

Development of Automotive Engineering Learning Video Media Using Camtasia Pn Light Veehicle Periodic Maintenance Material Ar SMK PGRI 1 Gresik.



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ABSTRACT: This study aims to develop learning video-based media using Camtasia on periodic maintenance material on light vehicles at SMK PGRI 1 Gresik. This development is to facilitate students in performing automotive engineering maintenance steps. The results of the study can be concluded that the development of automotive engineering learning video media using Camtasia on periodic maintenance material for light vehicles at SMK PGRI 1 Gresik, which is associated with character education by conducting several stages of testing the products developed by conducting validity tests using tri-angulation techniques including validation tests involving design experts, material experts, media experts and initial responses from student groups. Further trials were carried out by conducting limited group trials and large group trials. All validation results, limited group trials and large group trials produced a significant percentage with an average percentage that had a range of 70% - 90%, so that the overall conclusion from the trial results that the product developed, namely learning video media using Camtasia which is integrated with character education, can be used as media usage in carrying out the learning process in automotive engineering practice subjects.

KEYWORDS: Video Media, Catamsia, Periodic Maintenance, Light Vehicles

I. INTRODUCTION

Vocational Education in Indonesia, especially in Vocational High Schools (SMK), has an important role in preparing students to become skilled workers in various industries, including the automotive industry. The development of automotive skills is one of the main focuses in the SMK curriculum. One of the key aspects in automotive skills is the periodic maintenance of light vehicles. However, the teaching methods currently used may not be effective in teaching the concepts and practices of light vehicle maintenance. In today's digital era, multimedia technology has become a very effective tool in the learning process. The use of learning videos can foster students' learning motivation towards the material being taught, especially in a highly visual context such as automotive engineering. Therefore, the development of learning videos for light vehicle periodic maintenance material at SMK PGRI 1 Gresik is very important.

One of the efforts to foster student motivation and not to feel bored in learning is to use learning media in the automotive engineering learning process. According to Rusmawati and Fatirul (2023: 52-53), the benefits of learning media in general are as follows: 1. Simplify the understanding of messages so that they are not only written or spoken words. 2. Overcoming limitations related to space, time, and senses, for example: a. Objects that are too large can be replaced with reality, pictures, frame films, films, or models. b. Objects that are too small can be assisted by the camera. Objects that are too small can be helped with micro projectors, film frames, films, or images. c. Movement that is too slow or too fast can be helped with time lapse or high speed photography. d. Events or events that occurred in the past. Events or events that occurred in the past can be re-displayed through film recordings, videos, film frames, photographs, or verbally. e. Objects that are too complex, such as machines, can be used as a visual aid. Objects that are too complex, such as machines, can be presented with models, diagrams, and the like. f. Concepts that are too broad, such as mountains, mountains, and the like. Concepts that are too broad, such as volcanoes, earthquakes, and climate, can be visualized in the form of films, film frames, pictures, and the like.

In addition, there are several benefits of learning media according to experts. Sudjana and Rivai (1992) suggest the benefits of learning media in the learning process of students, among others: 1. learning materials will attract the attention of students more, which in turn can foster learning motivation. 2. Learning materials will be conveyed more clearly, making it easier for students to understand them, and helping them achieve learning objectives. 3. The teaching approach will be more diverse, not only limited to verbal communication through words by educators, so that students do not feel bored and educators do not feel tired, especially if teaching every lesson hour. 4. Students have the opportunity to be more involved in learning activities because they do not only

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listen to explanations from educators, but also engage in other activities such as observation, practice, demonstration, roles, and so on.

The selection of learning media must be adjusted to the learning objectives to be achieved and also the characteristics of students. With the use of appropriate learning media, it can clarify the information or concepts that the teacher wants to convey.

The learning media used at SMK PGRI 1 Gresik are package books from the government and also books in the library. Some automotive teachers have used power point slides (PPT) in delivering subject matter. But the learning media used is less interesting and less motivating for students in learning automotive. The obstacles and challenges that will be faced by educators will be more pronounced when teaching light vehicle engineering competencies in light vehicle periodic maintenance material. This material requires effective methods, models, and learning media in its delivery. Periodic maintenance of light vehicles emphasizes practice, where light vehicles with old components will experience damage and require routine maintenance. Therefore, the delivery of light vehicle periodic maintenance material should be done using interesting, creative, and innovative media, and equipped with illustrations or relevant examples to make it an attractive media. So it is necessary to develop learning media that is interesting and in accordance with the needs of students. One of them is with learning video media.

Some of the advantages of learning video media include (Yusminar, 2019) the use of learning videos provides stimulation to students and encourages students' interest in learning the material. Thus, the use of video media can improve learning outcomes. In addition, (Lalian, 2019) suggests that the use of video as a learning media for automotives. Some of the advantages of Camtasia include that this software is quite lightweight and easy to operate. This software is also suitable for interactive learning (tutorial making), company profile, or presentation. Camtasia can be used to make learning media more interesting. Learning videos made using Camtasia can improve the quality of learning for students, thus having a positive impact on fostering their learning motivation. The use of video tutorial media with Camtasia can also increase learning activities, which in turn will contribute to increasing students' learning motivation. Based on the above background, it is necessary to develop automotive engineering learning video media using Camtasia on light vehicle periodic maintenance material at SMK PGRI 1 Gresik.

Sapriyah, (2019) in his citation explains, the word media comes from Latin and is the plural form of the word medium which literally means intermediary or introducer. According to the Association of Education and Communication Technology (AECT) in America, limiting media as all forms and channels that people use to transmit messages or information. According to (Nurfadhillah & et al, 2021) the National Education Association (NEA) defines media as all objects that can be manipulated, seen, heard, read or talked about along with the instruments used for these activities. Meanwhile, according to (Nurrita, 2023) in his citation, the word media comes from Latin *medius* which literally means "middle", "intermediary" or "introduction". In Arabic, media is an intermediary or messenger from the sender to the recipient of the message. So, media is a tool that conveys or delivers teaching messages. Fadjarajani et al., (2020), teachers as educators must be able to choose learning media to be given to students so that they are easily understood and understood by students, and can be able to increase students' interest in learning to be able to absorb the knowledge provided by the teacher. Choosing learning media must be used effectively and can involve students who are active in learning. In general, this learning media includes people, materials, equipment, or activities that create conditions in which students acquire knowledge, skills, and attitudes. Based on the opinions that have been described, it can be concluded that, learning media is everything that is used as an intermediary or liaison from the teacher as an information provider to students as recipients of information, with the aim of stimulating students to be motivated and able to follow the learning process thoroughly and meaningfully. Learning media has five main components. First, as an intermediary for messages or materials in the learning process. Second, as a learning resource. Third, as a tool to stimulate student motivation in learning. Fourth, as an effective tool to achieve comprehensive and meaningful learning outcomes. Fifth, as a tool for acquiring and improving skills. Good collaboration of these five components will have implications for the successful achievement of learning in accordance with the expected targets.

Febrita & Ulfah, (2023) Learning media has an important role in the process of teaching and learning activities. With the media, the benefits of the teaching and learning process will be increasingly felt. The use of media is expected to have a positive impact, such as the emergence of a more conducive learning process, the occurrence of feedback in the teaching and learning process, and achieving optimal results. In the beginning, learning media was only considered as a tool to help learners in teaching activities (teaching aids). With media, the learning process becomes more interesting so as to encourage students to love science and like to find their own sources of knowledge. The ability of students to learn from various sources will be able to instill an attitude in students to always take the initiative to find various learning resources needed. By utilizing the media properly, it can help students' learning difficulties, personality formation, motivate learning and others. One of the efforts to increase students' interest and motivation to learn is using learning media. Video comes from Latin, *video-vidi-visum* which means seeing (having vision) or being able to see. Sukiman (2012) states that learning video is a set of components or media that can display images and sound at the same time. Cecep Kustandi (2013: 64) reveals that video is a tool that can present information, explain processes, explain complex concepts, teach skills, abbreviate or shorten the learning process.

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II. METHOD

The research method to be implemented in this study adopts the ADDIE model which stands for Analyze, Design, Develop, Implement, and Evaluation. ADDIE has been widely applied in learning environments that have been designed in accordance with learning objectives. Based on the educational philosophy, the application of ADDIE must be student centered, innovative, authentic, and inspiring. The development concept has been applied since the formation of social communities. Creating a learning product using ADDIE is an activity that uses effective tools. ADDIE helps solve complex learning problems as well as develop educational and learning products. (Fatirul & Winarto, 2022)

The research and development that will be carried out by researchers is to develop learning media in the form of learning videos using the Camtasia application and then validate the product. The initial stage of this research is to collect initial data about the learning media used at SMK PGRI 1 Gresik to be reviewed. The next step is to identify existing deficiencies in learning with the use of learning media, including analyzing the needs of students, then producing products and evaluating them through a series of trials and the last stage is to test the validity and effectiveness of the products to be produced in this study. Product trials are carried out to obtain data that can be used as a basis for making improvements in order to produce products that are valid, practical and effective for use by teachers and students. Some of the activities carried out to test learning video products in this research and development are as follows:

Validation

Validation by design experts, material experts and media experts aimed at providing advice and input on the initial draft of the product. This expert assessment was analyzed to determine the level of validity of the product before it was tested in the field.

Field trial

Field trials were conducted on students of FASE F SMK PGRI 1 Gresik in the 2024/2025 academic year. The field trial stage consists of several activities, namely:

- a. Observing students who are using the developed media.
- b. Giving tests after learning using the developed media.
- c. Learners provide an assessment of the developed media.
- d. Analyzing the data of the research results.
- e. Make media improvements based on the results of the assessment analysis.

Type of Data

The types of data in this research and development are qualitative data and quantitative data. Qualitative data in the form of suggestions and input from material experts, design experts and learning media experts. While quantitative data is obtained from the validation results of material experts, design experts and learning media experts, the results of student responses and the results of student learning tests.

Data Collection Techniques and Instruments

Data Collection Technique

The data collection technique in this study was to use validation sheets, student assessment questionnaires, and learning outcomes tests.

Data Collection Instrument

The instruments used in this research and development are:

Learning Media Validation Sheet

This validation sheet serves as a research instrument that aims to determine the criteria for the validity of the learning media being developed by researchers. This validation sheet was filled in by three validators consisting of design experts, material experts and media experts. The structure of this validation sheet consists of the validator's identity; introduction and filling instructions; filling scale with five levels of comments, criticisms or suggestions; and the endorsement section.

Learner Response Questionnaire

The learner response questionnaire is a sheet containing questions about the use of learning videos that are being developed by researchers. The questionnaire functions to determine the criteria for the practicality of the learning video being developed by the researcher. The structure of this questionnaire contains the identity of the questionnaire filler; instructions for filling; and contains statements with five answer options, a filling scale with five levels.

Data Analysis Technique

Data analysis is carried out to obtain evidence related to the validity, practicality, and effectiveness of the products developed in the form of learning videos.

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Validity Data Analysis

Data on the validity of learning videos comes from validation sheets obtained from design validators, material validators, and media validators. The analysis is continued by determining the final average of the data obtained and determining the product category according to the validity criteria. According to Sugiyono (2015) the calculation analysis is: The final average of the data that has been obtained is then converted according to the criteria.

Practicality Data Analysis

The data obtained from the observation sheet, then analyzed descriptively percentage. The results of this questionnaire were analyzed using the following formula:

According to Arikunto (2006), the percentage that has been obtained is then converted according to the criteria.

Effectiveness Data Analysis

Determination of the effectiveness of the automotive learning video developed is seen from the analysis of student learning outcomes test. Based on the minimum completeness criteria set by SMK PGRI 1 Gresik, students are considered individually complete if they get a score ≥ 76 with the understanding that these students have been able to complete, master competencies, or achieve learning objectives. While class success (classical completeness) is seen from the number of students who are able to complete or achieve a minimum score of 76, at least 75% of the total number of students in the class.

III. RESULT

Validation Test

Design Expert Validation

Table.1: Percentage of Design Experts

Tampilan Web							Interaktivitas						Kemanfaatan Media				Jml
1	2	3	4	5	6	7	1	2	3	4	5	6	1	2	3	4	
4	4	4	4	5	5	4	5	4	4	4	4	5	4	4	4	4	72
80	80	80	80	100	100	80	100	80	80	80	80	100	80	80	80	80	
85,7 %							86,6 %						80 %				
84,1 %																	

Material Expert Validation

Table, 2: Percentage of Material Experts

Aspek Isi/Materi						Aspek Kebahasaan			Aspek Penyajian			Jml	%
1	2	3	4	5	6	1	2	3	1	2	3		
4	5	4	5	5	5	5	5	4	5	4	4	55	91
80	100	80	100	100	100	100	100	80	100	80	80		
93,3 %						100 %			86,6 %				
93,3													

Media Expert Validation

Table, 3: Media Expert Percentage

Isi/Materi						Kebaharuan			Penyajian			Jml
1	2	3	4	5	6	1	2	3	1	2	3	
4	4	4	5	4	4	4	5	4	5	4	4	51
80	80	80	100	80	80	80	100	80	100	80	80	
83,3 %						86,6 %			86,6 %			
85,5 %												

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Student Responses

Table 4: Percentage of Student Responses

No.	Aspek Tampilan								Aspek Penyajian Materi							Aspek Manfaat					Jml	%
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	1	2	3	4	5		
1	4	4	4	4	4	4	4	4	4	4	4	4	4	5	4	4	5	4	5	4	82	82
2	4	3	3	3	4	4	4	5	4	4	4	4	3	3	4	4	4	4	4	4	76	76
3	4	4	3	4	4	4	5	4	4	3	3	4	4	4	4	4	4	4	5	4	79	79
4	4	4	4	4	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	78	78
5	4	4	3	4	4	4	4	4	4	5	4	4	4	4	3	4	4	4	4	4	79	79
	20	19	17	19	19	19	21	21	20	20	19	20	19	20	19	20	21	20	22	20		
%	80	76	68	76	76	76	84	84	80	80	76	80	76	80	76	80	84	80	88	80		
	77,5%								78,2%							82,4%						
	79,3%																					

Limited Group Trial

Table 5: Limited Group Percentage

No.	Aspek Tampilan								Aspek Penyajian Materi							Aspek Manfaat					Jml	%
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	1	2	3	4	5		
1	4	4	4	4	4	4	4	3	3	5	5	4	4	4	4	3	4	4	4	4	79	79
2	4	4	4	4	4	4	4	5	4	5	5	3	3	3	4	4	4	4	3	3	77	77
3	4	4	4	3	5	4	4	4	5	5	5	3	3	3	3	4	5	5	3	4	79	79
4	4	4	4	3	5	4	3	4	4	4	4	5	5	4	4	4	4	4	4	4	82	82
5	4	4	4	4	5	5	3	4	4	4	4	4	4	5	4	4	4	4	3	4	81	81
6	3	4	4	5	5	3	4	4	3	4	4	4	4	4	4	4	3	4	3	4	77	77
7	3	3	5	4	4	3	4	3	3	4	4	4	4	4	4	4	3	5	4	5	75	75
8	3	3	5	4	3	3	4	3	3	4	4	4	4	3	4	5	3	5	4	5	76	76
9	4	3	5	4	3	3	4	3	3	4	4	4	4	4	3	4	4	5	4	4	76	76
10	4	4	4	3	3	4	4	4	4	3	4	4	3	4	4	3	4	4	4	4	76	76
11	4	3	4	4	4	4	3	4	4	4	4	4	4	4	4	4	5	4	4	3	78	78
12	4	4	4	3	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	3	81	81
13	5	5	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	3	75	75
14	5	3	3	3	4	4	3	4	4	4	4	4	4	4	4	3	4	4	4	4	82	82
15	4	4	4	4	4	4	4	4	4	4	4	4	5	5	4	4	4	4	4	4		
	59	56	60	61	59	54	57	57	57	62	60	59	59	59	56	59	59	62	56	58		
%	78,7	74,6	80	81,3	78,7	72	76	76	76	82,6	80	78,7	78,7	78,7	74,6	78,7	78,7	82,6	74,6	77,3		
	77,1%								78,4%							78,3%						
	77,9%																					

Large Group Trial

Table 6: Large Group Percentage

No.	Aspek Tampilan								Aspek Penyajian Materi							Aspek Manfaat					Jml	%
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	1	2	3	4	5		
1	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	83	83
2	4	4	4	5	4	4	4	4	4	5	5	4	4	4	4	4	4	4	4	4	85	85
3	4	4	4	5	4	4	4	4	4	4	5	5	5	5	4	4	4	4	4	4	85	85
4	4	3	4	4	4	4	4	4	4	4	5	5	5	5	4	4	4	4	4	4	82	82
5	4	4	4	4	4	4	5	5	5	5	5	5	5	4	4	4	4	4	4	4	87	87
6	4	4	4	4	4	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	90	90
7	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	81	81
8	5	5	4	4	4	5	5	5	5	4	4	4	4	4	4	4	4	5	5	5	83	83
9	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	86	86
10	4	4	3	4	4	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	80	80
11	4	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	5	4	4	92	92
12	5	5	5	5	5	4	5	5	5	5	5	5	5	4	4	4	4	4	5	4	81	81
13	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	82	82
14	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	4	4	4	4	86	86
15	4	5	5	5	4	4	4	4	4	4	5	5	4	4	4	5	4	4	4	4	86	86
16	4	4	4	5	4	4	4	4	4	4	4	5	5	5	5	5	5	5	4	4	87	87
17	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	84	84
18	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	4	4	4	90	90
19	5	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	4	4	4	4	82	82
20	4	4	4	4	5	4	4	4	4	4	4	4	4	5	4	4	4	4	4	4	87	87
21	4	4	4	4	4	4	5	5	5	5	5	5	5	4	4	4	4	4	4	4	87	87
22	4	4	4	4	5	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	82	82
23	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	89	89
24	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	89	89
25	4	4	4	4	4	5	5	5	5	5	5	5	5	4	4	4	5	5	4	4	91	91
26	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	88	88
27	4	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	5	5	4	4	90	90
28	5	5	5	4	4	4	4	4	4	4	5	5	5	5	5	5	4	4	4	4	83	83
29	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	83	83
30	5	4	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	87	87
	126	125	124	125	124	127	128	130	129	134	133	133	129	131	128	131	131	130	130			
%	84	83,3	82,6	83,3	83,3	82,6	84,6	85,3	86,6	86	89,3	88,6	88,6	86	91,3	85,3	91,3	91,3	86,6	86,6		
	83,6%								88%							88,2%						
	86,6%																					

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Data Analysis.

Before the design is tested in the form of small, limited or medium, and large group trials, all design products will be validated by experts. In this validation using the triangulation validation technique, namely by involving validation of design experts, peers and student groups. Expert validation to obtain data on the feasibility of the product developed to obtain certainty in the application of the product in the trial. For peers, researchers want to get information from professional friends who have enough experience in the same field of study, while for students to get an initial response whether the product developed gets a positive response from the design of the product developed. More detailed results of data analysis from the three who were asked to provide dates or product validation are as follows:

Design Expert Validation

From the validation of design experts who have been shown in the table in the description of the data categorized into 3 aspects of deepening about the design, namely aspects of web display, aspects of interactivity between the display and the user, as well as aspects of the presentation on the web, it is found that for aspects of the display on the web get a validity of 85.7%, for the level of interactivity get a validity of 86.6%, and for aspects of the presentation in the material on the web get a validity of 80%. This indicates that all aspects of product design are said to be suitable for the next trial. Overall the aspects obtained a total percentage of 84.1%, this also gives the conclusion that the product developed is suitable for testing in a limited group.

Material Expert Validation

From the material expert validation that has been shown in the table in the description of the data categorized into 3 aspects of deepening about the material, namely the content/material aspect, the linguistic aspect, and the presentation aspect, it is found that for the content/material aspect it gets a validity of 93.3%, for the depth of the language it gets a validity of 100%, and for the material presentation aspect it gets a validity of 86.6%. This indicates that all aspects of the product design are said to be suitable for the next trial. Overall the aspects obtained a total percentage of 93.3%, this also gives the conclusion that the product developed is suitable for testing in a limited group.

Media Expert Validation

From the validation of media experts who have been shown in the table in the description of the data categorized into 3 aspects of deepening about the media categorized as aspects of content and material, aspects of discussion of material and content, and aspects of presentation of material, it is found that for aspects of material and content get a validity of 83.3%, for the level of presentation in the aspect of novelty get a validity of 86.6%, and for aspects of presentation in the presentation aspect get a validity of 86.6%. This indicates that all aspects of the product design are said to be suitable for the next trial. Overall the aspects obtained a total percentage of 85.5%, this also gives the conclusion that the product developed is suitable for testing in limited groups.

Small Group Trial (Student Responses)

From the peer validation that has been shown in the table in the description of the data categorized into 3 aspects of deepening about the design categorized by appearance aspects, material presentation aspects, and aspects of usefulness, it is found that for the appearance aspect, it gets a validity of 77.5%, for the level of presentation in the material presentation aspect, it gets a validity of 78.2%, and for the presentation aspect in the aspect of usefulness, it gets a validity of 82.4%. This indicates that all aspects of the product design are said to be suitable for the next trial. Overall aspects obtained a total percentage of 79.3%, this also gives the conclusion that the product developed is suitable for testing in limited groups. Some notes from questionnaire no. 3 get responses from a total of 5 students getting a percentage of 68%, therefore although it does not affect the product design which as a whole gets a percentage of 77.5%, but researchers still make minor revisions so that the results obtained get a more perfect design. After a small revision, the percentage obtained in the limited trial increased to 80%. This indicates that for instrument no. 3 after the revision has changed from 68% to 80%, so that the product can be continued in the next trial, namely the large group trial.

Limited Group Trial

From the peer validation that has been shown in the table in the description of the data categorized into 3 aspects of deepening about the design categorized as display aspects, material presentation aspects, and aspects of usefulness, it is found that for the display aspect, it gets a validity of 77.1%, for the level of validity.

DISCUSSION

As shown in the data description and analysis, the design of Camtasia-based learning media products integrated with character education shows that the products developed can be used as a basis for using automotive engineering learning videos using Camtasia. Automotive engineering learning video media using Camtasia on periodic maintenance of light vehicles developed will be an alternative and consideration in choosing learning media that is suitable for certain subjects. Of course, choosing media must also consider the characteristics of students who have diversity. There is no one media that is suitable for use in all subjects, but the

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design developed can be used as a reference to be tried in other subjects. Of course, the design developed can be created and adapted to the subjects that will be taught to students.

Learning automotive engineering using Camtasia on the material of periodic maintenance of light vehicles, trains students to be able to think critically and deeply so that they can apply well into automotive practice so that it is important for the formation of students' personal character. The results of Sirnayatin's research (2017), there is a clear contribution between automotive engineering learning and student character. So that every automotive engineering lesson needs to determine the character to be developed according to the level of student development, varied learning methods that can encourage and motivate students towards better, media and learning resources that are relevant to the characteristics of students.

Teachers have a big role in learning. The role of the teacher in learning is as a facilitator, tutor, motivator cannot be done carelessly in the learning process. In the learning process, theoretical knowledge, learning principles, and attitudes should be attached to the teacher. So that in the learning process can choose the right action in improving the way students learn (Achmad Noor Fatirul; Djoko Adi Walujo, 2020).

The Covid 19 pandemic that occurred in Indonesia had a huge impact on the education system in Indonesia, including SMK PGRI 1 Gresik. The implementation of the physical distancing policy which later became the basis for implementing online learning (Suni Astini, 2020), is the only option that must be carried out so that the learning process continues.

Learning based on learning video media using Camtasia on light vehicle periodic maintenance material, is a learning activity that utilizes media that can be accessed via the internet network. Automotive engineering learning video media using Camtasia on light vehicle periodic maintenance material, is one type of application of e-learning) (Rusman, 2012). Due to its virtual nature, learning using Camtasia-based learning video media in automotive engineering subjects on periodic maintenance of light vehicles is considered to have provided flexibility in accessing learning materials. The delivery of learning materials no longer depends on physical mediums such as printed textbooks or CD-ROMs. Learning materials are now in the form of data that can be decoded through electronic devices such as computers, smartphones, cell phones or other electronic devices.

Camtasia-based learning is built through several principles that play a role in determining the success of this learning process at the implementation stage. What makes Camtasia-based video learning on periodic maintenance of light vehicles effective basically depends on the views of the stakeholders. Therefore, it is very difficult to determine the main principles that must at least be present in media learning using learning videos using Camtasia in Rusman, 2012), including: interaction, usability, and relevance. Relevance to the design that is integrated with character education is a curriculum requirement. The implementation of the new curriculum gives its own meaning to character education, namely the strengthening of character education in the learning process. The curriculum provides opportunities for students to develop the domains of attitudes, knowledge and skills as outlined in the Graduate Competency Standards (SKL) at the elementary, junior high and high school / vocational school levels which are further described in the Core Competencies (KI) consisting of KI spiritual attitudes, KI social attitudes, KI knowledge and KI skills.

From the product development planned by the researcher, the validation test carried out by the validation of the design expert Dr. Rufii, S.Si, ST., M.Pd. obtained significant assessment and feasibility results, namely 84.1% and the suggestions given were Previous research conducted by Widiyaningtyas & Widiatmoko (2014) found that based on the analysis of the data obtained, a percentage value of 87.5 was obtained from media experts, 92.5 from material experts, 85.5 from small group trials, and 87.3 for large group tests. From this value, it shows that web-based chemistry learning media is very valid and feasible to use, Setyadi & Qohar (2017). Setyadi & Qohar (2017) found that the procedure in this study consisted of analyzing the products developed, developing initial products, and product trials. The results show that the web-based learning media developed are valid. Januarisman & Ghufron (2016). Some conclusions were obtained that (1) Products in the form of web-based learning media in science subjects using CMS (Content Management System) Wordpress software. (2) Web-based learning media products in science subjects have been declared feasible as learning media based on the results of validation from material experts with an average value of 3.98 with the category "Good", media experts with an average value of 4.07 with the category "Good", the initial field trial obtained an average assessment of 4.13 with the category "Good" and the main field trial obtained a gain value for SMP Muhammadiyah 2 of 22.2, SMP N 2 of 24, SMP N 3 of 21.6 and SMP N 5 of 19.6. (3) The effectiveness of web-based science learning media is evidenced by the increase in student learning outcomes based on pretest and posttest evaluation data.

Research conducted by Sari & Suswanto (2017) concluded that the web-based learning media developed was efficiently used in the learning process to improve student learning outcomes in Basic Network subjects, Asyhari & Diani (2017), concluded that after being validated by instructional design experts, learning media experts, and website designer experts, obtained a score with "very good" criteria and obtained a score with "very good" criteria after a limited trial (N = 15) and an expanded trial (N = 90) in terms of the attractiveness of the design and ease of use of the initial product and the final product of the WEC developed.

Lawanto (2000) concluded that combining face-to-face meetings with web-based learning can increase the contribution and interactivity between learners. Through face-to-face meetings, learners can get to know fellow learners and their accompanying teachers. This familiarity is very supportive of their virtual collaboration. Mubarrak & Lidia (2009) concluded that students gave good responses to the PBW model (81.8%), 80.5% (good) to the learning materials, 80.0% (good) to the quiz, 77.2% (good) to the

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discussion forum, 84.8% (good) to the chat media, 87.5% (good) to the evaluation questions, and 74.8% (good) to the advantages and disadvantages of the PBW model. It was concluded that the PBW model could significantly improve students' mastery of concepts and science generic skills and Muksin (2011) found that in relation to the use of the internet as a learning resource, the support of computer devices connected to the internet network is one of the important requirements. Thus in the end it is recommended to schools to implement a web-based e-learning learning model with e-pedagogy principles as a learning model in economic subjects at the high school level.

CONCLUSIONS

The development of automotive engineering learning video media using Camtasia on the material of periodic maintenance of light vehicles at SMK PGRI 1 Gresik, which is associated with character education by conducting several stages of testing the products developed by conducting validity tests using tri-angulation techniques including validation tests involving design experts, material experts, media experts and initial responses from student groups. Further trials were carried out by conducting limited group trials and large group trials. All validation results, limited group trials and large group trials produced a significant percentage with an average percentage that had a range of 70% - 90%, so that the overall conclusion from the trial results that the product developed, namely learning video media using Camtasia which is integrated with character education, can be used as media usage in carrying out the learning process in automotive engineering practice subjects.

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