p-ISSN: 2963-7856| e-ISSN: 2961-9890
Available online at jerkin.org/index.php/jerkin
Jurnal Pengabdian Masyarakat dan Riset Pendidikan
Volume 03 No. 03, Januari-Maret 2025, pp 235-241

Development Of Learning Video Based Problem To Attract High School Students' Learning Interest On The Material Of Green Chemistry Principles

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https://doi.org/10.31004/jerkin.v3i3.387

ARTICLE INFO

Article history
Received: 12 March 2025
Accepted: 19 March 2025
Published: 25 March 2025

Kata Kunci
Pengembangan, Media, Video Pembelajaran, Minat Belajar, *PBL*

Keywords
Development, Media, Learning Videos, Learning Interest, PBL

ABSTRACT

Video merupakan media audio visual yang menampilkan gambar dan suara.Video pembelajaran menyajikan materi, informasi dan menjelaskan konsep-konsep yang rumit kepada siswa dengan lebih menarik. Video pembelajaran ini dialurkan dengan menggunakan pendekatan berbasis masalah. Penelitian ini bertujuan untuk mengetahui kelayakan video pembelajaran berbasis masalah menurut validasi ahli materi dan ahli media, mengetahui penilaian guru serta respon siswa terhadap media yang dikembangkan. Penelitian ini merupakan penelitian pengembangan menggunakan model Lee & Owens yang terdiri dari tahap analisis (analysis), Desain (design), pengembangan (development), implementasi (Implementation) dan evaluasi (evaluation). Produk pengembangan divalidasi oleh ahli materi dan ahli media serta dinilai oleh guru bidang studi kimia yang setelahnya diuji cobakan pada kelompok kecil. Teknik analisis data yang digunakan, yaitu analisis data kualitatif dan kuantitatif. Hasil penelitian menunjukkan bahwa video pembelajaran mendapatkan persentase sebesar 87,8% dengan kualifikasi sangat layak dari dua ahli materi, 87,8% dengan kualifikasi sangat layak dari dua ahli media dan 96% dengan kualifikasi sangat baik dari guru bidang studi kimia. Sementara itu, pada uji coba kelompok kecil, video pembelajaran memperoleh persentase sebesar 90,5% dengan kualifikasi sangat baik. Berdasarkan hasil tersebut, dapat disimpulkan bahwa video pembelajaran berbasis masalah yang dikembangkan telah layak digunakan sebagai salah satu media dalam proses pembelajaran kimia..

Video is an audio visual media that displays images and sound. Learning videos present material, information and explain complex concepts to students in a more interesting way. This learning video is channeled using a problem-based approach. This study aims to determine the feasibility of problem-based learning videos according to the validation of material experts and media experts, to find out teacher assessments and student responses to the media developed. This study is a development research using the Lee & Owens model which consists of the stages of analysis, design, development, implementation and evaluation. The development product was validated by material experts and media experts and assessed by chemistry teachers who were then tested in small groups. The data analysis techniques used were qualitative and quantitative data analysis. The results showed that the learning video obtained a percentage of 87.8% with very decent qualifications from two material experts, 87.8% with very decent qualifications from two media experts and 96% with very good qualifications from chemistry teachers. Meanwhile, in the small group trial, the learning video obtained a percentage of 90.5% with very good qualifications. Based on these results, it can be concluded that the problem-based learning video developed is suitable for use as a medium in the chemistry learning process.

How to Cite: Rifka Yulfanny et al. (2025). Development e-LKPD Based Lesson Study For Learning Community (LSLC) On the Material of Reaction Rate Factors to Support Science Literacy Learners, 3 (3) 235-241. https://doi.org/10.31004/jerkin.v3i3.387

INTRODUCTION

The world of technology continues to develop dynamically, the current development of the world of technology is undeniable, especially in the field of education. The development of technology and education is one direction that is in line for the success of a country. Where a good country is reflected in the quality of its education because building a country requires competent human resources in exploring science and technology. By utilizing technology, Indonesia is expected to be able to face the era of society 5.0 in the field of education. Where in this era is a concept of a society that is centered on humans and based on technology (Rahmawan & Effendi, 2021). For this reason, the readiness of teachers and students in accessing and mastering technology continues to be encouraged in the field of education through changes in the curriculum and teaching systems that are continuously updated to follow the times.

The curriculum is a key element in the education system that affects the quality of learning and educational outcomes. Therefore, the development of a dynamic and responsive curriculum to changes in the times is very important to produce competent human resources. The curriculum provides a framework for what students should be taught and learned in schools. In 2018, the Indonesian government launched the concept of an independent curriculum or independent curriculum to address the problem of educational relevance (Wahyuni, 2022). The independent curriculum is designed to enable students to become active subjects in their own learning, not just objects of learning. This curriculum concept encourages teachers to use more contextual and interactive learning methods and can utilize technology in the learning process.

There are several new materials in the independent curriculum, especially in the subject of chemistry. Chemistry is a branch of natural science that has an important role in the development of technology and environmental sustainability. One of the modern concepts that is of concern in chemistry is green chemistry. Green chemistry is new material and one of the chemistry topics in phase E of the independent curriculum. The characteristics of this topic relate chemical concepts to students' daily lives. In addition, chemistry learning not only requires understanding concepts but also involves investigations to be applied, applied, and used in solving problems that occur in everyday life (Jayanti & Dina, 2024).

The problem encountered in the field is that in the process of learning green chemistry material, teachers have not used a variety of learning media or are still using conventional methods because the material is still new so that in the learning process teachers only use teaching materials in the form of textbooks. Therefore, students' interest in learning the learning process is still lacking. Interest in learning is an important factor in the success of the learning process. High interest in learning encourages students to be actively involved, understand the material, and achieve optimal learning outcomes (Aulia et al., 2023). This is in line with the problems found in preliminary studies in schools where most students face difficulties in understanding the application of green chemistry principles when directly related to everyday life, the level of difficulty reaches 86%. In questions related to learning interest, it was also found that students' interest in learning chemistry material is still low. From the results of this analysis, a significant gap can be seen between the facts in the field and the policies set by the government regarding the independent curriculum. Where the independent curriculum expects teachers to use more contextual and interactive learning methods and can utilize technology in the learning process to attract students' interest and motivation to learn, the reality in the field shows that its implementation is different, both in terms of methods and teaching tools. This raises questions about the suitability between the designed policies and the reality that occurs in the learning context.

Based on the problems that occur, researchers intend to provide optimal and appropriate solutions to overcome these problems by developing video media as a solution to assist in the learning process. According to Aliyyah et al. (2021), learning video media can increase and attract students' interest in learning, make learning time efficient, and easier for students to use because it can be accessed using a smartphone/cellphone. To provide an efficient impact on the media developed, this learning video uses a problem-based approach. Problem Based Learning (PBL) is a learning method that focuses on solving real problems, so that students are invited to think critically, creatively, and analytically in understanding the material (Wijaksana et all., 2021). Problem-based learning videos allow for the

presentation of green chemistry principle concepts visually, interactively, and contextually, which can help students understand how green chemistry principles are applied to solve environmental problems.

Through the background that has been described, the researcher intends to develop learning media in the form of problem-based learning videos to increase high school students' interest in learning the material on green chemistry principles with the hope that through the learning video media that will be created later, it can be used as additional media for teachers and students in chemistry teaching and learning activities, especially on the material on green chemistry principles.

METODE

The development model used in this study is the research and development model. Research and Development (R&D) adalah suatu metode atau langkah untuk menghasilkan produk (model pembelajaran) baru atau mengembangkan dan menyempurnakan produk (model pembelajaran) yang telah ada, dan digunakan untuk menguji keefektifan pembelajaran tersebut (Sa'diyah et al., 2020). This study will produce a learning media in the form of problem-based learning videos. This study uses the Lee & Owens model as the development model to be used. This development model has five stages adapted from the ADDIE framework, namely Assessment and Analysis, Design, Development, Implementation, and Evaluation.

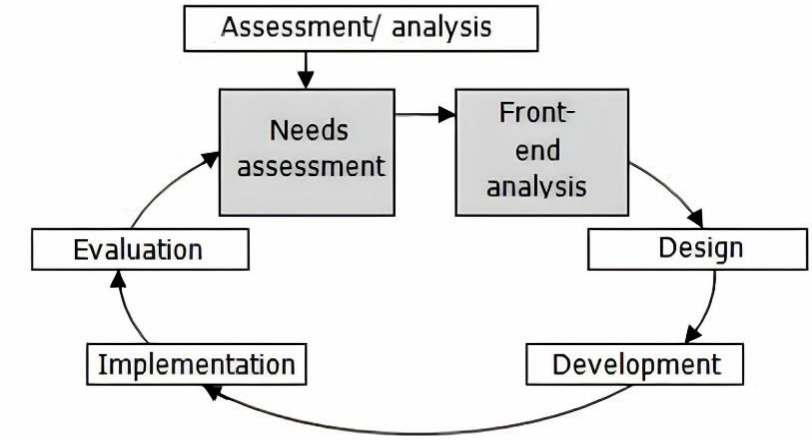

Figure 1. Design Development Stages Lee & Owens, (2004)

The first stage, namely Analysis, includes analysis of needs, student characteristics, learning objectives, materials and educational technology. This stage aims to identify the needs of the learning process and collect information about the product to be made. The next stage is the design stage, at this stage a specific design or concept of the product to be developed will be carried out starting from team formation, flowchart creation, storyboard creation and collection of supporting materials that will be included in the media. Designing a media is very important to produce good learning media, Asyhar (2010:127). After that, the development stage is carried out where at this stage the results of the product that has been designed have been obtained so that the previously designed product will become a real product. The product development process involves all activities of compiling and adjusting production materials to the content of the learning material that will be displayed. This stage also includes the product assessment process by experts, in order to obtain validation, input and minimize errors. This process can be repeated several times until the media reaches the desired quality standard. There are two validations that need to be carried out at this development stage, namely validation by material experts and media experts.

After making improvements and the product meets the validity standards, the learning media will be tested in the next stage. Next, namely the implementation stage where at this stage it will determine how the media or product is received by the audience and whether it can function according to the expected goals. At this stage the product will be viewed and re-evaluated by the teacher and then tested in small groups to obtain data on the quality of the product in the form of problem-based learning videos. This research was conducted at SMAN 1 Muaro Jambi with research subjects of class X Phase E students. The trial was conducted on small groups of 10 students with different cognitive levels.

ISSN 2963-7856 (print), ISSN 2961-9890 (online)

The instruments used for data collection in this study were questionnaires and interviews. The questionnaires used consisted of a product validation questionnaire and a product trial questionnaire. The product validation questionnaire was addressed to material experts and media experts as product validators in this study. This questionnaire was used to determine the feasibility of the problem-based learning videos produced both in terms of design and material. The product trial questionnaires used in this study included teacher assessment questionnaires and student response questionnaires. The use of student response questionnaires was intended to determine the practicality of problem-based learning videos used in small groups. While the teacher response questionnaire was intended to determine the practicality of problem-based learning videos in learning the Principles of Green Chemistry Material. And for interviews conducted with chemistry subject teachers as an initial analysis.

Qualitative data were obtained from the results of interviews with chemistry subject teachers and validation questionnaires from media experts, material experts and teacher assessments in the form of input, responses and suggestions. While quantitative data were obtained from the results of validation questionnaires from media experts and material experts, teacher research questionnaires and student response questionnaires in the form of assessment scores given. The results of validation data and practicality scores in the study were processed and then the intervals were determined using data intervals according to the Likert scale. The following is a table of criteria for validation data intervals, teacher assessments, and student responses.

Table 1. Criteria for Validation Data Intervals, Teacher Assessments, and Student Responses.

Score Range	Percentage	Criteria
>4,2–5,0	>81–100%	Very Hight
>3,4–4,2	>61–80%	Hight
>2,6–3,4	>41–60%	Medium
>1,8–2,6	>21–40%	Low
1,0–1,8	0–20%	Very Low

(Riduwan, 2015)

RESULT AND DISCUSSION

The development of problem-based learning videos on the material of green chemistry principles was carried out by referring to the Lee & Owens development model. This model consists of five main stages, namely Analysis, Design, Development, Implementation, and Evaluation. The first stage is analysis, based on the results of the analysis carried out, several problems were found that can be used as a basis for developing this problem-based learning video. The development of problem-based learning videos is one way to help attract interest and improve student understanding. Learning videos are an effective medium to develop because they can accommodate various student learning styles, both visual, auditory, and kinesthetic. Based on the results of the learning style assessment, it is known that 38.72% of students have a visual learning style, 31.8% auditory, and 29.48% kinesthetic. According to Mayer (2009) in the cognitive theory of multimedia learning, information processing is more optimal when students receive material through a combination of visual and auditory elements, so that learning videos can improve understanding and retention of information.

The next stage is the design stage, which aims to design solutions based on the results of field analysis, such as: media and learning models to be used. The design stage is the foundation of the media being developed. At the design stage, this problem-based learning video is designed by starting with the formation of a work team, preparing a research schedule, determining media specifications, designing the material structure and compiling flowcharts and storyboards to ensure that the concept of the material presented in the product can be conveyed properly. In addition, the collection of materials, images, videos and other components that make up the media is also carried out. In this design process, the problem-based aspect is one of the main concerns, so that the media created is able to present the material contextually.

The next stage is development, after the product is designed, then it is made and developed into an initial product. At this stage, the product developed is based on the storyboard that has been designed. The initial product resulting from the development is then validated by a team of experts consisting of material experts and media experts with the aim of assessing the feasibility of product development. The results of this validation become the basis for product improvement. Then the product is revised

according to the advice of experts, resulting in a product that is worthy of being tested. After that, the product is assessed by practitioners and tested on small groups.

Validation Results of Material Experts and Learning Media Experts

Based on Table 2, it can be seen that the problem-based learning video on the material of green chemistry principles developed is considered very feasible, both in terms of media and content, with an average validity of 87.8%, so that the developed learning video is feasible to be used as a supporting media for learning. The results were obtained from processing the validation questionnaire scores given to the validator by undergoing 2 stages of validation.

Table 2. Results of Validation by Material Experts and Media Experts

Validator	Average Score
Material Experts	87,8%
Media Experts	87,8%
Average	87,8%
Criteria	Very Hight

Teacher's Assessment Results

The next stage is implementation, implementation is carried out with the aim of seeing teacher assessments and student responses to the media developed. Based on teacher assessment instrument data, a percentage of 96% was obtained which was included in the interval of 81% -100% with the criteria of "Very Good". Some general comments or suggestions regarding the problem-based learning videos developed include the video concept, animation design and images are very good and interesting, the appearance of the learning videos is also good, the material in the media is also in accordance with the independent curriculum. In addition, students can easily access videos independently anywhere as long as they are connected to the internet and can also attract students' interest in learning. The teacher also hopes that in the future learning media like this can be developed for other chemistry teaching materials. Therefore, based on the results of the teacher's assessment of the score results, suggestions, and comments, the problem-based learning videos developed are considered suitable for testing on students.

Table 3. Teacher Assessment Results

Aspect	Average Score
Accurate	100%
Feedback	93,3%
Learning Control	100%
Prerequisite Capabilities	90%
Ease of Application	100%
Special Display	95%
Average	96%
Criteria	Very Hight

Small Group Trial Results

Table 4. Results of Student Responses to Media

Trial	Total Score	Average Score
Small Group Trial	679	90,5%
Criteria	Very Good	

The data obtained from the answers of all respondents amounted to 90.5% which is in the range of 81%-100% with the criteria of very good student responses. These results indicate that the use of problem-based learning video media on the material of green chemistry principles has a positive impact on students' understanding of concepts and learning interests. Specifically, it can be seen in the following aspects:

1. Display Aspect

Visually, learning videos get quite high ratings, especially in the use of logos, animations, and illustrations that help students understand. The duration of the video is also considered appropriate to learning needs. Specifically, in terms of appearance, students gave a very positive response to the visual quality, animation, and graphic design in the video, which were considered interesting and easy to

ISSN 2963-7856 (print), ISSN 2961-9890 (online)

understand. This is in line with the findings of Isra Miharti & Epinur (2024), who said that with learning videos, students find it easier to visualize the learning material being taught so that it is easy to understand. In addition, other studies also state that interesting video media can increase students' learning motivation (Parlindungan et al., 2020).

2. Material Aspect

The material presented in the video was considered good with a fairly high score on the suitability of examples to everyday life, indicating that students find it easier to understand concepts when the material is linked to their real experiences. In this material aspect, students assessed that the video content was in accordance with the principles of green chemistry, was systematically arranged, and was able to explain concepts clearly and applicatively. Other studies have also shown that the use of videos in learning can help students understand complex material better (Rakhma et al., 2024).

3. Learning Aspect

Videos are considered successful in attracting attention and motivating students to learn and encouraging them to think critically and connect the material to everyday life. Videos are also considered very good at supporting independent learning and are easy to access, which shows the flexibility of their use. In this aspect, learning videos are considered successful in attracting students' interest in learning through interactive presentations that are relevant to everyday life. Previous studies have also found that learning videos can help provide information and knowledge in a more interesting way and can also create a more enjoyable learning atmosphere (Teguh, et al. 2021). This enjoyable learning atmosphere has a positive effect so that it can attract students' interest in learning. In addition, other studies also say that the use of video media in learning can increase students' learning motivation and attract their interest in the learning process (Nurdin, 2022).

In theory, the use of learning videos has a positive influence on increasing students' interest in learning because the media uses interesting visuals and audio to help students understand the material more easily and enjoyably. Learning videos also allow for interactive delivery of information, so that students are more focused and motivated to follow the lesson. According to research by Nurdin (2022), the use of videos in learning increases students' interest in the material and makes them more active in the learning process. In addition, a study by Ayu Lestari & Mujazi (2024) found that learning videos help students understand concepts more concretely than conventional methods. Therefore, integrating videos into the learning process is an effective strategy to attract students' interest in learning and improve their learning outcomes.

The last stage is evaluation, this stage is carried out with the aim of reviewing whether the product is in accordance with initial expectations. Evaluation in this study is formative, carried out at every stage, including the analysis, design, development, and implementation stages. This evaluation aims to overcome the shortcomings in the problem-based learning videos that have been developed to be better and of higher quality.

CONCLUSION

The validity of problem-based learning videos to attract high school students' interest in learning the material on green chemistry principles has been tested and proven to be very valid and suitable for use in the learning process, with an average validation score of 87.8% from material experts and media experts. The content and practicality of problem-based learning videos on the material on green chemistry principles also received very good assessments and responses, with a teacher assessment questionnaire score of 96% and a student response questionnaire score of 90.5%. The suitability of problem-based learning videos in the learning process, as well as the concept of the material presented, can attract students' interest in learning the material on green chemistry principles. From the results of this study, it can be concluded that the media developed is suitable for use in the chemistry learning process, especially in the sub-material on green chemistry principles.

ACKNOWLEDGEMENTS

Thank you to Prof. Dr.rer.nat. H. Rayandra Asyhar, M.Si. and Prof. Dr. Drs. Haryanto, M.Kes., for their suggestions and contributions during the process of writing this article, who are also the supervisors in this research.

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ISSN 2963-7856 (print), ISSN 2961-9890 (online)