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The development of natural science learning material integrated with islamic values to attract santris' interest in learning the human digestive system

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Abstract. This research aimed to produce natural science learning material based on Ploom theory for Junior high school students. The learning material in this research was a book which was integrated with islamic values and satisfied validity, practicality, and effectiveness. Besides, the researchers also convinced that those criteria, validity, practicality and reliability, appropriate to students' test answer. The subjects of this research were 15 of eighth grade students of Madrasah Tsanawiyah (MTs) Darul Hidayah Wuluhan Jember, east Java Indonesia. The methodology on this research was adapted from Ploom theory. The validity product of this learning material could be shown by the expert validity. This can be reached when the expert said that it was valid for both the book and the test sheet. The practicality of the book must reach very practical criteria. This was based on how practical teacher delivered the material and how students understand the material. The effectiveness of the product could be shown by students' attitude in learning activities, cognitive skill, and well-skilled in psychomotor. The learning material was said valid because the validators said that those instruments were valid. Validator scored the learning material (book) as 3.3 (4 scales), and test sheet as 3.58. Hence, those learning materials can be said valid. Secondly, the learning materials was practical because the validators said that the book can be used with minor revision and students learned the material actively. The learning materials called effective as well, because satisfied two indicators of effectiveness, which were students' response about learning activity was positive with 82.21% students answered so, and the result of the test was said valid because reached minimal score of 0.73 and reliable about 0.57.

1. Introduction

Education is one of the national development sectors as an effort to educate the life of nation in order to produce quality human beings. According to UU No 20 year 2003 on National Education System, qualified human beings are defined as an educated human beings who are faithful and devoted to God, have a noble character, healthy, knowledgeable, capable, creative, independent, democratic and responsible. Through learning activities, national education was expected can build a nation and people character.

A component that plays important roles is learning material. Therefore, teacher must be able to prepare and design a wellstructured learning (includes learning materials) so that learning can be focused on students' activities. Aunurrahman [1] stated that during the learning process, learning problem mostly related to learning material and learning resources. Moreover, he stated that students have different leaning experience which will be used to support the learning activities. However, for students who have less experience related to the material to be studied, will face problems in learning, especially regard to readiness to learn. This applies to all subjects including natural sciences subject.

Natural science is one of the fields that played an important role both in school and in everyday life. The usefulness and benefits of studying natural science can be felt in many ways. But in fact, natural science is still a difficult lesson to students at MTs Darul Hidayah, Wuluhan Jember, East Java Indonesia. Based on preliminary interviews with one of the teachers at the school, she stated that the average score of student at their final report in even semester was quite low, especially in natural science lesson. It was around 6.51. The average score for this natural science lesson was low compared to the score of other subjects.



The result of preliminary observation showed that students at MTs Darul Hidayah Wuluhan Jember, east Java Indonesia were less motivated to study natural science. Most of the students who studied at MTs Darul Hidayah were santri (students who study alot about religion) so that they preferred to study all things related to Islamic to general subject (natural sciences subject). In one side, teachers tended to buy teaching materials in the form of students worksheet which was hoped that teacher would get benefits and bonuses from the seller, regardless of the content of teaching materials. This suggests that natural science teachers in schools were less creative in developing teaching materials especially that integrate natural science and Islamic values.

One of the students, named Romi, said that he was not ready to study natural science, he was bored in learning natural science, and he said that textbooks and students' worksheet less interesting, then it made him unable to understand the material. Related to this, we need some improvement, both from learning process and the availability of learning resources for students (santri).

One of the way to solve this was by integrating santris' habit and interest in learning religious subject with the non-religious subject (such as natural sciences). Moreover, Albert Einstein said that "*Religion without the help of science would be paralyzed and fail to achieve its noble purpose, and vice versa, science without the help of religion will be blind and fail to even see the goal that is true.*" [2]. It emphasized that integrating natural science to religion was valued. Therefore, integrating Islamic values, as part of religious subject, and natural science was needed, especially for learning material. This aimed to attract students' (santris') interest in learning natural sciences so that the results obtained was better.

Teachers' ability in designing or arranging materials or teaching materials becomes one of the things that play an important role in determining the success of students learning activities. Therefore, teacher, as presenter of the material, should be able to choose a method or approach which is appropriate to the conditions of the students' ability in the class, included the suitability in developing the teaching materials by integrating science and Islamic values to support the learning activities. According to Jacobsen [3], there are several things teachers should do with the availability of teaching materials, such as (1) providing various examples and representations of student learning materials, (2) encouraging high levels of interaction in the learning process, (3) linking subject matter with the real world. The material that has been developed can be organized into teaching materials to make it easier for students to learn it.

Related to that, the availability of teaching materials was needed to support the learning process and improve students' learning achievement. Teacher conducted a meaningful learning can be used to make the learning become interesting. In textbooks, meaningful learning can be applied by asking some questions which linked the students' knowledge with the material will be learned. In reality, however, the availability of meaningful textbooks, which was integrating science and Islamic values, and supporting the achievement of science learning objectives in accordance with curriculum demands, target characteristics, and problem-solving demands especially in junior secondary schools is still limited or even was not available.

Similarly, most of teachers still used textbooks that emphasize more on the subject matter and set of questions which was used as exercises. It influenced the way of teacher in transferring the material, which was tend to be teacher-centered learning, whereas it has been described in Permendikbud No. 68 year 2013 [4], that teachers were suggested to use scientific approach, students' learned every subject actively looking for their own concept about the subjects or in other words learning which emphasizes student activeness (students-centered). In addition, students faced difficulty in mastering the material which learned, both from cognitive aspect or soft skill aspect.

Teachers should be able to prepare natural sciences teaching materials in which contains the activities and able to choose strategies and approaches to learn in accordance with the conditions in the school by integrating science and Islamic values, so that students will experience more meaningful learning and reach good outcomes. Learning activities both in classroom and the learning materials should be linked to students' daily life and designed as fun activities as possible for students, so that learning activities experienced by students will be more meaningful to them. In order to make learning activity to be fun, new concepts or information must be linked to existing concepts in the student's cognitive structure. According to Ausubel [5], the knowledge already possessed by students will determine the success or failure of a learning process.

In the learning activities, if teachers were allowed to associate the material discussed with the condition of students, whether the hobby or the needs of students, cognitive development, daily environment, and stock that has been owned by students. It will give a positive impact for students such that their science concept learned is meaningful. Sulistyorini [6] suggested that knowing the relevance of the material that has been learned with everyday life can provoke learners' curiosity to learn well so as to improve their learning achievement. This learning can be applied through the use of contextual problems as a bridge of students' understanding of science. The use of contextual problems is a concept of learning that assumes that children will learn better if the environment is created naturally, learning will be more meaningful if children "work" and "experience" itself what they learn, not just "knowing" it.

Rahayu said that in the context of the integration of natural science should be clarified so as not to cause problematic dichotomy between science and prolonged influence on the historicity of science in the development of Islamic civilization [7]. Integration of this knowledge can be applied directly in the world of education, especially science development of science that had been detached from the values of textual or contextual religion. Early Childhood Education (ECD) as one of the containers educational weeks to implement the context so there are no mistakes in the history of science and religious education. In the learning material that is the theme of the universe, subthemes: This month is particularly relevant when applied to children in a series of structured learning from curriculum mapping, promissory notes, RKM, RKH. The study of celestial phenomena is very important in bayani be explored in terms of the study of texts in the Qur'an, Burhani study the phenomena of the universe in the form relating to the month in the community, and Irfani as the concept of peace with nature which has provided benefits for humans, thus giving a vehicle for wider learning to the learners.

Based on the description of the facts of the problem, the researcher conducted developmental research to create teaching materials for students (santri) at MTs Darul Hidayah Wuluhan Jember, east Java Indonesia. This integrated natural science and Islamic values in order to overcome the problems in natural science learning. Therefore, researchers conducted a reasearch about the development of natural science learning material integrated with islamic values on the topic of the human digestive system.

2. Methodology

The type of research was research and development (R & D) because researchers developed natural science teaching materials integrated to Islamic values. R & D is a research method undertaken to produce a particular product and test the effectiveness of the product used to anticipate problems in education [8]. The development of natural science teaching materials in junior high school class VIII integrated to Islamic values was based on Plomp Theory. In this research, researcher modified the development of Plomp model into 4 phases, which were: (1) initial investigation phase which aimed to know the initial information such as curriculum, classroom characters, and students' characters. This was done by asking to natural science teacher and several stuents (2) design phase, when researcher thought about the appropriate design, (3) phase of realization/construction, which was making action and realized the appropriate design into paper or computer, and (4) test, evaluation, and revision phases when researcher tried the printed design, as prototype, to the real learning activities and gathered some data which consist of students' response, students' activities, validity and reliability of the printed design. The data in the fourth phase then analysed to get a conclusion. The object of this research is the teaching materials of natural science in the form of modules/teaching materials integrated with the values of Islamic values on the human digestive system. The subjects in this study were students MTs Yayasan Pondok Pesantren Darul Hidayah Wuluhan Jember, east Java Indonesia as many as 15 students and science teachers in the class.

3. Results and Discussion

3.1. The Result of Preliminary Investigation Phase

In this phase, researchers identified and assessed the curriculum 2013 for natural science subjects, then did student analysis, material analysis, and task analysis. The results of the initial investigation are as follows

3.1.1. Curriculum Analysis

The curriculum used in the development of learning material refers to the curriculum 2013. Based on Permendikbud No 68 year 2013, it is mentioned that learning is designed to follow the four core competencies. These four core competencies include the spiritual, social, knowledge, and skills aspects. Curriculum 2013 also used scientific approach which includes observing, questioning, experimenting, associating, and communicating. Based on curriculum 2013, students are expected to master the skills such as observing, asking, reasoning, trying, making hypotheses and proving, furthermore the ability to write coherently based on fact or phenomenon is required. So, natural science must facilitate students to think critically and creatively and to know directly its integration in the science of Islamic religion.

3.1.2. Students Analysis

Analysis of students aimed to examine the character of students at MTs Darul Hidayah Wuluhan Jember, east Java Indonesia especially class VIII-A academic year 2017-2018. Data about these students were obtained by interviews with natural science teacher namely Muflikhah, S. Pd. Student analysis included background knowledge, cognitive development, and learning characteristics in the classroom. From the analysis results obtained the findings as follows:

1) Students' Knowledge Background

Students have learned human digestive system in the previous level but still limited to basic knowledge. Therefore, the problems contained in the textbook/module were constructed to make students build their own knowledge at the human digestive system main material by linking the initial knowledge of students.

2) The cognitive development of students

The students of MTs Darul Hidayah Wuluhan Jember, east Java Indonesia class were 13-14 years old. Piaget assumes that at that age a child has entered the formal operation stage so that the student has been considered capable enough to use logic and reasoning [9]. At that stage, students have been able to think abstractly, they were no longer dependent on the immediate or real. Therefore, it is possible that students at this stage are able to complete more systematic abstract tasks. Based on the level of cognitive development of students it is possible students can complete a series of tasks well.

3) Classroom characteristics

The data about classroom characteristics was gathered by asking several questions to teacher and students. Students at VIII-A had heterogeneous understanding and knowledge about natural sciences. Students Grade VIII-A consisted of 15 students and classified into high, medium, and low ability students based on the score of natural science subject in their previous daily test in the material before. Based on the results of interviews with natural science teachers in class VIII-A, researcher got information such as:

- a) Teachers are not accustomed to teach by using scientific approach. She tended to use common learning methods (teacher centered method).
- b) Student learning resources mostly comes from student handbooks and notes from teachers.
- c) Students' understanding about the human digestive system material tended to be low, especially which had to be integrated to Islamic value.
- d) Students' understanding related to natural science or applied science related to Islam was still lack, so they did not know the link between the two clumps of science.

Based on the analysis, the researchers argued that it was necessary to develop natural science teaching materials integrated Islamic values, especially on the material of the human digestive system

3.1.3. Material Analysis

Material analysis aimed to identify, and arrange the material systematically especially in the human digestive system main material. The development of teaching materials must follow the concept of scientific approach, integration with Islamic values, and content material in the curriculum 2013. Main competencies, basic competencies, and indicators for human digestive system materials in grade VIII SMP are presented in Table 1 as follows.

Table 1. The Analysis of Material at Human Digestive System

	Main competencies	Basic competencie	Indicators
3.	Understanding and implementing knowledge (factual, conceptual, and procedural) based on students' curiosity in natural science, technology, related to culture and art in real life.	3.6 Describing human digestive system and its relation with another human system like respiratory system, blood vessel system, and the usage food energy.	<ul style="list-style-type: none"> • Stating the types of nutrition • Explaining the usage of nutrition based on its types • Explaining the structure of human digestive system • Explaining the function of human digestive system organ • Explaining all kind of human digestive system problem
4.	Processing, serving, and giving concrete aspect (by using breaking down, arranging, modifying, and making) and abstract aspect (by using writing, reading, calculating, drawing, and arranging) based on what they learned at school and another resource which has the same theory.	4.6 investigating the mechanical human digestive system and chemist human digestive of food	<ul style="list-style-type: none"> • differentiating the mechanic human digestive system and chemist human digestive system • Proving the type of food based on its type of nutrition.

3.2. Designing phase result

Preliminary design in developing this learning tool created natural science teaching materials integrated with Islamic values which related to human digestive system which were Textbook/Module, and test of learning Result (THB). Furthermore, it was also designed the instruments needed in the study, include validation material/module validation sheet (validity), practicality could be seen from student activity observation sheet and effectiveness instrument (seen from the result of student learning and response). In general, the results of this design phase are as follows.

3.2.1. The design of learning aids

1) Integrated instructional materials (integrated modules)

The developed teaching material was a series of activities in the form of theory, practical guides, and problems which were developed with the aim of helping students find their own knowledge. In the teaching materials were also equipped with questions that helped students improve their knowledge in studying the material.

2) The result of learning result (THB) The developed THB was a series of questions used to measure student learning outcomes. The developed test form was a multiple choice of 8 and a description of two items. The time available to complete the test was 60 minutes. THB preparation process was done with attention to each indicator of achievement of learning outcomes.

3) Design of Research Instruments

a) Natural science teaching material validation sheet The validation sheet was an integrated piece of validated teaching material with an Islamic value, and a THB validity sheet. Both validation sheets were revised based on discussions with supervisors. The validation sheet was given to several experts with each expertise in their field sciences. The experts were 1 religious expert who focused on the integration of Islamic values with science, 1 biologist focused on material

- content, 1 health biologist and practitioner who focuses on biological cases, 1 biology education expert who highlighted the problem obedience of teaching materials.
- b) Student Activity Sheet Student activity observation sheets were adapted from Lestari [10] with modifications in accordance with research objectives. Then it revised based on discussions with supervisors, especially in several categories of student activities matched to the purpose of research.
 - c) Student Response Questionnaire The student response questionnaires were adapted from Lestari by revising the statement points that were adapted to the application of natural science integrated with Islamic values. The student response questionnaire consists of 9 items of statements, containing 4 items of favorable statements and 5 unfavorable statements. There are two choices answer for each statement, i.e. Yes and No.

3.3. The Result of Realization Phase

The result of this phase was natural science learning material integrated with Islamic values on the topic of human digestive system for grade VIII Junior High School (MTs), student activity observation sheet, response questionnaire, and Learning Outcome Tests (THB). The learning media resulted from this phase was called prototype 1. In addition, it is also designed the necessary instruments for another activity, i.e validation sheet. Prototype 1 and research instruments was discussed with research team for improvement until a prototype was ready for trial.



Figure 1. Islamic Values 1 Integrated with natural science

Moslem Corner

Untuk menghindari dari penyakit tersebut maka telah diperingatkan oleh Allah dalam surat Thaha ayat 81 yaitu:

كُلُوا مِن رِّزْقِنَا مَا نَزَّلْنَاكُمْ وَلَا تَطْلُقُوا إِلَيْهِ يُجْرِمُ عَلَيْكُمْ
 عُقُوبَتِي (الأنبياء)


"Makanlah di antara rezeki yang baik yang telah Kami berikan kepadamu, dan janganlah melampaui batas padanya, yang menyebabkan kemurkaan-Ku menimpamu"



Marasmus yaitu suatu kondisi serius malnutrisi kekurangan kalori dan protein, diabetes militus yaitu gangguan metabolisme karbohidrat, serta laktose intolerance yaitu gangguan metabolisme laktosa karena difisiensi enzim laktase.

Figure 2. Islamic Values 2 integrated with natural science to Al Qur'an

Mari Uji Makanan Kita



Tujuan umum kegiatan uji coba zat makanan adalah kalian dapat mengidentifikasi zat makanan yang terdapat di dalam berbagai bahan makanan yang telah ditentukan. Selanjutnya melakukan uji zat-zat makanan terhadap berbagai bahan makanan secara rinci

A. Alat dan Bahan:

Bahan

1. Reagen (lugol, biuret, benedict)
2. Bahan makanan yang ingin di uji (nasi putih, kentang, singkong, kuning telur, minyak, margarin, tahu, tempe, dll)

Alat :

1. Penjepi tabung reaksi
2. Pipet tetes
3. Lumpang porselin
4. Tabung reaksi
5. Pemes/pisau
6. Papan porselin




Figure 3. Feature design on the learning media as lab work



Figure 4. Feature design on the learning media 2 as the development of science in real life

3.4. The Result of Test, Evaluation, and Revision Phase

There were two results of this phase, i.e. the results of learning media validation and the results of learning media tests. The result of validation analysis was used to know whether teaching materials can be used or not. Moreover, it also could be used to know the category of validity and revised the teaching materials. While the results of the analysis of trial was used to produce a good teaching material, called the final teaching material/final prototype that was ready to be implemented. The resulting developments that we got, evaluated, and revised are made as follows:

3.4.1. Test Result Data

The data obtained through the learning result test (THB) was analyzed to check whether the developed THB reached the requirements of validity, and reliability. The process of calculating of the analyses was more fully attached.

1) Validity Item Problem

The result of THB item validity analysis is presented in table 2 below

Table 2. The validity of The Test

Question's number	Validity Coefficient	Validity Category
1	0.48	Medium
2	0.63	High
3	0.9	Very High
4	0.7	High
5	0.74	High
6	0.63	High
7	0.8	Very High
8	0.59	Medium
9	0.91	Very High
10	0.9	Very High

Based on the criteria of the validity of the items that have been specified, an item is determined to be valid if the validity coefficient is more than 0.4 or at least in the medium category. The analysis showed that the validity of the item was included in the category of medium, high or very high so

that the THB item could be said to be valid and could be used to assess the students' success in following the learning by using IPA teaching materials integrated with Islamic values.

2) Reliability of Problem Item

According to the reliability coefficient calculation procedure of the test, the results obtained from the calculation of the reliability coefficient item about 0.57. Based on the criteria of reliability of the items that have been set, test results are reliable if the coefficient of reliability is more than equal to 0.40 or at least are in the medium category. The analysis showed that the reliability of the item is included in the high category so that the THB item could be said to be reliable and could be used to assess the students' success in following the learning by using IPA teaching materials integrated with Islamic values.

3.4.2. Students' Activity Data

There were several data collected about students' activities during the implementation of developed learning material. The time used by student to do every activity at first meeting appropriated to the percentage of ideal time which was designed with tolerance 10%. The integrated science of Islamic values on the topic of the digestive system in the research class at the first meeting was said to be good. In addition, the time students used to conduct each activity at the second meeting was also appropriate to the ideal percentage of planned time with a tolerance of 10%. Then it can be said that student activity in science learning integrated the Islamic values at the second meeting was said to be good.

The result of analysis student activity showed that students' activity for 2 meetings was appropriate to ideal time percentage which was planned with 10% tolerance. So, based on the category of student activity that has been determined before, student activity for all meetings were good.

3.4.3. Students' Response Data

To know student's response about the learning activities, researcher gave questionnaire at the end of the learning activities. This aimed to collect information about student responses to science teaching materials integrated with Islamic values and cooperative learning activities with a scientific approach. Based on the available data, the average percentage of students who responded positively was 82.21%. Based on predetermined criteria could be said that the student's response to learning was positive.

3.4.4. Achievement of Natural Science Teaching Materials Integrated with Islamic Values

The criteria of IPA teaching materials integrated with good Islamic values were teaching materials developed based on learning device development procedures that suitable with the categories, valid, and effective. Validity of teaching materials was viewed from the supervisor assessment results. The effectiveness of teaching materials was seen from the results of the learning outcome test. Achievement of these criteria can be seen in the following table.

Table 3. Learning Aids Criteria Achievement

Number	Category	Explanation
1	Expert's validation of learning device (Validity)	Valid
2.	Learning outcome tests (Effectiveness)	Valid, Reliable
3.	Student's response	Positive
4.	Student's activity	Good

1) Validity of learning aids

Learning devices were said to be valid because it had been declared valid by the supervisor. According to the average supervisor scores obtained the criteria score of all aspects for teaching materials was 3.3; and for THB was 3.58. So the two devices were said to be valid.

2) Practicallity of learning aids

Learning devices were said to be practical because the experts (supervisor) say the device could be used with a little revision and student's activity indicated the good category.

3) The effectiveness of learning aids

Learning devices were said to be effective because they reached the two predefined effectiveness indicators, the student's response to positive learning where the minimum percentage of all statements was 82.21% and the TBH result reached the valid criteria with at least $r_{xy} = 0.73$; and reliable with the value of $\alpha = 0.57$. Based on these data, the developed teaching materials could be said valid, practical and effective criteria. So that, it could be said that the teaching materials of IPA integrated Islamic values is good.

4. Conclusion

Based on the results of data analysis and discussion of the research about development learning material integrated natural science to Islamic values on human digestive system theme, obtained the following conclusions:

The process of developing natural science teaching materials integrated in Islamic values on the human digestive system material in this study uses a development model of Ploomp which consists of five phases. However, researcher limited the phases by using only four phases among five phases. The four phases were as follows:

- a. Preliminary Investigation Phase In this phase, identification and assessment of natural science curriculum, student analysis, and analysis of natural science materials were used to identify, detailing and systematically preparing the main parts of the lesson
- b. Design Phase In this phase, natural science materials are designed to integrate Islamic values on human digestive system materials including integrated learning materials and THB. In addition, there are also designed research instruments that include validation of teaching materials, student activity observation sheets, and student response questionnaires.
- c. Realization Phase In this phase, natural science teaching materials are integrated into Islamic values on the human digestive system material called prototype 1.
- d. Test, Evaluation, and Revision Phase In this phase validation of learning devices, revisions, and prototype trials are performed to produce a good learning device, which meets valid, practical, and effective categories.

The resulting learning device is said to be good. This is because the learning device have been developed based on the learning device development procedure and meet the three predefined categories.

- a. Validity of learning device. Learning devices are said to be valid because it has been declared valid by the validator. According to the average validator scores obtained the criteria score of all aspects for teaching materials is 3.3; and for THB is 3.58. So the two devices can be said to be valid.
- b. Practicality of learning device. Learning devices are said to be practical because the experts (validators) say the device can be used with a little revision and student activity indicates the good category.
- c. The effectiveness of learning device. Learning devices are said to be effective because they have met the two predefined effectiveness indicators, the student's response to positive learning where the minimum percentage of all statements is 82.21% and the TBH result meets the valid criteria with at least $r_{xy} = 0.73$; and reliable with the value of $\alpha = 0.57$.

Researcher realized that this research was far a way from various themes in natural sciences. Therefore, researcher suggest for another researcher to conduct broader research in another theme or even in another subject.

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