The improvement of Chemistry Learning Outcomes of MAN 1 Cirebon City Student On the Material Structure of the Atom-Based Qurani Students Worksheet (LKPD)

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Abstract. This study aims are to determine the increase and percentage in learning outcomes of the Chemical on the material structure of the atom through the use of Qurani Students Worksheet (LKPD) in the students of grade tenth Science 3 of MAN 1 Cirebon City on the academic year 2018/2019. The research method is classroom action research cyclical. The subject of the research is the students of grade tenth science 3 of MAN 1 Cirebon City on the academic year 2018/2019. The technique of collecting data is the test and non-test. The use of Qurani Students Worksheet (LKPD) can improve the learning outcomes of the Chemical on the material structure of the atom in cognitive, affective and psychomotoric. Increased learning outcomes of students' cognitive is 22.9%, the students' affective domain is 21.05%, and the students' psychomotoric is 9.78%.

1. Introduction
MAN 1 Cirebon City is one of the schools under the Religion Ministry of the Indonesia Republic. Thus the materials which are taught cannot be separated from the association of religious values in the learning process in the schools. The learning environment in the schools is inseparable from the guidelines of the Islamic religion, namely Al-Qur'an Nur Kariim. Thus the integration of the Qur'an does not only occur in the religious subjects, but all subjects both in the activities and the teaching materials used, the facts in the field which are the result of the researcher's evaluation who teaches there indicate that teaching and learning chemical materials are not done using integrated with the Qur'an. Even though there are a lot of chemical teaching materials that can be integrated with the Qur'an, one of them is the atomic structure materials. This happens because the teaching materials used are only books and worksheets from publishers that have cooperate with the school, so the opportunity for the teachers to make teaching materials is not well explored. Teaching materials that have been adapted to the environment of students can improve students’ learning skill. As stated by Yurnetti et all that learning skills are required by students to get success in learning such as critical thinking, creative thinking, and collaboration, communication [1]. To solve this problem, it is necessary to make chemical teaching materials that are integrated with Al-Qur'an through LKPD.
LKPD is one alternative to the use of appropriate and efficient teaching materials in adding information about concepts that are studied systematically [2]. The LKPD used in this research is Quranic LKPD. Quranic LKPD is LKPD designed through the touch of the psychological value of students through the Qur'an. This teaching material is considered appropriate by researchers to be used in MAN 1 Cirebon City which has the uniqueness of Islamic religion where it is under the Department of Religion in accordance with the Government Ordinance of Minister of Religion No 60 [3]. This study presents the data showing an increase in chemistry learning outcomes in atomic structure material using Student Worksheet (LKPD) teaching materials. Atomic Structure material it talks a lot about natural phenomena. The process of studying natural phenomena can not only be conveyed by the lecture method, of course students need to be involved to look for sources of information to find themselves so that understanding will be easier. One approach that can support these learning activities is the scientific approach.

The scientific approach is used in the preparation of the Quranic LKPD. Through a scientific approach, students are trained to construct factual, conceptual, procedural, and metacognitive knowledge through scientific activities such as observing, asking questions, formulating hypotheses, attempting experiments, analyzing data, concluding and communicating [4]. The condition of learning that is expected to use this approach is that students are encouraged to seek information from various sources through observation, and not just to be informed [5].

In line with the research conducted by Wijayanti, Ritaningsih [6] revealed that one of the crucial principles of educational psychology is that teachers should not merely provide knowledge to students. Teachers should provide space for students to develop their abilities in studying science, by facilitating students through a scientific approach [7]. Students need to be trained to develop their reasoning power so that they can find the spirit of the knowledge they are learning.

Students must have an adaptive science (adjusted) in society and the environment. In its activities, education must always adjust to the dynamics of life that continues to move [8]. Thus students become the center of learning, in accordance with what was conveyed by Hartini et al in 2020 in addition to the use of teaching materials, the learning process that is centered on students in the learning process is also very important to be applied [9]. Other than that, as a chemistry educator at Madrasah Aliyah, it is necessary to teach chemistry by providing information on the usefulness of that knowledge in the Al-Qur'an based society, so that students understand that the knowledge they receive can be applied in real life. With Al-Qur'an based learning, they realize the majesty of Allah SWT regarding the creation of Allah SWT based on natural phenomena that occur.

2. Methodology
The method in this study is classroom action research (CAR) with the design of the Kemmis and Mc Taggart models.

Figure 1. Kemmis and Mc Taggart models [10]

The description of activities in each cycle consists of 4 stages, namely: (a) action planning, (b) action implementation, (c) observation / observation and (d) reflection. This research was conducted
for two months starting on 1 August to 29 September 2018 in MAN 1 Kota Cirebon. The subjects of this study were 32 students of Class X Natural Science with 32 students.

Data collection techniques using test and non-test techniques. Based on the variables studied, two types of data collection are used, namely the observation sheet and the learning achievement test. Of the two types of data collection tools taken in this study, then analyzed with descriptive analysis techniques.

3. Results and Discussion

3.1 Results

3.1.1 Cognitive Value Results in cycles 1 and 2

| Table 1. Pretest and posttest value of students in cycle 1 |
|----------------------------------------------------------|
| Aspect | Pretest | Posttest |
| Total | % | Total | % |
| Complete | 0 | 0 | 20 | 62,5 |
| Not Complete | 32 | 100 | 12 | 37,5 |

| Table 2. Pretest and posttest value of students in cycle 2 |
|----------------------------------------------------------|
| Aspect | Pretest | Posttest 1 | Posttest 2 |
| Total | % | Total | % | Total | % |
| Complete | 0 | 0 | 20 | 63 | 32 | 100 |
| Not Complete | 32 | 100 | 12 | 38 | 0 | 0 |

Both table shows the students’ learning outcomes in the cognitive domain which have reached kkm and an increase in the learning outcomes in the cognitive domain that starts from the cycle 1 to cycle 2 by 37%.

3.1.2 Results of Students’ Affective Values in cycles 1 and 2

| Table 3. Affective Value of Class X Science 3 students in cycle 1 |
|-----------------------------------------------------------|
| Affective Value Indicator | Discipline | Neatness | Cooperation | Activeness | Politeness | Honesty |
| Percentage | 87,50% | 84,38% | 81,25% | 79,69% | 71,88% | 75% |

| Table 4. Affective Value of Class X Science 3 students in cycle 2 |
|-----------------------------------------------------------|
| Affective Value Indicator | Discipline | Neatness | Cooperation | Activeness | Politeness | Honesty |
| Percentage | 89% | 86% | 83% | 82% | 88% | 77% |

Both table shows the learning outcomes in the affective domain have an average value that is included in the high category in each indicator a minimum of 76% and an increase in the percentage of the value of the learning outcomes in the affective domain from cycle one with the following information: a. Discipline 1,5%, b. Neatness 1,65%, c. Cooperation 1,75%, D. Activeness 2,31%, e. Courtesy 16,12% and f. Honesty 2%. 
3.1.3 Psychomotor Value Results of Students in Cycles 1 and 2

Table 5. Psychomotor Value of MAN 1 Students in Cirebon City in Cycle 1

| Psychomotor Value Indicator | Percentage |
|-----------------------------|------------|
| The suitability of the response to the question | 80,00% |
| Harmony of diction | 72,00% |
| Appropriate use of grammar | 75,00% |
| Pronunciation | 81% |

Table 6. Psychomotor Value of MAN 1 Students in Cirebon City in Cycle 2

| Psychomotor Value Indicator | Percentage |
|-----------------------------|------------|
| The suitability of the response to the question | 82% |
| Harmony of diction | 75% |
| Appropriate use of grammar | 77,00% |
| Pronunciation | 83% |

Both table shows, the learning outcomes in the psychomotor domain included in the enough category with the average between each indicator a minimum of 73,5% and each indicator domain increasing from cycle 1 to cycle 2, with the following information: a. The suitability of the response to the question 2%, b. The harmony of word choices 3%, c. The appropriate use of grammar 2% and d. The pronunciation 2%.

3.2 Discussion

Classroom action research is carried out through two cycles, while the stages in each cycle are described in the following table:

Table 7. Principal Plan of Research Activities

| Cycles | Activities Stages | Types of Activities |
|--------|-------------------|---------------------|
| I      | Planning:         | Plan the lesson that will be applied in (TLA) Teaching and Learning Activities |
|        | Identify the problem and determine alternatives | Determine KD and basic material |
|        |                   | Develop RPP |
|        |                   | Arrange LKPD |
|        |                   | Prepare learning sources |
|        |                   | Develop learning evaluation form |
| Action |                   | Apply the action by referring to RPP and LKPD |
| Observation | Conducting observations using affective and psychomotor assessment observation sheets | Assessing the results of actions with the LKPD format |
| Reflection | Evaluate actions taken through daily tests | |
| II     | Planning | Hold a meeting to discuss the results of the evaluation of the RPP, LKPD, etc. |
|        |         | Improve the implementation of actions according to the results of the evaluation for use in the next cycle |
|        | Evaluate action I | Identify the problem and determine alternative solutions to the problem |
|        | Development of action programs II | |
| Action | Implementation of the action program II | |
3.2.1 Cycle 1

Learning activities in Cycle 1 were carried out on 4, 11 and 18 August 2018. In this cycle, the researcher delivered the material: (a) Development of the Atomic Model, (b) atomic number and mass number, and (c) Isotopes. The description of activities in this first cycle consists of 4 stages, namely: (a) action planning, (b) action implementation, (c) observation and (d) reflection. The stages of action in this cycle are carried out into several meetings. The first meeting was held on 4 August 2018. The material presented by the researchers was the development of the Atomic Model.

In delivering the material development of the atomic model, there are nine verses of the Qur'an related to these chemical materials. The most exciting thing is when students asked how the concept of chemistry in the event of the Prophet Muhammad SAW Mi'raj incident with the transfer of the throne of the Queen of Balqis. Initially, they were confused, but after being explained, they were genuinely amazed by the truth of the Qur'an which never changes but could keep up with the times and respond to all the natural phenomena that exist.

After delivering the material following the rules of the scientific approach, researchers assign students to work on LKPD in groups. The researcher explains how to work on LKPD that starts with observing, asking, collecting data, associating, communicating and concluding activities. The researcher explained in the activity of communicating. Each group gave their representatives to present the work results of LKPD in front of other friends.

The 2nd meeting was held on 11 August 2018, on the matter of atomic number and mass number. There are different things that researchers do with learning at the first meeting. In the chapter of atomic number and mass number, researchers do not use the translation of the Qur'an. Researchers convey numerically calculating the value of molecular water weight in the Qur'an is the same as the calculation of the determination of the molecular water weight chemically. In chemistry, the molecular weight of water is obtained by adding up the product of the number of atoms by their relative atomic mass numbers, as for the translation as follows:

Note:
Hydrogen atomic mass weight = 1
Oxygen atomic mass weight = 16

Then the total of the water mass molecular weight (H2O) = (2 x 1) + (1 x 16) = 18.

Whereas in the Qur'an, there are 4 verses of the Qur'an, namely: (a) surah Al Mu'iminun verse 18 at the 18th Juz, (b) Surah Fathir which is located at the 35th surah in verse 27 at the 22nd juz, (c) An Naml is the 27th surah which is located in paragraph 61 at 20th juz and (d) Surah Ar-Ruum is the 30th surah which is located in paragraph 41 and the sequence of the 21th juz, which discuss water. When it is calculated by multiplying the letter-number verse number and the 4th juz paragraph number that discusses the water, the result is the same as the total molecular weight mass of water [11].

An example of the integration material delivery is as follows: "Environmental damage at sea and on land". It is the translation of Surah Ar-Ruum which is the 30th surah, and it is located in verse 41 and at 21st juz. The multiplication result is 30 x 41 x 21 = 25830 which is broken down into 2, 5, 8, 3, 0, and added up 2 + 5 + 8 + 3 + 0 = 18 [11].

The 3rd meeting was held on 18 August 2018, discussing Isotope material. At the meeting, the researchers conveyed the integrated Al-Qur'an isotope material, namely through Qs. Al-Hadiid: 25, which explains the Iron in the Qur'an known as Hadiid. The material explains the relationship of iron isotopes with the numerical value of the word Al-Hadiid both related to numerical calculations of letter numbers and verses.

One example of the Al-Qur'an integrating application is that Iron has eight isotopes, namely 52Fe, 54Fe, 55Fe, 56Fe, 57Fe, 58Fe, 59Fe, 60Fe. If all the masses are added together then 52 + 54 + 55 + 56
The word "iron" is in the 57th letter and the 25th verse. The number of words in Surah al-Hadid from verses 1 to 25 is 451 [12]. Just like the implementation at meetings 1 and 2, in the learning process students are given the task to work on LKPD in groups, which ends with the percentage of group representatives and activities to make conclusions with students.

The results of observing the learning process activities from each meeting found that the work process data of LKPD they had done well, followed each assignment rhythm that was following the scientific approach. After the observation phase, the researcher conducted a reflection phase in the form of evaluation, namely a daily test on 25 August 2018.

The data in Table 1 shows that at the time of the pretest, none of the students had been able to complete the questions. That is because, at the students' pretest, they had not received any material from the researcher. The posttest activities in the first cycle were held on 25 August 2018. The posttest results showed an increase in value where as many as 20 students had completed their cognitive values, namely fulfilling the KKM value (minimum completeness criteria), while 10 more people had not progressed, it happened because the 10 students did not want to ask, just copied and paste the answers of their friends and they did not want to study seriously. In addition to seeing the completeness of the students' cognitive value to see the difference after and before treatment is given, we can see through the results of the N-gain test. N-gain test of the cognitive value of class X IPA 3 students in cycle 1 is calculated as follows:

Note: The average posttest score = 68.33475
The average pretest score = 32.7813
Maximum score = 100

\[
N\text{-gain} = \frac{\text{Posttest score} - \text{Pretest score}}{\text{Minimum score} - \text{Pretest score}}
\]

\[
= \frac{68.34375 - 32.7813}{100 - 32.7813}
\]

\[
= \frac{35.56245}{67.21870}
\]

\[
= 0.5290559
\]

\[
= 0.53 \text{ (medium)}
\]

N-gain result shows that there is an increase in the cognitive value of students by 0.53 and included in the moderate category. It proves that the learning process in cycle 1 by using Quranic LKPD, has succeeded in improving the cognitive learning outcomes of students. Based on the results of the calculation of psychomotor values can be seen in the indicator of the choice of words, still showing the percentage of the average value below the KKM, this happens because students are not accustomed to doing a presentation in front of the class.

3.2.2 Cycle II

The learning process in the second cycle was carried out from 1st September to 22nd September, 2018. This stage is the reflection phase which is repeating the material previously taught in cycle 1. In 1st September, a reflection was carried out on the development of the atomic model, on the 8th September, material reflection atomic number and mass number were carried out, and in 15th September, the reflection was carried out on isotope material. The activities carried out in the learning process were also relatively the same as those which were carried out in the first cycle, but the difference lies in the emphasis on understanding chemical material by giving questions in the form of exercises to test students' understanding. After material reflection, the reflection process in cycle 2 was repeated through testing the results of the learning activities evaluation in cycle 2 in 22nd September 2015, to see the results of the posttest in cycle II, whether there was an increase in the results of posttest in cycle 1.

Data in table 2 shows an increase of the same amount of cycle 1, at the cycle 1 there were 12 students who had not finished reaching the KKM, but after being given treatment over the cycle 2, the
result showed an increase in the value of the 12 students who have not completed then it became complete, thus 12 students had reached the KKM. To see an increase in the category of cognitive, the calculation of N-gain was performed, while the N-gain cycle 2 was calculated as follows:

Note: The average score of posttest 2 = 75.59375
The average score of posttest 1 = 68.34375
The maximum score = 100

As the N-gain

Completion:

\[
N-gain = \frac{\text{Posttest 2 score} - \text{Pretest score}}{\text{Minimum score} - \text{Pretest score}}
\]

\[
= \frac{75.59375 - 32.7813}{100 - 32.7813}
\]

\[
= \frac{42.81245}{67.21870}
\]

\[
= 0.63691279
\]

\[
= 0.64 \text{ (medium)}
\]

N-gain result shows that there is an increase in the score of cognitive learners in cycle 2 and 0.64 in the medium category. And to calculate the increasing percentage of cycle 1 to cycle 2 posttest, it can be carried out through the following calculation:

\[
\% \text{ The increase of cognitive values} = \frac{\text{Posttest 2 score} - \text{Posttest 1 score}}{\text{Minimum score} - \text{Posttest score}} \times 100\%
\]

\[
= \frac{75.59375 - 68.34375}{100 - 31.9} \times 100\%
\]

\[
= \frac{7.25}{31.65625} \times 100\%
\]

\[
= 0.229 \times 100\%
\]

\[
= 22.9\%
\]

The result shows that there is an increase of 22.9% in the students’ cognitive score from cycle 1 to cycle 2. Thus the use of Qur'anic LKPD can improve cognitive learning outcomes of students. These results are in line with the results of the study by Abadi et al in 2017 about a scientific approach using interactive teaching materials suitable for used in learning process so get a positive response by students [13]. LKPD is an interactive teaching materials. The teacher can develop LKPD independently by analyzing the curriculum, including core competencies, basic competencies, indicators and learning materials [14]. Teaching material is a scientific communication between students and teachers concerning the concepts being learned [15]. LKPD is a teaching material that can build communication between teachers and students in two direction trough argument analysis. Table 4 shows the results of affective score of X IPA 3 class, in 1 cycle, the data shows the excellent average of the affective score and the average of the affective score in the cycle 2 increased, which was 21.05%. Table 6 shows the data acquisition of psychomotor owned by X IPA 3 students in cycle 2 increased to of 9.78%. The increasing percentage shows that the psychomotor skills of the students increase because more students are getting used to demonstrate the ability of communication in the presence of their peers.

The increasing number of learning outcomes that occur both on the cognitive, affective and psychomotor shows that action research using Qur'anic LKPD can improve learning outcomes. It is similar to what is disclosed by Arigiyati [16], who states that action research can improve the performance of students. Through this class action research, teachers and students gain a sense of empowerment and come to more situated understandings of the complexity of teaching and learning.
that reveal personally relevant transformative and emancipatory outcomes [17]. Classroom action research using LKPD Qur’ani makes students more confident in the power Allah SWT through his creation that can be seen through the material “Atomic Structures”. As stated by Vallespin et al in 2019 that each learner may be able to perceive things and evaluate them as good or bad as he or she enters school seeking to acquire knowledge to continually grow and prosper [18]. The teacher functions as a facilitator of the learning process with various techniques and strategies so that students can develop as a whole [19].

4. Conclusion

Based on the theory that is supported by the field observations as well as the problems raised about the use of Qur'anic LKPD to improve the learning outcomes of Chemical structure of atoms of X IPA 3 students, then the conclusions can be drawn as:

- The use of Qur'anic LKPD based on scientific material atomic structure can improve the learning outcomes of students MAN 1 students batch 2018/2019 both in cognitive, affective and psychomotor.
- The increasing outcome of the chemistry at the atomic structure material by the application of scientific Qur’anic LKPD based on MAN 1 students batch 2018/2019 shows, cognitive 22.9%, the affective of 21.05% and cognitive 9.78%.

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