


Development e-LKPD Based Lesson Study For Learning Community (LSLC) On the Material of Reaction Rate Factors to Support Science Literacy Learners

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ABSTRACT

Penelitian ini merupakan penelitian Penelitian dan Pengembangan (R&D) dengan menggunakan model pengembangan Lee & Owens yang terdiri dari tahap analisis, tahap perencanaan (design), pengembangan (development), implementasi (implementation) dan evaluasi (Evaluation). Penelitian ini bertujuan untuk menghasilkan e-LKPD literasi sains berbasis lesson study for learning community yang valid. Pola pengembangan LKPD literasi sains ini sendiri mengacu pada lesson study for learning community (LSLC) yang terdiri dari perencanaan, implementasi, dan refleksi. Penelitian ini dilaksanakan di SMAN 1 Muaro Jambi dengan subjek penelitian kelas XI Fase F4. Instrumen yang digunakan adalah lembar wawancara guru, angket validasi meliputi angket validasi ahli materi untuk memvalidasi kelayakan konten materi, dan angket validasi ahli media untuk memvalidasi kelayakan desain media, angket penilaian guru, dan angket respon siswa. Data yang diperoleh dianalisis menggunakan teknik analisis deskriptif kualitatif dan kuantitatif. Hasil penelitian menginformasikan bahwa e-LKPD yang dikembangkan telah terbukti sangat valid dengan presentase 10% oleh ahli media dan 10% materi, penilaian praktikalitas sebesar 10% oleh guru mata pelajaran kimia, dan juga bahan ajar ini praktis digunakan oleh siswa dengan presentase praktikalitas sebesar 10%. Dari hasil penelitian dapat disimpulkan bahwa bahan ajar yang dikembangkan layak digunakan dalam proses pembelajaran kimia khususnya materi faktor laju reaksi.

This research is a Research and Development (R&D) study using the Lee & Owens development model consisting of the analysis stage, the planning stage (design), development (development), implementation (Implementation) and evaluation (Evaluation). This study aims to produce a valid science literacy e-LKPD based on lesson study for learning community. The development pattern of this science literacy LKPD itself refers to the lesson study for learning community (LSLC) which consists of planning, implementation, and reflection. This research was conducted at SMAN 1 Muaro Jambi with the research subjects being class XI Phase F4. The instruments used were teacher interview sheets, validation questionnaires including material expert validation questionnaires to validate the feasibility of material content, and media expert validation questionnaires to validate the feasibility of media design, teacher assessment questionnaires and student response questionnaires. The data obtained were analyzed using qualitative and quantitative descriptive analysis techniques. The results of the study inform that the developed e-LKPD has been proven to be very valid with a percentage of 10% by media experts and 10% material, a practicality assessment of 10% by chemistry subject teachers, and also this teaching material is practical to use by students with a practicality percentage of 10%. From the results of the study, it can be concluded that the developed teaching material is suitable for use in the chemistry learning process, especially the



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INTRODUCTION

Education is one of the keys to advancing and educating humans. Quality education can create quality human resources. The advancement of science and technology globally has spread to various aspects of life. Therefore, education needs to be considered so that students can master 21st century learning that influences them to be more sensitive to the progress of the times (Cholifah & Novita, 2022). The 21st century learning process, technology is not something that is additional but mandatory. This is one of the keys to modern classroom learning. Learning is carried out based on ICT (Information Communication Technology).

Students have an active role in learning so that the teacher only acts as a facilitator (Eldila Sari, 2022).

21st century learning is defined as the tendency of students who must have skills such as the ability to adapt, creativity, innovation, intelligence and curiosity. Steps to prepare students for the future, teachers direct students to face the challenges of 21st century development. To realize this, several sciences that need to be learned by students, especially in High School (SMA), one of which is chemistry (Mayasari et al., 2023)

Science literacy in Indonesia is still low, as seen from the results of PISA 2018 which placed Indonesia in 6th place from the bottom with an average score of 396. Factors that influence this are the curriculum, learning process, and science assessment. Therefore, the government is making efforts to update the curriculum by using a scientific approach to improve students' science literacy (Agustina & Okmarisa, 2023).

Lesson Study for Learning Communities (LSLC) is lesson study which has undergone changes based on collaborative learning community. LSLC invites students to learn from each other (collaborative learning), a study group that cares for each other and is sensitive to the environment so that no one is neglected (caring community). The most important learning process is not group work but what they do and how they respond in the group. Students feel comfortable and give their full attention to the lesson and students can also learn to interact through media/objects. Social interaction skills develop first, then each child's academic abilities develop (Agustina & Okmarisa, 2023).

LKPD can facilitate learning by activating students, facilitating understanding of the material, and providing concise but rich exercises in questions (Khair et al., 2021). By integrating LKPD with the approach Lesson Study For Learning Community (LSLC), scientific literacy competencies can be instilled in students through stages plan, do, and see (Saito, 2012). LKPD can help improve chemistry learning activities and reduce the role of teachers, so that students play a more active role. In addition, LKPD can also improve students' scientific literacy skills and can be adjusted to the needs and circumstances of students (Izatunnisa, 2021).

Based on the results of interviews conducted with chemistry subject teachers, it was found that the teaching materials used in the chemistry learning process are still in the form of textbooks in the form of printed books which cause students to be less active and easily bored, which causes students' scientific literacy in chemistry to be still low. It was explained that using printed textbook teaching materials is far from satisfactory and the learning outcomes of students are still low. Previously, the class had used Student Worksheets (LKPD). In addition, information was obtained that it is highly recommended to integrate teaching materials in electronic form. The development of electronic teaching materials is expected to be more adaptive and friendly in its use. Therefore, it can be concluded that in chemistry learning it is very feasible to develop e-LKPD. Furthermore, it was also explained that in the chemistry subject, the material on reaction rate factors, students only know the points of the reaction rate factors without understanding the material more deeply. While the factors that affect the reaction

rate are materials that are directed to find out and do so that they can help students to apply the concepts that have been understood through scientific work (experiments) or even through group discussions (Fahrucah et al., 2012).

Based on the description that has been presented, the researcher is interested in developing teaching materials in the form of e-LKPD based Lesson Study For Learning Community (LSLC) on the material of reaction rate factors by utilizing group-directed technology.

METHODS

This research is a development research (Research and Development) with the aim of producing products e-LKPD based on LSLC on the material of reaction rate factors. Research and development is a research method to develop and test products that will later develop in education (Maydiantoro, 2021). This study uses the ADDIE development model developed by Lee and Owens (2004) (Rozi & Utami, 2023). According to researchers Rozi & Utami (2023), the Lee & Owens Model carries five steps in the research and development procedure, namely assessment/analysis (assessment/analysis) which includes needs analysis (needs assessment) and initial final analysis (front end analysis), design (design), development (development), implementation (implementation), and evaluation (evaluation). The following is the Lee & Owens stage scheme which can be seen in Figure 1:

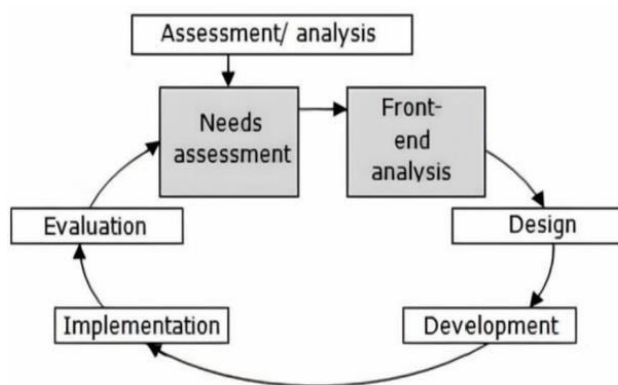


Figure 1. Lee & Owens (2004) development model

The first stage is analysis, the analysis stage consists of needs analysis, student characteristics analysis, objectives analysis, materials analysis and educational technology analysis. The purpose of this stage is to determine the needs of the learning process and obtain information about the product to be developed. The next stage is the design stage including team formation, research schedule, material structure, making flow chart, And storyboard. Next is development, what is important in this stage is validation carried out by the validator which aims to assess the feasibility of the product conceptually or theoretically. Input and suggestions provided by the validator, namely the material expert validator and media expert, are used by researchers as a reference for revision materials to produce teaching materials. e-LKPD based Lesson Study For Learning Community (LSLC) which is appropriate, apart from that, an assessment is also carried out by chemistry subject teachers to determine the practicality of teaching materials and determine the suitability of teaching materials so that they can be implemented in learning.

After the product is declared feasible by the validator and assessed by the teacher, the next stage is the implementation stage where the product is tested on a small group of 10 students. The last stage is evaluation, the evaluation used is formative evaluation which is carried out during teaching materials development processe-LKPD based on LSLC with the aim of evaluating input suggestions or product improvements made by media experts and material experts during product validation. Expert comments, suggestions or input are used to revise the product. In order to obtain a valid and feasible product. This research was conducted at SMAN 1 Muaro Jambi, with the research subjects being students of class XI Phase F-4 for small group trials totaling 10 people with varying levels of collaboration abilities. For more details, it can be seen in Figure 2 regarding the development procedure e-LSLC-based LKPD:

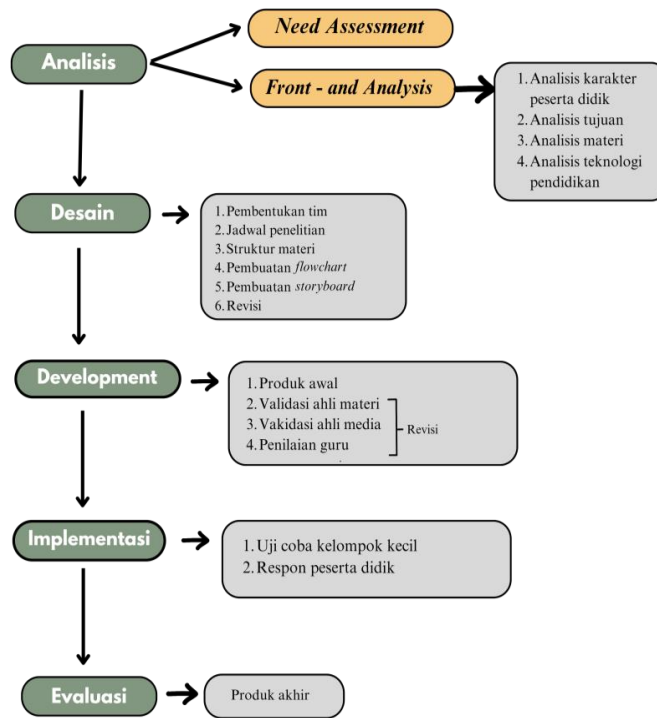


Figure 2. Development Proceduree-LKPD

The data instruments used in this study were teacher interview sheets to obtain the results of the needs analysis, then the material expert validation instrument consisting of aspects of content feasibility, presentation, language, and graphics, then the media expert validation instrument consisting of aspects of language and graphic feasibility. Teacher assessment instruments and student response instruments to determine the practicality of the developed teaching materials.

Teaching materials e -LKPD based on LSLC which will be developed by researchers will be tested for validity first by a team of material experts and media experts, after validation, the teaching material product that will be developed by the researcher will also be assessed for its practicality using a questionnaire.teacher assessment and student responses. The results of the validation data and practicality values in this development research 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. Assessment criteria for the material expert and media expert questionnaires

Average answer score	Criteria
> 4.2 – 5.0	Very Worthy (SL)
> 3.4 – 4.2	Eligible (L)
> 2.6 – 3.4	Fairly Decent (CL)
> 1.8 – 2.6	Not Worthy (TL)
1.0 – 1.8	Totally Unfit (STL)

Table 2. Teacher questionnaire assessment criteria

Average answer score	Criteria
> 4.2 – 5.0	Very Good (SB)
> 3.4 – 4.2	Good (B)
> 2.6 – 3.4	Good Enough (CB)
> 1.8 – 2.6	Not Good (TB)
1.0 – 1.8	Very Bad (STB)

Table 3. Assessment criteria for student response questionnaires

Score value (%)	Criteria
> 81 – 100	Very Good (SB)
> 61 – 80	Good (B)
> 41 – 60	Good Enough (CB)
> 21 – 40	Not Good (TB)
0– 20	Very Bad (STB)

RESULTS AND DISCUSSION

Teaching material e-LKPD based Lesson Study For Learning Community is an electronic teaching material that contains materials and discussion questions that help students find concepts and understand materials, especially materials on reaction rate factors. Teaching materials can also help students understand the concepts of the lessons taught well and improve students' memory of learning (Widodo & Jasmani, 2008). Development e-LKPD is conducted by following the Lee & Owens development model. This development model has five research steps, namely analysis (analysis), design (design), development (development), implementation (implementation), and evaluation (evaluation).

The first stage is analysis, it was analyzed that as many as 51.5% of students do not like chemistry learning. As many as 94.3% of students like group learning and 99% of students are happy if learning is done in groups and working together, especially in chemistry learning. In the material on reaction rate factors, it was seen that 97.1% of students would find it easier to understand the material if the implementation was carried out in small groups (Sukmawati & Ghofur, 2023).

The design process is the design of the product e-LKPD is made as attractive as possible which will be developed later. The e-LKPD design is adjusted to its components including the title, learning instructions, competencies achieved, supporting information, assignments, and assessments (Wahyuni et al, 2021).

After the product design is complete, the next stage is product development. At this stage, the initial product is created based on flow chart and storyboard previously designed. The initial product is then validated by material and media experts to assess the quality and feasibility of the product. The validation results are used as a reference for making product improvements. Based on suggestions and input from experts, the product is then revised and improved to produce a better product that is worthy of being tested.

Expert Validation Results

Based on table 4, it can be seen that the teaching material e-LKPD based on LSLC developed for the material of reaction rate factors is declared very feasible in terms of material with an average of 4.9 and also media experts with an average validity of 4.7 so that the developed teaching materials are feasible to be used as a support for the learning process. These results were obtained from processing the validation questionnaire values given to the validator with revisions of 2 times each.

Table 4. Validation results from material experts and media experts

Validators	Average Score
Media Expert	4.9
Subject Matter Expert	4.7
Criteria	Very Worth It

Teacher Assessment Results

Table 5. Teacher assessment results

Aspect	Average Score
Accurate (<i>Accuracy</i>)	4.8
Feedback (<i>Feedback</i>)	4.5
Control in learning (<i>Learning Control</i>)	4.5
Prerequisite skills (<i>Prerequisites</i>)	4.5
Easy to use (<i>Easy to use</i>)	5
Special view (<i>Special features</i>)	4.7
Average	4.6

Criteria	Very good
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Based on the results of the teacher assessment instrument for the producte-The developed LKPD obtained a total score of 70 with an average overall score of 4.6 which is seen from the interval >4.2 - 5.0 with the category "very good". The comments from the teacher were that the suitability of the color design and images was quite good and attractive. Based on the data from the assessment results of the chemistry teacher, it can be seen that there was a revision, namely the addition of a YouTube link about the material on reaction rate factors so that students can understand better by watching the video. The addition of a video link one-LKPD makes students better understand the material presented, the use of audio-visual media in learning can improve students' understanding of the material presented (Novitasari & Puspitawati, 2022).

Small Group Trial Results

Table 6. Small group trial results

Test	Total Score	Average Score
Small group trials	671	89.47%
Criteria		Very good

The next stage is implementation, a product trial is conducted in a small group of 10 students. Small group trials are conducted on students with varying levels of collaboration abilities who are directly selected by their chemistry teacher. In the trial process, the developer provides teaching material products.e-LKPD via groupwhatsappin PDF format to students so that they can be opened on their respective Androids via the application.WPS Office. After that, the researcher gave directions to the students on how to usee-LKPD. Next, students are invited to operate e-LKPD.

After students operate the teaching material producte-LKPD, students are asked to fill out the distributed student response questionnaire. Based on the calculation, the percentage of all respondents' answers was 89.47%, this value is in the range of 81%-100% with the criteria of "Very Good". The results of the student responses show thate-This LKPD has a very good category, and can be used by all students with varying levels of ability. Judging from the results of the response e-LKPD can provide benefits that are usede-LKPD in learning has an impact on students' learning activities becoming more enjoyable, learning becomes interactive, provides opportunities for students to practice and motivates students in learning (Puspita et al., 2021).

The last stage is evaluation, at this evaluation stage, it is carried out with the aim of reviewing the product that is in accordance with the initial expectations desired. The evaluation in this study is formative in nature which is carried out at every stage, both at the analysis, design, development, and implementation stages. This evaluation functions to correct deficiencies that contained in teaching materialse-LKPD basedLesson Study For Learning Communityon the material of reaction rate factors to make it better and more feasible.

CONCLUSION

Based on research results and discussions related to product development e-LKPD based Lesson Study For Learning Community(LSLC) on the material on reaction rate factors, the following conclusions can be drawn:

1. Development process e-LKPD basedLesson Study For Learning Community(LSLC) on the material of reaction rate factors was developed using the Lee and Owens development model where this model has 5 main stages, namely: (1) The analysis process is carried out by analyzing needs, student characteristics, objectives, materials, and technology used; (2) The design stage includes team formation, determining research schedules, product specifications, material structures, making flowcharts and storyboards; (3) The development stage, the product creation process and validation are carried out by a team of experts (4) The implementation stage involves product trials to obtain responses from students; (5) The final stage, the evaluation goes according to plan to assess the quality of the product being developed.
2. Eligibility e-LKPD basedLesson Study For Learning Community(LSLC) on the reaction rate factor material that has been developed is stated to be very feasible based on the validity of material experts with an average score of 4.9 and media experts with an average score of 4.7.
3. Teacher assessment of development e-LKPD basedLesson Study For Learning Community (LSLC) on the material on reaction rate factors that has been developed, the practical criteria obtained

from the assessment of chemistry subject teachers were stated to be very good with an average score of 4.6.

4. Student responses to e-LKPD based Lesson Study For Learning Community (LSLC) on the reaction rate factor material that has been developed obtained a good response percentage with the results of the questionnaire percentage of 89.47% in the very good category.

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