Development of Artificial Intelligence-Based Learning Videos on the Topics of Air Pollution using Lumen App

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Abstract: This research is a development research that aims to produce multimedia-based learning media that is valid, effective and practical. This research uses programming (AI) and is combined with the Lumen application. The development model of this research is: ADDIE development, namely analysis, design, development, implementation, evaluation. The subjects of this study were seventh semester students of environmental chemistry courses on air pollution material. There are three data collection techniques carried out in this study, namely validity, obtained through validation by validators; effectiveness, obtained through learning outcomes and student responses to learning media; practicality, obtained from assessment instruments by validators. The results showed that the average value of validity was 86.2%. The effectiveness of the media from student learning outcomes obtained an average of 86.3%. The practicality of the learning video was obtained from the questionnaire assessment of lecturers and students with an average practicality value of 89%.

Keywords: learning video, artificial intelligence, addie model, lumen's app or phrase.

Abstrak: Penelitian ini merupakan penelitian pengembangan bertujuan untuk menghasilkan media pembelajaran berbasis multimedia yang valid, efektif dan praktis. Penelitian ini menggunakan pemrograman (AI) dan dikombinasikan dengan aplikasi Steve Model pengembangan penelitian ini yaitu : pengembangan ADDIE, yaitu analysis, design, development, implementation, evaluation. Subjek penelitian ini adalah mahasiswa semester tujuh mata kuliah kimia lingkungan pada materi polusi udara. Teknik pengumpulan data yang dilakukan pada penelitian ini ada tiga yaitu kevalidan, diperoleh melalui validasi oleh validator; keefektifan, diperoleh melalui hasil belajar dan respon mahasiswa terhadap media pembelajaran; kepraktisan, diperoleh dari instrumen penilaian oleh validator. Hasil penelitian menunjukkan bahwa nilai rata-rata kevalidan yaitu 86,2%. Keefektifan media dari hasil belajar mahasiswa memperoleh rata-rata sebesar 92,3%. Kepraktisan video pembelajaran diperoleh dari penilaiaan angket dosen dan mahasiswa dengan nilai rata-rata kepraktisan 89%.

Kata kunci: video pembelajaran, artificial intelligence, model addie, aplikasi lumen

▪ INTRODUCTION

Today's learning thanks to technological advances encourages the transformation of learning into the digital era. In this 21st century, it is always required to keep up with the development of science and technology, in order to be able to present a classroom atmosphere that suits the needs of the times. But until now the learning process has not maximised the use of technology in the learning process (Ardiansyah, 2020). Applying technology in learning can help students more easily understand learning material (Astini, 2020). Learning media is one component that has an important role in learning. Quality learning will get maximum learning results. One of the learning media that can be applied is by making learning videos, the use of learning videos makes it easier for students to understand complex things such as chemical reactions that occur (Astuti,2018:695). With

the learning video, students are easier to visualise the learning material being taught so that it is easy to understand (Huda, 2021).

At this time, making learning videos is so easy and effective thanks to technological advances, one of which is Artificial Intelligence (AI), which is increasingly widespread and is needed in human life such as education, services, and so on (Suparno, 2019). This development is indicated by the number of devices that use artificial intelligence or AI-based technology (Susdarwono, 2021). This device greatly facilitates human work, especially in the learning process. In making learning videos using (AI) this can also be combined with various other applications, one of which is lumen, with this lumen application the resulting learning video is more interesting and easy to understand. Education today, an educator must be able to create interesting learning and increase students' interest in learning.

So that an educator must always learn to adapt to the progress of the times. With the existence of learning that attracts students, it is expected that interest in learning will automatically arise (Ashley, 2017). This research is a development research aimed at producing multimedia-based learning media that is valid, effective and practical. This research uses programming (AI) and is combined with Lumen's application Learning interest is an interest in something during the learning process or learning activities without anyone commanding to learn (Novferma, 2021). Learning interest is also seen as an attitude of student seriousness in learning process activities, where students who have a high interest in learning can manage their own learning schedule and are able to have their own initiative for their efforts made by being serious in learning (Mujahidawati, 2021). That to make a student interest in learning is needed learning strategy involves a lot of memory and learning processes that use memory (Ningsih, 2023). Therefore, the importance of learning videos made with the help of (AI) in order to raise students' interest in learning.

Introduction contains background, rational, and/or urgency of research. References (relevant literature or research), need to be included in this section, its relationship to the justification of research urgency, the emergence of research problems, alternative solutions, and selected solutions. The source writing method in the text needs to clearly show the author's name and source citations, in the form of the year of publication and the page where the text is located. For example are: the results of the study show that more than 70% of students are not able to recognize authentic problems (Abdurrahman, 2008).

Problems and objectives, as well as the usefulness of research are written narratively in paragraphs, do not need to be given a special subtitle. Likewise, the operational definition, if deemed necessary, is also written narrative. Introduction is written with a TNR-12 upright, with a space of 1. Each paragraph begins with a word jutting in about 1 cm from the left edge of each column.

▪ **METHOD**

This research is a type of development research (Research and Development), using the ADDIE product development model. The selection of the ADDIE model is based on the consideration that this model is developed systematically and rests on the theoretical basis of learning design. The ADDIE model stands for Analysis, Design, Develop, Implement, and Evaluate. The following is the design of the ADDIE model.
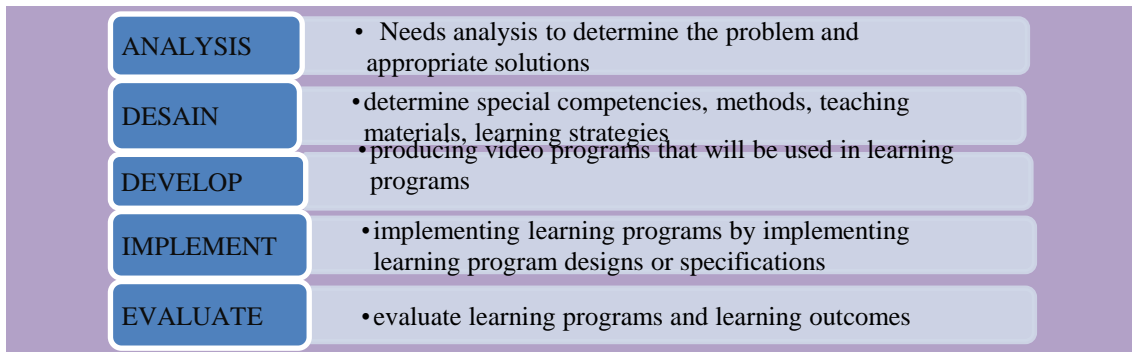
Figure 1. ADDIE model design

The subjects of this study were seventh semester students of environmental chemistry courses on air pollution material. product design and product validity testing. The development of this learning video was tested on 35 students by giving evaluations in the form of test questions before using the video and after using the learning video. The design used in this research is "One-Group Pretest–Posttest Design. ADDIE model so that in its development through stages, namely: analysis stage, design stage, development stage, implementation stage, and evaluation stage.

The analysis stage, in this research there are three types of analysis, namely needs analysis, analysis of campus facilities, and subject analysis. This stage is carried out by observing the learning process on the unja campus and conducting interviews related to the problems experienced in the learning process, as well as finding out the facilities and infrastructure owned by the campus.

The design stage, in designing this product, is carried out through three stages, the first is to make the material search with artificial intelligence (AI) development. Second, determine the software used, as for the software used, namely the Lumen application. third, design the script of the video to be developed. Development Stage, this stage is the stage for compiling prepared materials and materials for making learning videos, followed by the video editing process until finishing. Implementation Stage, in product implementation, the things that are done are carried out, namely product trials which include: subject content experts, learning media expert tests, learning design experts, individual trials, small group trials and field trials, application of learning videos in class by lecturers of environmental chemistry courses to measure the effectiveness of the products developed. Evaluation stage, this stage includes formative and summative evaluation. Formative evaluation consists of expert tests, namely (content experts, design experts, media experts) as well as individual tests, small group tests, and field tests. This is done to collect data at each stage passed and summative evaluation is carried out at the end of the programme to determine its effect on student learning outcomes before and after using learning video media, summative evaluation consists of giving pre tests and post tests.

Data collection in the study was carried out using observation, interview, and questionnaire methods. With an instrument in the form of a questionnaire, the validity test was carried out. Learning media in the form of learning videos about air pollution material is tested using a validity questionnaire which is useful for evaluating learning media. The validity test questionnaire was filled in by 3 validators, namely three lecturers from the department of chemical education FMIPA UNJA. The questionnaire is arranged

based on a Likert scale. After the validity data is obtained, then the questionnaire analysis is carried out on the validity test which has previously been filled in by the validator. Data analysis was carried out by determining the score of each validator by adding up each score on each indicator, and finally providing a valid assessment using a percentage assessment procedure.

The data analysis techniques used by researchers are quantitative and qualitative data. Quantitative data was obtained from the assessment scores from the validation assessment sheets of material experts, language experts, and media experts, as well as practicality questionnaires given to lecturers and students. Qualitative data was obtained from input/suggestions given by material experts, language experts, and media experts, as well as input/suggestions from 3 lecturers.

Feasibility Analysis

Analysis of the feasibility of learning videos obtained from 3 validators, namely material experts, teaching material experts, and linguists. suggests that the percentage of feasibility or validation can be determined by the following formula (Dayurni, 2020).

$$\text{Percentage of eligibility} = \frac{observed\ score}{expected\ score} \times 100\%$$

Table 1. Percentage of eligibility

Achievement percentage	Interpretation
76-100%	Very decent
56-75%	Feasible
40-55%	Less feasible
0-39%	Not feasible

Practicality Analysis

Practicality analysis was carried out with the responses of lecturers and students, with the same calculation method as the feasibility analysis as follows:

Table 2. Practicality percentage

Achievement percentage	Interpretation	Description
75-100%	Very practical	Can be used without improvement
50-74%	Practical	Can be used with minor improvement
25-49%	Less practical	Not recommended for use because major repairs are required
1-24%	Not practical	Should not be used

Effectiveness Analysis

Analysis of effectiveness is done with the product can be based on the achievement of students in receiving and understanding the lesson. The average test score is obtained from the sum of the scores of the students, then divided by the number of students who take the test, using the following formula:

Table 3. Effectiveness percentage

Effectiveness percentage	Interpretation
75 - 100%	Very effective
50 -74%	Effective
25 - 49%	Less effective
1 - 24%	Not effective

▪ **RESULT AND DISSCUSSION**

The results of the development of learning video products with the help of artificial intelligence (AI) using the ADDIE model, which is applied to seventh semester students of environmental chemistry courses. The following is an example of the development of a learning video that was created:

Figure 2. Example of learning video

Validation Stage

The results of the validity of the learning video development according to the subject content expert test, learning design expert test, learning media expert test, individual trial, small group trial and field trial, the validity results are more detailed as follows:

Table 4. Video development validation results

Assessment Aspects	Validator assessment			Total Score		Nilai Validitas (%)	Kategori
	I	II	III				
Content eligibility	76	74	75	75	85	88.2	Very good
Language	32	35	34	34	40	84.1	Very good
Presentation	63	64	61	63	70	89.5	Very good
Graphics	61	63	62	62	70	88.5	Very good
Colour combination	32	34	33	33	40	82.5	Very good
Total	264	270	265	266	305	431	
Average						86.2	Very good

Based on the results of table 4, for testing the results of the validation of learning videos by experts obtained results for the feasibility of content I get a validation score of

88.2% with a very good category then continued with language validated by three validators so as to get a score of 84.1% with a very good category. Then for the presentation, it got a score of 89.5% with a very good category, the graphics were assessed by the validator so that it got a score of 88.5% with a very good category, then the last one was the validation of the colour combination which got a score of 82.5% with a very good category so that based on the results of the average validator of 86.2% on the learning video, it stated that the learning video made was very suitable for use. The learning video developed using artificial intelligence (AI) with the help of Lumen makes it easier for educators to create teaching variations to make it more fun and adapt to the needs of today's students. The results of this study indicate that the learning video created with artificial intelligence with the help of Lumen's application developed has gone through a series of development stages and has been validated by experts in their fields and has been tested. a learning topic that features dynamic elements will be easy to understand when realised in the form of animation. This ease is important in the learning process because in delivering the message it must be easy to understand (Mahadewi, 2012).

Practicality Stage

The results of the practicality assessment of learning videos using artificial intelligence (AI) with the help of Lumen's application on air pollution material were carried out by giving a practicality questionnaire sheet to lecturers and 7th semester students of environmental chemistry courses to find out the practicality of teaching videos. The results of the practicality assessment are shown below:

Table 5. Practicality assessment results

Respondents	Score obtained
Lecturer	87%
Students	91%
Average	89 %

From the results of the table above, the average value of the questionnaire sheet for the practicality of lecturers and students in environmental chemistry courses for air pollution material obtained 89%. This shows that learning videos using artificial intelligence (AI) with the help of Lumen's application on air pollution material are declared very practical. learning videos that are easy to understand, as well as display designs that suit the needs of students. The design and various kinds of images it displays, which in the form of an image will cause its own interest for students (Fachri, 2021).

Effectiveness Stage

In its development, this learning video has been declared to have an effect on student learning outcomes in digital simulation learning. The effectiveness of this learning video can be seen from the effectiveness test of learning videos with the help of artificial intelligence (AI) and Lumen's application carried out by the multiple choice test method measured by giving a multiple choice question sheet to 35 7th semester students majoring in Chemistry Education, Jambi University.
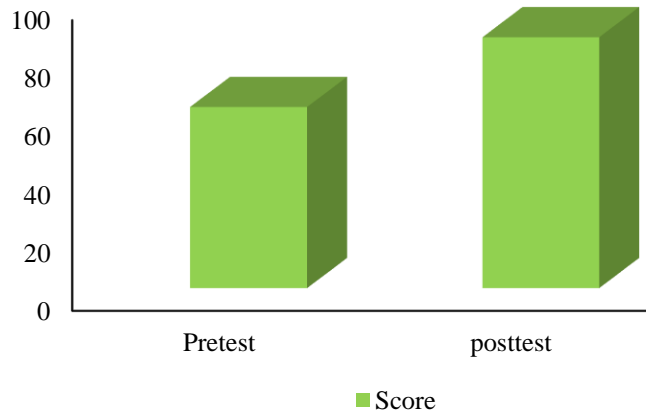
Figure 3. results of testing the effectiveness of learning videos

Through pretest and posttest. Based on the data of pre-test and post-test scores of 35 students, a t-test for correlated samples was conducted. The average student pretest score is 62.3 and the average student posttest score is 86.3. From the results of the t-test obtained $T_{count} = 15.600$ and $T_{table} = 2.000$ for db = 68 from the significance level of 5%. This means that $t_{count} >$ ttable so that H0 is rejected and H1 is accepted, so that H0 is rejected and H1 is accepted. This means, there is a significant difference (5%) in the learning outcomes of Digital Simulation before and after using the learning video with artificial intelligence (AI) assisted by Lumen's application. This learning video is effective because there is a significant difference in student learning outcomes between before and after using the learning video. There are several things that cause this learning video to be effective (Panje, 2016).

Based on several test results above, the media in the form of learning videos that have been developed are suitable for use based on the categories of validity, practicality and effectiveness which meet the criteria of very good by having a validity value of 86.2%, then practicality of 89% and finally the effective category of 86. .3%. so this learning video can help the learning process better. According to (Rajam 2023) learning videos can make students focus more on learning. Meanwhile, according to (Huangfu, 2022) The development of learning videos really helps natural teachers convey abstract material that is much easier for students to understand and understand (Kelli and Lowery, 2015). Developing learning videos also creates creativity and increases students' understanding of the material. According to (Galardo, 2020) the development of learning videos can make students more active in the learning process.

▪ **CONCLUSION**

There are three data collection techniques used in this study, namely validity, obtained through validation by validators; effectiveness, obtained through learning outcomes and student responses to learning media; practicality, obtained from assessment instruments by validators. The results showed that the average value of validity was 86.2%. The effectiveness of the media from student learning outcomes obtained an

average of 86.3%. The practicality of the learning video was obtained from the questionnaire assessment of lecturers and students with an average value of 89% practicality. This video design is made in the format of a video script and this video design is a video with a duration of about 6 minutes. The development of video scripts into products is carried out through the stages of the ADDIE development model, namely: analysis, design, development, implementation, and evaluation. The validity of this video based on expert tests (content, media, and learning design expert tests, language) obtained very valid results and product trials (individual, small group, and field tests), which are very practical. This video is effective to increase learners' motivation.

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