPSS itself is a computer program that can manage statistical data accurately and precisely [23]. This aims to determine whether the instruments that have been used are valid and reliable.

C. Result and Discussion

Student Response Result

Based on the results of filling in the student needs analysis questionnaire for the development of learning media, the results obtained for the first aspect, namely students' responses to physics subjects using 2 statements, statement 1 for "I find it difficult to understand physics learning, especially straight motion kinematics" with the percentage shown in the diagram 1st statement as many as 50 respondents strongly agree, 77 respondents agree, 16 respondents disagree and 4 respondent strongly disagree. Statement 2 for "I am not interested in learning physics" with the percentage seen in the and statement diagram as many as 42 respondents strongly agree, 40 respondents agree, 52 respondents disagree and 13 respondents strongly disagree as shown in figure 2

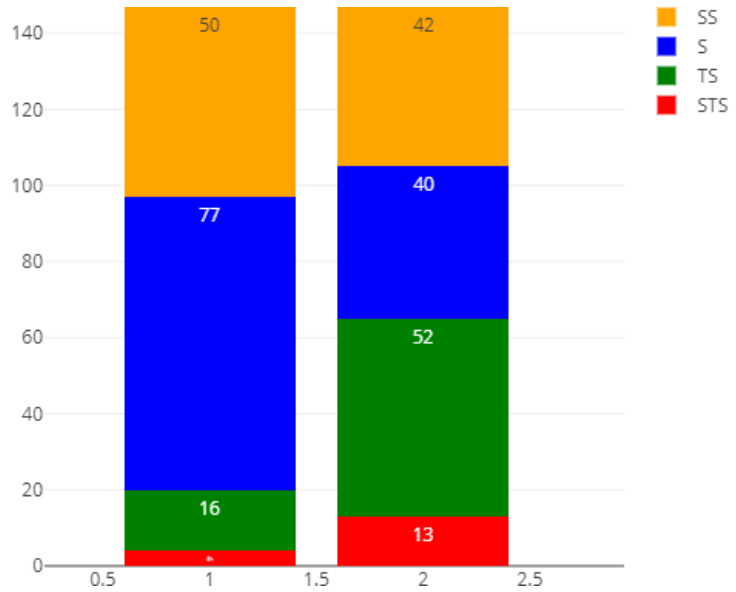

Figure 2. Student Response Diagram On Aspects Of Student Responses To Physics Subjects

Based on Figure 2, the results show that there are still many students who experience difficulties in learning physics, especially in straight motion kinematics material and a lack of interest in physics lessons. This was also expressed by [9] that the most misconceptions experienced by students regarding the concept of motion are often not in accordance with scientific concepts, so that students have difficulty both reading graphs, analyzing problems and applying them in equations of motion. The use of the appearance of physics textbooks in the classroom is currently too monotonous with long written texts containing formulas that make students feel bored and not interested in being involved in the learning process [24].

Students' description of the second aspect, namely the physics learning experience using 10 statements. Statement 3 for "during the learning process my teacher always uses textbooks" with the percentage shown in the 3rd statement diagram as many as 47 respondents strongly agreed, 59 respondents agreed, 35 respondents disagreed and 6 respondents strongly disagreed. Statement 4 for "I often get information about lessons from my teacher" with the percentage shown in the 4th statement diagram as many as 58 respondents strongly agreed, 67 respondents agreed, 21 respondents disagreed and 1 respondent strongly disagreed. Statement 5 for "I want the teacher to use instructional media in the physics learning process" with the percentage shown in the 5th statement diagram as many as 73 respondents strongly agree, 67 respondents agree, 5 respondents disagree and 2 respondents strongly disagree. Statement 6 for "I want the learning media that my teacher uses can help and support me in the physics learning process" with the percentage shown in the 6th statement diagram as many as 88 respondents strongly agree, 57 respondents agree, 1 respondent disagrees and 1 respondent strongly disagrees agree. Statement 7 for "my teacher has linked the subject matter of rectilinear kinematics with everyday life" with the percentage shown in the 7th statement diagram as many as 49 respondents strongly agreed, 81 respondents agreed, 17 respondents disagreed and 0 respondents strongly disagreed. As well as statement 8 for "I understand more easily physics subject matter if the material is related to activities and daily life" with the percentage shown in

the 8th statement diagram as many as 67 respondents strongly agreed, 71 respondents agreed, 7 respondents disagreed and 2 respondents strongly disagreed. Statement 9 for "I agree that learning media in the form of illustrated stories need to be created and developed" with the percentage shown in the 9th statement diagram as many as 72 respondents strongly agreed, 68 respondents agreed, 6 respondents disagreed and 1 respondent strongly disagreed. Statement 10 for "I need learning media that can increase my motivation in studying physics" with the percentage shown in the 10th statement diagram as many as 92 respondents strongly agreed, 51 respondents agreed, 4 respondent disagreed and 0 respondents strongly disagreed. Statement 11 for "I prefer physics lessons when using learning media" with the percentage shown in the 11th statement diagram as many as 72 respondents strongly agree, 65 respondents agree, 8 respondents disagree and 2 respondents strongly disagree. Statement 12 for "I have not been able to provide a simple explanation of what is being learned in learning physics" with the percentage shown in the 12th statement diagram as many as 53 respondents strongly agree, 74 respondents agree, 17 respondents disagree and 3 respondent strongly disagrees as stated shown in Figure 3 below

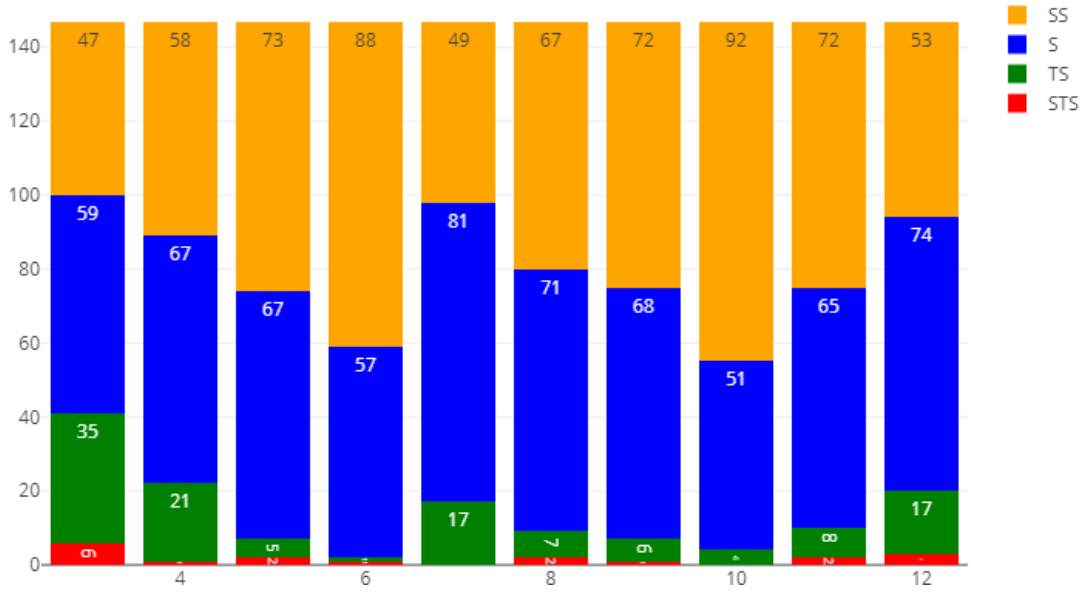

Figure 3. Diagram Of Student Response To Aspects Of The Physics Learning Experience

Based on figure 3 shows the results which explain that during the learning process many teachers still use textbooks, information about lessons is obtained by many students from teachers, as well as the desire of students so that teachers can use learning media to increase motivation, help and support the physics learning process associated with activities and daily life. This is in accordance with research [25] that teachers are still focused on using books obtained from schools without developing or not using learning media which causes a lack of teacher innovation in developing media according to student characteristics is also an obstacle.

Students' description of the third aspect, namely the need for learning media in the form of digital comics using 9 statements. Statement 13 for "I need other learning media as an alternative to the currently available teaching media" with the percentage shown in the 13th statement diagram as many as 65 respondents strongly agree, 73 respondents agree, 8 respondents disagree and 1 respondent strongly disagrees. Statement 14 for "I need learning media that can help me learn physics independently" with the percentage shown in the 14th statement diagram as many as 68 respondents strongly agreed, 67 respondents agreed, 11 respondents disagreed and 1 respondent strongly disagreed. Statement 15 for "The learning media that I want is one that uses simple and clear language" with the percentage shown in the 15th statement diagram as many as 89 respondents strongly agreed, 56 respondents agreed, 1 respondents disagreed and 1 respondent strongly disagreed. Statement 16 for "I need learning media that can make me more active when studying physics" with the percentage shown in the 16th statement diagram as many as 90 respondents strongly agreed, 54 respondents agreed, 3 respondents disagreed and 0 respondent strongly disagreed. Statement 17 for "I need learning media that is interesting and unique with a mix of appropriate colors and pictures" with the percentage shown in the 17th statement diagram as many as 70 respondents strongly agree, 69 respondents agree, 7 respondents disagree and 1 respondent strongly disagrees. Statement 18 for "The learning media that I want is learning media that can be accessed

without any restrictions, anytime and anywhere" with the percentage shown in the 18th statement diagram as many as 73 respondents strongly agree, 67 respondents agree, 7 respondents disagree and 0 respondents strongly disagree. Statement 19 for "I need learning media that can be accessed via smartphones and links only" with the percentage shown in the 19th statement diagram as many as 77 respondents strongly agreed, 57 respondents agreed, 12 respondents disagreed and 1 respondent strongly disagreed. Statement 20 for "I agree that learning media with picture stories is more fun" with the percentage shown in the 20th statement diagram as many as 70 respondents strongly agreed, 65 respondents agreed, 11 respondents disagreed and 1 respondent strongly disagreed. Statement 21 for "My teacher has used instructional media such as illustrated stories on straight motion kinematics material" with the percentage shown in the 21st statement diagram as many as 48 respondents strongly agree, 62 respondents agree, 36 respondents disagree and 1 respondent strongly disagrees as stated shown in Figure 4 below

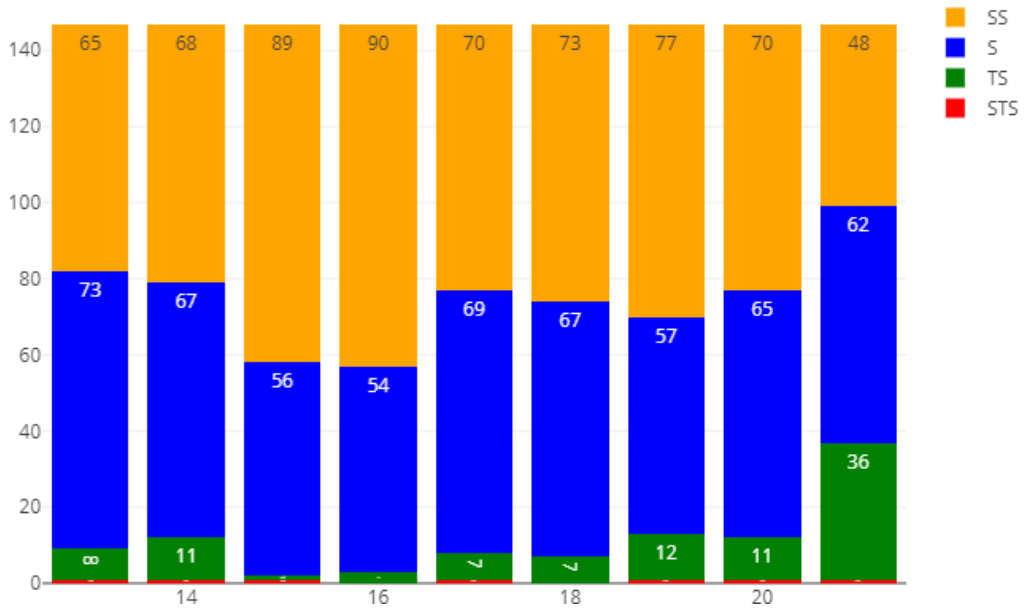

Figure 4. Diagram Of Student Response To Aspects Of The Need For Learning Media In The Form Of Digital Comics

Based on Figure 4, the results show that many students need learning media other than those currently available using simple language, a mix of colors, fun illustrated stories, accessible anytime and anywhere using a smartphone and just a link. can be used when studying independently and make students more active when learning physics. In line with that visual images always have a strong appeal compared to using words [26]. To get valid results in calculating the validity test, the item can be said to be valid based on table 3 below:

Table 3. Table Of Item Validation Test Result

Number Of Item	r-count	r-table	Description
1	0,718		
2	0,674		
3	0,627		
4	0,545		
5	0,686		
6	0,685		
7	0,656		
8	0,619		
9	0,670		
10	0,795	0,161	Valid
11	0,762		
12	0,633		
13	0,677		
14	0,758		

Number Of Item	r-count	r-table	Description
15	0,754		
16	0,705		
17	0,679		
18	0,673		
19	0,745		
20	0,699		

Table 3 explains that all items have a greater r-table value, so that it can be interpreted that all items in the questionnaire are valid.

Table 4. Table Case Processing Summary

		N	%
Cases	Valid	147	100.0
	Exluded[a]	0	.0
	Total	147	100.0

The summary resultof case management in table 4 showthat the number of respondents denoted by (N) consists of 147 respondents who are declared valid with a result of 100%. In the excluded data section is 0 (no data is excluded), si that the total for the entire data is obtained for 147 respondents 100%. The results of the reliability test can be seen after the validity test is carried out in table 5

Table 5. Table Reliability Statistics

Cronbach's Alpha	N of Items
.942	21

The results of reliability statistics in Table 5 of Reliability Statistics have 21 statement items with a score obtained of 0.942. The score obtained is compared with the value of the r-product moment or r-table using the r-table distribution at alpha (α) = 0.05 of 0.161. If the value of Cronbach's alpha is greater than the r-table value, the data will be declared reliable. Thus the Cronbach's alpha value is 0.942 > 0.161, it can be said to be reliable or trustworthy. Meanwhile, to find out the percentage of students' responses to the need for developing digital comic learning media can be seen in table 6

Table 6. Table of Data Results from Responses to Student Needs

Respondent	Averafe Score	Highest Score	Persentase (%)
147 High School Students	10.305	12.348	83,45%

Table 6 shows that students in 3 Bengkulu City High Schools strongly agree with the development of digital comic learning media for straight motion kinematics material. This can be seen from the percentage yield data obtained by 83.45% of the maximum percentage of 100%, based on table 2 of the Likert scale interpretation criteria. Then the data obtained was processed with Microsoft Excal to find out from all respondents how many students chose strongly agree to strongly disagree from the scale obtained based on the following diagram

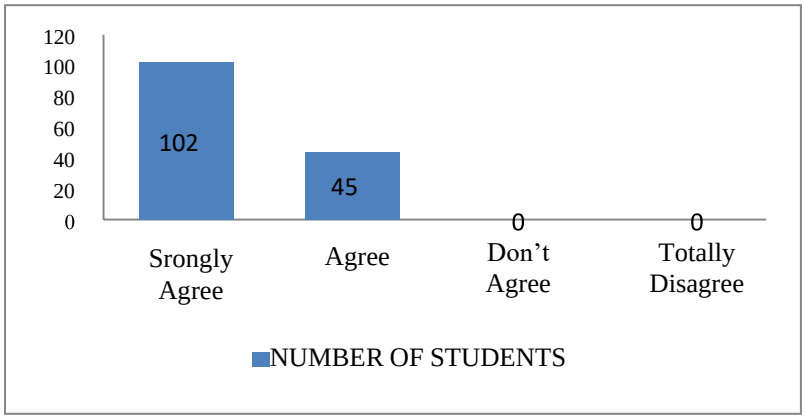

Figure 5. Bar Chart of the Number of Students Against Category Items

Diagram 1 provides information that out of a total of 147 respondents, namely participants students in 3 Bengkulu City State Senior High Schools obtained 102 students in the strongly agree category and 45 students in the agree category. Meanwhile, the disagree and strongly disagree categories consisted of 0 students. So from the diagram it can be stated that students in 3 Bengkulu City Public High Schools strongly agree with the development of digital comics on straight motion kinematics material.

Teacher Interview Result

In addition to the needs analysis questionnaire data, the researchers also conducted interviews with 4 physics teachers at 3 Bengkulu City Public High Schools. From the results of the interviews, the results were obtained based on the first focus, namely regarding the facilities and infrastructure owned, that the school already has an internet network such as wifi, but access is not given to the public. In addition, wifi facilities are also only available in certain places, such as offices, administrative rooms, libraries, and the principal's room. For parts of the classroom, wifi facilities are not available, so students use their respective data cards to be able to access the internet. In the physics laboratory in every school the management is well managed, even though it is not perfect as a whole. The tools available in the physics laboratory are also there, it's just that there are a number of tools that are no longer suitable for use and there aren't too many of them. This was also obtained from the teacher's explanation during the interview, where for now the school is still pursuing theory and is more focused on classroom learning than practicum, by utilizing supporting facilities such as LCD projectors and Infocus and other supporting media.

The second focus is on the learning process related to teaching materials, learning media, learning methods, activities, and subject matter. In this interview, the average teacher answered that the teaching materials used usually used worksheets, books in the library, PowerPoint and animated videos. The learning method used by the teacher varies according to the material which will be taught such as lecture methods, question and answer, and discussion. As for the activities while studying the teacher gave the answer that there were still some students whose focus was not on the lesson and could not follow the lesson properly. In the kinematics material of straight motion the teacher answers that this material is material that is included in the understandable category even though the teacher agrees that there are still students who find it difficult to understand the material. This also reinforces the fact that teachers need other learning media that can attract students' attention, especially when studying physics. Because students' learning motivation is important to be improved while learning physics.

The third focus is on school policies such as being allowed for students to bring communication devices in the form of mobile phones into the school environment. By being allowed to bring communication devices, the school continues to provide restrictions in which communication devices may not be taken out and played during class hours except with the permission of the teacher concerned. Other school policies can be seen from the existence of sanctions at each school. The latest school policy regarding the hours of lessons given. The teacher agrees that the study hours provided are not fully sufficient for the needs of students.

Based on the results of interviews that have been conducted by researchers, the teacher gave a positive response to developing a digital comic learning media related to the concept of physics, especially straight motion kinematics material which is expected to assist teachers in providing learning to students.

The results of the research above are in line with research conducted [15] with the result that students and teachers strongly agree and need E-Comic-based learning media and the instruments used are valid and reliable. The difference between this study and previous research lies in the material used, namely in the previous study using magnitude and unit material, while in this study digital comics were developed using straight motion kinematics material.

D. Conclusion

Based on the results of observations, interviews, and questionnaire analysis of students' needs for the development of digital comic, straight motion kinematics material. The results show that this learning media is needed by students and teachers to support the learning process with the results obtained 83.45%. Based on table 2, goes into it category strongly agree. The results of this study also indicate that the instruments used is valid and reliable.

E. Acknowledgement

The researcher thanks the Physics Education Study Program, Faculty of Teacher Training and Education, University of Bengkulu, for giving permission to the researcher to participate in the activities of the Research MBKM where this journal is the result. The researcher also expressed his gratitude to all the schools of Bengkulu City 1 Public High School, Bengkulu City 6 State Senior High School, and Bengkulu City 7 Public High School who were willing and gave permission to conduct research in the school environment.

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