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THE EFFECTIVENESS OF LESSON PLAN INSTRUMENTS ON LIVING CREATURES INTERACTIONS WITH ITS ENVIRONMENT THROUGH GUIDED INQUIRY BASED LEARNING

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Abstract:
A survey result by Programme for International Student Assessment (PISA) in 2015 shows that Indonesia students are ranked on 62 of 70 countries on the natural science subject. On average, Indonesian students still have problems on answering questions that require the critical thinking ability. The Lesson Plan used by the teachers is in line with the 2013 Curriculum but shows no sign of developing the critical thinking ability and the learning results on the students. This research aims to determine the effectiveness of lesson plan set on the subject matter of living creatures' interactions with its environment. This research used the Tessmer Model with the steps of self-evaluations, experts' opinions, individual tests, small groups tests, and field tests as the research's focus. The subjects are VII grade students of *SMP Negeri 1 KertakHanyar*. Data types including 1) critical thinking ability result, 2) cognitive learning result, 3) attitude assessment result, and 4) ability assessment result. The results of critical thinking ability are analyzed using LKPD with the quantitative rubric, the results of cognitive learning through tests are analyzed based on Minimum Completeness Criteria, the results of attitude assessment are analyzed using attitude assessment rubric. The result of RPP set is considered effective based on 1) the critical thinking ability result of the students is categorized as high, 2) the students' learning result passed the classical completeness of 75% of the students, 3) the attitude assessment result is categorized as good, and 4) the ability assessment result is categorized as good.

Keywords: effectiveness, RPP set, the interactions of living creatures with its environment

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1. Introduction

A survey result by Programme for International Student Assessment (PISA) in 2015 shows that Indonesian students are ranked on 62 of 70 countries on the natural science subject with the average score of 403 from the maximum score of 556 (Gorria, 2016). The average of Indonesian students still has problems on answering questions requiring the critical thinking ability which become the reason why the role of education is needed to prepare the critical thinking ability of the students in order to be able to compete in this era and the future. The low level of critical thinking ability and scientific performance of the students is caused by several factors; one of it is the teachers' dominance in the learning process and not giving access to the students to develop independently through findings and the thinking process (Sutama et al., 2014).

The government of the Republic of Indonesia already has efforts to increase the critical thinking ability of the students by updating the curriculum. It can be seen on the law of the Minister of Education and Culture number 65 of 2013 about the standard process of elementary and secondary education, which includes the development on attitude, knowledge, and ability domain as the targets. These three domains are elaborated by every education level. The emphasis on the thinking ability improvement is facilitated by learning models that used in designing learning plan.

The learning set is a learning process completion support tool which in it is mentioned about the learning process, method, media, and assessment. Suhadi (2007) stated that learning set is a set of materials, tools, media, instructions, and guidance which will be used in the learning process. Akbar (2013) stated that the learning set needed on managing the learning process which contains several components, there are syllabi, teaching materials, sources and learning media, assessment instruments, and the lesson plan.

In line with 2013 Curriculum where the students are pushed to be active in the learning process, thus the interactive learning to train and develop the students' critical thinking ability is needed. One alternative to support the students' activeness in order to emphasize the critical thinking ability is by fixing up the lesson plan. The lesson plan set is adjusted to the students' environment and the use of learning model is adjusted with the latest curriculum. It is in order to create the people who are productive, creative, innovative, affective through integrated attitude, ability, and knowledge (Kemdikbud, 2014)

All this time, the lesson plan set used by teachers is in line with the demands of 2013 Curriculum. However, there are still several aspects which are needed to be fixed up, those are 1) the formulation of learning goals which not yet used the Bloom C3-C5 taxonomy operational verbs which facilitated critical thinking ability, 2) the learning steps that is not yet reflecting the use of learning model, 3) cognitive test questions that still ranged on the low thinking capability, the learning that only emphasize on the concept mastering rather than the thinking capability mastering, 4) the used of Students Activity Sheet (*Lembar Kegiatan Peserta Didik / LKPD*) is still in form of discussion materials and instructions for memorizing rather than focusing on critical thinking that

should become the main demand and model manifestation in the 2013 Curriculum product is seen on neither LKPD nor cognitive assessment instruments. Because of those reasons, it is needed a learning set which accommodates the ability of problem-solving and students' critical thinking as well as the three aspects which are trusted by the curriculum which is attitude, knowledge, and ability. One learning model that can be used as a learning set is the inquiry learning model (Kariawan, et al, 2015)

The critical thinking ability is much needed and should be had by the students (Beaumont, 2010). It can be trained and developed through active learning and using guided inquiry learning model. The research done by Matthew & Konneth (2013) shows that guided inquiry learning model can give the students the opportunity to learn the critical thinking on the scientific process. Azizmalayeri et al. (2012) reported that guided inquiry model influences that critical thinking ability of the students in drawing the conclusions.

The ability which is manifested in the actions. Someone with good ability tends to show a few mistakes in doing the assignments, while the people with less ability make more mistakes if they are given the same assignments (Facione et al., 2000). According to Ennis (2001), critical thinking is thinking using reasonings and reflection with emphasizing on the decision makers about what to believe or do. So, the critical thinking ability will be assessed at the time the students do the LKPD according to the designed steps.

The learning model that will be used in developing this learning set is guided inquiry model, which in the learning process set will contain syntax in inquiry model which will train the critical thinking ability of the students. Kong & So (2008) stated that inquiry in general involved the students in understanding the problems, investigate the information, and solving the problems. McBride, et al. (2012) stated that inquiry approach as a 'guided invention'. The teachers guided the students' inquiry until the students find out the determined scientific concepts. The students are helped to learn and implement that process through problem-based investigation which is designed to learning scientific concepts. The teachers are helping the students to create questions to guide the investigations.

The steps of fixing up the RPP set are done through development research. This development research is a learning process innovation. Through this way, it will result on the valid, practical, and effective products (Plomp & Nieveen, 2013). It is said valid (relevant) because of interventions and the design is based on scientific knowledge. Tessmer (1998) explains that the term 'practical' if the users can easily use the products in the learning environment, and effective if the goals can be divided into specific criteria and questions. The development of RPP set use Tessmer's formative evaluation development model, which demands on the untested RPP set fixed up. The effectiveness of RPP set is determined from the result of critical thinking ability, cognitive learning result, attitude assessment result, and ability result.

Based on the explanation, the researchers come to the research question: How is the effectiveness of the Learning Implementation Plan set as the result of subject matters development on the interactions of living creatures with its environment?

2. Methods

This research is design-based using the Tessmer model (Tessmer, 1998). The steps of this research consist of self-evaluation, experts' opinions, individual tests, small groups tests, and field tests as the focus of research. The subjects are 25 students of VII F class. This research was conducted at SMP Negeri 1 Kertak Hanyar. The data type used as the RPP set effectiveness indicator consists of 1) critical thinking ability, 2) cognitive learning result, 3) attitude assessment result, 4) ability assessment result. The data is analyzed descriptively.

The critical thinking ability is received through LKPD with a quantitative rubric. The cognitive learning result through cognitive learning result based on the how many the right answers. Later, it will be linked to the Minimum Passed Criteria (*Kriteria Ketuntasan Minimal, KKM* = 70). The attitude assessment is done through attitude assessment rubric observation. The ability assessment through observation is using ability rubric.

3. Results and Discussion

The effectiveness of Lesson Plan is based on several indicators: 1) critical thinking ability is good, 2) cognitive learning result is surpassing classical standard, 3) the students' attitude is good, 4) students' ability is good.

Table 1: The Result of the Students Critical Thinking

No	Students' Name	Meeting			Average	Category
		1	2	3		
1	A. H.	75	80	85	80	Good
2	A. R.	70	80	80	75	Good
3	A.	75	75	80	77.5	Good
4	D. R.	65	75	75	70	Good
5	Ellya	70	70	75	72.5	Good
6	F.	80	80	80	80	Good
7	H.	50	80	80	65	Enough
8	H. S.	75	75	75	75	Good
9	J. E.A	85	90	95	90	Good
10	M. A.	65	70	70	67.5	Good
11	M. N.	80	80	80	80	Good
12	M. R. S.	75	70	75	75	Good
13	M.A.	70	75	80	75	Good
14	M. F. R.	75	75	75	75	Good
15	M. A. R.	95	90	95	95	Good
16	M. H.	80	80	80	80	Good
17	M. F.	80	80	85	82.5	Very Good
18	M. L. L.	90	90	90	90	Good
19	M. F.	50	80	80	65	Enough
20	N.	80	80	80	80	Good
21	R. A.	75	75	80	77.5	Good

22	R. A.	90	85	85	87.5	Very Good
23	R.	55	75	80	67.5	Good
24	S. A.	75	75	75	75	Good
25	Y. F.	80	80	85	82.5	Very Good

Notes: 0-40% = not good, 41-55% = less good, 56-65% = enough, 66- 80% = good, 81-100% = very good (Arikunto, 2001).

Table 1 shows the average score of the students is categorized as good. The students who got enough score are later moderated to fix the weaknesses in doing critical thinking ability.

Table 2: The Students' Learning Results

No	Name	Pre-test	Status	Post-test	Status
1	A.H.	43.33	Not passed	73.33	Passed
2	A.R.	43.33	Not passed	66.67	Not passed
3	A.	36.67	Not passed	80.00	Passed
4	D.R.	43.33	Not passed	78.33	Passed
5	E.	43.33	Not passed	65.00	Not passed
6	F.	36.67	Not passed	78.33	Passed
7	H.	41.67	Not passed	78.33	Passed
8	H.S.	43.33	Not passed	68.33	Passed
9	J.E.A	40.00	Not passed	76.67	Passed
10	M.A.	46.67	Not passed	71.67	Passed
11	M.N.	48.33	Not passed	76.33	Passed
12	M.R.S.	51.67	Not passed	78.33	Passed
13	M.A.	41.67	Not passed	80.00	Passed
14	M.F.R.	36.67	Not passed	68.33	Not passed
15	M.A.R.	53.33	Not passed	83.33	Passed
16	M.H.	45.00	Not passed	68.33	Not passed
17	M.F.	48.33	Not passed	80.00	Passed
18	M.L.L.	43.33	Not passed	80.00	Passed
19	M.F	43.33	Not passed	68.33	Not passed
20	N.	43.33	Not passed	76.67	Passed
21	R.A.	48.33	Not passed	83.33	Passed
22	R.A.	41.67	Not passed	75.00	Passed
23	R.	50.00	Not passed	80.00	Passed
24	S.A.	40.00	Not passed	73.33	Passed
25	Y.F.	50.00	Not passed	68.33	Not passed
Average		44,13		75.05	

Table 2 shows that no one passed the pre-tests, while 76% of the students passed the post-test. The students who did not pass the standard will have the remedial.

Table 3: The Result Summary of Social Attitude Assessment

No	Characters	Kriteria		Meeting's Score			Average
				1	2	3	
1	Cooperation	A	∑	4	7	11	
			%	16	28	44	29,3
		B	∑	12	13	10	
			%	48	52	40	46,7
		C	∑	4	3	4	
			%	16	12	16	14,7
		D	∑	5	2	0	
			%	20	8	0	9,3
2	Verbal Communication	A	∑	3	5	8	
			%	12	20	32	21,3
		B	∑	9	10	10	
			%	36	40	40	38,7
		C	∑	10	7	7	
			%	40	28	28	32
		D	∑	3	3	0	
			%	12	12	0	8

Notes: A= Very Good, B= Satisfying, C= Showing Progress, D= Need to be fixed up.

Table 3 shows that the majority of the students' social attitude is categorized as satisfying

Table 4: The Result Summary of Character Attitude Assessment

No	Character	Criteria		Meeting' Score			Average
				1	2	3	
1	Responsible	A	∑	5	8	11	
			%	20	32	44	32
		B	∑	10	10	13	
			%	40	40	52	44
		C	∑	5	6	1	
			%	40	40	52	44
		D	∑	5	1	0	
			%	20	4	0	8
2	Discipline	A	∑	4	5	9	
			%	16	20	36	24
		B	∑	10	13	12	
			%	40	52	48	46,7
		C	∑	7	4	4	
			%	28	16	16	20
		D	∑	4	3	0	
			%	16	12	0	9,3

Notes: A= Very Good, B= Satisfying, C= Showing Progress, D= Need to be fixed up

Table 4 shows that the majority of the students' characters attitude is categorized as satisfying

Table 5: The Summary Result of Ability Assessment

Meeting	Average	Three Meetings Average	Category
1	76,46		
2	78,36	78	Good
3	79,14		

Category: 0-40% = bad, 41-55% = below average, 56-65% = enough, 66- 80% = good, 81-100% = very good.

Based on Table 5, the result of ability assessment shows that the students are good at doing the investigation activity on every meeting

Regarding the research's result, the RPP set is effective to use based on 1) the critical thinking ability of the students is good, 2) the learning result is reaching the classical standard, 3) the students' attitude is good, and 4) the ability is also good.

4. Analysis

The Lesson plan set developed by the researchers is using the guided inquiry model which is designed to become a media that can train the students' critical thinking ability. Beaumont (2010) stated that the critical thinking ability is much needed and should be had by the students. Duran & Ilbilge (2016) stated that the inquiry-based learning has the significant positive impact on the students' critical thinking ability. The critical thinking ability assessment result is received at the time when the students did the LKPD according to guided inquiry model syntax during the learning process.

The overall critical thinking ability of the students is categorized as good, so the RPP set is categorized as good, so the RPP is categorized as effective. Beaumont (2010) stated that the critical thinking ability is much needed and should be had by the students. Duran & Ilbilge (2016) stated that the inquiry-based learning has the significant positive impact on the students' critical thinking ability. The students; critical thinking ability assessment result is received at the time the students did the LKPD according to guided inquiry model syntax during the learning process.

Lohner et al. (2005) explained that the inquiry learning is effective in demanding the students to develop and evaluate their own hypothesis and creating their own conclusions. Matthew & Kenneth (2013) also added that guided inquiry learning model can give the students the opportunity to learn critical thinking on the scientific performance process. The learning using guided inquiry model also can make the students more interactive and active in the learning process.

The effectiveness of developed RPP set is also seen from the students' cognitive learning result. The students already passed the classical standard of 75% which mean the RPP is effective. Brown (2010) stated that with the implementation of guided inquiry-based learning, it can improve the result of the students, push the involvement of the students to be active while learning, give direct feedback to the teachers about what the students do not know, and create the class environment that can be well received by the students.

The progress of learning results is caused by external and internal factors that influence the students' learning results. The internal factor is coming from the students that motivate them to study and understand the given materials. Meanwhile, the external factor is caused by the influence of guided inquiry learning model. It shows that the guided inquiry learning model gives positive impact to the learning result which is in line with Yarmalinda (2017) research that found out through the guided inquiry learning model, the students can be easier to understand the materials. So it can improve the learning result and scientific attitude of the students. Opera & Oguzor (2011) stated that the learning using inquiry could improve the students' achievements in biology through investigation. The students learn to make questions, develop explanations, testing the explanation scientifically and communicate ideas.

The learning effectiveness is also determined by the students' attitudes assessment. The assessed students' attitudes are social attitudes and characterized behaviors. Social attitudes which consist of cooperation and verbal communication are assessed by the determined rubric in form of detailed activities which shows those attitudes. The average of three meetings shows that majority of the students are categorized as satisfying. This category is derived based on the observations of the students' behaviors in the learning process. This is also caused by during the learning process using the guided inquiry model, the students are also demanded to shows their social ability moreover on the group activities. It is in line with the research done by Robyn et al. (2014) that shows the follow up the reasoning and problems in solving the assignment shows that the students' in trained condition increased their scores time by time even though the second time there is no significant difference between conditions. The learning process can make the students to be stimulated to know by asking because the learning is connecting the problems of the real world. According to Nur (2013), the social abilities can be achieved if every member group can have a role and able to cooperate without only focused on one or two students. Azizmalayeri et al. (2012) report that the guided inquiry model can sharpen their social abilities such as cooperating in the learning process.

The characterized behaviors in this research consist of responsible and discipline which were assessed in the determined rubrics in form of detailed activities which shows that attitudes. The characterized behaviors (discipline and responsible) are categorized as good. This achievement is caused by the use of guided inquiry learning model during the learning process. Besides that, it is also the result of the trained students in every meeting to be disciplined and responsible during to their groups. Jaya et al. (2014) stated that in the biology class using the approach of guided inquiry can create honesty, responsible, discipline, cooperation, and curiosity characters.

The attitude results also show that during three meeting, the average of students' ability is categorized as good which indicates that the students had been worked well during the learning process. The ability of the students also categorized as good because every observed aspect can be fulfilled well by the students. This is because of the learning process in the class which must in line with the syntax and the students' discipline to follow the learning process. The perfect score is not achieved is caused by

the working conditions of the groups in the class, where the working group give the students the freedom to do the assignments from the teachers. Some groups prefer to divide their assignment to every member so it can be time efficient. The portion is not necessarily divided fairly so it caused on psychomotor activity potential of the students is not achieved maximally. According to Sudjana (2014), the learning result types on psychomotor aspect has the connection with the ability or action capability after the students received certain learning experiences. The affective learning results can appear during the learning process or after that in the real life in the family, school, and social environment. That is why the affective and psychomotor learning results are wider, harder to observe, but have a meaningful value for the students' life because it can directly affect their behaviors.

5. Conclusion

The RPP set that produced is categorized as effective based on 1) the critical thinking ability of the students is categorized as good, 2) the cognitive learning result is categorized as good, 3) the attitude assessment is categorized as satisfying and 4) the ability assessment is categorized as good.

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