

Developing Video-based Instructional Media for Clutch System Maintenance in Light Vehicle Chassis and Powertrain Learning

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Article History

Received: 24 July 2024

Revised: 15 August 2024

Published: 30 August 2024

ABSTRACT

Learning media continues to develop and become an important component that supports the learning process because it can improve the quality of learning, help increase student engagement, and make lessons more accessible. The utilization of learning media still has some weaknesses such as not being able to display the original movement in practice and less interactive. These weaknesses can be overcome through media customisation and development. Quality education can be realised by changing conventional media into learning media that is more appropriate and easy to understand. This study aims to develop and design learning video media for clutch system maintenance subject matter in Light Vehicle Chassis and Powertrain Maintenance subjects according to material experts, media experts, and media feasibility tests on students. This research uses the Research and Development (R&D) method and uses the 4D development model. The results of the feasibility test of video-based learning media get a percentage of 95.29% from material expert validators, 86.66% from media expert validators, and 88% from the results of the media feasibility test results of 30 students. From the test results, it can be concluded that the video-based learning media for clutch system maintenance subject matter in the Light Vehicle Chassis and Powertrain Maintenance subject is 'Very Feasible' to be used for learning activities.

Keywords: Learning Media, Clutch System, Video

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How to cite: Priyanto, S., & Awalia, V. A. (2024). Developing Video-based Instructional Media for Clutch System Maintenance in Light Vehicle Chassis and Powertrain Learning. *NUSRA : Jurnal Penelitian Dan Ilmu Pendidikan*, 5(3), 1437–1443. <https://doi.org/10.55681/nusra.v5i3.6264>



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INTRODUCTION

Learning media continues to evolve and become increasingly important in supporting the education process. Learning media is an important component that supports the teaching and learning process as it can improve the quality of learning, help increase student engagement, and make lessons more accessible. Media is one of the factors that support the success of the learning process in schools because it can help the process of delivering information between teachers and students (Harsiwi & Arini, 2020). According to Nurrita (2018) learning media in general is a tool that can help the teaching and learning process. According to Sadiman (2011) in Fauzan & Rahdiyanta (2017) learning media is anything that can be used to convey messages from sender to receiver with the aim of encouraging students' thoughts, feelings, and attention to be involved in the learning process.

Learning media is a tool or form of stimulus that functions to convey learning messages (Siti, 2018). It can be concluded that learning media are tools used in learning to assist teachers in delivering material to students and making it easier for students to understand lessons so that learning objectives are achieved. The learning process is an activity between teachers and students in order to achieve learning goals (Jamaliyah & Wulandari, 2022). The method of delivering material by the teacher also affects the delivery of learning material to students. If the learning method used by the teacher is appropriate, achieving learning objectives will be easier to achieve. (Faradila & Aimah, 2018) stated that learning can take place well, effectively, efficiently, and interestingly if a teacher can make changes in delivering material creatively. From these problems, teachers are required to create interesting and innovative learning, one of which is through learning media. By using appropriate and effective learning media, teachers can ensure that students receive and understand lessons well. The right learning media can help students understand the

subject matter and improve student learning outcomes. According to Fatimatuzahroh et al., (2019) learning outcomes are the abilities that children acquire after going through learning activities. Fauhah & Rosy (2021) state that learning is a process, an activity and not a result or goal. Learning is not just remembering, but it is broader than that, namely experiencing. Student learning outcomes have a significant impact on aspects of knowledge and skills. Student learning outcomes are an indicator of the success of an educational process. Learning strategies and media used in the classroom can affect student learning outcomes.

According to Mustholiq et al., (2007) in Iman- syah & Hasanah (2024) learning media has an important role in the teaching and learning process, because it can make the learning atmosphere more lively and meaningful. In addition, the use of learning media can also help overcome the limitations of time, space, and energy, and make learning more interactive. The selection of media in the learning process is very important, especially the selection of the right media to teach a field of study (Miftah & Rokhman, 2022). The selection of the type of learning media needs to be adjusted to the learning objectives, the material being taught, and the characteristics of the students. Learning media itself has various types. Therefore, it is necessary to choose the right learning media so that it can attract students' attention and convey the clarity of the objects they will observe in the learning process (Rohima, 2023).

Currently, the utilisation of learning media still has some weaknesses, such as not being able to display original movements in practice and not being interactive enough. These weaknesses can be overcome by adjusting and developing learning media. One of the learning media that can be used is video learning media. According to Khairani et al., (2019) learning videos are audio-visual media in which they show sound and images. Learning videos have functions, namely, they can attract attention and focus

students' concentration on the material, learning objectives are more quickly achieved by understanding and remembering the message in the video, and can overcome passive students with the use of appropriate and varied media (Marliani, 2021). Learning videos are suitable for use in both online and offline learning processes because they have various advantages. According to Nasikhah et al., (2021), the advantages of learning videos are that they can overcome distance and time, are able to describe events in the past, convey messages quickly and easily in short, develop students' thoughts and opinions, and develop imagination. By using learning video media, it can help students understand the subject matter, increase learning motivation, and achieve better learning outcomes.

Based on the results of observations made by researchers during PKM (Teaching Skills Practice) activities at SMK Karya Guna Jakarta, especially in the competence of light vehicle engineering expertise, information is obtained that currently learning resources and media owned by teachers are still limited. Students only take notes and listen when the teacher delivers the material, this makes students feel bored and do not understand the content of the material because they only focus on taking notes. From the results of the researcher's interview with the Light Vehicle Engineering teacher stated that the lecture method in front of the class was still used to convey material and complained that students had difficulty understanding the material because students only held on to notebooks. This has an impact on the learning outcomes of students to be not optimal. Learning achievement has not met 80% KKM because the teacher still has not used the right learning media.

After that, researchers conducted a needs analysis through a questionnaire / google form to students in class XI Light Vehicle Engineering (TKR). From the data from the needs analysis that has been carried out, 90% of respondents stated that the learning media used in PSPTKR subjects still use conventional media, namely

modules or powerpoints. Then followed by a statement that conventional learning media or powerpoint cannot increase interest and motivation in learning with a percentage of 90% of respondents. Because of this, 100% of respondents stated that there was a need for learning media development in PSPTKR subjects and also the percentage results of 100% of respondents suggested that a learning video was needed so that it could be used as a guide during practice.

Learning media development is needed to support the teaching and learning process, increase student interest and understanding, and help achieve learning outcomes. Video tutorials were chosen as a solution so that teachers do not have difficulty in explaining the material and do not always rely on live demonstrations, because videos can be played repeatedly. Therefore, researchers sought to develop video-based learning media with audio and visual support to improve the quality of learning. This research focuses on the development of learning videos for the subject matter 'Clutch System Maintenance' in the subject of Light Vehicle Chassis and Powertrain Maintenance at SMK Karya Guna Jakarta, in accordance with the Flow of Learning Objectives (ATP).

METHODS

This study uses a research and development (R&D) method that refers to the 4D development model. The research and development method is a research method used to make certain products and test the effectiveness of these products (Sugiyono, 2015).



Figure 1. 4D Development Models

The 4D model is one of the research and development methods. The 4D model is used to develop learning tools. The development model used in this research is the 4-D model. This model consists of four main stages, namely: Define, Design, Develop, and Disseminate (Maydiantoro, 2021).

RESULTS AND DISCUSSION

This research was conducted on class XI students of Light Vehicle Engineering on the subject matter of clutch system maintenance of Light Vehicle Chassis and Powertrain Maintenance using the Research and Development (R&D) method referring to the Four-D (4D) Development model. According to Sugiyono (2019) in (Maydiantoro, 2021) the 4D development model consists of 4 stages of development, namely:

1. Define,
2. Design,
3. Development,
4. Disseminate.

Define Result

This stage is to determine and define the needs in the learning process and collect various information related to the learning method to be developed, in this defining stage includes five steps, namely: The results of the initial analysis that researchers found through observations when carrying out Teaching Skills Practices (PKM) at SMK Karya Guna Jakarta. It is obtained that there is no learning media that

can attract the interest and motivation of students during the learning process, so that students have difficulty understanding the material. After obtaining data from the initial analysis, the next step is to identify the problems found in classroom learning. Based on the results of the researcher's interview with the PSPTKR subject teacher at SMK Karya Guna Jakarta, information was obtained that learning in the classroom still used the lecture method. The media used during the learning process is still limited to using conventional media, namely module books or power point. Students only hold on to notebooks. So that it makes students find it difficult to understand the material during learning. Therefore, it is necessary to have learning media in reality that is in accordance with the needs of the field that can increase student interest and motivation to learn and make it easier to understand the material, so it is necessary to have learning media in the form of videos in the learning of Light Vehicle Chassis and Powertrain Maintenance subjects that will support learning by teachers and facilitate learning.

The results of student analysis aim to determine student characteristics. At this stage, it was carried out by giving a needs analysis questionnaire to 30 students of class XI Light Vehicle Engineering (TKR) 2 SMK Karya Guna Jakarta. Based on the results of the needs analysis, several problems can be identified as follows: 1. The media used cannot increase students' interest and motivation in learning, so there is a need to develop new learning media that can increase students' interest and motivation in learning. 2. Conventional learning media or Power Point cannot improve students' understanding of the material being taught, so there is a need to develop media that can improve students' understanding of learning material. 3. There is a need to develop creative and innovative media for learning Light Vehicle Chassis and Powertrain Maintenance.

The result of the concept analysis at this stage is that the researcher defines the learning objectives to be achieved in the

lesson. These objectives are aligned with the Learning Objectives Flow (ATP) and Learning Outcomes (CP) for the subject Light Vehicle Chassis and Powertrain Maintenance.

The results of the task analysis stage serve to determine the details of tasks assigned to students, aimed at helping them deepen their understanding of the material they have learned so they can achieve or surpass the minimum competency. The tasks assigned to students will take the form of evaluation questions given at the end of the instructional video.

The result of the goal specification stage is identifying the material to be presented in the instructional video by outlining the content of the media.

Design results

In this step, the product design must be realized in the form of images, animations or brief descriptions that can function as a basis for making, and are able to make it easier for other parties to understand. The following is a prototype of a media that has been developed.

In creating learning media designs, researchers utilize supporting equipment such as hardware and software. The learning media design process is divided into 3 stages, namely:

• Pre Production

At this stage is the stage of analyzing the problem, collecting data to solve the problem, compiling video material and making a video design (storyboard and script).

• Production

At this stage the production tools used to create learning media are camera, lens, lighting, microphone, memory card, tripod.

• Post Production

The post-production stage is the editing process, after the production of video footage that has been taken will be input into the editing process. In this process, researcher use CapCut software to edit videos and Adobe Audition to edit sound to get good quality.

Development result

After completing the design stage of developing instructional media through video, the researcher conducted product validity testing with subject matter experts, media experts, and media feasibility tests. The validation tool used was a non-test instrument utilizing a likert scale.

1. Results of Subject Matter Expert Validation

The results of the subject matter expert validation received a total score of 81 out of the expected 85. The feasibility percentage can be calculated as follows:

$$\text{Eligibility Percentage (\%)} = \frac{81}{85} \times 100\% = 95,29\%$$

2. Results of Media Expert Validation

The results of the media expert validation received a total score of 65 out of the expected 75. The feasibility percentage can be calculated as follows:

$$\text{Eligibility Percentage (\%)} = \frac{65}{75} \times 100\% = 86,66\%$$

3. Media Feasibility Test Results.

The results of the media feasibility test get a total score of 1985 and the expected total in the media feasibility test is 2250, The feasibility percentage can be calculated as follows:

$$\text{Eligibility Percentage (\%)} = \frac{1985}{2250} \times 100\% = 88\%$$

The final stage aims to distribute the research product for use in the learning process of the Light Vehicles Chassis and Powertrain Maintenance subject. This will be done by uploading the product to Google Drive and providing a barcode scan. The product will then be distributed to Class XI Light Vehicle Engineering students at SMK Karya Guna Jakarta.



Figure 2. Learning Media Barcode

CONCLUSIONS

Based on the results of the development research on video-based instructional media for clutch system maintenance in the subject of light vehicles chassis and powertrain maintenance, the following conclusions can be drawn:

1. The development of video-based instructional media for clutch system maintenance in the subject of light vehicles chassis and powertrain maintenance was developed using the 4D development model, which consists of four stages: define, design, development, and disseminate.
2. The feasibility of the instructional video can be determined from the validation tests conducted by subject matter experts, media experts, and media feasibility tests. The results are as follows: The results of the subject matter expert validation for the video based instructional media achieved a feasibility percentage of 95.29%, categorized as very feasible. The results of the media expert validation for the video-based instructional media achieved a feasibility percentage of 86.66%, categorized as very feasible. The results of the media feasibility test from Class XI TKR students achieved a feasibility percentage of 88%, categorized as very feasible.

Dissemination Results

The dissemination stage aims to distribute the developed learning media so

that it can be utilized in the learning process. The video-based learning media was disseminated by uploading the product to Google Drive and providing access through a barcode to facilitate users in accessing the video. The media was then distributed to class XI Light Vehicle Engineering students at SMK Karya Guna Jakarta as well as to subject teachers as supporting learning material.

Through this dissemination process, the developed video tutorial can be used as an alternative learning resource both in classroom activities and for independent learning outside the classroom. The accessibility of the video allows students to review the material repeatedly according to their needs. In addition, teachers can integrate the video into the learning process to enhance students' understanding and engagement.

REFERENCES

- Faradila, S. P., & Aimah, S. (2018). Analisis Penggunaan Media Pembelajaran untuk Meningkatkan Minat Belajar Siswa di SMA N 15 Semarang. *Prosiding Seminar Nasional Mahasiswa Unimus*, 1. <https://prosiding.unimus.ac.id/index.php/mahasiswa/article/view/194>
- Fatimatuzahroh, F., Nurteti, L., & Koswara, S. (2019). Upaya Meningkatkan Hasil Belajar Peserta Didik pada Mata Pelajaran Akidah Akhlak Melalui Metode Lectures Vary. *Jurnal Penelitian Pendidikan Islam*, 7(1), 35. <https://doi.org/10.36667/jppi.v7i1.362>
- Fauhah, H., & Rosy, B. (2021). Analisis Model Pembelajaran Make A Match Terhadap Hasil Belajar Siswa. *Jurnal Pendidikan Administrasi Perkantoran (JPAP)*, 9(2), 321–334. <https://doi.org/https://doi.org/10.26740/jpap.v9n2.p321-334>
- Fauzan, M. A., & Rahdiyanta, D. (2017). Pengembangan Media Pembelajaran

- Berbasis Video Pada Teori Pemesinan Frais. In *Jurnal Dinamika Vokasional Teknik Mesin* (Vol. 2, Issue 2). <https://journal.uny.ac.id/index.php/dynamika/issue/view/1445>
- Harsiwi, U. B., & Arini, L. D. D. (2020). Pengaruh Pembelajaran Menggunakan Media Pembelajaran Interaktif Terhadap Hasil Belajar Siswa Di Sekolah Dasar. *Jurnal Basicedu*, 4(4), 1104–1113. <https://doi.org/https://doi.org/10.31004/basicedu.v4i4.505>
- Imansyah, M. N., & Hasanah, U. (2024). Development of Video-Based Interactive Learning Media to Improve Students' Critical Thinking Abilities Pendidikan Teknologi Informasi STKIP Yapis Dompu. *Jurnal Ilmiah Mandala Education (JIME)*, 10(1), 2656–5862. <https://doi.org/10.58258/jime.v9i1.6680/http>
- Jamaliyah, R., & Wulandari, N. F. (2022). Implementasi Vidio Pembelajaran Berbasis E-Learning Untuk Meningkatkan Minat Belajar Matematika Siswa Kelas XI MAN Purworejo. *Jurnal Equation: Teori Dan Penelitian Pendidikan Matematika*, 5(1), 41. <https://doi.org/10.29300/equation.v5i1.5727>
- Khairani, M., Sutisna, S., & Suyanto, S. (2019). Studi Meta-analisis Pengaruh Video Pembelajaran Terhadap Hasil Belajar Peserta Didik. *Jurnal Biolokus*, 2(1), 158–166. <https://doi.org/http://dx.doi.org/10.30821/biolokus.v2i1.442>
- MARLIANI, L. P. (2021). Pengembangan Video Pembelajaran Untuk Meningkatkan Motivasi Belajar Siswa Sekolah Dasar. *Paedagogy: Jurnal Ilmu Pendidikan Dan Psikologi*, 1(2), 125–133. <https://doi.org/https://doi.org/10.51878/paedagogy.v1i2.802>
- Maydiantoro, A. (2021). Model-Model Penelitian Pengembangan (Research and Development). *Jurnal Pengembangan Profesi Pendidik Indonesia (JPPPI)*.
- Miftah, M., & Rokhman, N. (2022). Kriteria Pemilihan Dan Prinsip Pemanfaatan Media Pembelajaran Berbasis TIK Sesuai Kebutuhan Peserta Didik. *Educenter: Jurnal Ilmiah Pendidikan*, 1(4), 412–420. <https://doi.org/https://doi.org/10.55904/educenter.v1i4.92>
- Nasikhah, A. D., Yuliyani, M., Khikmah, N., & Safitri, W. D. (2021). Analisis Kebutuhan Terhadap Video Pembelajaran Matematika Dalam Meningkatkan Pemahaman Konsep Siswa Pada Masa Pandemi Covid-19 Di Smk N 1 Batang. *Prosiding Konferensi Ilmiah Pendidikan*, 2, 121–126. <https://proceeding.unikal.ac.id/index.php/kip/article/view/712>
- Nurrita, T. (2018). Pengembangan Media Pembelajaran Untuk Meningkatkan Hasil Belajar Siswa. *MISYKAT: Jurnal Ilmu-Ilmu Al-Quran, Hadist, Syari'ah Dan Tarbiyah*, 3(1), 171. <https://doi.org/10.33511/misykat.v3n1.171>
- Rohima, N. (2023). Penggunaan Media Pembelajaran Untuk Meningkatkan Keterampilan Belajar Pada Siswa. <https://osf.io/acxe2/download>
- Siti, S. (2018). Pengaruh Media Pembelajaran Berbasis Teknologi Informasi Dan Komunkasi Terhadap Keaktifan Belajar Siswa Pada Bidang Studi PAI di SMKN 1 Rukat Utara, Kecamatan Rukat Utara. <https://repository.uir.ac.id/5083/>
- Sugiyono. (2015). *Metode Penelitian Pendidikan by Sugiyono* (z-lib.org). 1–229.