THE DEVELOPMENT OF STUDENT WORKSHEET BASED ON DISCOVERY LEARNING OF NERVOUS SYSTEM MATERIAL TO TRAIN CRITICAL THINKING SKILLS OF 11TH GRADE STUDENTS

Pengembangan LKPD Berbasis Discovery Learning pada Materi Sistem Saraf untuk Melatih Kemampuan Berpikir Kritis Siswa Kelas XI

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Abstract

Critical thinking is one of the demands of 21st-century learning, the lack of teaching materials that train critical thinking skills and conventional learning results in low student learning outcomes. This study aims to produce a student worksheet of Discovery Learning-based on Nervous System material to train the critical thinking skills students of grade 11th with the valid, practical, and effective. This type of research was a development research with the ADDIE model, the data collection method uses validation methods for the level of validity, observation and questionnaire methods for the level of practicality, and test methods for the level of effectiveness, which were analyzed using qualitative and quantitative descriptive methods. The average validation result was 3.87, with very valid criteria. The results of practicality based on the implementation of learning were 96,87% and based on the results of questionnaires of 97%, both them got very practical criteria. The effectiveness results based on the completeness of learning outcomes of 100% with an average score of 91.5 are included in the effective criteria, then based on critical thinking skills by 90% on the indicators of critical thinking interpretation, and 93.75% on the indicators of critical thinking analysis and inference, with a very high category. It can be concluded that the developed student worksheet is valid, practical, and effective.

Keywords: critical thinking**,** nervous system,student worksheet, discovery learning,.

Abstrak

Berpikir kritis merupakan salah satu tuntutan dari pembelajaran abad 21, kurangnya bahan ajar yang melatihkan kemampuan berpikir kritis dan pembelajaran yang konvensional mengakibatkan rendahnya hasil belajar siswa. Penelitian ini bertujuan untuk menghasilkan LKPD berbasis Discovery Learning materi Sistem Saraf untuk melatih kemampuan berpikir kritis siswa kelas XI yang valid, praktis, dan efektif. Jenis penelitian ini adalah penelitian pengembangan dengan model ADDIE, metode pengumpulan data menggunakan metode validasi untuk tingkat validitas, metode observasi dan angket untuk tingkat kepraktisan, dan metode tes untuk tingkat keefektifan yang dianalisis menggunakan metode deskriptif kualitatif dan kuantitatif. Hasil rata-rata validasi sebesar 3,87 dengan kriteria sangat valid. Hasil kepraktisan berdasarkan keterlaksanaan pembelajaran sebesar 96,87%, berdasarkan hasil angket sebesar 97% keduanya mendapatkan kriteria sangat praktis. Hasil keefektifan berdasarkan ketuntasan hasil belajar sebesar 100% dengan rata-rata nilai 91,5 termasuk dalam kriteria efektif, kemudian berdasarkan keterampilan berpikir kritis sebesar 90% pada indikator berpikir kritis interpretasi, dan 93,75% pada indikator berpikir kritis analisis dan inferensi, dengan kategori sangat tinggi. Dengan demikian dapat diperoleh kesimpulan bahwa LKPD yang dikembangkan valid, praktis, dan efektif.

Kata Kunci: berpikir kritis, discovery learning,LKPD sistem saraf,

INTRODUCTION

Learning in 21st century requires students to have 4C skills, including creative thinking, critical thinking, communication, and collaboration skills (Partono et al., 2021). Critical thinking is one of the skills required in the 21st century learning process. Critical thinking refers to a

skill for conducting various analyses, assessments, evaluations, reconstructions, and decision-making that leads to rational and logical actions (Redhana, 2019).

Facione (2015) states that there are six critical thinking indicators, namely interpretation, analysis, inference, evaluation, explanation, and self-regulation. Critical thinking can be characterized by applying methods that have been studied correctly and carefully evaluating the description of the answers to the problem (Ennis, 2015). The teacher must be able to give much attention so that students can be involved in their critical thinking skills. However, many obstacles can be happened even though students' critical thinking skills can be trained by learning.

Biology, a science closely related to various events and occurrences in nature, often encounters obstacles in the learning process. These obstacles often result in less-than-optimal learning outcomes obtained by students. Based on interviews conducted with two biology teachers, information was obtained about one of the topics that are difficult for students to teach and learn, namely the Coordination System. This lesson plays a role in regulation in the human body, including the nervous system, hormones, and the senses. The main reason for the difficulty of conveying the material to students is the lack activities that can hone students' critical thinking skills so that student learning outcomes tend to be low.

The questionnaire results which were distributed during the pre-research in November-December 2022 with the target of class XI and XI I students, involved 46 respondents, where 76,1% of students experienced problems while studying the Coordination System chapter. As many as 66,7% of respondents also chose the Nervous System material as the most difficult to learn in the Human Coordination System chapter because the Nervous System material is comprehensive and a lot of new terms that are difficult to understand.

Diramita (2019) states that learning in the classroom tends only to be directed at students' abilities to memorize information so that students' critical thinking skills are not honed. These results were found in various obstacles in teaching and learning activities, one of which is not achieving optimal learning outcomes. The learning process is still dominated by the teacher's role in teaching a concept, so opportunities for students to be actively and critically involved are still not optimal. Therefore, learning activities developed by the government currently use a scientific approach. According to Prasetyawati (2016), the advantages of a scientific approach are making students more critical, productive, innovative, and creative in learning process.

The discovery learning model is a learning model with a scientific approach that can answer the needs of 21st-century education, one of which is critical thinking. It is the ability to analyze situations based on facts and evidence to obtain a conclusion (Agnafia, 2019). Moreover, Susilawati et al. (2020) also conveyed a similar statement that students' mastery of critical thinking can be developed through a learning process requiring students to seek, find, and solve the problems. The need to achieve mastery of students' critical thinking skills is following the definition and the learning syntax of the Discovery Learning model.

Discovery Learning is a learning model that helps students gain unknown knowledge, where students are stimulated to acquire concepts with various information or data by conducting observations or experiments (Nichen et al., 2018). Nahdlia and Budiyanto (2019) mentioned that Discovery Learning learning has several stages: providing stimulation, problem statements, data collection, data processing, verification, and generalization. Hosnan (2014) suggests several advantages of the Discovery Learning model, including the knowledge obtained through this model is very personal and strengthens memory, encourage students to think intuitively and formulate their hypotheses, and students are active in teaching and learning activities because they think and use their ability to find the result.

According to Khotimah and Suliyanah (2017), the facts on the field show that the teaching materials can still not train students' critical thinking skills properly, thus the teaching and learning process cannot occur optimally. These obstacles can be overcome by using teaching materials, such as Student Worksheets (*LKPD*). The Student Worksheet contains a set of essential activities that students must carry out to maximize understanding form basic abilities according to indicators of achievement of learning outcomes (Mustanir & Munandar, 2015). Student Worksheets in learning activities are expected to encourage students to learn more actively independently and hone critical thinking skills.

Student worksheet with Discovery Learning-based is expected to be a means for students to be more active and develop their critical thinking skills, which abilities can be honed through the syntax of the Discovery Learning model. This is supported by the results of research by Lestari and Utami (2017), which state that applying the Discovery Learning model in the learning process can improve students' critical thinking skills and conceptual understanding at SMPN 2 Blitar. Therefore, this study aims to produce student worksheet (*LKPD*)

based on Discovery Learning on the nervous system material to train valid, practical, and effective critical thinking skills of class XI students.

METHODE

This type of research was development research through the ADDIE development model (Analysis, Design, Development or Production, Implementation, and Evaluations). The validity of *LKPD* was viewed from the validation results of *LKPD* with validation sheet instruments, including component aspects of content, presentation, and linguistic assessed by three validators consisting of an education expert lecturer, a subject matter expert lecturer, and a high school biology teacher. Data were analyzed using a Likert scale and declared valid if they obtained a score of ≥2.51 (Riduwan, 2013).

LKPD that has been validated was then tested in a limited manner on 20 students in class XI-8 of SMAN 15 Surabaya in May 2023 to find out the practicality and effectiveness of *LKPD*. This practicality of *LKPD* in terms of implementation were through the observation sheet instrument of the implementation of learning, which three observers filled in the questionnaires, and the results of the response questionnaires filled in by students. *LKPD* is practical if the percentage of implementation and the results of the student response questionnaire reach ≥61% (Riduwan, 2013).

The effectiveness of *LKPD* was reviewed through the completeness of student learning outcomes and analysis of critical thinking skills. *LKPD* is declared effective if the number of students who completed or got a score of ≥ minimum completeness criteria (*KKM*) 75 reaches ≥75%. Analysis of students' critical thinking skills was obtained through evaluation sheets in the form of post-test questions, where the maximum score obtained was 4 for each item. The results of students' critical thinking skills are declared high if they reach a percentage of ≥71.5% (Setyowati, 2011).
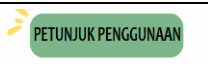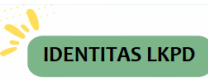
RESULT AND DISCUSSION

The research that has been carried out produces Discovery Learning-based Student Worksheets (*LKPD*) on Nervous System material to train students' critical thinking skills in class XI which consists of two activities, namely Activity 1, which contains the identification of the effect of activity on reaction speed, and Activity 2, which contains information on identify the position of the head relative to the direction of walking.

The *LKPD* components presented have exciting features, such as concept maps, instructions for use, and

LKPD identity; then, there was also features adapted to the syntactic characteristics of the Discovery Learning model and trained indicators of critical thinking. The features contained in the *LKPD* and the display presented in the activities in the *LKPD* based on Discovery Learning can be seen in Table 1.

Table 1. Description of Discovery Learning-Based Worksheet Features on Nervous System Material.

No.	Feature View	Description
1.	PETA KONSEP	This feature provides an overview for students regarding the material of the nervous system
2.	PETUNJUK PENGGUNAAN	This feature explains to students related to the process of using *LKPD*.
3.	IDENTITAS LKPD	identity in the form of time allocation, Basic Competency, Competency Achievement Indicators Competency, and learning objectives.
4.	STIMULASI - Keterampilan berpikir kritis: interpretasi	This feature presents illustrations in the form of stories related to learning objectives that are discussed with the aim of teaching interpretation critical thinking skills.
5.	IDENTIFIKASI MASALAH - Keterampilan berpikir kritis: analisis	This feature teaches student's analytical skills to formulate questions and hypotheses from the story illustrations in the previous stages.
6.	MENGUMPULKAN DATA	This feature invites students to do a simple experiment.
7.	MENGOLAH DATA - Keterampilan berpikir kritis: analisis	This feature invites students to analyze data from simple experiments and fill them in the tables provided.
8.	MEMBUKTIKAN - Keterampilan berpikir kritis: interpretasi	This feature trains the interpretation skills of students by answering questions related to simple experiments that have been carried out.
9.	MENYIMPULKAN - Keterampilan berpikir kritis: inferensi	This feature trains inference skills by writing the conclusions of the activities that have been carried out.

The features that are advantages of the *LKPD* developed are in the syntax of collecting data, where there are additional illustrations in the form of images as a guide for students in carrying out simple experimental steps. In line with the opinion of Setiawan et al. (2016), the existence of illustrations will help readers understand what they read because illustration images provide explanations for the written manuscript.

The design stage in the development of *LKPD* was carried out by making the initial *LKPD* design, which was given feedback by the supervisor and then revised to produce a draft I *LKPD* that suitable for seminars. The input results by the supervising lecturer and the revision results can be seen in Table 2 below.

Table 2. Results of the Early Draft of *LKPD* on Discovery Learning-based

No.	Before Revision	After Revision (Draft I)
1.	The indicators of critical thinking that will be trained should be written down with the syntax.	Write down indicators of critical thinking that will be trained in addition to syntax.
2.	Separation of the syntax is collecting and processing data.	Separating the syntax of collecting data and processing data.
3.	Changes to the syntax for collecting and processing data by looking for practicum activities or simple experiments.	Using simple experiment activities for the syntax of collecting data and providing tables for the syntax of processing data.
4.	Changes in page numbering should be upheld.	Enforces page numbering position.

The draft I of the *LKPD* produced was ready for the seminar and gets input from seminar examiners. The examiner's feedback during the seminar was used for revising to produce a draft II *LKPD*, as seen in Table 3.

Table 3. Suggestion by Seminar Examiners.

No.	Suggestions (Draft I)	Revision Result (Draft II)
1.	Concept maps should be changed to be more formal.	Change the concept map to be more formal.
2.	Writing learning objectives at the beginning of each activity.	Write down the learning objectives at the beginning of each activity.
3.	Stimulation syntax does not provide stimulation information for students and is not suitable for learning objectives.	Changing activities to the stimulation syntax by providing illustrations in the form of stories
4.	The steps in a simple experiment in the syntax of collecting data should be given a picture.	Giving pictures in the experiment steps in the syntax of collecting data.
5.	The table on the syntax of processing data is too	Simplify the table on the

No.	Suggestions (Draft I)	Revision Result (Draft II)
	complicated.	syntax of processing data.
6.	Questions on syntax proved too broad and not suitable for simple experimental activities.	Do simplification and adjustment of questions on the syntax of providing with simple experiment activities.

The revised student worksheets (*LKPD*) according to input from supervisors and seminar examiners (draft II), were then processed at the validation stage to determine the feasibility of the developed *LKPD*. The recapitulation of the *LKPD* validation results based on Discovery Learning is presented in Table 4 below.

Table 4. Data Recapitulation of *LKPD* Validation on Discovery Learning-based.

No	Rated Aspect	Score			Avr	Desc
		V1	V2	V3		
A. COMPONENTS OF FEASIBILITY CONTENT						
Scope of *LKPD* Activities						
1.	Description is according to learning activities	4	4	4	3,89	Very Valid
2.	The breadth of activities is according to the level of critical thinking of students	4	4	3		
3.	Activities in LKPD can be completed according to the time allocation for work	4	4	4		
Accuracy of *LKPD* Activities						
1.	Activities are easy to understand and do not cause much interpretation	4	4	4	4	Very Valid
2.	Activities are according to the applicable definition in the field of biology	4	4	4		
Sophisticated and Contextual						
1.	The activities presented refer to the student's environment	4	4	4	4	Very Valid
2.	Conformity with the development of science	4	4	4		
Characteristics of Discovery Learning Activities						
1.	Facilitating stimulating activities for students	4	4	4	3,94	Very Valid
2.	Encourage students to carry out problem-identification activities	4	3	4		
3.	Encourage students to collect data	4	4	4		
4.	Encourage students to process data	4	4	4		
5.	Encourage students to do verification	4	4	4		
6.	Encourage students to formulate conclusions	4	4	4		
Practicing Critical Thinking Skills						
1.	Activities at the	4	4	4	4	Very

No	Rated Aspect	Score			Avr	Desc
		V1	V2	V3		
	stimulation stage and prove to be able to train interpretation skills					Valid
2.	Activities at the stage of identifying problems and processing data can train analytical skills	4	4	4		
3.	Activities at the concluding stage can train inference skills	4	4	4		
B. PRESENTATION COMPONENTS						
Serving Technique						
1.	Systematic presentation coherent	4	4	4	3,89	Very Valid
2.	Suitability of the cover with the topic of discussion	4	4	4		
3.	Suitability of the cover with the topic of discussion	4	3	4		
Material Presentation Support						
1.	Appropriateness/accuracy of images or illustrations with the material	3,5	4	4	3,75	Very Valid
2.	Appropriate numbering, the naming of tables and images	4	4	3		
Presentation of Learning						
1.	*LKPD* presentation is interactive and participatory	4	4	3	3,83	Very Valid
2.	Presentation methods and approaches are directed to learning on Discovery Learning-based	4	4	4		
Presentation Completeness						
1.	Include instructions for using *LKPD*	3	4	4	3,67	Very Valid
2.	There is a concept map	3	4	4		
C. LANGUAGE COMPONENTS						
By the Students' Development						
1.	Conformity with the level of development of students' thinking	4	4	4	4	Very Valid
2.	Compatibility with the level of emotional development	4	4	4		
Motivating Ability						
1.	The language used can motivate students	4	3	4	3,72	Very Valid
2.	Communicative	3,5	4	4		
3.	The presentation of *LKPD* materials and activities encourages students always to think critically	4	4	3		
Directness						
1.	Accurate sentence structure	3,5	4	4	3,91	Very Valid
2.	Terminology	4	4	4		

No	Rated Aspect	Score			Avr	Desc
		V1	V2	V3		
Conformity with the Rules of the Indonesian Language						
1.	Grammatical accuracy	4	3	4	3,83	Very Valid
2.	Spelling accuracy	4	4	4		
Average Total Overall Score					3,87	Very Valid

Information:

V1: Material expert validator; V2: Media expert validator; V3: Biology teacher; Avr: Average; Desc: Description.

Student's Worksheet of Discovery Learning-based has been validated (draft II), and received some suggestions for improvement before being tested on a limited basis. After revising and producing draft III, the *LKPD* was ready to be tested on students. The results of the revision of improvements are presented in Table 5 below.

Table 5. Results of *LKPD* Revision based on Discovery Learning After Validated.

No.	Suggestion (Draft II)	Revision (Draft III)
1.	Pictures for the simple experimental steps for collecting data in Activity 1 should be replaced with illustrative photos.	Replacing the pictures of simple experimental steps for collecting data in Activity 1 with illustrations.
2.	The punctuation marks and conjunctions in each word/sentence needs to be corrected.	Fixed the use of punctuation and conjunctions in each word/sentence.

Based on the recapitulation of validation data results in Table 4 of the three validators, BSNP (2014) has established three eligibility components a textbook must meet to be considered reasonable. These requirements is content eligibility, presentation eligibility, and language feasibility. The results obtained an average total score of 3.87. Although obtaining very valid criteria based on validator, inputs/suggestions is presented in Table 5, some aspects still need to be improved to get better *LKPD* results.

The implementation of learning activities carried out by students while using the developed *LKPD* can be used as a practical result, where the observation of implementation was assisted by three observers from students of the Biology Department, FMIPA, Universitas Negeri Surabaya. The recapitulation of data from the observation of implementation is presented in Table 6.

Table 6. Data Summary of *LKPD* Implementation Result on Discovery Learning-based.

Learning Activities	Performance Score		
	1st Obsrv	2nd Obsrv	3rd Obsrv
MEETING 1			

Learning Activities	Performance Score		
	1st Obsrv	2nd Obsrv	3rd Obsrv
Students are stimulated by reading several cases presented (interpretation).	3	4	4
Students identify issues based on the issues analyzed (analysis).	4	4	4
Students write hypotheses on the problems that have been identified.	4	4	4
Students carry out data collection and processing activities through simple experiments.	4	4	4
Students participate actively in groups when working on *LKPD*	4	4	4
Students make conclusions based on the findings that have been made (inferences).	4	3	4
Students are able to complete *LKPD* by the specified time.	4	3	4
Students can work well with their groups.	4	4	4
MEETING 2			
Students are stimulated by reading several cases presented (interpretation).	4	4	4
Students identify problems based on the issues analyzed (analysis).	4	4	4
Students write hypotheses on the issues that have been identified.	4	3	4
Students carry out data collection and processing activities through simple experiments.	4	4	4
Students participate actively in groups when working on *LKPD*.	4	4	4
Students make conclusions based on the findings that have been made (inferences).	4	3	4
Students can complete *LKPD* by the specified time.	4	3	4
Students can work well with their groups.	4	4	4
Earned Score	63	59	64
Max Score	64	64	64
Performance of Each Observer (%)	98,43	92,18	100
Overall Compliance (%)	96,87 (Very Practical)		

Information:

Obsrv: Observer.

Based on the data presented in Table 6, it can be seen that implementing student learning activities using Discovery Learning-based worksheets averaged of 96,87%. Thus, it is classified into very practical category. According to Umar's research in 2019, *LKPD* based on Discovery Learning has received positive feedback due to the successful implementation of the Discovery Learning model.

The practicality of the developed *LKPD* was also reviewed based on the results of the student response questionnaire after completing the learning process using *LKPD*. The response questionnaire contains several questions, and students are asked to answer "Yes" as an agreement and "No" as an answer disagreement. The recapitulation of students' questionnaire response results is presented in Table 7 below.

Table 7. Data Recapitulation of Student Response Questionnaire Results.

No.	Question	Amount Student Answer		Reason
		Yes	No	
1.	Does the *LKPD* contain activities that are clear and easy to understand?	20	0	
2.	Does this *LKPD* use a good Indonesian language?	20	0	
3.	Are the instructions/orders contained in this *LKPD* easy to understand?	20	0	
4.	Does the *LKPD* have an exciting presentation?	19	1	Students feel too much writing.
5.	Does the *LKPD* have the appropriate font/number size, and is it easy to read?	20	0	
6.	Does this *LKPD* interest you to study it?	17	3	Students do not like experimental activities.
7.	Does this Discovery Learning-based *LKPD* help you understand the Nervous System material?	17	3	Students feel they still need to be assisted by the teacher because the Nervous System material is too difficult.
8.	Can this Discovery Learning-based *LKPD* motivate you to learn through discovery activities?	19	1	Students feel bored because in 2 *LKPD* activities, they continue to use the discovery method.
9.	Does this Discovery Learning-based worksheet motivate you to practice critical thinking in discovery activities?	20	0	
10.	Does this Discovery Learning-based worksheet support active and fun learning?	18	2	Students feel less fun because there are no "games."
11.	Can this Discovery	18	2	Students feel the

No.	Question	Amount Student Answer		Reason
		Yes	No	
	Learning-based *LKPD* train you to work together among group members?			group could be more cohesive.
12.	Do the activities in the *LKPD* have cases/problems as providing stimulation or stimulation?	20	0	
13.	Do the activities in the *LKPD* teach students to identify problems?	20	0	
14.	Do the activities in the *LKPD* train students to collect data based on simple experiments?	20	0	
15.	Do the activities in the *LKPD* train students to process data?	20	0	
16.	Does the activity in *LKPD* train students do proof?	20	0	
17.	Do the activities in the *LKPD* train students to formulate conclusions?	20	0	
18.	Does the activity in the *LKPD* have a phase to train students in activities to understand and express a problem/activity? (Interpretation)	20	0	
19.	Does the activity in *LKPD* have a phase to train students in analyzing a problem? (Analysis)	20	0	
20.	Does the activity in *LKPD* have a phase to train students in concluding? (Inference)	20	0	
	Number of "Yes" Student Answers	388		
	Maximum Number of "Yes" Answers	400		
	LKPD practicality based on Student Response Questionnaire	97% (Very Practical)		

Based on the recapitulation of data from the questionnaire responses of students presented in Table 7, it is known that the practicality of *LKPD* on Discovery Learning-based that was developed obtained a practicality percentage of 97% of a total of 20 students. Thus, it is included in the very practical category. Syamsu (2020) conducted relevant research and found that *LKPD*, which is focused on Discovery Learning, was positively received by students, with over 85% approving.

Although most students chose "Yes" to agree with the questions, some of them also chose the answer "No" to express disapproval of the questions asked by writing down their reasons. Students' disapproval is often attributed to the absence of *LKPD*, which becomes relevant during the researcher's final product evaluation.

The effectiveness of *LKPD* was measured through the completeness of the results of learning and critical thinking skills. Then, the completeness of student learning outcomes was measured from the results of the Discovery Learning-based *LKPD* work done in groups during the learning process. Students are declared complete and reach the *KKM* if their score ≥75. Data completeness learning outcomes are presented in Table 8 below.

Table 8. Completeness of Learning Outcomes using *LKPD* on Discovery Learning-based.

No.	Student's Name	Score		Avr	Desc
		Meet 1	Meet 2		
1.	Student 1	88	96	92	Complete
2.	Student 2	96	92	94	Complete
3.	Student 3	92	92	92	Complete
4.	Student 4	88	96	92	Complete
5.	Student 5	88	96	92	Complete
6.	Student 6	88	96	92	Complete
7.	Student 7	96	92	94	Complete
8.	Student 8	92	92	92	Complete
9.	Student 9	92	92	92	Complete
10.	Student 10	88	88	88	Complete
11.	Student 11	88	88	88	Complete
12.	Student 12	92	92	92	Complete
13.	Student 13	88	88	88	Complete
14.	Student 14	88	88	88	Complete
15.	Student 15	88	88	88	Complete
16.	Student 16	92	92	92	Complete
17.	Student 17	96	92	94	Complete
18.	Student 18	88	96	92	Complete
19.	Student 19	96	92	94	Complete
20.	Student 20	96	92	94	Complete
Average of All Students		91,5			
Total Completed Students		20			
LKPD Effectiveness (%)		100%			

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Information:

Avr: Average; Desc: Description.

Based on the completeness data of students' learning outcomes using the Discovery Learning-based *LKPD* presented in Table 8, it is known that 100% of students are complete because they get more than the *KKM* set by the school ≥75 with the average score obtained by 20 students is 91.5. As a result, *LKPD* on Discovery Learning-based that was developed can be stated to be very effective.

Effectiveness is measured based on the completeness of student learning classically, provided that the number of students who complete is greater than or equal to 80% of the number of students in the class (Sannah et al., 2015). Internal and external factors have proven to support a positive direction so that the value obtained by students from working on *LKPD* in groups is far above the *KKM* value set by the school. Rosdiana et al. (2017) conducted research that found the Discovery Learning model significantly impacted student learning outcomes, resulting in a 93.3% completion rate.

The effectiveness of critical thinking skills was measured using the results of the post-test questions, which were carried out at the end of the meeting after learning Discovery Learning-based worksheets. The post-test questions contained three questions, each covering one critical thinking skill. The critical thinking skills that were trained included interpretation, analysis, and inference. The maximum score for each question is 4. The Table 9 below shows the results of students' critical thinking skills.

Table 9. Results of Student's Critical Thinking Skills

No.	Name Student's	Post-test Score (Maximum Score 4)		
		1	**2**	**3**
1.	Student 1	3	3	4
2.	Student 2	3	4	4
3.	Student 3	4	4	4
4.	Student 4	3	4	3
5.	Student 5	4	4	3
6.	Student 6	4	4	4
7.	Student 7	4	3	4
8.	Student 8	3	4	4
9.	Student 9	4	3	4
10.	Student 10	4	4	4
11.	Student 11	4	4	3
12.	Student 12	4	4	4
13.	Student 13	3	4	3
14.	Student 14	3	3	4
15.	Student 15	3	4	4

No.	Name Student's	Post-test Score (Maximum Score 4)		
		1	**2**	**3**
16.	Student 16	4	4	3
17.	Student 17	4	3	4
18.	Student 18	4	4	4
19.	Student 19	3	4	4
20.	Student 20	4	4	4
	Student scores	78	75	75
	Maximum Score	80	80	80
	Students' Critical Thinking Skill Score (%)	90% (Very High)	93,75% (Very High)	93,75% (Very High)

Information:

1: Questions with indicators of interpretation critical thinking skills; 2: Questions with indicators of analytical critical thinking skills; 3: Questions with indicators of inference critical thinking skills.

Based on the data on the results of students' critical thinking skills in Table 9, it can be observed that students' critical thinking skills in every aspect are very high. In contrast, in the question aspect with the interpretation critical thinking indicator, the percentage of the average value of students' critical thinking skills is 90%, and 93.75% on aspects of questions with indicators of critical thinking skills analysis and inference.

To achieve effectiveness in *LKPD*, learners must display competency in critical thinking indicators. Facione (2015) outlines the necessary elements for each indicator: interpretation is measured by the learner's ability to categorize, convey significance, and explain an event; analysis is measured by their ability to identify opinions, reasons, and ideas; while inference is measured by their ability to draw valid and logically justified conclusions.

CLOSING
Conclusion

This study produced a Discovery Learning-based worksheet product on the Nervous System material to train the critical thinking skills of class XI students, which are very valid with a score of 3.81. The result of very practical, with an implementation percentage of 96,87% and a questionnaire response percentage of 97%, then very effective with complete student learning outcomes of 100% with an average score of 91.5. Critical thinking indicators get very high criteria on the results of working on post-test questions with a percentage score of 90% on critical interpretation skills indicator questions, and 93.75% on indicators of critical thinking skills analysis and inference.

Suggestion

Researchers' suggestions based on the results of this study are the separation of post-test work time from work on *LKPD*, and the need for research with trials within the scope of more comprehensive.

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