

Mini Research Based of Learning Material under Theme of Human Respiration System

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Abstract

This research aims to find out validity and reliability of mini research based learning material supplement for fifth graders primary school. This research and development (R&D) had stages started from: identifying potency and problem, collecting the data by using questionnaire, observation, interview, pre-test question and post-test, designing product in the form of mini research based learning material under theme respiration system of human as learning supplement with current developed topic about the danger of smoking for human health, validating the design done by media and material experts, revising the design based on judgment, critics, and experts' advices, and testing the products done at VB graders of Islamic Primary School Ta'allamul Huda Bumiayu. The data was analyzed descriptive qualitatively. The finding showed that the media and the subject content experts giving average score of 3.48 (87%) and 3.94 (98.33%), respectively. Based on the teacher's judgment, the average score obtained 3.20 (80%) and judgment given by students showed average score 3.82 (95.49%). The judgment from media and subject content experts, teachers, and students showed that the supplement was reliable. The implementation of this product to measure conceptual understanding and showed improvement from 42.54 into 74.77 with N-gain 0.55, categorized as moderate. The students' attitudes dealing with smoking showed N-gain 0.39, categorized moderate with improvement score from 82.33 into 87.67, categorized to gave negative respons for smoking attitude. The learning material supplement based on mini research under theme human respiration system was valid and reliable to be used as learning materials for fifth graders.

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INTRODUCTION

The dangerous of smoking habit seems to be enormous threat for younger generation of our nation. It is proven by *The Global Youth Survey* in 2006 showing that 6 of 10 learners (64.2%) becoming passive smokers while they were at home. More than 1/3 (37.3%) of learners smoked and 3 out of 10 positively became smokers under 10 years old (Hidayati and Eka, 2012). It is strengthened by National Commission of Child Protection Data (Komnas), since 2008 until 2012 the numbers of young smokers under 10 year old in Indonesia reached 239.000 people. Meanwhile, the numbers of smokers between 10 until 14 year old reached 1.2 million people (Priyanti and Sondang, 2017). It made Indonesia being remarked by *Baby Smoker*. This habits occurring on students were influenced by many factors, one of them was attitude or perception (Isthofiyani *et al.* 2014). Attitude could be defined as tendency owned by individual or group to behave on that certain object (Adha *et al.* 2010; Effendy *et al.* 2010). The difference of size and length of the given stimulus would influence to the fostered behavior. To solve and overcome this problem are our responsibilities as well as to find solution to suppress the numbers of under 10 year old smokers.

Commonly, education is still considered effective to stop smoking chain. Health education about the danger of smoking should be included into Science lesson. However, in the reality, based on the interview with the fifth grade teacher on March 2, 2019, at the school, it was limited only on smoking prohibition suggestion as stated on thematic book for fifth graders and on worksheet. Teacher had not tried to seek further information dealing with smoking danger and to keep respiration system organ healthy for the students. Besides that, it was found the absence of learning material about more detail dangers of smoking for students.

The role of science lesson for Primary School about human respiration system could be done to prevent students whom have smoked or to smoke by using appropriate science lesson to change the behavior based on learning experience

(Munaddhiroh and lisdiana, 2017). Thus, teachers are demanded to design meaningful, joyful, and understandable learning (Rahayu *et al.*, 2012). The meaningful learning process could be realized by existence of appropriate learning source to its model, method, and student need. This learning source could take form into learning material supplement which stimulates and motivates effectiveness and efficiency of learning process improvement (Wulandari *et al.*, 2017). Learning supplement arranged based on method and student need would facilitate teacher to achieve learning objectives. Therefore, there is a need of certain method or approach used by teacher to reach effective and efficient learning. One of the methods to use in Science learning is mini research. It is a part of inquiry learning (Wenning, 2005).

Mini research learning is a learning model with problems as initial stage in collecting and managing information (Lesono, 2016). It is supported by Sanjaya (2010) telling that mini research in Science learning has important role to improve student understanding process toward science learning and a success of leaning process. By using this method, the students are facilitated to do mini project. It makes them able to explore, judge, interpet, synthesize, and inform data of their project.

The purpose of learning process is to understand the students' concept of their future. It is in line with Falchikov in Sudarmin (2011) stating that conceptual mastery would prepare students to master knowledge, investigate, have technology, and have reasoning skill. However, it was found that the learning achievement of the students showing low score under minimum passing grade (KKM), 67. It was proven by observational result on March 2, 2019 with 50% of students had not reached the passing grade.

Based on the explanation, it is important to develop supplementary learning material on science lesson under theme human respiration system based on mini research. The learning material was added by information about the danger of smoking for health, so that conceptual understanding instilment of the students could be improved and their attitude to smoking would

turn into negative. This research aims to find out validity and reliability of the supplementary learning material. This research is expected to contribute as preventive effort to suppress early - smoking behaviors in Indonesia.

METHODS

The current developed learning supplement is based on mini research under theme human respiration system. The learning material supplement consisted of more complete material plus the danger of smoking for health.

This *Research and Development* (R&D) used Sugiyono’s stages which were modified based on the research needs. Sugiyono (2016) stated that research and development is a method to create certain products and to test effectiveness of the product. The stages cover (1) identifying potency and problem, (2) collecting data, (3) designing product, (4) validating design, (5) revising the design, and (6) trial testing of the product. The instruments to collect the data were necessity questionnaire sheet, reliability questionnaire sheet filled by teacher and students, judgment sheet by media and material experts, *pre-test* and *post-test* questions about their conceptual understanding, and student attitude questionnaire sheet dealing with smoking.

On identification of problem and potency plus data collection, preliminary and field studies were done to find out initial data dealing with needs of learning material supplement development. The results were used as the bases to develop the learning material. The learning material based on mini research was then validated by the experts whom also advised toward the learning material. There were 4 experts: 2 material and 2 media experts. After being validated, revisions were done based on criticism and suggestion of the experts. Then, it was trial – tested limitedly. The validity was obtained by handing off the validation sheet to the experts.

Limited trial – test was done to find out students and teachers’ opinion as the users of the learning material whether it was reliable or not. The learning material’s reliability was done

within small – scale. It was readability test of the learning material given to both teachers and students (Riduwan, 2015). The test was done for 24 students of VB class and a teacher of VB class at the school. After the test, the students and the teacher were given questionnaire to judge and share their suggestion upon the learning material. The criteria of its reliability were if the students’ responses and the teacher’s response higher or equal to 75%, categorized reliable. The assessment from *pre-test* and *post-test* of student attitude questionnaire dealing with the students’ conceptual understanding about the danger of smoking was measured in term of its average improvement score by following N-gain (g) formula.

$$(g) = \frac{\text{Post – test Score} - \text{Pre – test Score}}{\text{Maximum Score} - \text{Pre – test Score}}$$

The interpretation criteria of N – gain scores as in Table 1.

Table 1. N-Gain Score Interpretation

N - Gain (g)	Interpretations
$g < 0,3$	Poor
$0.3 \leq g \leq 0,7$	Moderate
$g \geq 0,7$	High

After the test, then the product was revised based on the judgment and suggestion of small – scale trial run. Then, the data was analyzed. The data was analyzed descriptive qualitatively by determining the average scores obtained from experts’ validation and reliability response sheet of the learning material. The percentage obtained from those sheets were compared to criteria as shown in Table 2.

Table 2. Interval Percentage Categories of Expert Validation and Reliability of the Learning Material

Interval percentage categories (%)	Criteria
$76 < P \leq 100$	Very reliable
$51 < P \leq 75$	Reliable
$26 < P \leq 50$	Sufficiently reliable
$0 < P \leq 25$	Not reliable

RESULTS AND DISCUSSION

Based on the potency and problem data taken from observation and the interview with teacher, it was obtained that during learning, teacher only used worksheet and 2013 curriculum thematic book. On science learning, the teacher did not try to seek more needed information by students about the danger of smoking for health. The teacher only explained its prohibition to not smoke. The learning was centralized on teacher and there was no learning material supplement which was specifically designed based on the method and needs of the students. It made the students' conceptual understanding poor in science learning under theme human respiration system. It was not in line with 2013 curriculum value which centralized learning on students to be more active in finding out concepts. Information dealing with potency and problem were used as learning material supplement design based on mini research under theme human respiration system. The nature of the learning material was as supplement or enrichment which backed up the main learning material book (Maryam, 2012; Wibowo *et al.* 2014).

The design of the learning material consisted of mini – research syntax. In this research the learning material supplement was

created and developed as supportive learning material to assist teacher and students in learning process. Besides, the use of this learning material was expected to improve the students' conceptual understanding and their negative attitude toward smoking so the numbers of smoker could be suppressed in Indonesia.

The current developed learning supplement applies or facilitates students to do mini research started from problem formulation, proposing hypothesis, conducting research, recording the research findings, processing and analyzing the data, and concluding to understand the danger of smoking which has not existed in conventional learning material. This learning material was about human respiration system with the developed materials about the danger or smoking for health. The design of the learning material had suggestion from 4 validators: 2 medium and 2 material validators.

There were five aspects judged by media validators. The aspects were presentation technique, supportive presentation technique, size of the learning material, cover of the learning material, and content design. Based on the validation result, it was obtained that the learning material very reliable. The data could be seen on Table 3.

Table 3. The Results of Media Expert dealing the Learning Material

Aspects	Average	Percentage (%)	Categories
Presenting technique	3.83	95.83	Very reliable
Supportive material presentation	3.57	89.29	Very reliable
Size of learning material	3.50	87.50	Very reliable
Cover of learning material	3.67	91.67	Very reliable
Content design	3.57	89.29	Very reliable
Total	3.48	87	Very reliable

The material validation was done on three aspects. They were content, presentation, and language reliabilities. Based on the validation, it

was obtained that the learning material was categorized very reliable. The data is presented in Table 4.

Table 4. Results of Subject Content Validations of the Learning Material

Aspects	Average	Percentage (%)	Categories
Content reliability	3.92	97.92	Very reliable
Presentation reliability	4.00	100.00	Very reliable
Language judgment	3.90	97.50	Very reliable
Total	3.94	98.33	Very reliable

Based on the judgment of the validators, it could be known the scores of each aspect. The

media validator result showed average score 3.48 with percentage 87%. The material validator

result showed average score 3.94 with percentage 98.33%. based on the result, it showed that the learning material was valid with category very reliable.

The experts as validators did not only judge based on the provided statement but also provided criticism descriptively. The criticism

and suggestion written by the experts on the critic and suggestion sheets were used as reference to revise the learning material. The Revision Results based on Criticism and Suggestion of the Experts: (1. Preliminary design; 2. Revision after experts suggestion; and 3. Final design) as in figure 1, figure 2, figure 3, and figure 4.

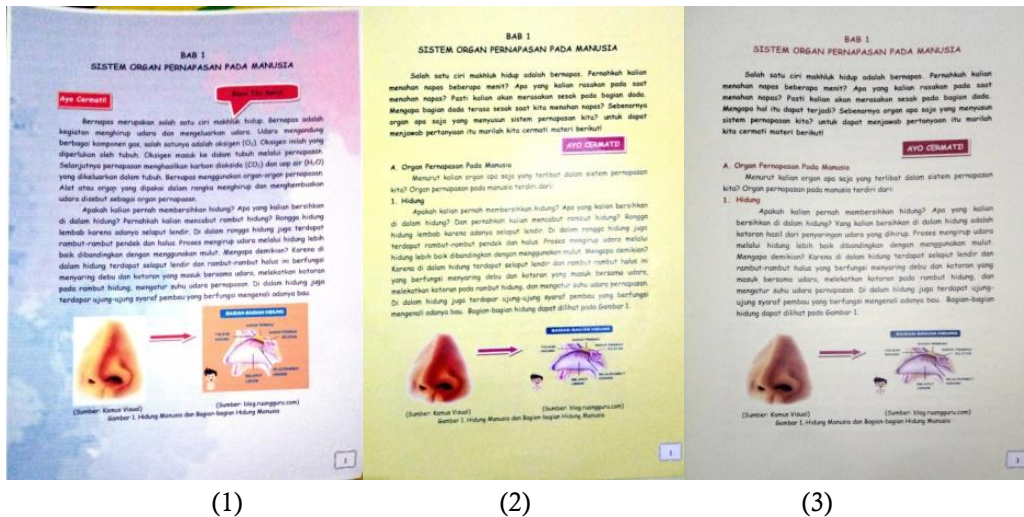


Figure 1. Simplifying The Sentences

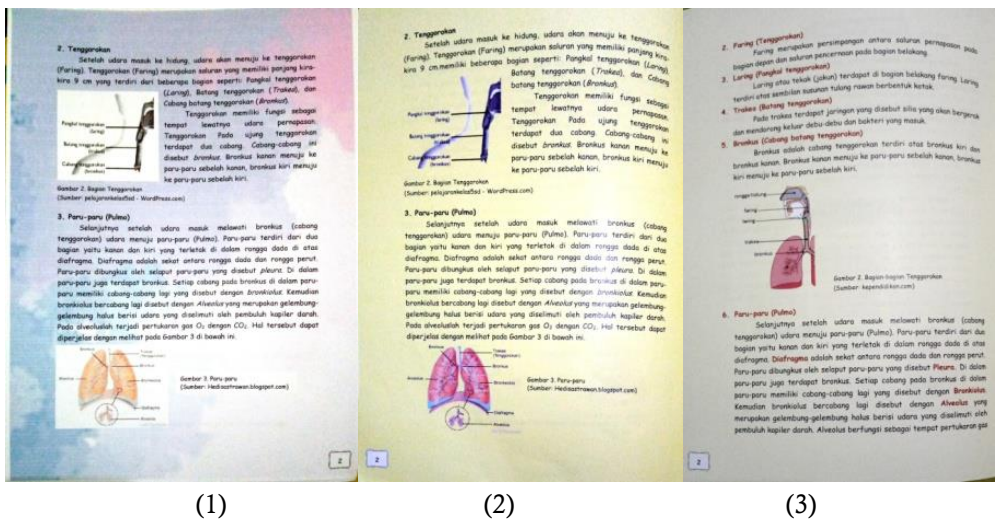


Figure 2. The Materials Should Be Orderly Arranged and Should Complete The Poor Points

The small – scale trial run was done at SD Ta'allumul Huda Bumiayu. The test involved a teacher and 24 students of VB class. The test was done in common learning activity by using stages as stated on lesson plan. Before the learning, the students were given *pre-test* to find out their initial concept and were given attitude questionnaire dealing with smoking before using the learning

material. After the learning by using the learning material, the students were given *post-test* and attitude questionnaire dealing with smoking after the learning. Besides, the teacher and the students were also given reliability questionnaire to judge the learning material supplement. The questionnaire method is a method to collect data by giving

series of questions or written statement for the respondents to be answered (Sugiyono, 2016).



Figure 3. On The Content, The Yellow Color Should Be Lighter

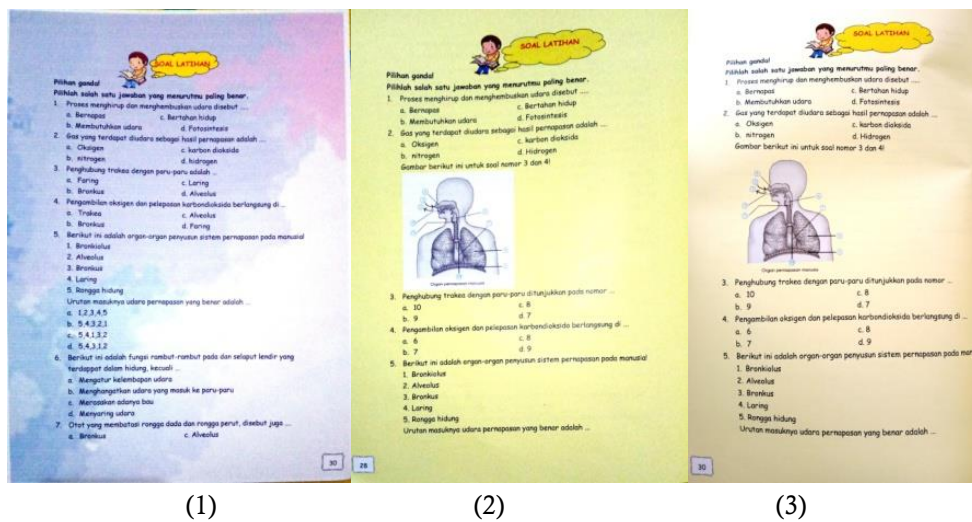


Figure 4. Attaching Figures On The Questions

This questionnaire consist of three aspects. The judged aspects were interest, subject content, and language. The data could be seen on Table 6 by the teacher and Table 7 from the students.

Table 6. Result of Reliability test of the Learning Material by the Teacher

Aspects	Average	Percentage (%)	Categories
Interest	3.40	85	Very reliable
Subject Content	3.14	78.6	Very reliable
Language	3.00	75	Reliable
Total	3.20	80	Very reliable

The reliability judgment of the learning material done by teacher and the students showed that the learning material with mini research had interesting display, practice, and easy to bring. It did not make them boring and the language was understandable and clear for both the point and readability. It helped students to master science mastery dealing with daily life so that students were facilitated to find their own concepts. It was proven by reliability judgment by teacher with overall percentage 80% and the overall percentage given by students was 95.49%. Based

on the trial test done for teacher and students, the learning material was categorized very reliable.

The achievement of the criterion is in line with Zainuddin *et al.* (2012) stating that after being validated, then the result was categorized reliable, then the product could be used in learning process. Based on validation and trial test stages, they showed that the learning material supplement based on mini research was valid to use in learning and could be tested in larger scale. Based on the small – scaled learning, the *pre-test* and *post-test* data were obtained.

Table 7. Result of Trial Test of the Learning Material from the Students

Aspects	Average	Percentage (%)	Categories
Interest	3.83	95.83	Very reliable
Content	3.79	94.79	Very reliable
Subject			
Language	3.85	96.18	Very reliable
Total	3.82	95.49	Very reliable

The recapitulation of the tests about the students' conceptual understanding dealing with smoking could be seen on Table 8.

Table 8. Recapitulation of Pre-test and Post-test of Conceptual Understanding and Attitudes of the Students about Smoking

Data types	Data		N-gain	N-gain criteria	Remarks
	Pre-test	Post-test			
Conceptual understanding	42.54	74.77	0.55	Moderate	Improved
Attitudes of the students toward smoking	82.33	87.67	0.39	Moderate	Extremely negative toward smoking

Based on the test, the average of *pre-test* and *post-test* was on $0.3 \leq g \leq 0.7$, categorized moderate. It indicated that the students' concepts and attitudes dealing with smoking improved. The finding is in line with Azizah & krispinus (2015) about mini – research task with metacognitive strategy influenced significantly toward learning achievement. Then, the students' attitudes dealing with smoking was significantly improved with negative category toward smoking. This research is in line with Ikhsan *et al.* (2013) & Nuradita *et al.* (2013) concluded that health education about smoking was proven to influence knowledge and suppress intention to smoke found in teenagers. It is in line with Green (Rohmadi *et al.* 2013) stating that an individual's behavior was influenced by predisposing factor. It covered knowledge, attitude, belief, trust, value, and tradition. Therefore, it was expected for the students to have very negative to smoking until they would grow mature. The implementation of this learning material supplement required students to cooperate in finding the concepts dealing with the danger of smoking for health, especially human respiration system. Therefore, students could conclude that becoming passive and active smokers would get respiration organ problems so it would be easy to get sick such as respiration problem, lung cancer, and even death.

CONCLUSION

The learning material supplement based mini research about human respiration system was stated valid by media and material experts with each percentage 87% and 93.33% respectively and was categorized very reliable. The learning material was also stated very reliable by the teacher and the students with each percentage 80% and 95.49% respectively so that it could be used in the learning. The result of conceptual understanding showed improvement from 42.56 into 74.77 with *N-gain* 0.55, categorized moderate. The attitude of the students dealing with smoking showed *N-gain* 0.39, categorized moderate with improvement score 82.33 into 87.67, categorized extremely negative to smoking. The learning material supplement based on mini research about human respiration system was valid and reliable to be used in learning for the fifth graders.

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