Muchamad Sudjada Cholilulloh[1]
Atiqoh[2]
Hartono[3]

DEVELOPMENT OF E-LEARNING LEARNING MEDIA FOR MACHINE MAINTENANCE SUBJECTS USING GOOGLE SITES FOR STUDENTS OF WIJAYA PUTRA VOCATIONAL SCHOOL, SURABAYA

Abstrak

Tujuan penelitian ini adalah mengembangkan media pembelajaran dengan menggunakan situs e-learning Google. Jika pada proses belajar mengajar sebelumnya hanya menggunakan media konvensional seperti handbook atau manual book, maka penelitian ini digunakan untuk mengembangkan media pembelajaran di SMK khususnya jurusan teknik kendaraan ringan otomotif. Berdasarkan hasil observasi peneliti diketahui bahwa sebagian besar siswa pada saat mengikuti pembelajaran pemeliharaan mesin kurang tertarik atau bosan dengan pembelajaran konvensional. Di sisi lain, kontribusi minat siswa dalam proses pembelajaran berpengaruh terhadap hasil belajar, sehingga peneliti perlu berinovasi mengembangkan media pembelajaran pemeliharaan mesin berbasis e-learning Google Sites. Jenis penelitian yang digunakan adalah model penelitian pengembangan ADDIE (Analysis-Design-Development-Implementations-Evaluation). Sasaran penelitian ini adalah siswa kelas XII SMKS Wijaya Putra Surabaya jurusan Teknik Kendaraan Ringan Otomotif. Tingkat kesesuaian situs Google dilihat berdasarkan validitas penilaian ahli materi, ahli media, dan ahli desain. Berdasarkan hasil penilaian yang dilakukan oleh validator, uji validasi yang dinilai oleh ahli materi terhadap 3 aspek tersebut mempunyai rata-rata persentase aspek sangat baik sehingga media dapat digunakan. Kemudian hasil uji validasi dinilai oleh ahli media dari 3 aspek tersebut, rata-rata persentase aspek cukup baik sehingga media dapat dikategorikan sangat baik atau layak digunakan. Kesimpulan dari penelitian ini adalah media ini dapat digunakan dan diimplementasikan di SMK Wijaya Putra Surabaya. Media pembelajaran ini digunakan untuk mata pelajaran pemeliharaan mesin kendaraan ringan kelas XII, teknik kendaraan ringan otomotif..

Kata Kunci: ADDIE, Situs Google E-Learning, Pengembangan Media Pembelajaran,Perawatan Mesin

Abstract

The aim of this research is to develop learning media using e-learning Google sites. If the previous teaching and learning process only used conventional media such as handbooks or manual books, this research is used to develop learning media in vocational schools, especially automotive light vehicle engineering majors. Based on the results of the researcher's observations, it was found that the majority of students when taking part in machine maintenance learning were less interested or bored with conventional learning. On the other hand, the contribution of students' interest in the learning process influences learning outcomes, so researchers need to innovate to develop machine maintenance learning media based on Google Sites e-learning. This type of research is ADDIE (Analysis-Design-Development-Implementations-Evaluation) model development research. The target of this research was class XII students at SMKS Wijaya Putra Surabaya majoring in Automotive Light Vehicle Engineering. The level of suitability of Google sites is seen based on the validity of assessments by material experts, media experts and design experts. Based on the results of the assessment carried out by the validator, the validation test assessed by the material expert for these 3

[1,2,3])Universitas PGRI Adi Buana Surabaya

email: cholilulloh27@gmail.com, atiqoh@unipasby.ac.id, hartono@unipasby.ac.id

aspects has an average percentage of very good aspects so that the media can be used. Then, the validation test results were assessed by media experts from these 3 aspects, the average percentage of aspects was good enough so that the media could be categorized as very good or usable. The conclusion of this research is that this media can be used and can be implemented at Wijaya Putra Vocational School, Surabaya. This learning media is used for the class XII light vehicle engine maintenance subject, automotive light vehicle engineering.

Keywords: ADDIE, E-Learning Google Sites, Learning Media Development, Machine
          Maintenance

INTRODUCTION

With advances in technology, teachers are required to be able to utilize various media. This is reinforced by Law Number 14/2015 concerning teachers and lecturers which states that every teacher and lecturer must be able to utilize information and communication technology for the benefit of carrying out educational development activities (Dessiane & Hardjono, 2020; Karyati & Rahmawati, 2021; Priando Purba et al., 2021).

The use of learning media can stimulate students' thinking processes from concrete thinking to abstract thinking. The use of media in the learning process can attract students' attention and help them learn so that they will better understand what they are learning, and learning will become more meaningful (Fitria et al., 2021; Handayani, 2021; Kuswanto, 2019). Learning about light vehicle engine maintenance in class still uses lecture, question and answer and assignment methods where the learning process tends to convey theory, provide examples and provide practice questions. Using this learning method, the teacher plays a dominant role and students are not fully involved in learning. Students are rarely given the opportunity to discover for themselves the mathematical concepts they will study. This results in low motivation in learning, students are passive, bored, and find it difficult to understand lessons.

The teaching materials used by teachers and students in the classroom learning process are in the form of Student Worksheets (LKS) and other supporting books provided by the school. In general, the LKS used are not interactive because communication is only one way and the structure of the LKS only contains a summary of the material, a collection of formulas, example questions, and practice questions (Hersandi & Shafihan Rosyid, 2023; Martoni, 2023; Nurhaliza, 2019). This pattern gives students a narrow view of mathematics subject matter because the material, example questions and practice questions presented are said to have minimal explanation. This causes students to lack understanding of concepts and difficulty in solving problems with the material being taught. Apart from that, the LKS used by teachers and students does not emphasize understanding concepts, is not visual in nature, the appearance and color of the images presented in the LKS are not attractive, resulting in students finding it difficult to understand material that has graphic elements (Auwallah et al., 2023; Idzi' Layyinnati, 2023; Norhayani et al., 2023). Therefore, teachers and students need interactive teaching materials that are complete both in terms of material, example questions and practice questions, especially for abstract and visual ones, making it easier for students to understand the material presented.

Initial observations were made by prospective researchers at SMKS Wijaya Putra Surabaya. Observation results show that students' interest in learning is still low. This is shown by the fact that there are still many students who do not fully pay attention to the teacher's explanations during learning activities. Students are still busy with their own activities which are more fun than studying. Students' low interest in learning must receive special attention and immediate solutions so that students again have a high interest in learning. There is a great need for solutions that can increase students' interest in learning. High interest in learning will support the success of the learning process and in direct proportion can also improve student learning outcomes.

One factor that can increase students' interest in learning is teacher creativity and innovation in compiling teaching modules for students. The solution to overcome these problems as above is that teachers can develop learning resources in the form of teaching modules in the form of e-learning, namely by using Google Sites, which are free and easy to use. This Google Sites e-

Learning has more advantages, namely that it is easy to use because it can be operated by beginners who do not know programming languages and websites.

In accordance with Government Regulation Number 19 of 2005 article 19 paragraph 1 states that: The learning process in educational units is carried out in an interactive, inspiring, fun, challenging manner, motivates students to participate actively, and provides sufficient space for initiative, creativity and independence in accordance with talents, interests, and physical and psychological development of students.

Through Government Regulation Number 19 of 2005 article 19 paragraph 1, in learning it is hoped that educators can use methods and media that are able to actively involve students and create a fun, interesting and interactive atmosphere that is adapted to the stage of thinking development, characteristics and learning conditions of students (Pamulang & Selatan, 2021; Ridayanti et al., 2021; Wainira et al., 2021). This condition is also very necessary when learning about light vehicle engine maintenance at Vocational Schools majoring in Automotive

METHOD

The research carried out adapted the ADDIE research and development model (Analysis-Design-Development-Implementations-Evaluation which was adapted from Brach (2009). The selection of this model was based on the consideration that this model was developed systematically and was based on the theoretical foundation of learning design. This model arranged programmatically with systematic sequences of activities in an effort to solve learning problems related to learning resources that suit the needs and characteristics of students. This model has five steps or stages that are easy to understand and implement to develop development products such as textbooks, learning modules, learning videos, multimedia and so on.

The development model using ADDIE provides the opportunity to evaluate development activities at each stage. This has a positive impact on the quality of development products. The positive impact of evaluation at each stage is to minimize the level of errors or product deficiencies at the final stage of this model. The research and development model is depicted in the following chart.
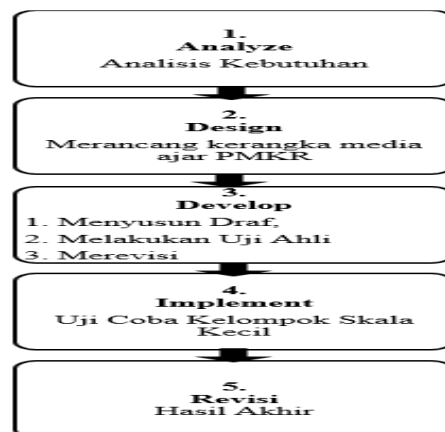

Figure 1. ADDIE Development Model

Data analysis in research and development is carried out using steps, including: identifying data, classifying data, processing data, interpreting data, describing data. The data analysis is presented as follows. (a) Identifying Data, Activities to identify data that has been obtained from experts and students through questionnaires that have been given and observation sheets. Data obtained through questionnaires in the form of responses about teaching modules from experts and student responses regarding interest in learning after using Google Sites-based e-learning light vehicle engine maintenance learning media, (b) Classifying Data, Then after being identified, the data will then be classified by grouping numerical data (score) and verbal data (comments). Numerical data in the form of a score shows an assessment of the condition of

the product, for example in terms of content, language and presentation. (c) Answers to questionnaires and comments as well as constructive criticism from experts are used to improve parts of the product. Data in the form of student questionnaire answers are classified based on user names, (d) Processing Data, There are two forms of data, in the form of numbers (scores) and verbal (comments) processed based on the score obtained. Score data indicating that the condition of the product is unfit or less suitable is followed up by correcting the part in question, (e) Interpreting the Data, Then after the data is processed, the data is interpreted carefully by paying attention to the predetermined scale. Apart from that, the data is interpreted based on the words expressed by the expert regarding whether or not the parts of the product being developed are suitable, (f) Describing the Data, then entering the final stage, all the data is described. Data description means that the data is expressed in clear and precise words so that it is easy to understand. The product section gets both low and high scale scores as well as responses in the form of criticism and recommendations, all of which must be expressed in a qualitative descriptive manner. In this way, changes in the condition of the product can be understood from its initial condition until it finally becomes a product that is suitable for use.

RESULTS AND DISCUSSION
Results
At this development stage, after the product has been designed, validation needs to be carried out so that the product to be tested meets standards that are suitable for use. Validation is carried out by a number of validators, including material expert validators, media expert validators, and educator expert validators.

1. Material Expert Validator

   The material expert test is obtained from filling out an assessment sheet with a total of 39 items by a material expert. Comments from Material Experts are: The product that has been developed is suitable for use. It is necessary to emphasize the conclusion of the material to make it easier for students to understand the content of the material (summary). So, the conclusion of this learning media is that it is stated "It is suitable to be tested in the field with revisions". Comments from material experts will be revised before being tested on students in small groups or large groups.

2. Media Expert Validator

   The media expert test is obtained from filling out an assessment sheet with 38 items by a media expert. Comments from Media Experts are: Improve the size of the menu (enlarge it) and provide a discussion/forum menu regarding student difficulties. So the conclusion of this learning media is that it is stated "It is suitable to be tested in the field with revisions". Comments from media experts will be revised before being tested on students in small groups or large groups.

3. Design Expert Assessment

   The design expert test is obtained from filling out an assessment sheet with 30 items by a design expert. Comments from Design Experts are: The teaching media product design developed is suitable for use as a thesis (Master's) research instrument. So the conclusion of this learning media is stated "It is suitable to be tested in the field without any revisions".
   The comments from the validator above are then used as a reference for making theoretical improvements so that they can be implemented.

4. Small Group Trial

   The small group trial was carried out on Thursday 11 May 2023. Before carrying out the small group trial in schools, the researcher made several preparations which included a brief explanation of the objectives of the implementation and sending the Google Sites e-learning link/barcode that had been published using the application. Google Sites to 7 students via short message application or WhatsApp. The e-learning Google sites allow students to carry out programs in the teaching media for Light Vehicle Engine Maintenance starting from discussing the material to the question evaluation stage. The Google e-learning sites have gone through a validation process by material experts, media experts and design experts. After preparations are complete, implementation of learning media can be carried out immediately.

5. Large Group Trial

After successfully passing the previous trial and making the necessary improvements, a large group trial was then carried out. The large group trial is scheduled for Thursday 18 May 2023 and involves the participation of 31 students. In this large group trial, students were directed to carry out the program contained in the Light Vehicle Engine Maintenance teaching media. The implementation of Light Vehicle Engine Maintenance teaching media based on Google Sites e-learning using the Google Sites application went very well and smoothly, so that students showed enthusiasm and enthusiasm in using the Google Sites e-learning Light Vehicle Engine Maintenance teaching media.

Discussion

The results of data analysis in expert tests regarding product design include validation tests by material experts, media experts and design experts with several revisions. Apart from that, small group tests, large group tests, validity tests and instrument reliability tests were carried out. This assessment of each item has several tests using 5 scales, namely: very bad = 1, not good = 2, fair = 3, good = 4, very good = 5. The following are the results of expert tests on e-book/teaching media products Light Vehicle Engine Maintenance from each assessment:

1. Material Expert Test Results

The data from the material expert test assessment sheet includes 3 aspects, namely the appropriateness aspect of content, the appropriateness aspect of presentation, and contextual assessment. The percentage of appropriateness aspects of content is 92% in the very good category, the percentage of appropriateness aspects of presentation is 93% in the very good category, and the percentage of contextual assessment is 82% in the very good category. So from these 3 aspects it can be concluded that the average aspect percentage is 89%, which means that the light vehicle engine maintenance teaching media product based on Google Sites e-learning is very good/very suitable for use in the learning process for light vehicle engine maintenance for class XII Light Vehicle Engineering. Automotive at SMKS Wijaya Putra Surabaya and further trials can be carried out. The above data is in accordance with table 1 below (Material expert test data is in the attachment):

Table 1. Material Expert Assessment Results

No.	Aspek	Jml. Butir	Persentase Aspek	Kategori
1.	Kelayakan Isi	17	92%	Sangat baik
2.	Kelayakan Penyajian	11	93%	Sangat baik
3.	Kontekstual	9	82%	Sangat baik
Rata-Rata Persentase Aspek			**89%**	**Sangat baik**

2. Media Expert Test Results

The data from the media expert test assessment sheet includes 3 aspects, namely the appearance aspect, the usage aspect and the utilization aspect. The percentage of display aspects is 88% in the very good category, the percentage of usage aspects is 88% in the very good category, and the percentage of utilization aspects is 92% in the very good category. So, from these 3 aspects it can be concluded that the average aspect percentage is 89.3%, which means that the teaching media product for Light Vehicle Engine Maintenance based on e-learning on Google sites is very good/very suitable for use in the learning process for Light Vehicle Engine Maintenance for class XII Engineering. Automotive Light Vehicles at SMKS Wijaya Putra Surabaya and further trials can be carried out.

Table 2. Media Expert Assessment Results

No.	Aspek	Jml. Butir	Persentase Aspek	Kategori
1.	Tampilan	15	88%	Sangat baik
2.	Penggunaan	5	88%	Sangat baik
3.	Pemanfaatan	5	92%	Sangat baik

Rata-Rata Persentase Aspek	**89,3%**	**Sangat baik**

3. Design Expert Test Results

    The data from the design expert test assessment sheet includes 2 aspects, namely the graphic aspect and the language aspect. The percentage of graphic aspects is 91% in the very good category, the percentage of language aspects is 92% in the very good category. So from these 2 aspects it can be concluded that the average aspect percentage is 91.5%, which means that the teaching media product for Light Vehicle Engine Maintenance based on Google Sites e-learning is very good/very suitable for use in the learning process for Light Vehicle Engine Maintenance for class XII Engineering. Automotive Light Vehicles at SMKS Wijaya Putra Surabaya and further trials can be carried out.

Table 3. Design Expert Assessment Results

No.	Aspek	Jml. Butir	Persentase Aspek	Kategori
1.	Kegrafikan	29	91%	Sangat baik
2.	Desain Media	12	92%	Sangat baik
Rata-Rata Persentase Aspek			**91,5%**	**Sangat baik**

4. Small Group Trial

    The results of the small group test were in the aspect of student response, an average of 84% with a total of 7 students who produced the very good category/very suitable for use in the learning process of Light Vehicle Engine Maintenance for class XII Automotive Light Vehicle Engineering at SMKS Wijaya Putra Surabaya and were able to further testing is carried out. The 7 students include: Farhan Dwi Syahputra, Irsad Syayudin, Diki Saputra, Indra Sultan Ferdinand, Fathikhul Akmal Ramadani, Ferdinand Maulana Putra, Farid Ade Saputra.

Table 4. Small Group Test Results

No.	Aspek	Jml. Butir	Persentase Aspek	Kategori
1.	**Respon 7 Peserta Didik**	**18**	**84%**	**Sangat baik**

5. Large Group Trial

    The results of the large group test were in the aspect of student response, an average of 88% with a total of 31 students who produced the very good/very suitable category for use in the learning process for Class XII Light Vehicle Engine Maintenance, Automotive Light Vehicle Engineering at SMKS Wijaya Putra Surabaya and were able to further testing is carried out.

Table 5. Large Group Test Results

No.	Aspek	Jml. Butir	Persentase Aspek	Kategori
1.	Respon 31 Peserta Didik	18	88%	Sangat baik

    Therefore, Google Sites e-learning received a positive response from students in class XII Automotive Light Vehicle Engineering at SMKS Wijaya Putra Surabaya. In the large group trial, students looked very happy and enthusiastic about learning using Google Sites e-learning because it could help students understand word processing. The appearance of Google Sites makes students very interested and fosters interest in learning because Google Sites has an attractive appearance. The average value obtained from small group trials to large group trials has increased. The following is the average score obtained from student responses:

Figure 2. Graph of Average Value of Student Responses

Verification/Revision

Product revision is an improvement in learning media after digital book validation is carried out. At this stage, improvements are made to the deficiencies in the learning media based on suggestions from material experts, media experts and design experts. There are several disadvantages, namely:

1. Revision of Material Expert Test

Based on the formative evaluation by the material validator, it is necessary to emphasize the conclusion section of the material to make it easier for students to understand the content of the material (summary).

Before Revision:
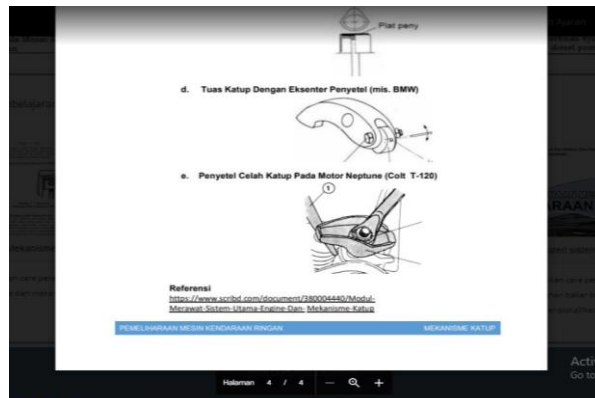
Figure 2. The display requires emphasis on the conclusion of the material
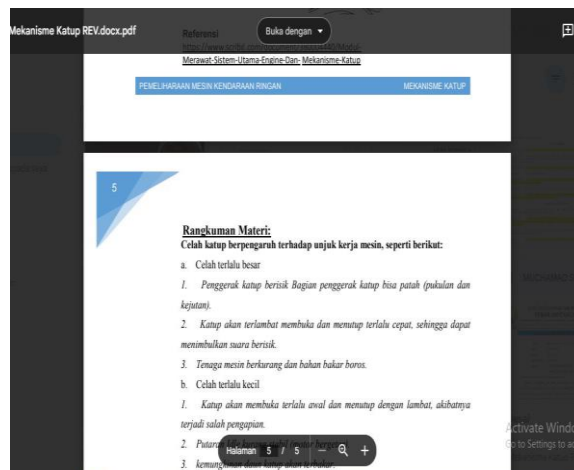
After Revision:

Figure 3. Display of the material summary section after being added

2. Revision of the Media Expert Test

Based on formative evaluation by media validators, the writing and image systematics are adjusted. So that the learning media is declared worthy of being tested in the field and revised. Before Revision
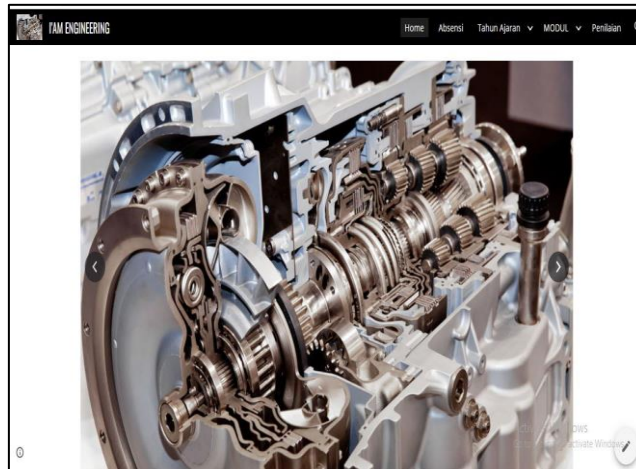

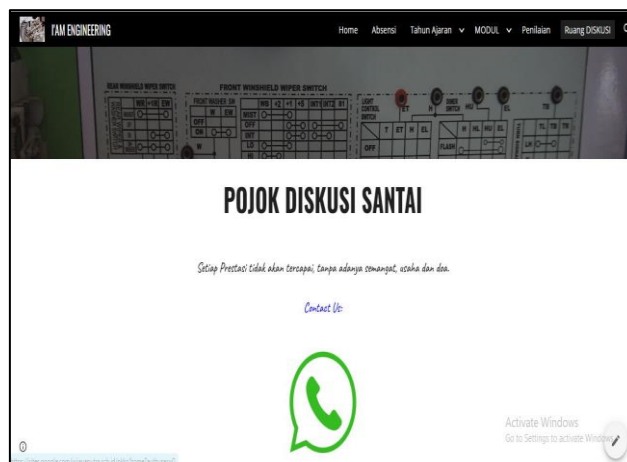Figure 4. There is no Forum Discussion link yet

After Revision

Figure 5. Display of adding a discussion room link

Before Revision

Figure 6. The font appears small on a web page
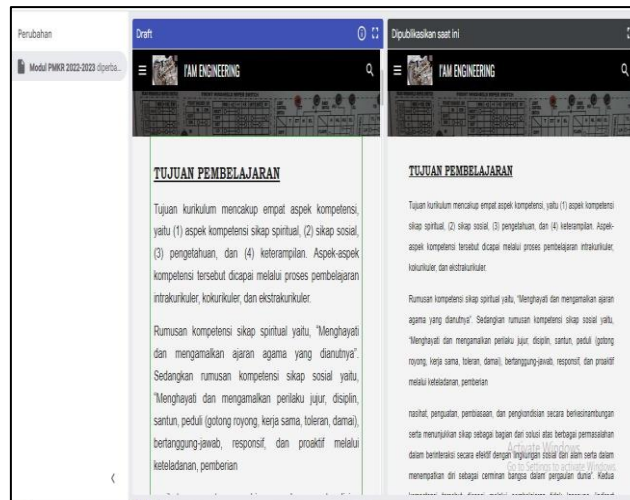
After Revision

Figure 7. Appearance of letters after the image is enlarged

3. Design Expert Test Revision

Based on the formative evaluation by the media validator, the teaching media product design developed is suitable for use as a thesis research instrument (S2). So that the learning media is declared suitable for testing in the field without any revisions.

CONCLUSION

Based on the development objectives and the results of the research that has been carried out, it can be concluded that this development and research has produced a product in the form of learning media in the form of Light Vehicle Engine Maintenance teaching media based on the Google Sites e-learning model ADDIE (Analysis-Design-Development-Implementations-Evaluation) on the material on how to maintain the main engine system and valve mechanism in class XII Automotive Light Vehicle Engineering at SMKS Wijaya Putra Surabaya. Based on the results of the assessment carried out by the validator, the validation test assessed by the material expert for the 3 aspects has an average percentage of very good aspects so that it can be categorized as very good or usable. Then, the validation test results assessed by media experts from these 3 aspects were an average percentage of very good aspects so that the media could be categorized as very good or usable. The validation test results assessed by design experts from these 2 aspects averaged a good enough percentage of aspects so that the media could be categorized as very good or usable. Then, on the results of the small group test and the results of the large group test, in the aspect of student responses, the average small group test results were quite good and the large group test results were quite good on average, so that the two groups were in the very good/very good category. worthy. The average value obtained from small group trials to large group trials has increased.

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