



Development of Learning Media System Video Animation Material of Motorcycle Battery Charging System for Automotive Students of UM Purworejo

Dwi Jatmoko¹, Agus Haryadi², Arif Susanto³, Aci Primartadi⁴, Mohammad Reza Listiana⁵

¹⁻⁵Department of Automotive Engineering Education, Universitas Muhammadiyah Purworejo, Indonesia, 321054

aci@umpwr.ac.id

<https://doi.org/10.37339/e-komtek.v9i1.2423>

Published by Piksi Ganesha Polytechnic Indonesia

Info Articles

Submitted:

23-01-2025

Revised:

04-06-2025

Accepted:

26-06-2025

Online first:

30-06-2025

Abstract

This study aims to 1) produce a product. 2) determine the feasibility of the product. This research method includes development research. Based on assessing the feasibility of the media, the results of the questionnaire were obtained from two experts, namely media experts and material experts as well as the results of responses to small group trials and the results of responses to the data analysis test. The validation results from media experts showed the percentage of feasibility of the differential system learning media, namely 85%. The figure of 85% is included in the "good" classification. Analysis of the validation results carried out on material experts obtained 85%. From the data validation criteria, 85% is included in the "good" classification. Small group trials involving 5 students with an assessment percentage of 90%. Based on the analysis of the results of the small group trials above, the score is included in the "Very Good" classification. Large group trials with an assessment percentage of 91%.

Keywords : Ridge Regression; Multiple Linear Regression; Dengue Fever Prediction; MAPE

Abstrak

Penelitian ini bertujuan untuk 1) menghasilkan produk. 2) mengetahui kelayakan produk. Metode penelitian ini termasuk penelitian pengembangan. Berdasarkan menilai kelayakan media tersebut didapatkan hasil angket dari dua ahli yaitu ahli media dan ahli materi serta hasil tanggapan pada uji coba kelompok kecil dan hasil tanggapan pada uji Analisis data hasil validasi dari ahli media menunjukkan presentase kelayakan media pembelajaran sistem diferensial yaitu 85%. Angka 85% tersebut termasuk dalam klasifikasi "baik". Analisis hasil validasi yang dilakukan terhadap ahli materi, diperoleh 85%. Dari kriteria validasi data, 85 % termasuk dalam klasifikasi "baik". Uji coba kelompok kecil yang melibatkan 5 mahasiswa dengan persentase penilaian adalah 90%. Berdasarkan analisis hasil uji coba kelompok kecil di atas sudah menunjukkan skor termasuk klasifikasi "Sangat Baik" Uji coba kelompok besar dengan persentase penilaian adalah 91%.

Kata kunci : Ridge Regression; Multiple Linear Regression; Dengue Fever Prediction; MAPE



This work is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/).

1. Introduction

The rapid development of technology in the current era of globalization has provided many benefits in progress in various social aspects. The use of technology by humans to help complete work is a necessity in life. This technological development must also be followed by developments in Human Resources (HR). One of the technological developments used in learning is the existence of various types of learning media development. One of them is the motorcycle battery charging system which is an important part of motor vehicle technology that must be understood by automotive students. However, there are several challenges in the learning process of this material: 1) Complex Material: The battery charging system involves various technical components such as alternators, regulators, and batteries, which are often difficult to understand only through textual explanations and static images. 2) Conventional Methods: Learning often uses lecture methods, textbooks, and two-dimensional images, which are less interactive and interesting, thus limiting students' understanding. 3) Limitations of Direct Practice: Not all students have access to motorized vehicles to practice directly the working mechanism of the battery charging system. 4) Needs of the Digital Age: Today's students tend to be more responsive to technology-based learning methods such as animated videos, which can present dynamic visualizations to explain complex work processes.

Learning media has an important role. The term media comes from Latin, namely *medius*, which means middle, intermediary, or messenger. In Arabic, media is an intermediary or messenger of messages from the sender to the recipient of the message [1]. states that media is one of the components of communication, namely as a message carrier from the communicator to the communicant [2]. Based on this definition, it can be said that the learning process is a communication process. The use of animated video learning media has an impact on student activities during the direct teaching and learning process.

Put forward three characteristics of media which are clues as to why media is used and what the media does that teachers may not be able to (or are less efficient) to do [2].

Fixative media This process describes the ability of media to record, store, preserve, and reconstruct an event or object. With this fixative characteristic, media allows a recording of an event or object that occurs at a certain time to be transformed without knowing the time. While the manipulative characteristic is Transformation is an event or object. possible because the media has manipulative characteristics. Events that take a long time can be

presented to students in two or three minutes. In addition to being able to be accelerated, an event can be slowed down when re-displaying the results of an animated video.

By using learning videos, it will make it easier to learn the activity itself. In this material, there are things that are studied, namely the motorcycle battery charging system. The charging system is a mechatronic circuit that functions to supply electrical energy to the battery so that the electrical needs of the body or engine can be met. The battery or accumulator is part of the charging system that functions to store the current generated by the charging system. In the battery, the electrical energy will be converted into chemical energy.

Based on this material, the purpose of this study is to develop an animated video system learning media for motorcycle battery charging system material for automotive students at UM Purworejo. To determine the feasibility of the Animation Video System Learning Media for Motorcycle Battery Charging System Material for Automotive Students of UM Purworejo. Based on this objective, a study was also conducted by Fatwa Suci Masyta entitled "Development of Audio Visual Learning Media to Increase Student Interest in Battery Maintenance Subjects at SMKN 1 Wadaslintang" that audio visual media in the learning process there is a difference in the results of student interest in SMK Negeri 1 Wadaslintang between students who use audio visual media and students who are taught with conventional media. According to the questionnaire given, the results obtained were with an average of 55.62% in the control class and 72.55% in the experimental class [5]. This is also in line with Ali Subkhi, Wirawan Sumbodo entitled "Improving Automotive Electricity Learning Outcomes Using Conventional Ignition System Demonstrators" The results of the study showed that there was an increase in automotive electricity learning outcomes using conventional ignition system demonstration tools. With an average value (pre-test) of 56.11 and an average value after using the ignition system props (post-test) of 73.33 [4]. This is also reinforced by research conducted by Henry Cahyo Sumargo entitled "Development of Brake System Learning Media to Increase Learning Interest of Class XI Students at SMK Yepika Purworejo" the results of the student learning interest questionnaire were 62.75%. Meanwhile, the student learning outcome test was 86.67% [5].

2. Method

The research This research is a type of development research to produce a product, namely an Animation Video System for Motorcycle Battery Charging System Material [6].

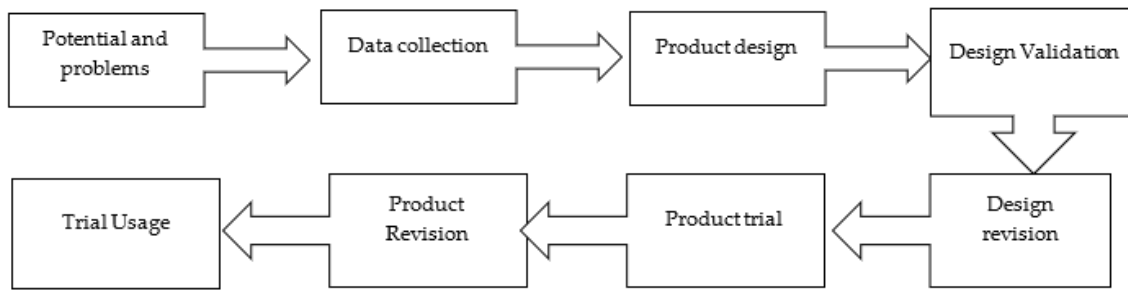


Figure 1. Steps of Research and Development (R & D) Method (Source: Sugiyono 2015:409). The following are the steps of the development method carried out which include 8 stages as follows.

1. Potential problems

The problem in this study is the absence of learning media and teaching aids used. Learning media is still in the form of standard presentations and has not considered the aspects of interactivity and creativity. With the presence of teaching aids, the sign system is expected to be of higher quality and can maximize the use of facilities and infrastructure optimally.

2. Collecting data

1) observation or interviews include interviews with teachers teaching the subject of the Motorcycle Battery Charging System in particular and students who receive teaching from teachers in the subject, 2) Questionnaires are used to assess the trial of the resulting product, namely in the form of an animated video of charging a motorcycle battery, there are three stages of trials on students, the first is the first trial stage, then the small group trial stage, and the large group test.

3. Product design

The media used for the development of learning media for the motorcycle battery charging system is an animated video of a praga tool for the motorcycle battery charging system as a practical tool for the motorcycle battery charging system, which has the same function as the practical tool for the motorcycle battery charging system which is an animated video of the praga tool, so that it can be used for learning. The product design is adjusted to the material in the learning so that there is a relationship between the media and learning, so that it can generate creative, critical thinking in students

4. Design validation

The validator who is none other than a lecturer, validation is a process of activities to assess whether the product design, in this case the new work system will be rationally more effective than the old one or not. It is said rationally, because validation here is still an assessment based on rational thinking, not field facts.

In this study, validation is in the form of product design validation.

5. Design improvement

After the product design, it is validated through discussions with experts and other experts. then its weaknesses can be identified. These weaknesses are then tried to be reduced by improving the design. The person in charge of improving the design is the researcher who wants to produce the product.

6. Product trial

The product that has been made is tested on students involved in the research.

7. Product revision

Product testing on a limited sample shows that the performance of the new system is better than the old system. The difference is very significant, so that the new work system can be implemented.

8. Usage trial

After the product testing is successful, and there may be revisions that are not too important, then the product in the form of a new work system is applied in real conditions for a wide scope.

Data collection in this study used a questionnaire. (Sugiyono, 2015: 199) a questionnaire is a data collection technique carried out by giving a set of written questions or statements to respondents to answer. Questionnaire The questionnaire and questions in the study consisted of a questionnaire for media experts, a questionnaire for material experts, and a student questionnaire.

3. Results and Discussion

The following are the validation results from media experts as follows

a) Media Expert Validation Results

Table 3. Media Expert Validation Results

NO	INDICATOR	CRITERIA	SCORE	%
1	Suitability of material to be displayed with motorcycle charging system media	A	4	100
2	Suitability of motorcycle charging system media with learning material	B	3	75
3	Ease of students in understanding media	B	3	75
4	Ease of students in understanding material with media	B	3	75
5	Learning tempo using media	A	4	100
6	Clarity of material with learning media	B	3	75
7	Suitability of media with topics presented	B	3	75
8	Relationship of media with material	B	3	100
9	Coverage of media with material	A	4	100
10	Suitability of media to achieve expected	A	4	100
Goals			34	
Total score			40	
Maximum score				
Average			3,4	
Presentase			85	
Presentation			good	

Based on **Table 3**, the analysis of validation data from media experts shows the percentage of eligibility of the differential system learning media is 85%. The figure of 85% is included in the "good" classification.

b) Results of Validation by Material Experts

The following are the results of validation by material experts as follows.

Table 4. Results of Validation by Material Experts

NO	INDICATOR	CRITERIA	SCORE	%
1	Suitability of material with learning media	A	4	100
2	Suitability of media display with material	A	4	100
3	Ease of students in understanding media	B	3	75
4	Ease of students in understanding material with media	B	3	75
5	Learning tempo using media	B	3	75
6	Clarity of material with learning media	B	3	75
7	Suitability of media with topics presented	A	4	100
8	Relationship of media with material	B	3	75
9	Coverage of media with material	B	3	75
10	Suitability of media to achieve expected goals	A	4	100
	Total score		34	
	Maximum score		40	
	Average		3.4	
	Percentage		85	
	Classification		Baik	

The analysis of the validation results conducted on material experts obtained 85%. From the data validation criteria, 85% were included in the "good" classification.

c) Small Group Student Response Results

Table 5. Small Group Student Responses

No	Statement	Score	%	Category
1	Suitability of material with learning media	18	90	Very good
2	Suitability of media display with material	17	85	good
3	Ease of students in understanding media	17	85	Enough
4	Ease of students in understanding material with animated video media	18	90	good
5	Learning tempo using media	18	90	Very good
6	Clarity of material with learning media	19	95	Very good
7	Suitability of media with topics presented	18	90	Very good
8	Relationship of media with material	18	90	Very good
9	Coverage of media with material	18	90	Very good
10	Suitability of media to achieve expected goals	18	90	good
Total Score		179		
Maximum Score		200		
Presentation		89.50%		
Classification		Sangat Baik		

Small group trials involving 5 students with a percentage of assessment of 90%. Based on the analysis of the results of the small group trials above, it has shown a score including the classification of "Very Good". Results of Large Group Student Responses

Table 6. Large Group Student Responses

No	Statement	Score	%	Category
1	Suitability of material with learning media	92	92	Very good
2	Suitability of media display with material	91	91	Very good
3	Ease of students in understanding media	90	90	Very good
4	Ease of students in understanding material with animated video media	92	92	Very good
5	Learning tempo using media	92	92	Very good
6	Clarity of material with learning media	90	90	Very good
7	Suitability of media with topics presented	93	93	Very good
8	Relationship of media with material	90	90	Very good
9	Coverage of media with material	94	94	Very good
10	Suitability of media to achieve expected goals	90	90	Very good
Total Score			914	
SM			1000	
Presentation			91.4	
Classification			Sangat Baik	

Large group trials involving 15 students with a percentage of assessment of 91%. Based on the analysis of the results of the small group trials above, it has shown a score including the classification of "Very Good"

This learning media is designed referring to the concept of the Research and Development Method by Sugiyono (2015), the results of the steps: UM Purworejo Automotive Study Program already has a workshop that has met the standards needed for learning. With the presence of motorcycle battery charging system demonstration media, it

is hoped that learning will be of better quality and can maximize the use of facilities and infrastructure optimally. The researcher used observation in data collection, while the material selected was in the Motorcycle Electrical Maintenance subject. In general, the product design is in the form of an animated video of motorcycle battery charging. The media developed is expected to improve learning outcomes for the Motorcycle Electrical Maintenance subject.

In general, the response to the small group trial reached 90% with a very good classification because with video learning, students found it easy to practice the Motorcycle Battery Charging System. The response to the large group trial reached 91% with a very good classification because with video learning, students found it easy to practice the Motorcycle Battery Charging System.

A motorcycle battery charging system animation video media developed based on a preliminary study based on the needs analysis that has been described in the sub-planning. The technical manufacturing process, by collecting relevant references for the development of the material. Product validation through several stages, namely material validation and media validation, by selecting validators who are academically and professionally competent in their fields, so that comprehensive input is obtained for the feasibility of the media when tested.

4. Conclusion

Based on the research that has been done, there are several results obtained that :The stages in this development research include 8 steps, namely 1) potential and problems, 2) data collection, 3) product design, 4) design validation, 5) design revision, 6) product trial, 7) product revision, 8) usage trial. To assess the feasibility of the media, the results of a questionnaire were obtained from two experts, namely media experts and material experts as well as the results of responses to small group trials and the results of responses to the test. Data analysis of validation results from media experts shows the percentage of feasibility of differential system learning media, namely 85%. The figure of 85% is included in the "good" classification. Analysis of the validation results carried out on material experts, obtained 85%. From the data validation criteria, 85% is included in the "good" classification. Small group trials involving 5 students with an assessment percentage of 90%. Based on the analysis of the results of the small group trials above, the score is included in the "Very Good"

classification. Large group trials involving 15 students with an assessment percentage of 91%. Based on the analysis of the results of the small group trials above, the scores are included in the "Very Good" classification.

References

- [1] Arsyad, Azhar. 2013. *Media Pembelajaran*. Edisi Revisi. Jakarta: RajaGrafindo Persada
- [2] A. Primartadi, S. Suyitno, A. Maulana, and D. Jatmoko, "Pengembangan Media Pembelajaran Sistem Kopling Teknologi Sepeda Motor pada Pendidikan Tinggi," *jtvok*, vol. 9, no. 2, pp. 161–166, Dec. 2021, doi: 10.30738/jtvok.v9i2.11504
- [3] A Primartadi, S Suyitno, D Jatmoko (2024). Pengembangan Media Pembelajaran Sistem Rem Cakram dan Tromol Sepeda Motor Terhadap Minat Belajar Siswa SMK. *Jurnal Pendidikan Vokasi Otomotif*, 6 (2), 99-106. <https://doi.org/10.21831/jpvo.v6i2.72387>
- [4] Daryanto. 2016. *Media Pembelajaran*. Edisi ke 2 Revisi. Yogyakarta: Gava Media
- [5] Masytha, F. S. (2015). Pengembangan Media Pembelajaran Audio visual Untuk Meningkatkan Minat Belajar Siswa Pada Mata Pelajaran Memelihara Baterai di SMKN 1 Wadaslintang. *Jurnal Pendidikan Teknik Otomotif*, 6(1), 13
- [6] Nugroho, A. Z., Anitasari, M. E., & Primartadi, A. (2024). Penggunaan Video Animasi pada Pembelajaran Mesin Pembakaran dalam Terhadap Hasil Belajar Siswa. *Jurnal Ilmu Pendidikan Dan Vokasi*, 1(3), 61-64. <https://doi.org/10.37729/jipv.v1i3.6335>
- [7] Subkhi, A., & Sumbodo, W. (2012). Peningkatan Hasil Belajar Kelistrikan Otomotif dengan Menggunakan Alat Peraga Sistem Pengapian Konvensional. *Jurnal Pendidikan Teknik Mesin*, 12(1).
- [8] Sugiyono, D. (2013). Metode penelitian pendidikan pendekatan kuantitatif, kualitatif dan R&D.
- [9] Sumargo, H. C. (2014). Pengembangan media pembelajaran sistem rem menggunakan macromedia flash untuk meningkatkan minat belajar siswa kelas XI di SMK YEPEKA Purworejo. *Skripsi. Universitas Muhammadiyah Purworejo. Purworejo*.