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Development of Articulate Storyline Interactive Learning Media to Improve Light Vehicle Engine Knowledge

Sunarto Sunarto[1]✉, Samsudin Anis[2], Dwi Widjanarko[2]

[1]SMK Negeri 1 Petarukan, Jawa Tengah, Indonesia
[2]Universitas Negeri Semarang, Indonesia

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Abstract

The learning problem of SMK N 1 Petarukan students of light vehicle engineering is the low achievement in understanding light vehicle engine materials. This research aims to develop, analyse the feasibility, practicality and effectiveness of Articulate Storyline learning media in improving students' engineering knowledge. This research uses the ADDIE development model (Analysis, Design,Development, Implementation, and Evaluation). The assessment of the feasibility of the media was carried out by three experts in the material and media, the practicality of the media in the value of 12 educators in this study72 students of class XI TKR SMKN 1 Petarukan. The results of the study show that the media that learning Articulate Storyline was declared feasible and practical. Statistical analysis showed a significant improvement after treatment. From the results of the N-gain test, the experimental class achieved an increase of 56.64% (medium category) compared to the control class of only 20.08% (low category). This shows an increase in student knowledge using the developed learning media. The Articulate Storyline interactive learning media has proven feasible and effective in improving the engineering knowledge of SMK students in light vehicle engineering.

✉ Correspondence:
Jln Raya Petarukan - Pegundan KM.3 Pemalang,
Jawa Tengah 52362, Indonesia
E-mail: sunarto91@students.unnes.ac.id

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INTRODUCTION

Improving the quality of education is very crucial in advancing a country. Countries with an effective education system can increase productivity, encourage innovation, improve people's welfare, and contribute to social and economic development. At this time, vocational education is one of the government's focuses which is felt to be able to answer the challenges of the times, one of which is through vocational schools (SMK) which are felt tobe able to print the competencies oftheir students in accordance with the needs of the world of work (Schweisfurth, 2022; Wignall, 2023).Inthe 21st century, it is importantfor vocational schoolteachers to utilize the learning process, especially IT-based, to apply technology to keep up with the times. Studentsneed tobe familiarwith skills thatare relevantto the demandsof today's times, so that in the learning process in the current era, they must utilize technology or digital devices.

In the independent curriculum, the light vehicle engineering vocational school phase F has three main elements, namely *electrical, chassis* and *engine*. Based on the results of pre-research observations conducted in the light vehicle engineering of SMK N 1 Petarukan, it shows that the average engine value in class XI is the lowest compared to the average electrical and *chassis* values. In the last two years, it has been shown that the learning achievement of light vehicle engineering students in light vehicle engine material in grade XI has not been good, in the 2022/2023 school year with a minimum completion score of 75, only 60% of students have achieved the minimum completeness score and in the 2023/2024 school year only 55% of the 4 existing classes. From the results of the interviews, it was found that the main obstacle was that 80% of students stated that they were not interested in the learning media used, so there was a need for the development and innovation of the light vehicle engine system learning media at SMK N 1 Petarukan.

Digital-based interactive learning with *Articulate Storyline*is the innovation of choice to overcome existing learning obstacles, because it is a software based on presentation points equipped with motion animations, *backsound* and images, interactive videos, games and can be filled with quis and evaluation interactively so that students can actively explore knowledge in learning (Hafiedz & Nurhamidah 2023). With its advantages and characteristics, *the Articulate Storyline* learning media is suitable to be developed as a learning medium for light vehicle *engineering engine* system materials .Supported by research by Ananda et al. (2023) which revealed that *Articulate Storyline* learning media is practical to use, effective and able to improve student learning activities and outcomes Research Gusrizal et al. (2024) also shows that *Articulate Storyline* learning media practical and suitable for use in learning materials that require an understanding of complex concepts. Fatikhah and Anggaryani (2022) also conveyed that *the Articulate Storyline* learning media is able to help teachers convey learning materials in the independent curriculum in a more interactive and interesting way.

The objectives of this research include (1) producing interactive learning media Articulate Storyline for light vehicle engine materials; (2) Analyzethe feasibility of interactive learning media Articulate Storyline light vehicle engine material ; (3) Analyzethe practicality of interactive learning media Articulate Storyline light vehicle engine material ; (4) Analyze the effectiveness of interactive learning media Articulate Storyline light vehicle engine material.

This research is expected to provide benefits both theoretically and practically. Theoretically, this research plays a rolein developing science in the field of educational technology, more specifically in utilizing the interactive learning media *Articulate Storyline* to increase students' knowledge on the competence of light vehicle engineering expertise, as well as being a reference for future research about the use of interactive learning mediain vocational schools. Practically, this research is useful for teachers to deliver learning materials in an interesting and interactive way, as well as improveteachers' skills in utilizing digital learning media. For students, this research is expected to

be able to increase learning motivation through interactive and fun learning so as to improve learning outcomes. For schools, this research supports the implementation of schools in utilizing IT technology in learning and increasing the relevance of the curriculum to the needs of the times.

Thisresearch contributes to strengthening various learning theories that are relevant to the context of education. First, this research supports the theory of constructivism through the application of *Articulate Storyline*-based learning which emphasizes the activeness, independence, and ability of students to find knowledge independently with teachers acting as facilitators. Second, this research expands the relevance of connectivity theory in the digital era by presenting learning media that utilizes information technology to build a dynamic knowledge network, facilitate collaboration and exchange of ideas through digital platforms. Third, this research contributes to Thorndike's *Law of Exercise* theory by emphasising the importance of repetitive exercises in strengthening students' understanding, while emphasising the need for a variety of learning strategies so that the process of repeating the material remains interesting and effective. Thus, this research not only enriches the theoretical foundation of learning but also shows the integration between classical and modern theories in supporting the effectiveness of technology-based learning.

METHODOLOGY

This study uses a research and development approach *(Research and Development)* with the ADDIE *(Analysis, Design, Development, Implementation and Evaluation*) model to develop and analyse *articulate storyline* learning media for light vehicle engine materials. The research design used the *Pre-test and Post-test* methods with two groups, namely the experimental group that used *articulate storyline* media and the control group that did not.

Group	**Pre-test (O_1)**	**Treatment (X)**	**Post-test (O_2)**
Eksperimen	O_1	X	O_2
Control	O_1	-	O_2

Information:

X: Treatment (The experimental group used the media-articulate storyline in learning).

O_1: Pre-test (Measurement of knowledge ability before treatment).

O_2: Post-test (Measurement of knowledge ability after treatment is carried out).

The subjects of this research are students in grade XI of the competence of Light Vehicle Skills (TKR) at SMK Negeri 1 Petarukan, Pemalang regency, with a total of 72 students, of which 36 students from XI TKR 4 were used as experimental classes and 36 students from class XI TKR 3 played a role as a class.

Feasibility data collection is carried out through the evaluation of media and material experts using media and material eligibility instruments to assess the feasibility of the developed product. Media practicality data was obtained through practicality instruments assessed by practitioners of light vehicle engineering subjects. Meanwhile, the effectiveness of the developed media was studied through *pre-test and post-test* questions, which were tested for validity using *Aiken's V* and reliability test using the *Interrater Correlation Coefficient (ICC)* with t-test analysis and N-Gain test.

RESULTS OF RESEARCH AND DISCUSSION

Results

Based on the results of data analysis, this study is a study on the development and evaluation of interactive learning media, an *articulated storyline,* light vehicle *engine* material, to improve engine knowledge of light vehicle engineering vocational school students. Based on the validation assessment instrument of three media experts with a CVI *(content validity index)* calculation of 0.92 and a reliability test using a *percentage of agreement* (PA) of 92%, it is classified as "very feasible". Meanwhile, the validation of

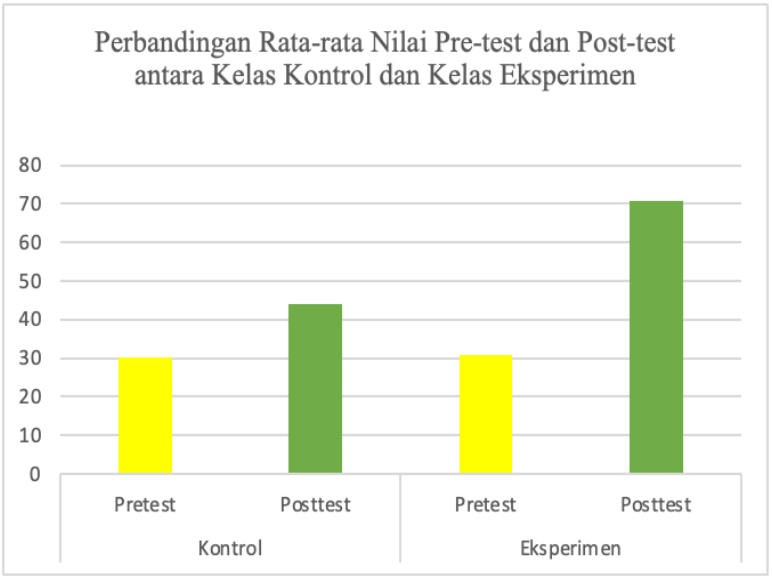
three subject matter experts obtained a CVR *(validity content ratio)* score of 0.94 with a reliability of PA of 94% classified as "very feasible". From the results of tests conducted by media experts and material experts, it shows that experts state that interactive learning media articulate storyline, light vehicle engine material is very feasible to use both in terms of design and media content.

Next, the media practicality test was carried out by 12 practitioners of light vehicle engineering teachers as validators, who were then calculated with a score of reproducibility coefficient (Kr) and scalability coefficient (Ks). The results of the calculation showed that the interactive learning media *articulate storyline* light vehicle *engine* material obtained a Kr score of 0.95 and a Ks score of 0.86, so it was concluded that the media was declared "practical".

The feasibility of the knowledge test questions was validated by eight experts and tested for validity by *Aiken's V* method, with an average score of 0.97indicating that the test question instrument used in this study had very high validity. Furthermore, the test questions were tested using the *Intraclass Correlation Coefficient* (ICC) method through the *IBM SPSS Statistics* 24 program with an *Intraclass Correlation* value of 0.728. This value indicates that the evaluation instrument developed is relatively reliable.

Pre-test and *post-test* tests in this study were carried out on 72 students of class XI of light vehicle engineering SMK Negeri 1 Petarukan, consisting of 36 students of the experimental class and 36 students of the control class. The results of *the pretest* were tested using a two-sample t-test with the aim of comparing two groups of samples that were independent of each other and used as a determinant of whether the difference between the two was significant. The results of the t-test of the two pretest parties showed a calculated t-value of 0.105 and a significance level (*Sig . 2 tailed*) of 0.916 > 0.05, with the conclusion that the two groups did not have a significant difference in initial ability.

Posttest results were analysed using descriptive analysis, normality test, homogeneity, right-party t-test, and N-Gain test. The results of the descriptive analysis showed that the experimental class obtained an average posttest score of 70.92 while the control class obtained an average posttest score of 44.25. In the normality test, the Kolmogorov-Smirnov value was used for the control class of 0.156 with a significance of 0.026 > 0.05 and the experimental class of 0.130 with a significance of 0.128 > 0.05, with the conclusion of normally distributed research data. The homogeneity test with Levene Statistic yielded a significance value of 0.219 > 0.05, which confirmed that the data were homogeneous. *(Independent sample t-test)* significance (Sig . 2-tailed) was 0.000 < 0.05. These results showed a significant difference in *posttest* performance between the experimental and control groups



The results presented in the diagram above show the difference in the increase in results between the control and experimental classes. The control class obtained an average pretest score of 30to 25 while the experimental class obtained an average pretest score of 30to 80, which indicates no significant difference between the two classes at the beginning. After the *post-test*, the control class got an average score of 44.25, while the experimental class got an average score of 70.92. The increase in control class knowledge by 20.08% shows progress in mastering light vehicle engine materials through conventional learning methods. On the other hand, the experimental class obtained an increase of 56.64% which showed a significant increase in the understanding of material after using the interactive learning media *articulate storyline* material of light vehicle *engines*.

Based on the results of the calculation of the *N-Gain* Test, the average *N-Gain Score* in the experimental class was 0.57 (medium category) or 56.64% which was categorised as "quite effective". Meanwhile, the average *N-Gain Score* in the control class was 0.20 (low category) or 20.08% with the "ineffective" category. This proves that the use of interactive learning media *articulating storyline* light vehicle engine material is effective in improving the engine knowledge of SMK students in light vehicle engineering.

Discussion

This research is a type of development research *(Research and Development)* using the ADDIE model, which produces a product, namely developing an interactive learning media with an *articulate storyline* on the light vehicle engine system material, which shows significant results in improving engine knowledge of light vehicle engineering vocational school students. The interactive learning media *articulate a storyline* that was developed and received feasibility validation from media experts and subject matter experts with valid and reliable results, so that it is feasible to use. This finding is in line with the research of Hadza et al. (2020), who stated that Articulate Storyline media is suitable for use in classroom learning activities. Research by Safira et al. (2021) also proves that the *Articulate Storyline* media developed using the ADDIE model is very suitable for use to convey abstract learning. Rubani et al. (2024) said that *Articulate Storyline*-based learning can improve students' understanding.

The *Articulate Storyline* interactive learning media was developed based on practicality testing using a reproducibility coefficient score, or Kr, and a scalability coefficient, or Kss. It is also categorised as practical, with a Kr score of 0.95 and a Ks score of 0.86. According to Handika et al. (2023), interactive media that articulate a storyline allow a combination of various elements such as video, audio, animation, text, and interactivity *(drag-and-drop, multiple choice, layer feedback),* making it easier for students to learn and attracting students' interest. According to the Theory of Engagement in *Higher Education* (Febrianti et al., 2024), student involvement in meaningful educational activities is strongly correlated with academic achievement and student retention. When students can be active, they will increase their academic achievement. The practicality of *Articulate Storyline* media also supports the research of Ananda et al. (2023), who revealed that *Articulate Storyline* media is practically used in learning in the independent curriculum. Maarif et al. (2024) also found that the *Articulate Storyline* learning media is very practical to use in learning at vocational schools.

Furthermore, the results of the comparison of the effect of the use of learning media developed in the experimental group with the control group in improving the knowledge of the engine of light vehicle engineering students were carried out using the right-hand t-test. The results of the calculation showed that there was a difference in the learning outcomes of the light vehicle *engine* system between the control class and the experimental class after the treatment. The learning media used in the experimental class are able to stimulate student activity so that learning becomes more lively and enthusiastic. As revealed by Khadijah (2016), everything that is conveyed in learning has a great influence on the level of learning absorption. In accordance with what was stated by Sumoked et al. (2021), who stated that there is an influence between the accuracy of the learning media used on the learning outcomes, Mutia et al.

(2022) also revealed that the quality of the learning media used determines the absorption of learning materials.

The level of media effectiveness is known from the use of interactive learning media, articulating a storyline on light vehicle engine system materials by comparing pretest and post-test results using the N-Gain Score calculation. The results of the N-Gain Score calculation using SPSS showed that the average N-Gain Score for the control group was 0.20 (low category), in the form of a percentage, 20.08% (ineffective). Meanwhile, the average N-Gain Score for the experimental group was 0.57 (medium category), in the form of a percentage, which was 56.64% (quite effective). Based on the calculation of the N-Gain Score, the learning in the experimental class using interactive learning media, which articulates a storyline on the engine system material of the ring vehicle, has a higher effectiveness category, so it can be concluded to be more effective in improving the understanding of the engine of SMK students in light vehicle engineering. Thus, it shows that interactive learning media articulating a storyline is an important part of the study of light vehicle engine systems.

This is in accordance with the opinion of Surya & Sutopo (2024), who stated that interactive learning media is easy for students to digest and has high effectiveness in absorbing learning. Interactive learning media *articulate* a learning medium that allows students to be more active, independent and learn with fun. Susilo et al. (2023) also said that student learning outcomes after teachers use online-based interactive learning media have a positive influence on the use of interactive media and student learning achievement. In line with research from Rubani et al. (2024), Rubani et al. (2024) said that *Articulate Storyline-based* learning can improve students' understanding by allowing them to visualise the things they learn. Hanim et al. (2021) also said that using *Articulate Storyline* interactive learning media is effective in increasing the learning completeness of light vehicle engineering vocational school students. So that the *Articulate Storyline* learning media that was developed on light vehicle *engine* system materials is very suitable for use in light vehicle engineering vocational school learning.

A significant increase in knowledge of light vehicle engines in the experimental class proved that the use of *Articulate Storyline* interactive learning media for light vehicle *engine* materials was more effective than learning using old model learning media, such as books and presentations. *The Articulate Storyline* learning media for light vehicle *engine* materials also provides an interesting and challenging student learning experience to make it easier for students to absorb, understand and explore the information and materials available.

The *Articulate Storyline* interactive learning media for light vehicle engine material has the characteristic of being easy to use by anyone, because it can be accessed with just a link and can be run using a mobile phone, Android, laptop, tablet or other digital device as long as you are connected to the internet. For schools or users who do not have internet access, *Articulate Storyline* interactive learning media can be accessed offline using HTML files. This *Articulate Storyline* interactive learning media will be maximised if all students have their own digital devices, such as mobile phones and a smooth internet connection.

CONCLUSIONS

Based on the results of the research and development of the *Articulate Storyline* interactive learning media for light vehicle engine system material at SMK Negeri 1 Petarukan, it can be concluded as follows: (1) The *Articulate Storyline* interactive learning media with light vehicle engine system material was successfully developed with the ADDIE model and has been tested. (2) *Articulate Storyline* interactive learning media is very suitable for use in the learning process. (3) *Articulate Storyline* interactive learning media developed practically for use in the learning process. (4) The *Articulate Storyline* interactive learning media was effective and
significantly improved the engine knowledge of light vehicle engineering students, based

on the *N-Gain* score of the experimental class of 0.57 or 56.64% greater than that of the control class that used conventional learning methods by teachers.

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