DEVELOPMENT OF INQUIRY-BASED STUDENT WORKSHEETS ON ECOSYSTEM MATERIALS FOR THE HIGH SCHOOL LEVEL

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Abstract	This study aims to develop inquiry-based student worksheets to improve students' critical thinking skills and learning motivation. This development research uses the ADDIE (analysis, design, development, implementation, and evaluations) method. The development of inquiry-based student worksheets is developed on ecosystem materials. The results of the development of inquiry-based Student Worksheets with validity tests obtained an average score of 3.58 with very valid categories, so they have excellent quality and are worthy of use. The results of the development of student worksheets and the teacher response practicality test obtained an average score of 92.83 in the very practical category. From the results of the practicality test obtained, inquiry-based Student Worksheets have very practical qualities. The results of the development of inquiry-based student worksheets have a significant influence on improving students' critical thinking skills and learning motivation with a test significance value of t $0.000 < 0.005$. The results of the t-test on improving students' critical thinking skills showed a mean statistics percentage of 83.12 very critical categories. The results of the t-test on increasing student learning motivation showed a mean statistics percentage of 82.8 categories of highly motivated.
Keywords	Worksheets, Inquiry, Ecosystems, Critical Thinking, Learning Motivation

INTRODUCTION

This 21st-century learning is learning that integrates literacy skills of knowledge, skills, and attitudes, as one of the knowledge skills that students are required to have in 21st-century learning is the ability to think critically. Critical thinking ability is one of the higher-order thinking abilities that invites students to become active learners because students perform the ability to analyze, evaluate and create (Coklin, 2012). The ability to think critically must be trained in students so that students' critical thinking skills are very important in ensuring learning success (Alfonso, 2015). Based on the theory of the experts above, it can be said that critical thinking is one of the essential abilities for students to succeed in learning.

Critical thinking ability is related to learning motivation because highly motivated students can produce high critical thinking skills (Sri, 2017). Based on the results of observations and interviews with one of the biology teachers of class X MIPA SMAN 1 Minas, it is known that students critical thinking skills and learning motivation are still low. This is due to teacher-centered learning activities and still orienting students to the ability to remember, understand and apply concepts. Low critical thinking skills and student learning motivation can be caused by less innovative learning. This is related to teaching materials or media as well as learning models used in the learning process. Based on the results of observations and interviews with biology teachers at SMAN 1 Minas, it is known that biology teachers use teaching materials in the form of worksheets available from teacher deliberations; there have been no innovations in the learning process. There is a paradigm that, so far, what has been made is only limited to questions that do not show the activities of students in thinking at a high level, monotonous questions, and unattractive appearances that make students saturated in learning (Suryani et al., 2019). Student worksheets can be developed by teachers as facilitators to support learning in the classroom (Widjajanti, 2008). The purpose of developing this student worksheet is to improve students' critical thinking skills and learning motivation. Students' critical thinking skills can be trained through teaching materials, one of which is worksheets (Shanti et al., 2018). this serves to add and explore students' knowledge about the material provided because, in it, there are components that have been formed to aim to provide motivation or attraction in the form of problems related to daily activities (Pratama & Siragar, 2019).

Ecosystem learning includes biology material in KD 3.10 which requires students to be able to analyze the components of the ecosystem and all the interactions that take place in it. In the material ecosystem, students are directed to find out and do, thus requiring students to think

critically, which can help students gain a deeper understanding of the material (Indah et al., 2009). This can be done using a learning model that requires students to think critically. One of the related learning models is the inquiry learning model (Budiono, 2020). The learning model that supports students' critical thinking skills in the development of student worksheets is an inquiry with the aim of training and inviting students to directly search and find for themselves the answer to a problem in question (Hamruni, 2012). The inquiry learning model of students is required to learn independently or in groups by applying critical thinking skills (Kristanto& Susilo, 2015). There are six steps of the inquiry learning model, namely, orientation, formulating problems, formulating hypotheses, collecting data, testing hypotheses, and formulating conclusions (Sanjaya, 2015).

The research conducted by Mariana &Sukarman (2020) is the development of Student Worksheets on human reproductive system material class XI SMA. The results showed that the development of inquiry-based LKPD is suitable for use as a learning resource, especially in biology subjects. In terms of the feasibility aspect of the material, with a value of 89% of the very decent category, the language aspect, with a value of 91.25% of the category is very feasible, the presentation aspect with a value of 86%, the category is very feasible, and the graphic aspect with a value of 91.25% the category is very feasible. The research conducted by I Made DarmaYase et al. (2020) was the development of Student Worksheets on circulation system material at SMA Negeri 5 Palangka Raya. The results showed that inquiry-based LKPD development results are suitable for use based on validation by material experts with 65% good criteria, learning media experts with 96% excellent criteria, linguists with 95% excellent criteria, and teacher responses with 77% excellent criteria, and student responses to LKPD developed by 85% excellent criteria. The research conducted by Rizayana (2014) was the development of inquiry-based Student Worksheets (LKPD) on the material of the respiratory system class XI SMA Negeri 4 Pekalongan. The study also showed that the development of inquiry-based student worksheets is feasible to be used as a learning resource by obtaining an average eligibility score from validators of 88.5% of very valid criteria. The research conducted by Nurhafizah et al. (2017) was the development of inquiry-based Student Worksheets on class XI MA Raudhatul Firdaus Kubu Raya cell material. The results showed that inquiry-based LKPD met the 94.05% validity criteria. The average validation assessment result was 94.05% with a very valid category, and the Large-scale student response was 78.03% with a valid category. Based on the results of the analysis of research data, shows that the resulting inquiry-based student worksheets are valid and suitable for use in learning cell material. The research conducted by Savitri

Herdianawati et al. (2013) was the development of inquiry-based Student Worksheets on biogeochemical recycled materials that were tested on students of SMA Negeri 1 Bangsal. Research shows that the validation results of LKPD 1 of 93.75% of categories are very feasible, and the validation results of LKPD 2 of 94% of categories are very feasible. Based on the results of the study, shows that the resulting inquiry-based LKPD is suitable for use in learning biogeochemical recycled materials.

Through some of the research above, it is known that the development of inquiry-based student worksheets was developed only to focus on seeing the results of validity tests and practicality tests in determining the quality of feasibility that has been produced. However, what distinguishes it in this is the development of LKPD applying an inquiry learning model with ecosystem material and focusing more on seeing the results of effectiveness towards improving students' critical thinking skills and learning motivation. Referring to what has been presented, researchers need to research "Inquiry-Based Student Worksheet Development (LKPD) on Ecosystem Materials to Improve Critical Thinking Ability and Learning Motivation of Class X SMA Students."

METHOD

The type of this research is research and development Using the method of certain products and testing the effectiveness of those products (Sugiono, 2011). The product that will be produced in this development research is inquiry-based LKPD. The inquiry-based LKPD development model used is the ADDIE model. ADDIE stands for analysis, Design, Development, Implementation, and Evaluation (Brach, 2009). According to Endang Mulyantiningsih (2011), the ADDIE development model is divided into 5 stages Analysis, Design, Development, Implementation, and Evaluation. The analysis includes the stages of curriculum analysis, material analysis, and teaching material analysis. The design includes an inquiry-based design stage. Development includes validity test and inquiry-based practicality testing. Implementation includes the stage of implementing inquiry-based LKPD to experimental classes. The overall evaluation stage of the achievement of use. This research was conducted at SMAN 1 Minas for two months. The types of data in this study are primary data and secondary data. Primary data is data on critical thinking ability and learning motivation. In this study, primary data sources for critical thinking skills were obtained directly from posttest data, while primary data for motivation were obtained directly from student learning motivation response questionnaires. Secondary data is supporting data from this research data obtained from

other and relevant sources. Secondary data sources are obtained from sources of scientific articles or scientific journals that have been researched by researchers or researchers before. The population in this study was all students of class X MIPA SMAN 1 Minas. The research sample consists of 2 classes, namely the experimental class and the control class. The experimental class consisted of 31 students, and the control class consisted of 31 students. Sample determination begins with conducting a prerequisite test after which random sampling is determined so that a research sample consisting of 2 classes is obtained, namely the control class and the experimental class. Data collection in this study used validation questionnaires, practicality questionnaires, posttest question instruments, and learning motivation questionnaires. Validation questionnaires are used to obtain the results of inquiry-based student worksheet quality assessments that have been developed by pedagogic experts, material experts, and media experts. Meanwhile, the practicality questionnaire is used to obtain the results of the practicality assessment after being assessed by the learning teacher. Then posttest questions made in the form of multiple-choice questions were used to see the effectiveness of the use of inquiry-based LKPD on students' critical thinking skills. Motivational questionnaires, it is used to see the effectiveness of using inquiry-based student worksheets on learning motivation. Data analysis was carried out on the results of the validity test, practicality test results, critical thinking post-test results, and student learning motivation response questionnaires. The questionnaires used are in the form of validation questionnaires, practicality questionnaires, and product trials. Validation sheets are given to pedagogical experts, material experts, and media experts to evaluate and provide input on the LKPD that has been developed. The LKPD validity analysis is established based on the percentage criteria presented in Table 1:

Table 1. Validity Criteria

No.	Average	Category
1.	3,25 – 4,00	Highly Valid
2.	2,50 – 3,24	Valid
3.	1,75 – 2,49	Invalid
4.	1,00 – 1,74	Highly Invalid

(Sugiyono, 2015)

The practicality questionnaire is used to see the practicality of the LKPD. The practicality analysis of LKPD is determined based on the percentage of criteria presented in the following Table 2.

Table 2. Practicality Criteria

No.	Grades	Criteria
1.	81 –100	Very practical
2.	61 – 80	Practical
3.	41 – 60	Quite Practical
4.	21 – 40	Impractical
5.	0 – 20	Very Impractical

(Riduan, 2016)

The way to process data after carrying out the pretest and postest is to use the SPSS program. Guidelines for making decision criteria on the value of the effectiveness of the pretest and Posttest can be seen in Table:

Table 3. Critical Thinking Ability Criteria

No.	Criteria	Category
1.	81% -100%	Very Critical
2.	66% - 80%	Critical
3.	56% - 65%	Moderately Critical
4.	41% - 55%	Less Critical
5.	0% - 40 %	Uncritical

(Arikunto, 2016)

The hypothesis test calculation in this study is an independent t-test assisted by SPSS statistics 20. The hypothesis test was carried out to determine the signification of the effective value of the use of inquiry-based LKPD on differences in improving critical thinking skills and student learning motivation. Hypothesis test using a t-test with a significance level of α=5% or 0.05. The hypotheses in this study are as follows:

Hipotesis Ha: Inquiry-based student worksheets on ecosystem materials are effectively used in improving the critical thinking skills and learning motivation of class X students.

Hipotesis Ho: Inquiry-based student worksheets on ecosystem materials are not effectively used in improving the critical thinking skills and learning motivation of grade X students.

FINDINGS AND DISCUSSION

Findings

Pedagogic Expert Validation Results

Validator assessment of LKPD includes material aspects, language aspects, presentation aspects, and characteristic aspects. The results are shown in the following table:

Table 4. LKPD Validation by Pedagogic Expert

No	Assessment Aspects	Average	Validation Categories
1.	Material Aspects	3,13	Valid
2.	Language Aspects	3,00	Valid
3.	Serving Aspects	3,29	Highly Valid
4.	Characteristic Aspects	3,15	Valid
Total Average		3,14	Valid

Based on the validation results above, the material aspect obtained an average value of 3.13 with valid categories, the language aspect of 3.00 with valid categories, the presentation aspect of 3.29 categories is very valid, and the Characteristic Aspect is 3.15 with valid categories. The results of pedagogic expert validation for the development of inquiry-based LKPD on KD 3.10 ecosystem material from 4 aspects obtained an overall average value of 3.14 is a valid category. These results show that the quality of LKPD that has been developed in terms of pedagogic is by material aspects, language aspects, presentation aspects, and aspects of LKPD characteristics.

Material Expert Validation Results

Validation of the material expert in this LKPD validation, is a lecturer in Biology Education at Riau University, namely Dr. Darmadi, M.Si. Material validation is an assessment related to the material from the LKPD developed. Based on data analysis, the results can be summarized based on table 5 below:

Table 5. Recapitulation of Average Material Expert Validation Score

No	Assessment Aspects	Average	Category
1.	Content Eligibility Aspects	3,90	Highly Valid
2.	Language Eligibility Aspects	3,60	Highly Valid
3.	Feasibility Aspects of Material Presentation	3,80	Highly Valid

Based on the validation results from material validators the content feasibility aspect obtained an average score of 3.90 for very valid categories, the language feasibility aspect obtained a value of 3.60 for very valid categories, and the material presentation aspect obtained a very valid value of 3.80 for categories. The overall results of material expert validation for the development of inquiry-based LKPD on KD 3.10 ecosystem materials from 3 aspects obtained an average value of 3.77 with a very valid category. The results of the validation of material experts can be concluded that the quality of inquiry-based LKPD that has been developed is by the aspects of content, language feasibility, and presentation of the material and is worth testing.

Media Expert Validation Results

Validation The media expert in this LKPD is a lecturer in Biology Education at LancangKuning University, namely Mar'atulAfidah, M.Pd. for the data obtained based on the following table:

Table 6. Material Expert Validation Results

No	Assessment Aspects	Average	Category
1.	Aspects of Size Desian	3,50	Highly Valid
2.	Cover Design Aspects	3,75	Highly Valid
3.	Content Design Aspects	3,63	Highly Valid

Based on the validation results of media experts for the development of inquiry-based LKPD on the design aspects of the LKPD size obtained an average of 3.50 with very valid categories, the LKPD cover design aspects obtained by 3.75 very valid categories, the LKPD content design aspects obtained by 3.63 very valid categories. The overall results of media expert validation for the development of inquiry-based LKPD on KD 3.10 ecosystem materials from 3 aspects were obtained in 3.83 very valid categories. Validation from the media expert can conclude that the inquiry-based LKPD developed is by the aspects of size, aspects of cover design, and content design and can be used in learning.

Inquiry-based LKPD Validation Recapitulation

The following will be presented as a recapitulation of the results of validation by validators. The data below is taken from the results of validation by material experts, media experts, and pedagogics. From the existing data, it will be analyzed to see whether the inquiry-based LKPD developed is valid and whether the next research process can be carried out. The recapitulation of validation results by validators can be presented in Table:

Table 7. Recapitulation of Validation Results by Validators

Pedagogic Expert	Material Expert	Media Expert	Average	Category
3,14	3,77	3,83	3,58	Highly Valid

Table 7 shows that the recapitulation of validation results by validators obtained an average of 3.58 highly valid categories. Based on the results of the validation recapitulation, it can be said that LKPD is based on meeting various requirements on pedagogic aspects, material aspects, and media aspects.

Practicality Test

Practicality is related to the ease of using inquiry-based LKPD on ecosystem materials. Data collection was carried out through questionnaires filled out by 2 biology subject teachers at SMAN

1 Minas. The results of the teacher's response to the practicality of inquiry-based LKPD can be presented in the following Table:

Table 8. Practicality Test Results

No.	Aspects	Average	Category
1.	Content	95%	Very practical
2.	Language	95%	Very practical
3.	Servings	90%	Very practical
4.	Total Average	92,83%	Very practical

The table above shows that the results of inquiry-based LKPD practicality obtained an average of 92.83% categorized as very practical. The teacher responded that inquiry-based LKPD provides convenience in understanding the material, the use of LKPD according to the allocation of available time, the appearance and illustration of images according to the description of the material, the language used is easy to understand, and accordance with the enhanced spelling.

Students' Critical Thinking Ability

The indicators of critical thinking ability measured in this study are interpretation, analysis, evaluation, inference, explanation, and self-regulation. Students' critical thinking results were obtained through posttest data conducted for control and experimental class students. The results of students' critical thinking skills can be presented in the table below:

Table 9. Postes Values Critical Thinking Students Control and Experiment Classes

No.	Indikator	Control	Category	Experiment	Category
1.	Interpretation	60,39	Kritis	83,86	Very Critical
2.	Analysis	61,85	Kritis	82,27	Very Critical
3.	Evaluation	62,37	Kritis	89,23	Very Critical
4.	Inference	64,5	Kritis	82,25	Very Critical
5.	Explanation	61,05	Kritis	82,12	Very Critical
6.	Self-regulation	61,3	Kritis	80,6	Very Critical
7.	Average	61,91	Kritis	83,39	Very Critical

Based on Table 9, you can see the posttest values of control classes and experimental classes on each indicator of critical thinking ability. The explanation of the student's critical thinking ability in each indicator is as follows:

1. Indicators of interpretation

The interpretation indicators for the control class obtained a posttest value of 60.39 critical categories and the experimental class obtained a posttest value of 83.86 very critical categories. The posttest value for the experimental class is higher than that of the control class. This is because the experimental class benefits from the use of inquiry-based LKPD during the learning process so that

critical thinking skills are high in these aspects of interpretation. Interpretation is the ability to categorize problems, defining characteristics, and classify meanings well (Zhou et al., 2013). Meanwhile, the value of the control class on the interpretation aspect looks lower than that of the experimental class. This is due to the conventional learning method of the control class.

2. Analytical indicators

The analysis indicators for the control class obtained a posttest value of 61.85 critical categories and the experimental class obtained a posttest value of 82.27 very critical categories. This is because the experimental class using inquiry-based LKPD can think critically about the analysis aspect. Meanwhile, the control class does not get a treatment that trains students to think critically about this aspect of the analysis.

3. Evaluation indicators

The evaluation indicators for the control class obtained a posttest value of 62.37 critical categories and the experimental class obtained a posttest value of 89.23 very critical categories. The posttest value for the experimental class is higher than that of the control class. This is because the experimental class students during the learning process use inquiry-based LKPD which triggers students to think critically about the evaluation aspect. Where inquiry-based LKPD can guide student activities on how to assess the credibility and logically predict the relationship of a statement based on critical thinking ability. Evaluation is the ability to access the credibility of statements/representations and be able to logically access the relationship between statements, descriptions, questions, and concepts (Facione, 2015). Meanwhile, the control class in the evaluation aspect has not been skilled in accessing logically the relationship of a concept. This is because the control class during the learning process has not been given a treatment that guides student activities so students seem to find it difficult to produce logical reasoning in stating the relationship of a concept.

4. Inference indicators

The inference indicator for the control class obtained a value of 64.5 critical categories and the experimental class obtained a posttest value of 82.25 very critical categories. The value of the experimental class is higher than that of the control class. This is because the experimental class using inquiry-based LKPD can hypothesize the formulation of the problem that has been proposed in the LKPD. Meanwhile, control classes with conventional learning are only able to understand the form of problem formulation but it is difficult to find a hypothesis.

5. Explanatory indicators

The explanatory indicator obtained a posttest value of 61.05 critical categories and the experimental class obtained a posttest value of 82.12 very critical categories. The experimental class obtained a higher score than the control class. This is because the students of the experimental class are skilled in logical arguments concepts whereas experimental class students give arguments based on complete sources of information or data and strong evidence. Whereas the control class is still less skilled at generating logical reasoning included in the investigation of relevant information.

6. Indicators of self-regulation

The control class self-regulation indicator obtained a posttest value of 61.3 critical categories and the experimental class obtained a posttest value of 80.6 very critical categories. The experimental class is higher than that of the control class. This is because the experimental class has excellent cognitive activity on self-regulation indicators. Cognitive activity in the aspect of Self-regulation triggers students to be able to process information obtained or existing based on student knowledge. The overall indicators of students' critical thinking ability for the control class obtained a posttest average score of 61.91 critical categories and the experimental class obtained a posttest average of 83.39 very critical categories. Based on the posttest average value of the control class and experiments showed that the average posttest of the experiential class was higher than that of the control class. This shows that the use of inquiry-based LKPD in experimental classes can improve students' critical thinking skills. This is in line with Rodliyah's opinion (2016) stating that inquiry-based student worksheets can improve students' critical thinking skills.

7. Test the Hypothesis of Critical Thinking Ability

Hypothesis testing is carried out to obtain conclusions on the results of research that has been carried out. To conduct a hypothesis test, prerequisite tests are first carried out, namely the normality test and the homogeneity test. The results of the normality test on the hypothesis test can be presented in the Table:

Table 10. Normalias Shapiro-Wilk Test Value

No.		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
1.	Posttest Kontrol	,073	31	,200[*]	,984	31	,903
2.	Posttest Eksperiment	,079	31	,200[*]	,965	31	,392

The results of the post-test data normality test for the control class obtained a significance value of 0.903 greater than 0.05. The results of the normality test value for the experimental class post-test data obtained a significance value of 0.392 greater than 0.05. Normality test results for the control and experimental classes obtained significance level values (2-tailed) > 0.05. Based on the results of normality tests for control classes and experiments, it can be concluded that they are normally distributed. Then a homogeneity test is performed to find out whether the data has a homogeneous variance or not. The results of the homogeneity test on the hypothesis test can be presented in the Table:

Table 11. Homogeneity Test Value

No			Levene Statistic	df1	df2	Sig.
1.		Based on Mean	2,414	3	120	,070
2.		Based on Median	1,852	3	120	,141
3.	Result	Based on the Median and with adjusted df	1,852	3	106	,142
4.		Based on trimmed mean	2,472	3	120	,065

The homogeneity test results obtained a significance value of 0.070 greater than 0.05. Based on the results of the homogeneity test, it can be concluded that the control class and the experiment have a homogeneous variance. After the normality and homogeneity test, the hypothesis test carried out is the independent t-test for students' critical thinking variables. The t-test was performed on the post-test data of the control class and the experimental class. The results of the critical thinking t-test can be presented in Table:

Table 12. Independent Test T-Test Critical Thinking

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Posttest Control	Equal variances assumed	5,538	,122	-17,810	60	,000	-21,9258	1,2311	-24,3884	-19,4632
Posttest Experiment	Equal variances not assumed			-17,810	52,802	,000	-21,9258	1,2311	-24,3953	-19,4563

Table 12 shows that the t-test scores of control and experimental class students obtained a sig(2-tailed) value of 0.000 < a sig of 0.005. Based on the conclusion of the hypothesis shows that an independent t-test with a significance level (2-tailed) smaller or less than the sign of 0.005 then Ho is rejected and Ha is accepted. This means that inquiry-based LKPD on ecosystem materials is effectively used in improving the critical thinking skills of class X students. The basis for concluding critical thinking hypotheses is that:

a. If the independent t-test score shows a significance (2-tailed) level of < 0.005 then Ha is accepted and Ho is rejected meaning that LKPD based on inquiry effectively improves students' critical thinking skills.

b. If the independent t-test score shows a significance (2-tailed) level of > 0.005 then Ho is accepted and Ha is rejected meaning that inquiry-based LKPD does not effectively improve students' critical thinking skills.

8. Student learning motivation

The learning motivation of students is measured using a questionnaire compiled based on learning motivation indicators consisting of the desire and desire to succeed, the presence of encouragement and needs in learning, the existence of hopes and ideals for the future, the appreciation of learning, the existence of interesting activities in learning and the existence of a conducive learning environment (Uno, 2009). The questionnaire aims to see the learning motivation of students in control classes and experimental classes. The results of the learning motivation of students of control classes and experimental classes can be presented in the following Table:

Table 13. The Value of Learning Motivation of Control and Experimental Class Students

No.	Indicators	Control	Category	Experiment	Category
1.	Passion for learning	68%	Motivated	83%	Highly Motivated
2.	Encouragement of learning	67%	Motivated	83%	Highly Motivated
3.	Hopes and ideals	68%	Motivated	82%	Highly Motivated
4.	Learning awards	66%	Motivated	83%	Highly Motivated
5.	Interesting activities	70%	Motivated	83%	Highly Motivated
6.	Learning environment	69%	Motivated	82%	Highly Motivated
7.	Average	68%	Motivated	82,8%	Highly Motivated

Based on the table above, it can be seen the value of the motivation to learn between the control class and the experimental class. The explanation of student learning motivation for each indicator is as follows:

1. The existence of desire and desire to succeed

   The aspect of the existence of desire and desire succeeded for the control class obtained an average score of 68% in the motivated category and the experimental class obtained an average of 83% in the highly motivated category. The experimental class is higher compared to the control class. This is because experimental classes with the help of inquiry-based LKPD can foster a high desire for students to succeed in the face of learning difficulties. The existence of curiosity will encourage students to fulfill their curiosity so that it will lead students to the process of searching and finding (Ameliah et al., 2016). Whereas in control class when students find difficulties in learning, students quickly cause desperate desires.

2. There is a drive and a need in learning

   The drive and need aspects of learning for the control class obtained an average of 67% of the motivated category and the experimental class obtained an average of 83% of the highly motivated category. The experimental class is higher compared to the control class. This is because the experimental class using inquiry-based LKPD can show a very high curiosity to find information for yourself to add insight and knowledge. In contrast control classes during learning are when the teacher allows asking questions but students do not show the desire to ask questions or to find information.

3. The existence of hopes and ideals of the future

   Aspects of future expectations and ideals for the control class obtained an average of 68% of the motivated category and the experimental class obtained an average of 82% of the highly motivated category. The experimental class is higher compared to the control class. This is because the experimental class using inquiry-based LKPD can arouse the determination of the experimental class students in realizing learning goals. The use of inquiry-based LKPD is a concern for students in generating learning motivation. In contrast to control, classes are only motivated to learn but with less effort and perseverance in the hope of obtaining better results.

4. There is a learning award

   Aspects The learning rewards for the control class obtained an average of 66% of the motivated category and the experimental class obtained an average of 83% of the highly motivated category. The experimental class has the highest average score compared to the control class. This is because the experimental class on the use of inquiry-based LKPD has a reward or value at the end of the learning.

5. The existence of interesting activities in learning

An interesting aspect of activity in learning for the control class obtained an average of 70% of the motivated category and the experimental class obtained an average of 83% of the highly motivated category. The experimental class is higher than that of the control class. This is because experimental classes using inquiry-based LKPD can encourage the formation of great attraction to learning activities. Activities in LKPD can encourage and inspire students to be able to understand, apply and develop rational and objective thinking patterns in responding to learning substances or materials (Kemendikbud, 2013). As for the control class, the use of LKS only involves student activities in pursuing question assignments. The control class feels bored doing the problem assignments on the worksheet.

6. There is a conducive learning environment

In the aspect of the learning environment conducive to the control, the class obtained an average of 69% and the experimental class obtained an average of 82% in the highly motivated category. The experimental class is higher than that of the control class. This is because the use of inquiry-based LKPD in experimental classes using inquiry-based LKPD can create a good learning atmosphere. Experimental class students during learning using inquiry-based LKPD did not cause social jealousy towards students. Students of the experimental class showed more comfort and fun in doing learning activities. Meanwhile, in the control class, the learning atmosphere of students tends to be less conducive which is characterized by students lacking concentration and enthusiasm for learning. The overall score of student learning motivation indicators for the control class obtained an average of 68% in the motivated category and the experimental class obtained an average of 82.8% in the highly motivated category. The results of the overall score of learning motivation showed that the experimental class was higher than the control class. The hypothesis test carried out is a t-test for student learning motivation variables. The t-test was carried out on the data on the learning motivation value of control and experimental class students. The results of the student learning motivation t-test can be presented in the following table:

Table 14. Test the Hypothesis

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
									Lower	Upper
After the experimental class	Equal variances assumed	,705	,404	-26,521	60	,000	-15,2516	,5751	-16,4019	-14,1013
	Equal variances not assumed			-26,521	59,815	,000	-15,2516	,5751	-16,4020	-14,1012

Table 14 shows that the t-test values after learning the experimental class and control class obtained a sig(2tailed) of 0.000 < a sig of 0.005. Based on concluding the hypothesis shows that an independent t-test with a significance (2-tailed) level smaller or less than the sign of 0.005 then Ho is rejected and Ha is accepted. This means that inquiry-based LKPD on ecosystem materials is effectively used in increasing the learning motivation of class X students. The basis for concluding the learning motivation hypothesis is that:

1. If the independent t-test score shows a significance level (2-tailed) < 0.005, then Ha is accepted, and Ho is rejected, meaning that LKPD based on inquiry effectively increases student learning motivation.

2. If the independent t-test score shows a significance (2-tailed) level of > 0.005 then Ho is accepted and Ha is rejected meaning that inquiry-based LKPD does not effectively increase student learning motivation.

Discussion

Rizayana's research (2014) development of inquiry-based student worksheets was developed on respiratory system material to determine the feasibility of material, media, and language at the validity test stage. Research conducted by Nurhafizah et all (2017) developed inquiry-based Participant Worksheets developed on cell material to determine the validity criteria of student responses. Research conducted by Savitri Herdianawati et all (2013) on the development of inquiry-

based Student Worksheets was developed on biogeochemical recycled materials to determine the validation results of LKPD 1 and the validation results of LKPD 2. Meanwhile, in this study, inquiry-based LKPD was developed on ecosystem material. The LKPD that has been developed is tested for validity and practicality, then implemented to determine the improvement of students' critical thinking skills and learning motivation. The implementation results show that inquiry-based LKPD on ecosystem materials is known to improve students' critical thinking skills and learning motivation.

CONCLUSION

The results showed that cycle II learning with static fluid material obtained an average student learning outcome score of 86.09 with classical completeness of 100% and an N-Gain Score of 0.60. That is the predetermined indicator of research success in previous planning that says that the learning outcomes of students' science process skills are in a good category with classical 85% having been achieved and exceeded. Thus, it can be concluded that "The application of the Discovery Learning learning model to improve the science process skills of class XI MIPA 1 SMA Negeri 1 Onohazumba students is effectively used so that the cycle is stopped."

1. The results of the development of inquiry-based Student Worksheets (LKPD) have very good quality, this is seen from the validity test which obtained an average score of 3.58 with a very valid category so that it is feasible to use.

2. The results of the development of student worksheets in the teacher response practicality test obtained an average score of 92.83 in very practical categories and the response test students obtained an average score of 85.7 in very practical categories. From the results of the practicality test obtained, inquiry-based Student Worksheets have very practical quality.

3. Inquiry-based Student Worksheets (LKPD) have a significant influence on student's critical thinking ability with a t-test mean of 83.12 for very critical categories.

4. Inquiry-based Student Worksheets (LKPD) have a significant influence on student learning motivation with a t-test mean of 82.8 highly motivated categories.

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