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THE EFFECTIVENESS OF LESSON PLAN INSTRUMENTS ON DIGESTIVE SYSTEM MATERIAL THROUGH INQUIRY BASED LEARNING

Mella Wahyulina,
Abdullah,
Muhammad Zaini[i]
Lambung Mangkurat University Banjarmasin, Indonesia

Abstract:
Education is one form of dynamic and developing human civilization. The development of education is a must happened thing, in line with the change of cultural life. This research is aimed to evaluate the effectiveness of developed lesson plan instruments. The development research method used in this research is based on Tessmer model, which consists of: 1) self-evaluation; 2) expert review; 3) one-to-one; 4) small group; and 5) field test. The subject of the research is 24 students of VIII A grade of MTsN 1 Tanah Laut. The effectiveness is determined from cognitive study result, critical thinking skill, behavior assessment, social skill assessment, and student activity. The result of this research shows that the lesson plan instrument is effective in use based on good students' accomplishment on cognitive learning, very well critical thinking skill, good result of behavior assessment, good social skills, and good students' activity.

Keywords: lesson plan instruments, digestive system, inquiry

1. Introduction

Education is one form of dynamic and developing human civilization. The development of education is a must happened thing, in line with the change of cultural life. The change in which, the improvement of education in every stage needs to be done continuously as the anticipation of future interest and modern society requirement. One feature of a modern society is improvement oriented. This is surely related to various fields, while education is not an exception (Amri, 2013).

The study result description from The Trends in International Mathematics and Science Study (TIMSS) in 2007 shows that on science, the Indonesian students score

[i] Correspondence: email muhammadzaini@unlam.ac.id

achievement was 427 (Kemendikbud, 2016). Later on, in 2011, the average of science achievement score was 406 (TIMSS, 2011). This score places Indonesian students' rank on science on the 40th from 42 countries. Indonesian students are still dominantly in lower level, specifically on memorizing skill in science learning.

Digestive system as the primary material in IPA (science) is a relatively difficult material, especially when it is taught verbally. This is based on the research of Tekayya et al. (2001) in Mulyasa (2013) which exposes the condition when students experience difficulty of learning especially on body system discussion, while digestive system is included there.

The conventional learning application is still in use regularly, besides, the lesson plan instrument which is designed to grow thinking skill is not very popular. As consequence, it is important to design lesson plan instrument which is able to train the critical thinking skill. Designing learning activity can be conducted through development research. Plomp and Nieveen (2007) stated 4 criteria about high quality intervention in development process, those 4 criteria are content validation, construct validation, practicality and effectivity.

Based on Walker (2003) students' thinking skill can be developed through active learning. One effort to create active learning is to conduct the learning process based on constructivist principles using student oriented learning models, such as inquiry model, and problem based learning. These models of learning give chances to the teachers to explore critical thinking skill. Tawil and Liliasari (2013) added that the critical thinking skill is a discipline process which is intellectually active, and being skilled on finding concepts, implementing, analyzing, synthesizing, and evaluating information collected from the observation, experience, reflection, reasoning or communication.

2. Method

Design based research uses Tessmer model (Tessmer, 1993). The research stages; self-evaluation, expert reviews, one-one, small group, and field test as the research focus. The research subject is 24 MTs students of VIII A grade academic year 2016/2017. The research is held in MTs Negeri 1 Tanah Laut.

The kinds of data which is also the indicators of lesson plan effectiveness cover 1) cognitive study result, 2) critical thinking skill 3) personal behavior, 4) social skill, and 5) student's activity. The effectiveness data of cognitive study result is obtained by giving score 1 (true) and 0 (false). The critical thinking skill is observed based on rubric; very good (86-100%), good (76-85%), sufficient (60-75%), low (55-59%) and very low (≤54%). The behavior and social skill are observed based on the range $4<X\leq5$ = very good, $2<X\leq3$ = good enough, $3<X\leq4$ = good and $1<X\leq2$ = low. Students' activity is based on its appearance on observation during the learning process, it is said to be active if ≥10%, and not active if ≤10%.

3. Result and Discussion

The effectiveness of lesson plan is based on indicators; 1) cognitive study result, 2) critical thinking skill, 3) personal behavior, 4) social skill, and 5) students' activity, they are sequencely presented below. The cognitive study result is presented on table 1.

Table 1: The average of students' study result

No.	Name	Pretest	Result	Postest	Result
1	Ahmad Rafi'i	38,08	NA	90,44	A
2	Al Fiya Rahma Afifa	33,32	NA	100	A
3	Alia Siti Aulia	23,8	NA	66,64	A
4	Andri	38,08	NA	80,92	A
5	AuliaUlAjkia	14,28	NA	66,64	A
6	Hairi Sap'ani	57,12	NA	85,68	A
7	Hestarina	23,8	NA	61,88	NA
8	Ilia Anita	52,36	NA	90,44	A
9	LisdaRianti	33,32	NA	71,4	A
10	M. Pikri Ramadani	42,84	NA	95,2	A
11	M. Rizali Fahmi	38,08	NA	85,68	A
12	M. Rullah	14,28	NA	52,36	NA
13	M. Saman Mulia	47,6	NA	95,2	A
14	M. Yusril Maulana	33,32	NA	95,2	A
15	M. Yusuf	52,36	NA	95,2	A
16	Maulida Agustina	23,8	NA	80,92	A
17	Misna	28,56	NA	76,16	A
18	Muhidin	19,08	NA	61,88	NA
19	Naimah Andriyani	42,84	NA	90,44	A
20	Rahmad Mustapa	14,28	NA	66,64	A
21	Raudatul Nisa	47,6	NA	85,68	A
22	Riyan	38,08	NA	71,4	A
23	Soleha	28,56	NA	85,68	A
24	Wulandari	19,08	NA	85,68	A
Classical Accomplishment		0		87,5	

Note: A=Accomplished, NA=Not Accomplished; Minimum Accomplishment Criteria (KKM) ≥ 65

Table 1 shows that the classical accomplishment is beyond the minimum limit. The summary of performance assessment is provided on Table 2.

Table 2: The average result of critical thinking skill

No.	Name	Parameter					
		1	2	3	4	5	6
1	Alia S.A	9.5	9.37	17.37	17.75	18.37	17.87
2	Aulia U. A	9.5	9.37	17.37	17.75	18.37	17.87
3	Hairi S	9.5	9.12	17.75	17.75	17.87	16.87
4	M. Yusril M	10	9.75	18.5	19	18.87	18.5
5	M. Yusuf	10	9.75	18.75	19.25	18.87	18.5
	%	97	94.72	89.74	91.5	92.35	89.61
	Category	Very good	Very good	Very good	Very good	Very good	Very good

Category: very good (86,00-100%), good (76,00-85,99%), sufficient (60,00-75,99%), low(55,00-59,99%) and very low (≤ 54%).

Table 2 shows that the result of critical thinking skill assessment is categorized as very good. The summary of the personal behavior assessment observation result is provided on Table 3.

Table 3: Personal behavior assessment

No.	Name	Responsibility		Accuracy	
		Score	Category	Score	Category
1.	Alia S. A	2.25	Good enough	2.75	Good enough
2.	Aulia U. A	2.25	Good enough	2.75	Good enough
3.	Hairi S	3	Good	3.75	Good
4.	M. Yusril M	4.25	Very good	4.25	Very good
5.	M. Yusuf	4	Good	4	Good

Note: $4 < X \leq 5$ = very good; $2 < X \leq 3$ = good enough; $3 < X \leq 4$ = good; $1 < X \leq 2$ = low

Table 3 shows that the students' personal behavior is good. The summary of social skill assessment result observation is provided on table 4.

Table 4: Social skill assessment

No.	Name	Cooperation		Idea contribution	
		Score	Category	Score	Category
1.	Alia S. A	2.5	Good enough	2.5	Good enough
2.	Aulia U. A	2.25	Good enough	2.25	Good enough
3.	Hairi S	3.25	Good	3.25	Good
4.	M. Yusril M	4	Good	3.75	Good
5.	M. Yusuf	3.5	Good	3.5	Good

Note: $4 < X \leq 5$ = very good; $2 < X \leq 3$ = good enough; $3 < X \leq 4$ = good; $1 < X \leq 2$ = low

Table 4 shows that the students' social skill is also good. The summary of students' activity result observation is provided on table 5.

Table 5: Students' activity assessment

Meeting	Parameter						
	1	2	3	4	5	6	7
1	17	15	12	18	16	11	9
2	20	17	17	24	23	14	7
3	21	17	15	23	23	17	11
4	25	17	19	25	29	17	17
Category	T	T	T	T	T	T	T

Note: < 10% : R (low); ≥ 10% : T (good)

1. Listening to teacher's explanation
2. Asking question (problem formulation)
3. Making hypothesis (temporary answer)
4. Conducting observation
5. Noting result and making analysis
6. Presenting
7. Concluding

Table 5 shows that students' activity is good. Based on the data of research result, the lesson plan instrument has been effective considering 1) accomplished classical accomplishment, 2) students' good critical thinking skill, 3) students' good personal behavior (responsibility and accuracy), 4) students' good social skill (cooperation and idea contribution), and 5) good students' activity during the learning process.

The lesson plan instrument is effective in use because the classical accomplishment is accomplished. This finding is supported by former research (Rosmalina, 2013; Rinarta, 2014; Sumiyadi et al., 2015; Febriani, 2016). Based on Akbar (2013), a good test is the valid one, that is a test which can measure the competency as the way it is, or the result of the test fits the real condition. Luiminigh (2007) added that study result is a representation of students' competencies which is hoped to exist after they complete the learning process.

The critical thinking skill is very good, the former report supports the result of this research (Rahmawati et al., 2014; Kurniawati and Atmojo, 2015; Zaini, 2016; Duran, 2016). The inquiry based learning has correlation with students' critical thinking (Rahmawati et al., 2014). The inquiry based learning has significant positive impact on students' critical thinking skill (Duran, 2016)

Personal behavior using accuracy and responsibility as the indicators is good based on the assessment; this is in line with the former research (Heriningsih and Agustina (2014)). They explained that the developed inquiry based lesson plan which is also integrated with characters has been successful to grow the attitude. Students' behavior shows positive result through guided inquiry (Koksal, 2014). Other research reports that the behavior appeared is independency, curiosity, tolerance, creativity, discipline, cooperation, and responsibility (Trian et al. 2013)

The social behavior using cooperation and idea contribution as indicators is good based on the observation, this is in line with the reported research (Henykartikasari et al., 2015) the developed lesson plan shows the increasing students' competence because the inquiry syntax can accommodate spiritual, social, knowledge and skill competence. Students' social skills are emerged through the designed learning in the form of group work which requires students to cooperate to reach one goal together. In the process of reaching the target, the students are also required to appreciate each other so the hoped target can be completed with the process of collecting and accommodating various ideas from each member of the group. This is relevant with Harlen (2014) report which explains that student-to-student interaction can develop through group work assignment or observation in inquiry learning.

Students' activity during the learning process is good based on the observation. The teaching and learning process is conducted based on inquiry based learning. According to Jauhar (2011), learning through inquiry, students will directly have to do with the material and actively take part physically and mentally in reorganizing their knowledge structure. One feature of active learning is that the students not only listen to the material passively, but they do the things related to the material (Rooijakkers, 1991). Kong, et al (2008) added that generally, inquiry entangles students in understanding the problem, analyzing information, and solving the faced problems.

Based on Sanjaya (2006) there are some prime characteristics of inquiry learning. First, the inquiry learning emphasizes on maximum students' activity to search and find. Second, all students' activities are directed to search and find the answers from their own questions, so it is hoped that their confidence will grow. Third, the aim of inquiry based learning is to develop the systematic, logic, and critical thinking.

4. Conclusion

The lesson plan is effective in use because 1) the cognitive study result is beyond the stated classical accomplishment, 2) the critical thinking skill is very good, 3) the personal behavior (responsibility and accuracy) is good, 4) the social skill (cooperation and idea contribution is also good, and 5) students' activity during the learning process is good.

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