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# E-MODULE OF CONTEXTUAL BASED CHEMISTRY IN INCREASING LEARNING ACTIVITY ON HYDROCARBON COMPOUND MATERIAL

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**Abstract:** This study aims to find out how to make contextually based chemistry e-modules, develop contextually based chemistry e-modules, feasibility of contextually based chemistry e-modules, increase learning activity, increase learning interest and learning outcomes of class XI IPA students using e-modules contextual based chemistry on the material of hydrocarbon compounds. The research method used is Research and Development (R&D). The research was conducted in class XI IPA of SMA Negeri Samber with a total of 22 students. The results of the study show that: Assessment of student learning activeness in lesson plan 1 to lesson plan 3 obtains a percentage of 82% in the active category.
**Keywords:** Chemistry E-module, Contextual, Active learning, Hydrocarbon Compounds.

## 1. INTRODUCTION

E-learning is defined as a teaching and learning process that uses electronic circuits to convey learning content, interaction or guidance. In addition to the above definition, there are also those who define e-learning as a form of distance education carried out through internet media. Electronic learning (e-learning) is a new concept of learning and learning combined with information and communication technology that is developing rapidly. This learning concept makes it easier for students and teachers to obtain learning resources with easy and light access. In order to learn students, especially in critical thinking, creativity, collaboration and communication skills in learning, a teaching material media in the form of e-modules is needed.

According to Santyasa (2009:9), by using e-modules, a learning is expected to be able to bring students to the expected competencies. Furthermore , Santyasa said that the strategy of organizing subject matter in the module contains sequencing which refers to the creation of a sequence of presentation of learning materials, and synthesizing which refers to efforts to show students the interconnectedness of facts, concepts, procedures and principles contained in the learning material. To design learning materials, there are five categories of capabilities that can be learned by students, namely (1) verbal information, (2) skills, intellectual, (3) cognitive strategies, (4) attitudes and (5) motor skills. This is carried out in schools both at the elementary school level

and high school, for example in Samber State.

The results of initial observations at SMA Negeri Samber obtained the result that the availability of printed teaching materials and the number is still limited and teachers only give assignments or just through power points or printed books. This shows that there has been no innovation in electronic teaching materials developed such as flipbook-based e-modules for students at Samber State High School in chemistry subjects, there are still problems in learning activities in the classroom on hydrocarbon compound materials. In the learning process, there is still no interaction of students' activity as a whole in the learning process because teachers are focused on explaining material concepts with conventional methods to students. In addition, teachers' preparation in preparing learning activities is lacking, such as the unavailability of student worksheets and unattractive assessments, making the learning activity process still look passive. The activities of the condition of students who are still found sleepy during the learning process and the absence of learning modules, especially the learning module of chemistry subjects, especially e-modules, and also the learning outcomes of students on the basic competencies of hydrocarbon compound materials are still below the Minimum Completeness Criteria (KKM), which is less than 60.

According to Budi Utami (2009), hydrocarbon compounds are the simplest and most commonly found carbon compounds in nature. The definition of a hydrocarbon compound itself is a compound composed of the atomic elements carbon (C) and hydrogen (H This compound is formed from the nucleus of a carbon atom that has four valence electrons. These four valence electrons will bond with valence electrons of another atom or similar to covalent bonds. In our daily lives, we encounter many hydrocarbon compounds, such as kerosene, gasoline, natural gas, plastics and others. To date, more than 2 million hydrocarbon compounds have been known. To make it easier to study so many hydrocarbon compounds, experts are helping to classify hydrocarbons based on the arrangement of carbon atoms in their molecules. According to Erfan Priyambodo et al. (2016), carbon atoms have the privilege of being able to form stable fertilization that is so large, because carbon atoms have several peculiarities.

Carbon atoms can form bonds between carbons; in the form of single, double or triple bonds. Carbon atoms have the ability to form chains (long bonds). The carbon chains formed can vary i.e. straight, branched and circular chains

(cyclical), so that it needs to be explained in a real or contextual manner so that it can increase the learning activity of students.

According to Whipple in Hamalik (2009), student learning activity is a teaching and learning process that emphasizes the activeness of students physically, mentally, intellectually and emotionally in order to obtain learning results in the form of a combination of cognitive, affective and psychomotor aspects while students are in the classroom. Dimyati and Mujiono (2006) stated that student learning activity is a learning process that leads to optimization that involves students' intellectual-emotional in the learning process by involving students' physicality.

## 2. RESEARCH METHODS

Research and development methods or in English Research and Development are research methods used to produce certain products and test the viability of those products.

The use of e-modules for learning chemistry of hydrocarbon compounds refers to the research and development design of modifications of the development model according to Borg and Gall. The results of the assessment of learning activity were obtained from an assessment sheet instrument in the form of a questionnaire, based on the findings at the time of the learning process conditions.

$$P = \frac{n}{N} \; x \; 100\%$$

Description: P: Percentage of learning activity assessment scores, n: Number of scores obtained, N: Maximum number of scores. Then the criteria for learning activity from students are considered (Table 1).

**Table 1.** Student Activity Criteria

| **Interval % Score** | **Criterion** |
|---|---|
| 89 % < ≤ score 100 % | Very high |
| 69 % < ≤ score 89 % | Tall |
| 39 % < ≤ score 69 % | Low |
| 0 % ≤ ≤ score 39 % | Very Low |

Source ( Riduwan, 2004)

## 3. RESULTS AND DISCUSSION.

The results of the recapitulation of the aspects of students' learning activity before using the e-module on hydrocarbon compound material for grade XI students of SMA Negeri 1 Samber are shown in Figure 1:

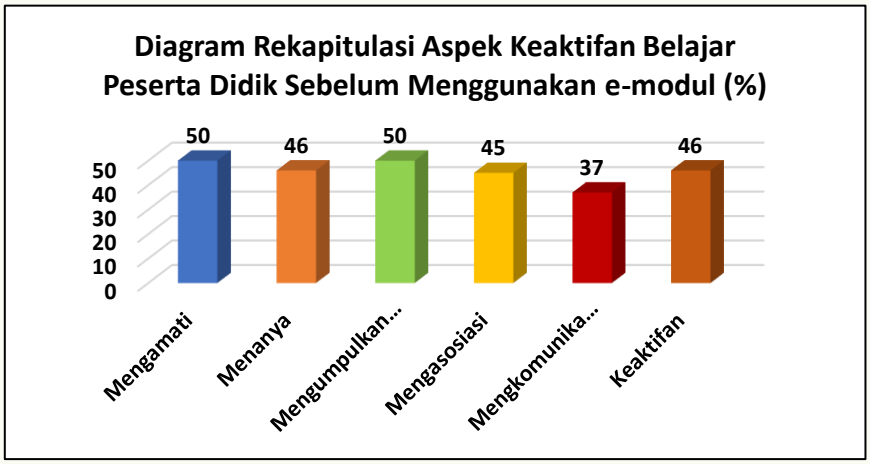


Figure 1. Diagram of Aspects of Students' Learning Activity Before Using E-Module

Figure 1. showed the learning activity of students per indicator, where the indicators were observing (50%), asking (46%), collecting data (50%), associating (45%), communicating (37%), thus the average learning activity of students was (46%).

Results of the Recapitulation of Analysis of Students' Learning Activity in Meetings 1, 2 and 3 Using e-Module on Contextual Carbon Compound Materials for Class XI Students of SMA Negeri 1 Samber. Before the e-module was used by Tiurlina Siregsr, et al. (2024) that the chemical e-module on carbon compound materials is feasible to use. The chemistry learning of hydrocarbon

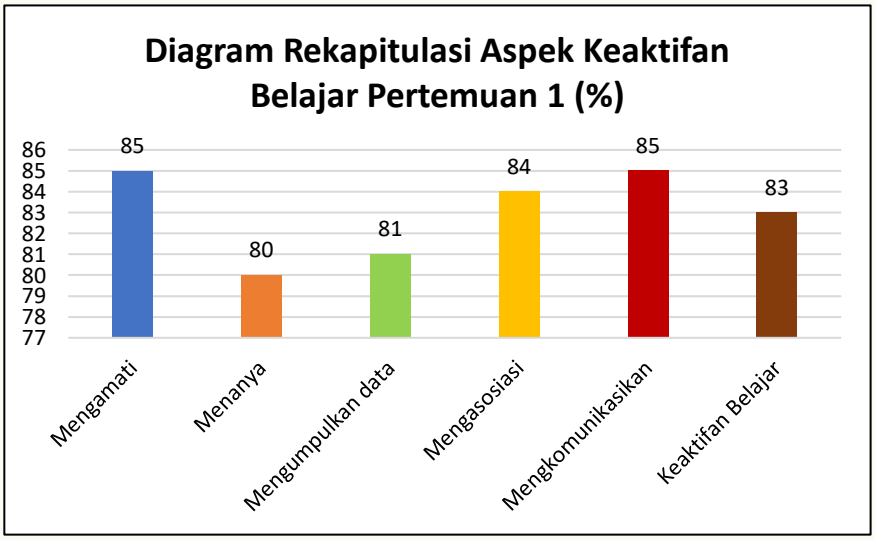


Figure 2. Recapitulation Diagram of Aspects of Students' Learning Activity Meeting 1

compound material uses an e-module with a total of 22 students, measuring the aspects of learning activity assessment (observing, questioning, collecting data, associating and communicating). Each meeting can be seen from meetings 1, 2 and 3 can be seen in Figures 2, 3 and 4:

Based on Figure 2, it shows that the learning activity of students in the indicators of observing (85%), asking (80%), collecting data (81%), associating (84%), communicating (85%), so the average learning activity of students is obtained (83%).

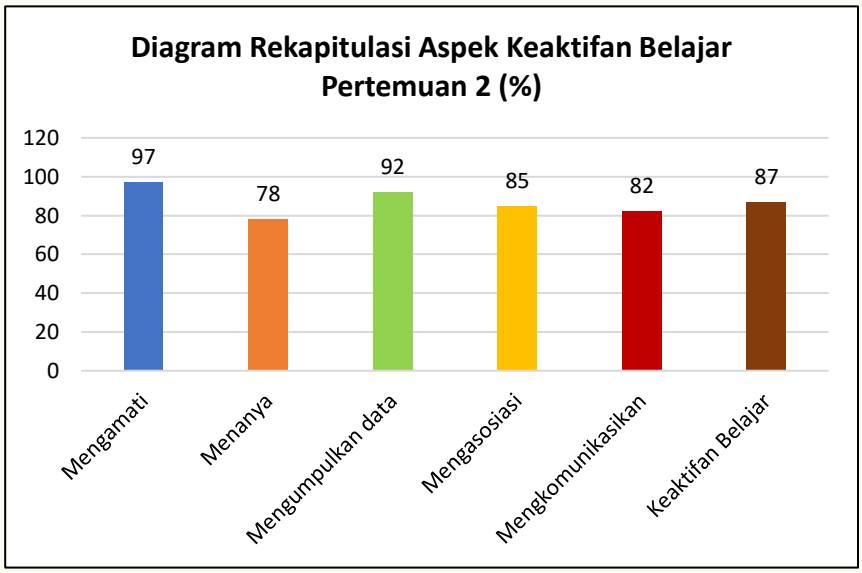


Figure 3. Recapitulation Diagram of Aspects of Student Learning Activity Meeting 2

Figure 3, shows that the learning activity of students per indicator, where the indicators are observing (97%), asking (78%), collecting data (92%), processing data (85%), communicating (82%), thus the average learning activity of students is (87%).

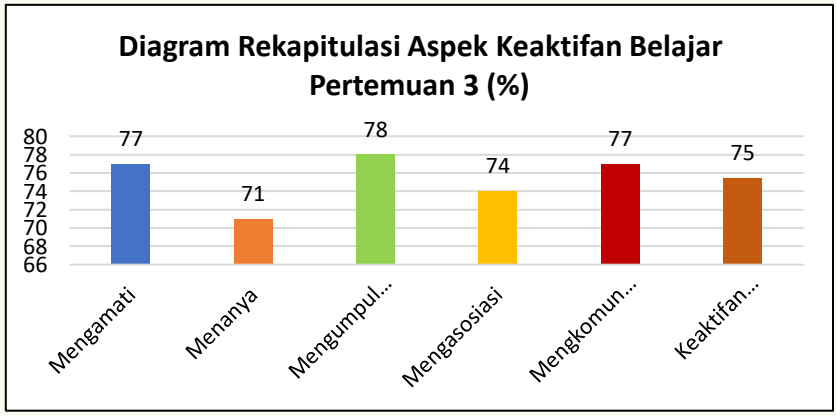


Figure 4. Recapitulation Diagram of Aspects of Student Learning Activity Meeting 3

The learning activity of students is an indicator, where the indicators are observing (77%), asking (71%), collecting data (78%), processing data (74%), communicating (77%), thus the average learning activity of students is (75%).

Based on meetings 1, 2 and 3, the average increase in students' learning activity in learning chemistry of hydrocarbon compounds using contextual-based e-modules is shown in Table 1 as follows:

Table 1. Recapitulation of Average Analysis of Students' Learning Activity

| No. | Activities | Percentage (%) of Students' Learning Activity |
|---|---|---|
| 1 | Meeting 1 | 83 |
| 2 | Meeting 2 | 87 |
| 3 | Meeting 3 | 75 |
| | **Average** | **82 (High)** |

Table 2 shows that the recapitulation of the average learning activity of students at meetings 1, 2 and 3 in chemistry learning activities using e-modules, obtained the results of the average percentage of students' learning activity of 82% with the category of high learning activity (percentage of meeting 1 = 83%, percentage of meeting 2 = 87% and percentage 3 = 75%).

The results of the recapitulation of the analysis of the average learning activity of students at meetings 1, 2 and 3 were carried out through direct observation during the learning activities of chemistry of hydrocarbon compounds using e-modules with a total of 22 students, the average results of the percentage of students' learning activity (observing, questioning, collecting data, associating and communicating by 82%. When compared to the results of the recapitulation of observation of students' learning activity before using the e-module, which is 46% (low category), there has been an increase of 36%. A comparison of students' learning activity before and after using the e-module can be seen in Figure 5 below:

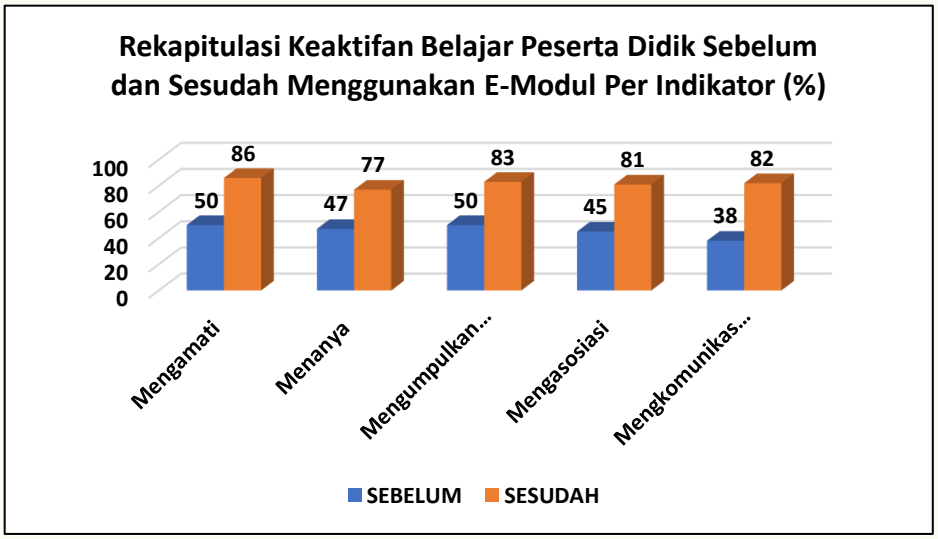


**Figure 5.** Diagram of Recapitulation of Students' Learning Activity Before and After Using E-Module

The difference between the students' learning activity before and after using the e-module (Figure 5). In the aspect of observing, if seen before using the e-module, it is at 50% while after using the e-module there is an increase of 36% to 86%, the aspect of asking before using the e-module is 47% while after using the e-module there is an increase of 30% to 77%, the aspect of collecting data before using the e-module is 50% while after using the e-module there is an increase of 33% to 83%, The aspect of associating before using the e-module is 45% while after using the e-module there is an increase of 36% to 81%, and the last is the aspect of communicating before using the e-module by 38% while after using the e-module there is an increase of 44% to 82%. The range of the percentage of students' learning activity before using the e-module, which is in the range of 38% to 50%, is included in the low activity category, while the learning activity of students after using the e-module is in the range of 77% to 86%, including the high activity category

This striking difference is due to the fact that the activeness of students at Samber State High School is indeed very lacking, not only in chemistry subjects but also in several other exact subjects. However, in this study, learning using a tablet where one student gets one tablet, this is the first experience of each student in learning using one tablet accompanied by a smooth internet network and researchers create a comfortable atmosphere for students, so each student is encouraged to be active in the use of the tablet both to access the internet network and even to Open the e-module and access references related to the material via the Internet. In addition, in terms of asking questions, students seem to be more active, starting from asking questions related to accessing the e-module

link to the pretest and posttest and then related to the learning materials and references contained in the e-module. This is in line with previous research conducted by Hendri Gunawan (2018) where the results of the research show that the e-module teaching materials developed have the potential effect of improving student learning outcomes.

The results of this study are also in line with previous research conducted by Tiurlina Siregar (2021) and Tiurlina Siregar, et al. (2024) with the title "Development of Chemistry Modules on Culture-Based Elemental Periodic System Materials". The results of the study showed that there was an increase in chemistry learning outcomes from three meetings with an average pretest score of 69 after using the postes module to 91.97. The chemistry e-module on carbon compound material is feasible to be used to improve learning outcomes.

## 4. CONCLUSIONS AND SUGGESTIONS

### CONCLUSION

Contextual-based chemistry e-module in increasing the learning activity of students in class XI science of SMA Negeri 1 Samber on hydrocarbon compound material obtained an n-Gain of 0.66 is in the medium category, this shows that the e-module is quite effective in increasing the learning activity of students.

### SUGGESTION

Contextual-based chemistry e-module on hydrocarbon compound material to increase learning activity.

## 5. ACKNOWLEDGMENTS

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