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Development of Learning Videos Using YouTube Integrated Video Prezi Applications on Fuel Injection Systems in Vocational Schools

Hendi Iswanto[1], Yayat Ruhiat[2], Cucu Atikah[3]

[1] Universitas Sultan Ageng Tirtayasa, Serang, Indonesia ; 7772210035@untirta.ac.id
[2] Universitas Sultan Ageng Tirtayasa, Serang, Indonesia; yruhiat@untirta.ac.id
[3] Universitas Sultan Ageng tirtayasa, Serang, Indonesia; cucuatikah@untirta.ac.id

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ABSTRACT

The development of information and communication technology has touched various aspects of life, one of which is the world of education. Education cannot be separated from the development of IT. The Prezi video application can be used to create interesting learning video media for students. This research is a Research and Development (R&D) research through a 4D development model, which consists of 4 stages, namely: (a) Define, (b) Design, (c) Develop, and (d) Disseminate. This study aims to develop material on the basic competence of gasoline injection systems for class XI Automotive Light Vehicle Engine Maintenance. Subject Automotive Light Vehicle Engineering (TKRO) expertise program at a state vocational high school in Serang City. This research is limited to the development of media, which is validated by media experts, material experts, and student response trials. This is due to the limited research time. Data analysis techniques were obtained for product feasibility with a Likert scale. From the results of the stages carried out through this method, it can be concluded that the material expert validation was obtained by 87% with the very feasible category and the average media expert validation was obtained by 90% with the very feasible category to be used as an alternative learning video media to make it easier for students to understand material about Electronic Fuel Injection (EFI) Gasoline Injection system. Based on product trials conducted by 30 students, 87% of results were obtained in the very good category, or students were very interested in the learning videos that the researchers made.

Corresponding Author:
Hendi Iswanto
Universitas Sultan Ageng Tirtayasa, Serang, Indonesia ; 7772210035@untirta.ac.id

1. INTRODUCTION

The development of information and communication technology has touched various aspects of life, one of which is the world of education. Science to create fun learning media for students is urgently needed at this time. Benefits derived from the development of information and communication technology (ICT). one of which is to encourage the world of education to always update and utilize

technology in various aspects of the learning process. Utilization of this information technology will facilitate the delivery of material to students. If the teacher does not make use of learning media in a class by making learning media in the form of video or audio, students will have difficulty understanding competency material in class (Samosir, Pitasari, & Tjahjono., 2018)(Anyan, Ege, & Faisal, 2020).

Technological and information developments have a major influence on the quality of education in Indonesia. The use of media in learning by utilizing ICT is expected to make it easier for students to absorb and master competency material (Kristianti, D. & Julia, 2017). The use of learning media in the world of education will spur and stimulate students' interests and talents in learning in the classroom(Fina Fitriya & Faizah, 2021).The benefits obtained from learning media made for students are that they can facilitate learning messages and overcome the occurrence of limitations in sensory power, space, time, and energy as well as providing stimulation from experience and perception (Antika & Suprianto, 2016). According to (Azhar, 2019), the use of instructional media in the process of learning activities can generate motivation, new desires, and interests, generate positive stimuli in learning and even have a psychological influence on students. A teacher is required to be able to create and develop creative and innovative learning media that can be accessed by students online anywhere and anytime both at school and in their respective homes (Nuriansyah, 2020). Various kinds of digital applications and content are available, it only remains for the teacher to be creative in making online-based learning media.

Based on the pre-research conducted by researchers using a questionnaire, it was found that the ability to understand the gasoline injection system was very low, most students did not understand the concept of the injection system and how to check it so that the injection system was classified as material that was difficult to understand. Injection system material is not easy to teach because of limited time and learning media, especially if it is not supported by facilities and infrastructure that support learning such as laptops, and LCDs. Therefore, there is a great need for learning media that are practical and easy to use to help students learn quickly and easily. Utilization of information and communication technology media, especially prezi videos that are integrated with YouTube, is one of the solutions to streamline learning so that students can repeatedly understand the material delivered by the teacher (Samosir et al., 2018).

An application that is present in the world of education and can be used to explain competency material is the Prezi video application (Rohiman & Anggoro, 2019). This application can be downloaded and can be made online or offline so that it is easy to operate. An easy-to-use application platform will make it easier for educators to create learning media content. Online-based applications will be more useful if they are easy to operate. Prezi video is an application that is easy to operate. The results of this online-based media can be downloaded and uploaded on YouTube (Anisa, 2022; Utami et al., 2018).

The Prezi application was first developed in 2007 and published in 2009 by an artist born in Hungary, namely Adam Somely Fisher, in collaboration with Peter Halacy, a professor from the Budapest University of Technology(Surani & Ampera, 2017). Prezi is a software that is capable of making slides run and interactive, for interesting presentations for students online. Unlike PowerPoint, Prezi provides space/canvas that can be used to express creative ideas for making slides and also collaborate on making slides with others (Iman et al., 2019).

The Prezi application can insert pictures, animated photos, or videos into the slides that will make presentations. Prezi users can create fun and informative learning slides and videos and improve the quality of learning (Rohiman & Anggoro, 2019). According to (Aradea, Cahyono, Sasongko, Kristiawan, & Lestari, 2022), the Prezi application can be installed on a desktop or personal computer which has the advantage that if it is installed, it can operate for free for a maximum of. Due to the free Prezi application for presentations only 15 minutes. Users of applications that have been installed on computers, especially those with Prezi videos, can make a recording of lessons that have been prepared with presentation assets in the form of images, animations, or videos that will be displayed and then recorded and downloaded to be submitted to students either uploaded to their account. social media and YouTube (Samosir et al., 2018). It is hoped that the existence of learning videos that have the characteristics of displaying images and sound can facilitate students' understanding in learning, especially vocational students for the basic

competencies of the gasoline injection system, especially class XI of the Light Automotive Engineering Expertise Program (TKRO)(Firdaus, Atikah, & Ruhiat, 2021).

The advantages of this research compared to previous researchers are that this research is applied to gasoline injection system material, which no researcher has done for this material, and the form of learning videos using a tutor so it's not just sound with an attractive video packaging then the video is made in mp4 format. This video also uses simpler language to explain how to check the injection system components in the learning video so that students can more easily understand the content and intent of the video. Seeing the rapid development of gadgets and social media, the researchers used YouTube as the output of this learning video, because YouTube has the advantage of being a learning medium, which is potential. YouTube is the most popular site on the internet that can provide edit value to education and is practical, that is, easy to use and can be followed by all groups, including educators and students, and is shareable, which can be shared on social networks such as Facebook, and Instagram, WhatsApp, and also blogs/websites.

2. METHODS

The results obtained from the research have to be supported by sufficient data. This research is a research development or Research and Development (R&D) aimed at developing a learning video on the Basic Competency of Gasoline Injection Systems in the subject of Light Automotive Engine Maintenance specifically for class XI at SMK Negeri 4 Serang City. The development research model used is the 4D development model (Kartini, Hutabarat, & Suanto, 2022). Research and development methods or Research and Development are research methods used to be able to produce certain products (for classroom learning), and test the effectiveness of these learning media products, and whether they can increase interest in and understanding of a competency material.

The name of the 4D development model was obtained from four stages of development, namely define, design, develop, and disseminate. The 4D development model was named directly by its originators, namely Sivasailam Thiagarajan, Dorothy Semmel, and Melvyn Semmel. Researchers did not carry out the dissemination or dissemination stages as a whole due to limited time and research costs, starting from the define stage, the design stage, and the development stage.

According to (Nasution & Siregar, 2019), the Four-D (4D) model has several stages, namely, defining, designing, developing, and deploying. (1) Define is an activation process that has the goal of determining what product to be developed, along with the expected specifications. This step is a needs analysis activity, which can be carried out using literature studies or research. (2) Design is the activity of making design learning products that have been determined. (3) Development is the process of making a design into a learning product and testing the feasibility of the product produced by the specifications set beforehand (4) Dissemination is an activity for conveying the results of this product for learning activities.

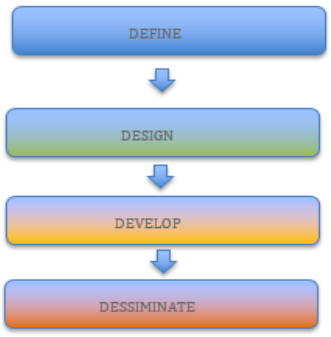

Figure 1. 4D Model development flow

3. FINDINGS AND DISCUSSION

Reporting to the official Prezi account, Prezi provides features for prezi videos, namely to make learning videos online. Free accounts are given access for 15 minutes to be able to make an online learning video. More than 15 minutes is expected to upgrade to a premium or paid account. Apart from being online, Prezi Video can be used offline by downloading and installing it on a laptop or personal computer. The offline recording is recommended for a maximum of 30 minutes, although researchers can use video recordings of more than 30 minutes. The second prize feature is the Prezi design which is in the form of slides, and infographics with various templates. For paid accounts, you can enter the prezibase website, and users can use a more varied template. The advantages of a premium or paid account on Prezi are Unlimited projects, create unlimited projects on all Prezi products (Video, Design, and Present), privacy controls, download videos, recording videos without watermarks (Watermark), Full HD quality videos, and unlimited video duration limited, offline recording and access, host notes, and support from the makers of the Prezi app.

This project utilises the Prezi video programme to create instructional films for class XI students of the TKRO Expertise Programme offline. The videos are created utilising the 4D development model on injection system material. A free account is used by researchers. Creating instructional materials that students would actually use was the primary goal of the researchers in this study. Ways to captivate and engage students in learning about petrol injection systems using engaging and accessible educational materials.

The first steps of the flow and stages of the 4D model carried out by the researcher are:

3.1 Define stage

At this stage, the researchers analyzed the problems and the needs of the learning media process needed at SMKN 4 Serang City, majoring in TKRO, the subject of Maintenance of Light Vehicle Machines. Researchers analyzed how needed a learning product to overcome problems in the learning process at SMKN 4 Serang City, especially the material on the Gasoline Injection System. This can be done with the method of observation, interviews, and the value of basic competency lessons on gasoline injection systems. After the analysis was carried out, it turned out that the supporting media for the injection system material were very limited. Students find it difficult to understand the function of electronic components and check for damage to the gasoline injection system.

3.2 Design Stage

At this stage, the researcher compiled and collected the materials to be displayed in the learning video, based on the KD of the gasoline injection system in the PMKR subject. The material shown in the learning videos is based on KD in the PMKR subject, and also on the results of the PMKR subject teacher's assessment of the value of students' knowledge and skills. After finishing systematically arranged in terms of material then proceed with making a sequence of slides on the display in the prezi video. Design the order of the material to be presented in the prezi video. Location and subject of research at SMKN 4 Serang City class XI TKRO Expertise Program with 30 students participating.

3.3 Development Stage

The development step of this research begins with compiling the designs that have been made. Records of competency materials are made in the workshop. Making a short video about the gasoline injection system, pictures, and animation, which the researcher then inserts material assets into the prezi video.

The learning video development step by utilizing the prezi video application on the KD injection system is as follows:

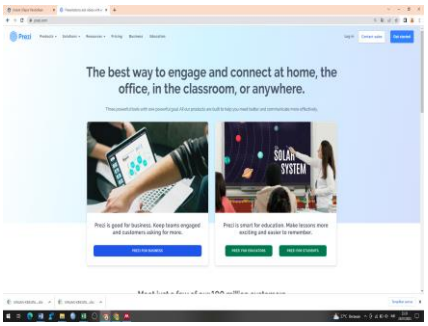

Figure 2. Initial prezi display before registering/logging in

There are 3 options to register, namely for businesses, educators, and students. Prezi users can take advantage of the available features. Prezi users can take advantage of a free account with limited video recordings and presentations.

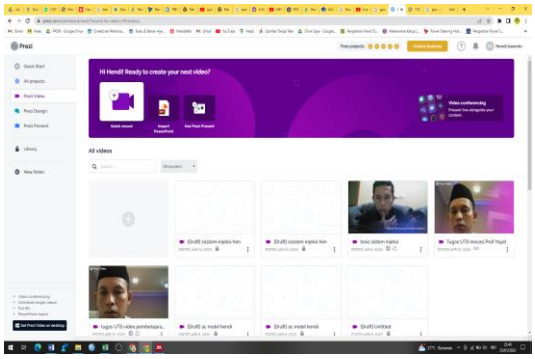

Figure 3. Prezi video display that has been registered

The Prezi option consists of 3 options, namely, Prezi Design with output in the form of slides or PDF (links can be shared), Prezi Present with output in the form of online presentations, and Prezi Video with output in the form of downloadable video recordings. Researchers develop learning videos with prezi videos that are downloaded and then uploaded on YouTube. The Prezi video application requires 500 MB of application storage space.

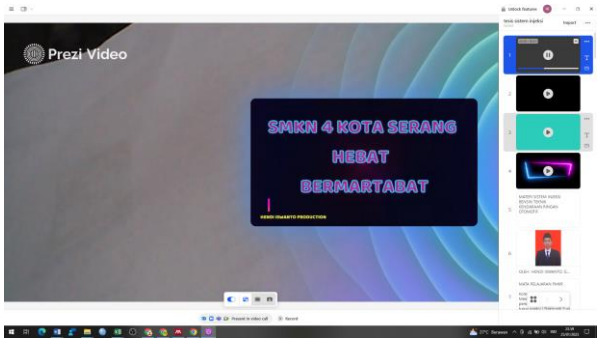

Figure 4. Collection of media assets to be displayed

At this stage, after selecting the template to be used, upload videos, animations, or images that will be displayed during the recording process. To make your presentation more interesting, you can modify images or videos with other applications, such as Canva, Animaker, Powtoon, and others.

Figure 5. Submission of the title of the learning video

The basic competency of the gasoline injection system is the Automotive Light Vehicle Machine Maintenance Subject, the Automotive Light Vehicle Engineering Skills Program. Researchers collect learning media assets that will be conveyed when recording presentations on injection system material.

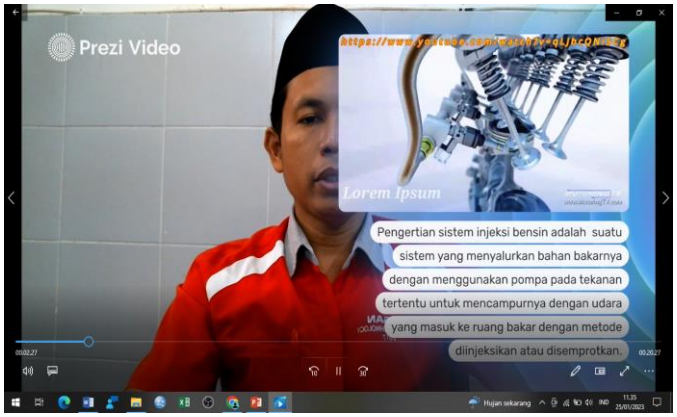

Figure 6. The researcher explains the injection system video, its advantages, and disadvantages, as well as the types of injections that exist

The development of learning videos using the Prezi video application will make it easier for students to repeat again if their understanding is unclear. the researcher conveys the main system in the gasoline injection system, explains the types of sensors and actuators, and explains how to check injection system components with a video that has gone through an editing process with other applications. The video-saving process that has been completed is then uploaded on YouTube.

After the learning video is finished, the next step is to validate it with material and media experts who are competent in their fields. In addition to validation by material experts and media experts, product trials were also carried out for class XI students. Student response questionnaires were filled out by 30 students majoring in automotive light vehicle engineering. The results of the media made by researchers are expected to be more interesting and make it easier for students to master competency material and can be accessed anytime and anywhere, available on YouTube at the address https://youtu.be/oSRSELFNzbY.

3.4 Dissemination Stage

At this stage, the results of the learning video about the gasoline injection system for TKRO skill competency students in the PMKR subject can be downloaded and viewed on the YouTube website. The implications for the world of education from the results of the development of learning videos are certainly influential in efforts to improve comprehension skills, learner motivation, and interest in the world of education, especially automotive technology (Fadiana et al., 2021). This learning video material can be accessed by all YouTube users.

The data obtained from survey techniques, as well as trials, are limited to the product results of learning video media development. The instrument was made in the form of a questionnaire, which was filled out by media and material experts. Alternative answers from media experts and material experts use a Likert scale with five alternative answers.

Table 1. Rankings of the Likert Scale

No	Score	Statement
1	5	Strongly Agree
2	4	Agree
3	3	Medium
4	2	Disagree
5	1	Strongly Disagree

(Sugiyono, 2013)

Table 2. Category Value Percentage

No	Interval	Criteria	Statement
1	81 %- 100%	Very Good	Very Valid/Very Feasible
2	61 % -80%	Good	Valid
3	41%-60%	Sufficient	Less valid
4	21%-40%	Less	Invalid/needs revision
5	< 20%	Very less	Totally invalid

Table 3. Table of criteria for processing Student Response Questionnaire Data instruments

No	Interval	Criteria	Statement
1	81-100%	Very Good	Very effective/very interested video
2	61-80%	Good	effective/interested video
3	41-60%	Sufficient	Effective enough/interested enough
4	21-40%	Less	Ineffective/disinterested video
5	< 20%	Very less	Not very effective/very not interested in learning videos

SDR, M.Pd then validated the instruments made by the researchers as a material expert validator with the following results:

Table 4. Table of material expert validation instruments

No	Assessment Aspects	Aspects assessed	X		Y	
1	Aspects of material relevance	The clarity of the formulation of learning objectives		5		5
		Material suitability with indicators	5		5	
		The suitability of the material with the learning objectives		5		5
		The truth of the material concept is reviewed from a scientific aspect		4		5
2	Organizational aspect material	Clarity of delivery of material	5		5	
		Systematic delivery of material		5		5
		Completeness of material	4		5	

		Clarity from figure		4		5
3	Evaluation aspect or exercises	Appropriateness of evaluation in learning videos	4		5	
		Difficulty level of questions		4		5
4	Aspects of language	Accuracy in the use of terms		4		5
		Ease of understanding the flow of material	4		5	
5	Aspects of the quotient effect learning strategy	The use of media according to ability student learning	4		5	
		Media support for independence students	4		5	
		The ability of the media to add interest student learning	4		5	
	TOTAL			**65**		**75**

X= Data value obtained Y= Maximum data value

Based on table 4 above, a total of 65 or 87% is obtained, which means that based on material experts developing learning videos using the Prezi video application, the criteria are very feasible for use in learning gasoline injection system competency material at SMKN 4 Serang city. The following are the instruments for media expert validation carried out by YO, Ph.D. as a media expert validator:

Table 5. Table of media expert validation instruments

No	Assessment Aspects	Aspects assessed	X		Y	
1	Aspects of Media Design	Media design can be attractive and appropriate with the basic competency of gasoline injection	4		5	
		Image design can be attractive so it is clear to see		4		5
		Suitability of the cover media with the concept studied		4		5
2	Aspects of display	The menu display order is clearly described content of the activities studied		5		5
		The use of media is very easy so not confusing while doing the learning process	4			
		The image quality is not broken so it clearly visible and attractive		4		5
		Image conformity to basic competencies petrol injection system		5		5
		Display for legible typeface	5		5	
		The suitability of selecting the type of text is clearly visible		4		5
		The suitability of the text layout is easy to read and understandable		5		5
3	Aspects of language	Writing according to the rules of the Indonesian language	5		5	
		The sentences used are interesting and can be easy to understand	5		5	
		The use of language used is not lead to multiple interpretations		5		5
		The language used is easy so you can attract students' interest		4		5
		The use of the term according to the dictionary English		5		5
	TOTAL			**68**		**75**

X= Data value obtained Y= Maximum data value

Based on table 5 above, a total of 68 or 90% is obtained, which means that according to media experts, learning video development using the Prezi video application is a very feasible criterion for use in learning gasoline injection system competence at SMKN 4 Serang city. After being validated by material experts and media experts, trials were then carried out on class XI students in the Department of Light Vehicle Engineering at SMKN 4 Serang city, namely 30 students. The instrument used was an open questionnaire using a Likert scale. Student response questionnaires were given to 30 students. The questionnaire instrument is as follows:

Table 6. Student response instrument questionnaire table

No	Assessment Aspects	Aspects assessed	Z x 30 (Data Value Obtained)	5 x 30 (Max Data)
1	Material aspects	The material presented in the video learning easy to understand	120	150
		The material contained in the video, suitable for learners	130	150
		Image display in video Learning	125	150
2	Aspects of learning	Video learning enhances learning enthusiasm for learning	141	150
		This learning video can help the learning process	140	150
		Learning videos can be used whenever and wherever	141	150
		This learning video is easy in use	136	150
3	Media Aspects	Image and display in the video learning is interesting and according to material	120	150
		Font size, type and color easy to read learning videos	125	150
		Layout has pulled	132	150
	TOTAL		**1310**	**1500**

Z = Total acquisition of each instrument

Based on table 6 above, a total of 1310 or 87% is obtained, which means that based on the responses from trials conducted by 30 students using the Prezi video application, the criteria are very good or very interested in learning videos to be used in learning gasoline injection system competencies at SMKN 4 Serang city.

Discussion

Based on previous research, several studies have been carried out which developed prezi based learning media, some of which were research (Fitriyah, Wiyokusumo, & Leksono, 2021), entitled "Development of Prezi Learning Media with the ADDIE Model in Simulation and Communication Subjects" that validated was carried out by material experts an average percentage of 86.6% was obtained and the validation of learning media experts was 81.4% in the "appropriate" category for use as a learning medium. The relevance of this research to the research conducted by the researchers is that they both developed the Prezi application-based learning media. The difference is in the subjects, models, and aspects of the subjects studied.

"Prezi as an Innovative Teaching Tool for the Strengthening of Significant Learning" (Sanchez, Marcos Fernando, 2020) found that using Prezi as a learning medium improved both presentation quality and the depth of students' understanding. Both academics are working on learning media based on Prezi, but they are studying distinct themes. This makes their work relevant. The results of research conducted by (Rohiman & Anggoro, 2019), on mathematics learning media using Prezi software show that the quality of mathematics learning media using Prezi software is very good based on the

validation results of media experts with a score of 93% and based on material experts is good with a score of 77.5%, and the response of students to learning media was very good with a score of 83.9% using a Likert scale. The relevance of this research to the research conducted by the researchers is that they both developed the Prezi application-based learning media. The difference is in the subjects, models, and aspects of the subjects studied.

The products generated by researchers differentiate their media products from those of prior researchers. Prior studies on media products did not include video editing software like Canva. These days, researchers start with Canva and work their way up to Prezi Video. The researcher developed an animated video for the injection system inspection using the Canva software, and then recorded it using the Prezi video editor, to make it more engaging and user-friendly. In addition, while at the workshop, the researcher filmed a video demonstration of the steps needed to inspect the various components of the injection system's sensors. The steps for inspecting actuators and sensors are laid out in a way that students may easily follow during their workshop practical.

Results achieved by recapitulating the validation by specialists in media and materials are as follows: With 87% of the materials validated, it's clear that the Prezi video application is a viable option for educational video media. The results show that learning video media is quite feasible to utilise, with an average value of 90% for media expert validation. An impressive 87% of pupils who participated in the media trials had either very good criteria or were extremely engaged with the instructional videos. On top of that, students will be required to take an efficacy test, but the researchers' time constraints and the need to adapt to class material have rendered this test impossible to administer. It would be great if other researchers could pick up where this one left off.

4. CONCLUSION

The purpose of developing prezi video-based learning films is to enhance students' comprehension of the petrol injection system curriculum at SMKN 4 Kota Serang city. The utilisation of the offline Prezi video application facilitates the creation of engaging and enjoyable learning experiences by harnessing information and communication technologies in the field of education. Students receive a concise elucidation of the constituents of the injection system, the functioning of each constituent, and the method for inspecting each constituent. Researchers concentrated on enhancing media to increase its appeal to pupils. This material is more captivating than its predecessors due to the inclusion of a sample video showcasing the inspection of injection system components in the workshop, enhanced with animation using the Canva programme for video editing. Furthermore, no researchers have utilised the Prezi video tool to create video media for instructing fundamental skills related to petrol injection systems.

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