Validity and practicality of redox reaction module based on discovery learning with scientific approach to increase the critical thinking ability of 10th grade high school students

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Abstract. The module based on discovery learning with a scientific approach has developed to increase students' learning outcomes and critical thinking in redox reaction material. Research and Development (R & D) is applied as this type of research. This study aims to examine the validity and practicality of the modules developed using the Plomp development model consisting of 3 stages: preliminary research, prototyping stage, and phase assessment. The module was validated by 8 validators and tested to 2 schools of medium and low ability respectively. The results of the validity data analysis showed that the module generated meets the valid criteria in terms of content, constructs, graphics and language aspects. The module practice is interpreted from the teacher response questionnaire and the student response questionnaire. The results of module practicality from the aspects of attractiveness, ease of use, time efficiency, and the benefits of teachers and students have been practicable with the teacher's kappa response questionnaire of 0.86 and 0.81 for the student response questionnaire with module practicality categorized as very high.

1. Introduction
The subject of chemistry is partly invisible and most of it is abstract. Abstract concept causes students have difficulty to understand the material. That could be causes of difficulty understanding the concept of chemistry and describing it in concrete form.

One of the abstract chemical materials is the redox reaction. The abstract redox reaction material, as well as the development of the redox concept, it is the binding and release of oxygen, the binding and release of the electron, and the change of the oxidation number. This causes students to understand less and tend to memorize only existing theories without understanding them. To support the learning process that can help students to understand the learning of chemistry required teaching materials.

Teaching materials are all forms of materials used to assist teachers in carrying out teaching and learning activities, one of which is the module [1]. The modules are packed intact, systematically and designed to help students master specific learning objectives. The module is a teaching material that is arranged systematically with language easily understood by the students, according to their age and level of knowledge so that they can learn independently with minimum guidance from the teacher [2]. The use of the module in learning will reduce the role of the teacher, meaning the teacher is no longer a learning center that explains the material from beginning to end. The teacher is only a facilitator who guides and directs the students, no longer dominating in the lessons learned in the 2013 curriculum.
Module will help students who have high speed in learning will more quickly master the material. Meanwhile, students who have low speed in learning can learn again by repeating the parts that have not been understood [3]. The module provides flexibility to students, either individually or in groups. Students can actively seek, explore, and discover the concepts and principles of a knowledge that must be mastered in accordance with its development. Learning using this module will be more emphasized to the students. Students act as learning centers that actively construct their own knowledge, so the modules developed must be designed with stages that can help and facilitate students to develop critical thinking skills of students who fall into the category enough. This is in line with what Ellizar and Djamastated that the critical thinking ability of high school students in Padang is quite low at 35.13%, so students' thinking ability should be trained and improved [4]. The ability to think critically will help students to think properly so that students can solve a problem [5].

In addition to the module, to support the development of students' critical thinking skills requires appropriate learning models in accordance with the revised 2013 curriculum. The learning model corresponding to the abstract redox reaction material with the factual, conceptual and procedural dimensions of knowledge is discovery learning [6]. The discovery learning model has the characteristics of a scientific approach and can be used to improve critical thinking skills. In Permendikbud No. 65 (2013) mentioned that to strengthen the scientific approach, thematic integrated, and thematic (in a subject) need to apply research-based learning, one of them is discovery learning [6]. Discovery learning model can encourage students to think, analyze independently so that they can find their own knowledge and better understand [7]. This is the same as Risdianto said using the model of discovery learning gives way to students to develop thinking ability [8].

One of the goals of discovery learning is that students have the ability to think critically [9]. This is because students perform mental activities before the material being studied can be understood. These mental activities include analyzing, classifying, making conjectures, drawing conclusions, generalizing and manipulating information.

Learning using discovery learning can improve students' critical thinking skills because students are trained to observe, question, try, reason and communicate through the learning stages of the model. At the stage of stimulation students are invited to observe and ask questions, the stages of the student's statement are asked to collect information, the data collection stage students are invited to try and observe, the data processing stage of the students are invited to reason and the stage of verification and generalization of students are invited to reason and conclude. So the discovery learning model is considered to be compatible with a scientific approach.

The scientific approach is an approach that adopts scientific steps in building knowledge through the scientific method. Thus, the discovery learning model is highly relevant to the scientific approach. The scientific approach consists of observing, asking, trying, reasoning and communicating what is recommended by the 2013 curriculum. Scientific approach is more highlight the dimensions of observation, reasoning, invention, validation, and explanation of a truth, which means students are required to be actively involved in the learning process [10].

This discovery learning model is suitable to be applied in redox reaction material, because the material is in the form of facts, concepts, principles, procedures and related to the world of students, so it can be a problem to stimulate students to be more interested in learning. Students will be directly involved with the learning given so as to provide experience to these students and will increase students' understanding of the abstract redox reaction material. To support the learning needs to be prepared appropriate teaching materials to support the discovery learning model and adapted to the scientific approach, so as to help students to learn independently to build the concept and its knowledge. The use of discovery learning in modules is expected to make learning of chemistry more meaningful for students.

Based on the interviews to chemistry teachers and students, the teaching materials used in schools is still not maximally help students in finding concepts in the learning process. The teaching materials used still emphasize the content of the material, yet there are no stages that guide students to find concepts as mandated in the revised 2013 curriculum. Students have not been directly involved in
building their own concepts or knowledge. The teaching materials used present the learning materials from beginning to end.

Based on the interviews with some students, on the material redox reaction students are still difficult to determine the oxidation number of an element, in addition, in the redox reaction material problems experienced by students is difficult to distinguish between the oxidation reaction and reduction reaction based on the concept of development reaction redox [11]. Students are still reversed in defining the redox reaction. This is evidenced by the many daily test scores of students who are under the KKM, that is as much as 54.83% of students have a value below the KKM in the academic year 2016/2017 and as many as 87.09% of students whose value is below the KKM in 2014/2015. The low value of student learning outcomes is due to the lack of students' willingness to learn [12] a discovery learning redox reaction module with a scientific approach designed in accordance with the stages of the discovery learning model which is expected to assist students in understanding the redox reaction material by guiding students find concept. Through the student module will be guided to develop a frame of mind. Students will be actively involved in learning. Teachers act as facilitators and motivators for students.

This study aims to develop discovery learning redox reaction module with scientific approach to improve students' critical thinking ability, and to know the validity and practicality of developed modules.

2. Method
Research and Development (R & D) is used as type research. The development model used is a Plomp model consisting of three stages, namely preliminary research, prototyping, and assessment phase. At phase prototyping phase, there are formative evaluation, namely self-evaluation, expert review, one to one evaluation, and small group evaluation.

Preliminary research stage aims to identify the problems that occur in the learning of chemistry so as to obtain a description of the product specifications required in developing the module. At the preliminary research stage, it is necessary to analyze the needs of teachers and students by conducting interviews and context analysis with literature review. In the context analysis is done curriculum analysis and concept analysis. The curriculum analysis aims to study the scope of materials and learning objectives for developing teaching materials. The conceptual analysis aims to identify the materials to be discussed in the lesson. Then, it arranged systematically by linking the concept one with another concept so as to form a concept, so it can be known the main concepts which needed for the next concept can be understood well.

Phase prototyping phase is designed discovery learning-based redox reaction module with scientific approach based on the analysis results in preliminary research stage. Modules that have been designed are formative evaluations. Formative evaluation is done by self-evaluation using check list, expert review using module validation sheet, one to one evaluation with interview and questionnaire of student's response and small group using questionnaire of student response practicality.

The last phase is the phase assessment that is done by field test. Test use of this module aims to know the practicality of the modules developed in large groups, which is 62 students of 10 grade high school students using questionnaire teachers and students respond.

3. Result and Discussion
3.1. Development Result
3.1.1. Preliminary Research .In preliminary phase, information gathering about the problems in chemistry study especially on redox reaction in 10 grade is needed. Needs analysis was conducted by presenting five chemistry teachers in Padang city and 9 students. Based on the results of interviews can be concluded that the teaching materials used are textbooks and students’ worksheet from the publisher. Teaching materials used in schools present the material as a whole and no stages have helped students to find concepts in learning as mandated in the 2013 curriculum and no activities have
helped guide students to critical thinking. Based on the results of interviews with students it can be seen that students need interesting teaching materials equipped with images, color, clear and can help students to better understand learning. Exciting images and colors can arouse students' interest to learn. In addition, based on the results of critical thinking tests of 9 students, it can be seen that the level of critical thinking skills of students are still in enough categories, so it needs to be improved.

Based on the analysis stage of teachers and students who have done need a given solution. The solution given is that a chemistry in instruction is needed in the form of a module that can meet the students' needs in active learning, and can assist students in developing critical thinking skills in learning, so that the learning model is needed to support the learning process. One of the model that can support the needs of these students is a model discovery learning. That is one of the goals of discovery learning is that students have the ability to think critically \[9\]. This discovery learning model is suitable for use with the scientific approach used in the revised 2013 curriculum. This module allows students to be active in learning. Students are given space to participate directly in building knowledge.

The curriculum analysis aims to formulate indicators, learning objectives, content of materials in redox reactions. This curriculum analysis is done by analyzing the basic competence (KD) on the material of redox reactions of 10 grade in odd semester, which is listed on the syllabus of chemistry curriculum 2013. Analysis of this curriculum as a reference for the development of indicators in organizing materials that aims to determine what capabilities students must have in studying the redox reaction material.

Conceptual analysis aims to identify the main concepts taught, breakdown and systematically arrange to achieve the indicators of achievement of the competence of understanding the redox reaction material. The main concepts in redox reaction materials are the development of the redox concept, the determination of the elemental oxidation number, determining the oxidizing agent and the reducing agent, determining the disproportionation and conproportionation reactions as well as distinguishing the redox reactions rather than the redox reactions. The results of concept analysis is used as a reference in arranging the learning sequence in the module.

3.1.2. Prototyping Phase. Based on the results of the analysis at the preliminary research phase, it is designed discovery learning-based chemical modules with a scientific approach that will be used in the learning process on the redox reaction material. The design of this module includes aspects of content, constructs and graphics. In the contents aspect of the module contain materials that support the achievement of KD from redox reactions that are tailored to the indicators and learning objectives to be achieved. The feasibility of this content is assessed from the discovery learning stage with a scientific approach in a module oriented to improve students' critical thinking skills. The construct aspect in module development is seen by taking into account the presentation of the module; organizing the module systematically covering cover, introduction, table of contents, module usage manual, competence, student activity sheet, evaluation question, answer and reference key and adjusted with discovery learning stage.

The graphic aspects is including images, cover design, use of letters and colors. Cover is made using photoshop program with presented fireworks illuminated picture which is an example of redox reaction. Discovery learning-based discovery learning module is designed using the type of writing Garamond with size 13 for the presentation of content, and Old Bookman Old Style writing with size 12 for writing titles contained in the module. This type of writing is chosen because it is not too formal and more interesting to see and read. The dominant color used in the module is blue. The selection of blue color is based on student analysis at the preliminary research phase where most students love the blue color. The blue color used in this module will also be combined with other colors like orange, red and green to make the module look more interesting and not boring. The design of modules in terms of language aspects is to use simple languages that are easily understood by students. The language used is adjusted to the level of education of grade X high school students and adapted to the correct Indonesian grammar rules. After the module is designed, self evaluation will be performed to know
the visible error, such as typing error, image size and module completeness using check list. The results of self evaluation indicate that the module developed there are still errors in typing and incomplete letters. Errors encountered, then repaired and produced prototype I.

The activities undertaken on prototype I are validation by experts (experts review). Validation of this module aims to obtain a valid protocol in terms of scientific content, constructs, languages and graphics. Discovery learning-based chemistry module with scientific approach validated by 8 experts consisting of 3 lecturers of chemistry, 1 lecturer of educational technology, 1 lecturer of Indonesian language and 3 chemistry teachers. the instrument used in the validation phase of this module is the validation sheet. The validator will assess the module and provide suggestions for improvements to the modules already developed. The validator suggestion will be the reference in improving the module. The validation results of the discovery learning module with the scientific approach by the validator were analyzed using kappa moment. the results of the analysis can be seen in table 1.

| No. | Rated Aspects            | k     | Criteria   |
|-----|--------------------------|-------|------------|
| 1   | Content component        | 0.92  | Very High  |
| 2   | Construct component      | 0.91  | Very High  |
| 3   | Language component       | 0.83  | Very High  |
| 4   | Graphics component       | 0.88  | Very High  |
|     | Average                  | 0.88  | Very High  |

Based on the result of validation sheet analysis, the average overall kappa moment is 0.88 with the category of very high prevalence. Thus, it can be concluded that discovery learning module with a scientific approach developed valid from aspects of content, constructs, language and graphics. the revised draft module has been validated by an expert named Prototype 2.

Activities undertaken on Prototype II is to test the module's practicability that has been declared valid by the expert by doing individual evaluation (one to one evaluation). One to one evaluation was conducted through interviews and questionnaires of practicality with three students with low, medium and high ability. This individual evaluation is conducted through interviews and student response questionnaires. The aspects evaluated are clarity, attractiveness, and apparent error.

Based on the result of questionnaire of student response and interviews it was obtained that in general the instruction of module usage was clear, the appearance of the module was interesting according to the students. The learning steps on the module can be understood by students with high and medium capability. For low-ability students, it is difficult to determine the problems at the stimulation stage, so there is one-to-one evaluation step that should be done is to add questions in the stimulation stage that can guide the students in finding the problems. The result of improvement on one to one evaluation of module is called Prototype 3. The result of student response questionnaire can be seen in table 2.

| No. | Rated Aspects    | k    | Practicality level |
|-----|------------------|------|---------------------|
| 1   | Attractiveness   | 0.79 | High                |
| 2   | Ease of Use      | 0.77 | High                |
| 3   | Efficiency       | 0.80 | High                |
| 4   | Benefit          | 0.71 | High                |
|     | Average          | 0.77 | High                |

Prototype III that has been obtained will be tested by doing a small group evaluation evaluation to 8 students. Each student will get a module design (prototype III). 8 students divided into 4 groups, each group consists of two people. Learning activities are designed to resemble learning in the classroom, and know how the learning effectiveness in terms of time and answers module students. After the
learning is done, at the end of the meeting the students are asked to fill out a questionnaire regarding the use of the module in the learning process. This questionnaire aims to know the practicality of the module before proceeding in the field test stage. Aspects assessed in this small group are attractiveness, ease of use, efficiency of learning time and module benefits. The questionnaire analysis of small group student practicability can be seen in table 3.

| No. | Rated Aspects | k  | Practicality level |
|-----|---------------|----|-------------------|
| 1   | Attractiveness| 0.90| Very High         |
| 2   | Ease of Use   | 0.82| Very High         |
| 3   | Efficiency    | 0.81| Very High         |
| 4   | Benefit       | 0.87| Very High         |
|     | Average       | 0.85| Very High         |

The average module practice result that has been developed in the small group is 0.85 with very high criteria, and there are some parts that must be fixed in the module. After the revision it can be concluded that discovery learning-based chemical module with scientific approach on redox reaction material class X can already be continued in Prototype IV. In Prototype IV, field test was conducted at the school. Place conducted test in field test are two schools, namely SMAN 5 Padang and SMAN 7 Padang. Then proceed at the assessment phase.

3.1.3. Assessment Phase. The assessment phase aims to see the practicality of discovery learning-based modules with a scientific approach that has been developed on a larger scale, which is tested in two schools.

Practicality data was obtained from questionnaire of student response and teacher response questionnaire after implementing learning using module. Questionnaire student's practicality is given to 62 students of class X after learning to use module. The practicality of the module is seen from the charm of charm, ease of use, efficiency of time and benefit. The result of students' practicality in the experimental phase can be seen in table 4.

| No. | Rated Aspects | k  | Practicality level |
|-----|---------------|----|-------------------|
| 1   | Attractiveness| 0.87| Very High         |
| 2   | Ease of Use   | 0.82| Very High         |
| 3   | Efficiency    | 0.74| High              |
| 4   | Benefit       | 0.8 | Very High         |
|     | Average       | 0.81| Very High         |

Based on the above table it can be concluded that the average of the overall practicability is 0.81 which is at a very high level of practicality, it can be concluded that the module has been developed interesting, easy to understand because there are instructions for its use, it can help students understand the learning materials with the step discovery learning, and can help students learn independently. The results of the data analysis show that the discovery learning-based chemical module with a scientific approach to the 10 grade student for redox reaction material is practical for use. Questionnaire teacher response was filled by two chemistry teachers after learning using modules. Questionnaire teacher response contains 13 aspects of a statement that has been validated. The result of questionnaires of teacher responsiveness is shown in table 5. Based on the above Table 5 can be seen that the learning modules that have been developed have a very high level of practice, meaning learning module is practically used by teachers in the learning process.
Table 5. Results Practical Questionnaire Response by Teachers

| No. | Rated Aspects     | k    | Practicality level |
|-----|-------------------|------|--------------------|
| 1   | Attractiveness    | 0.86 | Very High          |
| 2   | Ease of Use       | 0.83 | Very High          |
| 3   | Efficiency        | 0.76 | High               |
| 4   | Benefit           | 0.86 | Very High          |
|     | Average           | 0.81 | Very High          |

3.2. Discussion

3.2.1. Validity. Validity of redox-based reaction module discovery learning with scientific approach can be seen in terms of aspects of content, construction, language and graffiti. Content validity means the suitability of the contents of the module with the material in the 2013 revision curriculum. The validity of the construct means the suitability of the module developed with the learning model used, the discovery learning model. As for the validity of the language means the module uses a language that is easy to understand and in accordance with Indonesian language grammar. Graphic validity means the module has an interesting look. Module validation was done with 3 lecturers of postgraduate chemistry education, 1 lecturer of Indonesian language, 1 lecturer of educational technology, and 3 chemistry teachers. Product validation can be done by some experts or who have experience to assess the weakness and strength of the resulting product [13]. Validation of this module is done by discussing with the validator, and improving the module according to the suggestion given by the validator. Once fixed the module will be given back to the validator until the valid module is declared and can be used to the next stage. Validator will validate the module that has been developed.

In the content aspect, to know the compatibility of chemistry modules with the curriculum, the suitability of the learning steps with the discovery learning model, and the accuracy of the material content presented in the module [10]. Based on research results, discovery learning module with scientific approach to improve students' critical thinking skills have very high criteria. This indicates that the material presented in the module has been in accordance with the 2013 revision curriculum 2016, it is in terms of Basic Competence, indicators, and learning objectives to be achieved. The validity of the content shows the products developed in accordance with the curriculum [14]. In addition, the illustrations of the problems given in the module correspond to the taught material, the questions contained in the module are able to guide the students to find the concept. Existing questions or statements have also been adapted to the discovery learning model. Components of the contents of the module are valid otherwise the module developed can be used in the learning process to help teachers and students in achieving the competencies that must be possessed by students in redox reaction material. The use of this module in learning is able to guide students to find concepts, as mandated in the 2013 revision curriculum 2016.

The construct validity of a product indicates that the various components in the product are related to each other and connected consistently [15]. In the aspect of construction or presentation aspect, the module has very high criteria. This shows that the activities in the module have been systematically arranged from the title to the reference and answer key. The module presents the learning objectives and indicators that will be achieved clearly and can be well understood by teachers and students. In addition, the activities in the module have been prepared based on the steps of the discovery learning model, ie stimulation, problem identification, data gathering, data processing, verification and generalization. The discaching learning stage is linked to scientific approach (observing, asking, gathering data, associating and communicating) thus allowing students to explore their own knowledge through the stages in the module.

The language component of the module has a very high validity. This indicates that the language used in the module is easy to understand, the text used is clear and easy to read and in accordance with the Indonesia language grammar. The language used is adapted to the level of understanding of 10 grade high school students and it can help develop students' thinking skills.
The developed graphics aspect of the module has very valid criteria. This criterion indicates that the images contained in the developed module can be clearly observed, the use of letters and the size of the letters proportional, so that it can be read well by users. The layout of the contents or layout of the modules is regular and the combination of colors in the module is interesting so that it can attract students' interest to learn.

3.2.2. Practicability. Evaluation of the module's practicability is done by teachers who assist researchers teaching using redox reaction modules. The results of the teacher's practicality assessment at the field test stage are very high. The attractiveness aspect is practicable with very high criteria. This indicates that the module developed has an interesting look to be used in the learning process.

For the aspect of ease of use, the practice is very high category. This shows that the easy-to-use module can be seen in terms of clear and user-friendly usage instructions. The contents of the module have also been in line with the KD, the learning objectives, statements and questions in the module are also clear and can help students solve problems in learning.

Based on the time efficiency aspect and the benefit of module of practice category obtained is high. This shows that learning using the module will make the time more efficient because the students directly fill the answers in the module, and the teacher does not need to state the matter through the whiteboard, but the teacher must require the students to keep the lesson running in accordance with the desired time. In terms of usage benefits, the module can support the teacher's role as a facilitator, the teacher no longer explains the learning but the teacher guides the students using the module so that students can explore their knowledge and find concepts in the learning process. The module also facilitates the teacher in achieving the learning objectives because the modules are arranged based on the learning objectives to be achieved.

Based on the results of the module designed practical analysis can be seen that the module designed is practical. Aspects of practicability in terms of its use that can be used in normal conditions and developed products can be applied by teachers and students [16]. Modules are considered practical if they have fulfilled aspects of attractiveness, ease of use, efficiency of time and benefits of the use of developed modules.

Practicability test questionnaire student response done three times that is in stage one-to-one, small group, and field test. The first student response questionnaire was given to 3 class X students at the one to one evaluation stage. Prior to the student questionnaire, the first redox reaction module was developed. This evaluation is done per individual student. Researchers will direct students using modules. Students are asked to read the module, and give their opinion if there are still words that are difficult to understand in the use of the module, and see if there are still typing errors in the module. After finishing the module and reading it, students are asked to fill out student practice questionnaires. In the aspect of attractiveness, aspects of ease of use, time efficiency aspects and module benefit aspects, each gained a high degree of practicality. at the one-to-one evaluation stage, the researcher gets some improvements to the module. Improvements are made to make the module more practical and easy to understand for testing in small groups.

In the small group evaluation obtained the category of practicality is very high. Questionnaire response students are given to students of 10 grade. In the small group evaluation stage the module is tested to 8 students with heterogeneous ability. Trial is done under actual conditions. At the end of the meeting students are required to provide an assessment of the modules that have been developed by filling out a student response questionnaire. The results of questionnaire analysis for the attractiveness aspect obtained very high practicability category. This means that according to the students the developed modules have an attraction that can trigger students to learn.

Aspects of ease of use, time efficiency and module benefits in the small group stage obtained very high category of practicability. In this small group stage the researchers also get some improvements to the module. Improvements to the module aim to make the module developed will be better and practical to be used in the next stage, that is the test phase or field test.
Field test were conducted in two schools; SMAN 5 Padang and SMAN 7 Padang. Practicality of the module in this field test stage is to provide a questionnaire to students of 10 grade who have learned to use discovery learning-based chemical modules with scientific approach to improve students' critical thinking skills in each school. The average kappa moment value for each school module practicality at this stage of the test is 0.87 with very high practice category for SMAN 5 Padang and 0.77 with high practicality category for SMAN 7 Padang. In the aspect of the attractiveness of the module obtained kappa moment of 0.93 for SMAN 5 Padang and 0.82 for SMAN 7 Padang, with the category of very high practicability. This indicates that the discovery learning redox-based reaction module with a scientific approach has an attractive appearance with varying color compositions. The degree of practicability in the ease of use of the module is very high for SMAN 5 with a kappa moment of 0.89 and high for SMAN 7 Padang with a kappa moment of 0.76. This means the discovery learning redox-based reaction module with a scientific approach is easy to use by students, has clear instructions. The drawings and illustrations used in the module are also easy to understand by students so students enjoy learning to use the modules. The next aspect of practicability that is analyzed is time efficiency. The kappa moment for time efficiency for SMAN 5 Padang is 0.79 and SMAN 7 Padang 0.69 with high practicality category. That is, learning is done by using the modules developed, the learning time will become more efficient. Learning with modules can help students to learn at their own pace [3]. The time spent in studying this module should be managed as well as possible, as teachers should always direct students to work on the module's stages, so that the role of the teacher is crucial to the successful use of time efficiently. The last practical aspect is the use of modules. Module is said to be practical while benefit for users. In the utilization aspect of this module we get kappa 0.86 for SMAN 5 Padang with very high category and 0.75 for SMAN 7 Padang as high category. This suggests that learning using modules can help students improve understanding of redox reaction materials. The steps of a discovery learning model with a scientific approach can guide and assist students in finding concepts in learning.

In addition, the module can also help students to learn independently because the module presented comes with instructions that can lead the students. Learning with individual methods, students are required to be able to learn independently [17]. It is expected that with this individual method students with high ability will get higher learning outcomes. The results of questionnaires of practicality at the stage of one to one evaluation, small group evaluation and field test stage, it can be seen that the redox-based discovery learning reaction module with a scientific approach to improve the critical thinking skills of practical students used in the classroom during the learning process. The modules used in this lesson can attract students' interest to learn. Modules can guide students to discover concepts and better understand learning. Stages of discovery learning and the scientific approach invite students to be directly involved in learning and splitting knowledge possessed by students. The images and colors present in the module can help students connect the facts and concepts they get. The existence of a stimulus in the form of images on teaching materials will provide better results in remembering, recognizing, recalling, and linking facts and concepts [18]. In addition, Ellizar stated that color charts make the brain more active in improving students' sense of pleasure [19].

But there are still students who also argue that not all the exercises as well as the discussion of problems that exist in the module can be resolved properly, then the time used is still not enough. This is because the ability of students is different, so in solving problems or problems that exist in the module takes a little longer time. To overcome this problem the role of teachers is needed to help students who are difficult in the group.

4. Conclusion
Based on the development and experiments conducted on the discovery learning redox reaction module with valid, practical and effective scientific approach. The learning modules generated in this development study; the validity level is very high in terms of contents, contours, graphics and that with an average of 0.88 kappa moments, and the high level of practicality for the questionnaire results one to one evaluation, categorized as very high from small group questionnaire results, categorized as
very high from the results field questionnaire SMAN 5 Padang and categorized as High from the results of the SMAN 7 Padang questionnaire. It have a very high level of practicality from the teacher questionnaire response results.

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