Development of integrated science student’s worksheet (LKPD) based on research-based learning integrated with religion value

Shofia Ranti1* and Usmeldi2
1Department of Physics, Faculty of Mathematics and Natural Sciences, Universitas Negeri Padang, Jl. Prof. Hamka, Padang, 25124, Indonesia
2Department of Electrical Engineering Education, Faculty of Engineering, Universitas Negeri Padang, Jl. Prof Hamka, Padang 25131, Indonesia

*shofiaranti93@yahoo.co.id

Abstract: The LKPD is not fully in accordance with the criteria of a good LKPD and has not yet referred to the 2013 curriculum. The material description presented in the LKPD is not yet clear about the factual, conceptual, and procedural concepts. The presentation of the LKPD is not in accordance with the components of a good preparation for competency in knowledge, attitude and skills. Various efforts to improve the competence of students, one of which is through the use of LKPD in Integrated Science learning. Therefore, the research-based learning LKPD developed integrated religious values that are valid, practical and effective. This research and development use the ADDIE model. The research instruments were interview guides, observation sheets, LKPD validation sheets, teacher and student response questionnaires. The results of the study indicate that the developed LKPD includes a valid category based on expert judgment. LKPD includes practical categories based on the results of observations, questionnaires response to teachers and students. The use of Integrated Science based LKPD based on Research-based learning integrated effective religious values to improve the competence of students.

1. Introduction
Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation and country. The 2013 curriculum emphasizes learning that activates students, students' thinking skills, creativity and independence of students to achieve the three expected competencies, namely knowledge, attitudes and skills using a scientific approach or scientific approach. The scientific approach or scientific approach in learning 2013 Curriculum includes 5M, which is observing, questioning, reasoning, experimenting, and communicating [1].

Integrated science is a very important subject and is expected to be able to improve the quality of Indonesian education. Integrated science learning is expected to be a vehicle for students to study the natural environment and can be applied in everyday life. The learning process emphasizes cognitive aspects, including factual knowledge, conceptual knowledge, and procedural knowledge. The concept of science learning for most students is a difficult concept, so an educator is said to be successful in
the science learning process if he is able to change lessons that were difficult to become young. Education is a conscious and planned effort to create a learning atmosphere and learning process so students actively develop potential himself to have religious spiritual power, self-control, personality, intelligence, noble character, and skills needed by himself, society, nation and state, which were not attractive to be interesting, which were not meaningful to be meaningful so students made learning science a necessity not because they were forced.

Science learning can raise students' curiosity about natural symptoms in the environment. The role and concern of educators on the environment is very important as an example of students in everyday life. Through science learning students can gain direct experience, so that they can add strength to receive, store, and apply the concepts they learn. Science learning requires teaching materials to achieve learning goals. The role of educators is expected to be able to understand the demands of the curriculum well so that they can design and implement learning.

The results of preliminary observations conducted at MTsN 5 Padang showed that 50% of students who had not yet reached the KKM and had not mastered the material well, even though the Minimum Completion Criteria (KKM) of science subjects set by the school was 76. This was due to lack of students on integrated science material. Based on interviews with integrated science educators who teach in class VII stated that the difficulties faced by students during learning are a lack of interest in reading and repeating lessons at home, so that students' initial knowledge when attending school is not going well. Another factor is the teaching materials used in the form of textbooks and LKPD made by publishers. The LKPD is not fully in accordance with the criteria of a good LKPD and has not yet referred to the 2013 curriculum. The material description presented in the LKPD is not yet clear about the factual, conceptual, and procedural concepts. In terms of language, LKPD has used Indonesian spelling that is correct and easy to understand. The presentation of the LKPD is not in accordance with the components of a good preparation such as there are no learning instructions for educators and students, learning indicators, problem solving steps, conclusions and assessment sheets, and there is no explanation from the verses of the Koran or hadith as this relates to KI 1.

LKPD is one of the means to help and facilitate teaching and learning activities so that effective interactions between students and educators will be formed, so as to increase the activity of students in improving learning achievement. Based on the analysis of the social and emotional environment of students 64% can be categorized as good, because students are happier in discussions. To support the success of integrated learning can be used learning models that also provide direct experience to students, one of them is the Research Based Learning model, also known as a research-based learning model. Research Based Learning is learning that is achieved through real experience [2]. This learning model has benefits in developing subject matter and learning skills. This means that RBL can be used in science subjects because it can reach the entire scope of science as a process, product, and attitude. Research-based learning provides opportunities for students to find information, compile hypotheses, collect data, analyze data, and make conclusions on data that has been arranged; in this activity learning applies the learning by doing approach. This learning is expected to be able to build character in students as a scientist who is characterized by a high attitude of curiosity, able to solve every problem, with an attitude of thinking systematically, objectively, and having a strong rationale. In the Research Based Learning model students are really required to be active in learning.

The Research Based Learning model is a learning model based on research (research) as a step in implementing the process. This means that the learning process that takes place is the implementation of a combination of characteristics of research actions and meaningful learning. In implementing Research Based Learning students are expected to play an active role in the learning process so that learning becomes more meaningful. Research based learning can make students remember lessons longer.

Religious values are principles and standards that are based on the Al Quran, Sunnah of the Prophet, and Islamic literature that are relevant in achieving religious quality [3]. Religious values are based on statements in the Qur'an and Sunnah. Islamic values in the Qur'an related to science. So Islamic values are a principle that is believed to be truth based on the Qur'an, Sunnah and Ijtihad in the
form of Aqeedah and moral values which are used as guidelines in life. Attitude is a level of positive or negative feelings towards an object, subject or event. Characteristics of attitude is attitude can be learned because attitude is not innate, attitude can be learned in society, attitude is influenced by group norms, attitudes are interrelated with beliefs, values, likes and dislikes that can influence and change attitudes, and attitude determines behavior. The Ministry of National Education (2008) [1] mentions religion is the belief in the existence of supernatural powers over humans. Religion is religious / religious. "Religion is an attitude and behavior that is obedient in carrying out the teachings of the religion it adheres to, tolerant of carrying out the worship of other religions, and living in harmony with other believers" The religious moral values are can be developed in the learning process is the moral value of devotion, honesty, sincerity and responsibility.

Integrated science learning based on integrated research-based learning, religious values are expected to improve student competencies. In connection with this matter, the research problem was formulated as how integrated science-based LKPD based on integrated research-based learning religious values that are valid, practical, effective to improve the competency of students in SMP/MTs?

2. Research Method

The type of research that will be conducted is research and development or Research and Development (R & D). The type of development carried out is development research (Research & Development) to create a product that is integrated science LKPD based on Research Based Learning integrated religious values. According to To get the results of certain products used research that is needs analysis and to test the effectiveness of these products in order to function in the wider community, research is needed to test the effectiveness of these products.

The integrated science LKPD development model based on integrated religious value research-based learning models was adapted from the ADDIE model. The ADDIE model consists of five stages, namely: 1) analysis, 2) design, 3) development, 4) implementation, 5) evaluation. The subjects of the study were integrated science LKPD for SMP / MTs students. The research respondents were integrated science students and teachers at Padang MTsN 5. The research instruments were interview guides, observation sheets, LKPD validation sheets, teacher response questionnaires, student response questionnaires, and assessment sheets.

Data are analyzed qualitatively and quantitatively. The LKPD validation data, observations, questionnaires, were analyzed descriptively and compared with the validity criteria, practicality, and effectiveness of the LKPD. Data on learning implementation was analyzed qualitatively by revising the readability and steps of activities in the LKPD. The revision is based on suggestions from validators and practitioners, while the effectiveness of LKPD using the T test is comparing the control class with the experimental class.

3. Result and Discussion

3.1. Integrated science LKPD based on research-based learning integrated religious values

In this study an integrated science based LKPD based on research-based learning was integrated into religious values. Integrated Science LKPD compiled based on research-based learning steps. The research-based learning model is one of the student-centered learning models that integrates research in the learning process. In this learning model students are given the opportunity to search for information, compile hypotheses, collect data, analyze data, and make conclusions on data that has been arranged. The Research Based Learning model is learning based on the constructivism philosophy. Constructivism learning includes four aspects, namely learning that builds students' understanding, learning by developing prior knowledge, learning which is a process of social interaction and meaningful learning achieved through real experience. The Research Based Learning model is carried out with the aim of increasing higher competencies. Students are also provided with motivation to be active in practice-based learning. This learning model is also intended to practice
discipline and ethical values. The Research Based Learning step used in this research is the step proposed by Usmeldi [4] Identification of Problems, Formulating Problems, Reviewing the Theory, Formulating Hypotheses, Collecting and Analyzing data, and Interpreting and Concluding. The LKPD systematics is presented in Figure 1.

**Figure 1. Systematic LKPD**

### 3.2. Integrated Science LKPD Validation

The LKPD that has been designed is tested for its validity. Research based learning LKPD validation consists of 4 aspects, namely aspects of content, aspects of language, aspects of presentation and aspects of graphics. Validation was carried out by 3 lecturers from UNP and 2 educators from MTsN 5 Padang. The LKPD validation is carried out by AR, DH, US, NS and AF validators. The results of LKPD validation can be seen in Table 1.

| Aspects     | Validation value | Categories |
|-------------|------------------|------------|
| Contents    | 0.85             | Valid      |
| Constructions | 0.79           | Valid      |
| Language    | 0.85             | Valid      |
| Graphics    | 0.80             | Valid      |

The developed LKPD is in the valid category with an average value of 0.82, where in the aspects of content, construction, language, and graphics there is a V value of 0.6. Thus, this LKPD can be used in the learning process.

### 3.3. Integrated Science LKPD Practicality

LKPD practices are related to the ease, interest and efficiency of the use of LKPD by educators and students. In the implementation phase, the questionnaire responses of educators and students' responses to the LKPD were implemented. Data on practical results can be interpreted as follows:

**3.3.1. Results of Practicality Analysis of Educator LKPD.** This practicality is seen from the results of questionnaires filled out by educators and students. Questionnaire for the response of educators to use
research-based learning LKPD which was developed to see aspects that were easy to understand, interesting and efficient. The results of practicality by educators can be seen in Table 2

**Table 2. Results of LKPD Practicality by Educators**

| Aspect          | Value (%) | Category     |
|-----------------|-----------|--------------|
| Easy to understand | 90        | Very practical |
| Interesting     | 91        | Very practical |
| Efficient       | 93        | Very practical |
| Average         | 91        | Very practical |

Table 2 shows that the practical results of LKPD by educators have an average of 91% with very practical categories. This means that the developed LKPD is easy to understand, interesting, and can be used efficiently by educators so that it can be said to be very practical for educators.

### 3.3.2. Results of Practicality Analysis of Educator LKPD

Practical questionnaire LKPD is also given to students who use LKPD based on research-based learning. Analysis of the LKPD practicality data by students can be seen in Table 3.

**Table 3. LKPD Practicality by Students**

| Aspect          | Value (%) | Category     |
|-----------------|-----------|--------------|
| Easy to understand | 85        | Very practical |
| Interesting     | 93        | Very practical |
| Efficient       | 90        | Very practical |
| Average         | 89        | Very practical |

Table 3 shows that the average practical results by students are 89% with very practical categories. That is, LKPD based on research-based learning is easy to understand, interesting, and efficient in the use felt by students.

The implementation of learning using LKPD means that educators and students can use LKPD that is made easily and refers to that the LKPD can be used by educators to deliver integrated science topics in every learning condition that takes place. According to the results described previously, the LKPD that has been implemented is categorized as practical.

### 3.3.3. The effectiveness of integrated science LKPD

Product effectiveness can be seen from the three results of learning competencies, namely aspects of attitude by observing, aspects of knowledge through analysis of LKPD assessments at each meeting and final test, and aspects of skills through performance evaluation.

### 3.4. Results of Attitude Competency Assessment

Attitude competency assessment by observation (observation) by the observer. Assessment of student attitudes is carried out using observation sheets at each meeting by the observer. This assessment is done to see how students behave in the learning process. The results of observations on the competency of students' attitudes can be seen in Table 4.

**Table 4. Recapitulation of Student Attitude Competency Assessment Results**

| No. | Attitude Aspect | Experiment Class Percentage | Category | Control Class Percentage | Category |
|-----|-----------------|----------------------------|----------|--------------------------|----------|
| 1   | Curiosity       | 74.79                      | Well     | 66.21                    | Well     |
| 2   | To be responsible | 73.96                      | Well     | 68.55                    | Well     |
| 3   | Cooperation     | 76.04                      | Well     | 68.75                    | Well     |
| 4   | Communicative  | 74.58                      | Well     | 69.53                    | Well     |
Table 4 shows the attitude of students in the experimental class in the good category and more than 70% of students stated complete. While in the control class 67% of students were declared complete. This shows that the worksheet based on research-based learning integrated religious values is in the effective category. At each meeting the attitude of students has increased. The attitude of learners by using research-based learning based LKPD integrated religious values to be better during the learning process. This shows that the development of LKPD can improve the competency of students’ attitudes.

3.5. Results of Knowledge Competency Assessment
Data on knowledge competency effectiveness can be seen from the improvement of learning outcomes from knowledge competencies obtained through LKPD assessment during the learning process. The increase in student learning outcomes in knowledge competencies is done by analyzing the results of the assessment on each step of the research-based learning in the LKPD used by students as seen in Table 5 and Table 6.

Table 5. Results of Knowledge Competence Analysis of the Control Class

| No. | Learning Steps | Research Based Learning | Student Value | Meeting 1 | Meeting 2 | Meeting 3 | Meeting 4 |
|-----|----------------|-------------------------|---------------|-----------|-----------|-----------|-----------|
| 1   | Identify problems | 52.50 | 70.00 | 77.50 | 82.50 |
| 2   | Formulate problems | 50.00 | 57.50 | 70.00 | 80.00 |
| 3   | Theory review | 72.50 | 77.50 | 80.00 | 82.50 |
| 4   | Formulate a hypothesis | 50.00 | 55.00 | 65.00 | 77.50 |
| 5   | Collect and analyze data | 69.00 | 73.00 | 75.00 | 80.00 |
| 6   | Interpretation and conclusions | 70.00 | 73.75 | 77.50 | 81.25 |
|     | Average | 60.67 | 67.79 | 74.17 | 80.63 |

Table 6. Results of Knowledge Competency Analysis of Experimental Class

| No. | Learning Steps | Research Based Learning | Student Value | Pert. 1 | Pert. 2 | Pert. 3 | Pert. 4 |
|-----|----------------|-------------------------|---------------|---------|---------|---------|---------|
| 1   | Identify problems | 70 | 77.5 | 81.25 | 82.5 |
| 2   | Formulate problems | 69 | 70 | 80 | 81.75 |
| 3   | Theory review | 77.5 | 80 | 82.5 | 82.5 |
| 4   | Formulate a hypothesis | 60 | 65 | 77.5 | 80 |
| 5   | Collect and analyze data | 73.75 | 75 | 80 | 83 |
| 6   | Interpretation and conclusions | 73.75 | 77.5 | 81.25 | 82.5 |
|     | Average | 70.67 | 74.17 | 80.42 | 82.04 |

Table 5 and Table 6 show that there is an influence between the use of integrated science LKPD developed with research-based learning. This can be seen from the results of the knowledge competency analysis of each meeting of two different classes, namely the percentage in the higher experimental class compared to the control class. This means that research-based learning LKPD is in the effective category and increases students’ knowledge in the learning process. In addition, there was an increase in student learning outcomes using an objective test, in the experimental class almost all students reached the KKM, while the control class only half of the students reached KKM.

To see the effectiveness of the LKPD developed Hypothesis Test is carried out, where the hypothesis test requirements are that the data must be normally distributed and homogeneous.
Therefore, before conducting the Hypothesis test, the Normality and Homogeneity tests are carried out first.

3.5.1. Normality Test Results. This normality test is done to find out the variable data distribution used in the study is the normal distribution or not. In addition, a test is used to carry out the normality test Lilliefors. The data used are data on learning outcomes of students using objective tests of 35 questions. Data obtained from the calculation results are summarized in Table 7

| Class  | n  | Mean | Standard Deviation | \( L_0 \)  | \( \alpha = 0.05 \) | \( L_t \) |
|--------|----|------|-------------------|-----------|----------------|--------|
| Experiment | 3 0 | 81.25 | 9.12 | 0.0956 | 0.1498 | 0.161  |
| Control  | 3 2 | 77.5  | 8.75 | 0.0180 | 0.1498 | 0.1103 |

Based on Table 7, it is known that \( L_0 < L_t \) in the experimental class, so that the analysis data comes from populations that are normally distributed. Likewise, with the control class, where \( L_0 < L_t \) and analysis data come from populations that are normally distributed. Overall the data on learning outcomes analyzed in the experimental class and the control class are from normally distributed populations. So, based on the data obtained, the two classes are worthy of being used as samples in the study.

3.5.2. Homogeneity Test Results. The homogeneity test aims to see whether the samples taken by researchers come from a homogeneous population. Where the samples taken are 2 classes in the same school as the experimental class and control and tested using the test \( F \). the results of the calculation are summarized in Table 8

| Class  | N  | Mean | Standard Deviation | \( F_{count} \) | \( \alpha = 0.05 \) | \( F_{table} \) |
|--------|----|------|-------------------|----------------|----------------|-----------|
| Experiment | 30 | 81.25 | 9.11 | 1.69 | d denominator = 29 | 1.08 |
| Control  | 32 | 77.5  | 8.74 | dk numerator = 32 | |

Based on the results of the homogeneity test in Table 8 it can be seen that the two samples came from a homogeneous population. Where from Table 8 can be seen the value of \( F_{count} \) and \( F_{table} \) is 1.69 and 1.08. From these data it is known that the value of \( F < F_c \), which means that both classes have a homogeneous variance. The same sample variance proves that the two classes have the same variation of data and are suitable for use in research.

3.5.3. Hypothesis Test Results
Based on normality and homogeneous test results the sample is known to be normally distributed and homogeneous. Where to test the hypothesis, the average similarity test is carried out using the \( t \) test. This hypothesis test is used to test the similarities of the two averages in the two-party test, where the study requires a comparison between the two conditions. the results of calculation of hypothesis testing are presented in Table 9.

| Class  | n  | Mean | Standard Deviation | \( t_{count} \) | \( \alpha = 0.05 \) | \( t_{table} \) |
|--------|----|------|-------------------|----------------|----------------|-----------|
| Experiment | 3 0 | 81.25 | 8.93 | 2.55 | dk = 29 | 1.67 |
| Control  | 3 2 | 77.5  | 8.93 | dk = 31 | | |
Based on the results of hypothesis testing in Table 9 it can be seen that the value of $t_{count}$ and $t_{table}$ are 2.55 and 1.67 respectively. If the value of $t_{count} < t_{table}$, it means that $H_0$ is accepted and if $t_{count} > t_{table}$, then $H_0$ is rejected. From these data, it is known that $t_{count} > t_{table}$, which means that $H_0$ is rejected. This means integrated Science LKPD based on Integrated Research Based Learning of Religious Values has an influence on improving learning outcomes. Where learning outcomes obtained by experimental class students are higher than the control class. Thus, the developed LKPD means that it has been effectively used to improve student learning outcomes.

3.6. Skills Competency Assessment Results

Data on the effectiveness of using LKPD was also obtained from observations of students' skills during experiments using digital practicum tools. Data from the observers' skill competency by observers can be summarized briefly in Table 10.

| No. | Aspect                      | Experimental class | Control Class |
|-----|-----------------------------|--------------------|---------------|
| 1   | Identifying Problems        | 75.83, Well        | 72.73, Well   |
| 2   | Asking question             | 76.39, Well        | 70.71, Well   |
| 3   | Participation in Research   | 79.17, Well        | 73.99, Well   |
| 4   | Processing Data Analysis    | 76.67, Well        | 73.99, Well   |
| 5   | Withdrawal Conclusion       | 76.11, Well        | 72.98, Well   |
|     | Average                     | 76.83, Well        | 72.88, Well   |

Table 10 shows the average competency value of the skills of the experimental class students is 76.83 which is in the good category and more than 75% of students get a score above the KKM. While the average competency value of the skills of the control class students is 72.88 which is in the good category and more than 70% of students get a score above the KKM. This means that the research-based learning LKPD is integrated with effective religious values in its implementation and increases the activity of students in the learning process. This can be caused by the use of LKPD to make students' skills visible and increasing in accordance with the indicators assessed. Overall, students get scores on the KKM in competing attitudes, knowledge, and skills. This shows that research-based learning based LKPD integrated religious values are in the effective category of use in the learning process.

Integrated Science LKPD Based on integrated research-based learning religious values are categorized as valid. This includes all components including the feasibility of content, language, presentation, and graphics (Ministry of National Education 2008). Integrated science LKPD developed was used in research-based learning integrated religious values. The results of the LKPD trial show that LKPD is stated to be practical and effective to improve the competence of students. The results of this study are supported by Usmeldi [2], Febri Yanto [5] and Wandrianto [6] in their study concluded that the application of research-based learning can improve students' competencies.

4. Conclusion

Research has integrated science LKPD Based on research based learning integrated religious values. Integrated science LKPD developed has been valid, practical, and effective for increasing the competency of students is assessed from three competencies, namely attitudinal competence, knowledge competency, and skills competency. Assessment of student competencies in all dimensions shows an increase in each meeting. The average competency value of students' attitudes includes good categories. The average skill competency is categorized as good. The attitude of students to science is in the good category. More than 85% of students have met the level of classical achievement set. The potential coefficient of knowledge is seen from the results of the hypothesis test $T_{count} > T_{Table}$. It is recommended for integrated science educators to apply this developed learning module.
researchers so that they can develop learning modules on material that has not been studied in modules that have been developed.

Acknowledgment
The authors would like to thank Dr. Ramli, Universitas Negeri Padang for his assistance during research.

References
[1] Depdiknas. (2008). Panduan pengembangan bahan ajar. Jakarta : Direktorat Pembinaan Sekolah menengah atas.
[2] Usmeldi. (2015). *Pengembangan Lembar Kerja Siswa dalam Pembelajaran Fisika Berbasis Riset Di SMAN 1 Padang*. Padang: UNP
[3] Ogunbado, A. F., & Al-Otaibi, A. M. (2013). Is quality management an islamic value? *IOSR Journal of Business and Management, 8*(3)
[4] Usmeldi (2017b), The Development Of Research Based Learning Model With Science, Environment, Technology, And Society Approaches To Improve Critical Thinking Of Students
[5] Yanto, F. (2015). Pengembangan Perangkat Pembelajaran Fisika SMA Menggunakan Model Research Based Learning pada Materi Karakteristik Gelombang di SMA Negeri 1 Koto Kampung Dalam Kabupaten Padang Pariaman. *Tesis*. Padang: Program Pasca Sarjana UNP.
[6] Wandrianto. (2017). *Pengembangan Perangkat Pembelajaran Fisika Berbasis Model Research Based Learning Terintegrasi Nilai-Nilai Karakter Di Man Lubuk Alung* Tesis: Program Pascasarjana Universitas Negeri Padang.