The fullness of Higher Order Thinking Skills (HOTs) in Applied Science Textbooks of Vocational Schools

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Abstract. Textbooks as a dominant learning source of HOTs have not been fulfilled which can influence the growth of HOTs in vocational students. Mix method explanatory HOT HOT design starting from the collection and analysis of quantitative data followed by qualitative data collection and analysis that builds on the initial results of the quantitative data. Analysis of the fulfillment of HOTs Indicators in Vocational High School Applied Science learning about "Material and its Changes" in BC 3.6 and 4 (four) Indicators and BC.4.6, with the percentage of cognitive level HOTs still at the level of analyzing (C4) of 62.9%, the level of evaluating (C5) of 14.3%, and the level of creating (C6) of 22.9%. The next 112 descriptors of the assessment component are based on 14 indicators and 8 Indicators HOTs, 21 material items, 9 self-ability tests, 20 Multiple Choice competency test questions, and 5 essay questions. With the recapitulation results of HOTs fulfillment of 30.4% high criteria, 42.9% medium criteria, and 26.8% low criteria. The fullness of HOTs Indicator by 50.7% in the study of the Applied Science Textbook of Vocational School/MAK Class X Semester I in KD.3.6 Analyzing the Material and its Changes and BC. 4.6 Conducting Experiments on Material Change and Mixed Separation. HOTs are difficult to identify in a short time because they are not instant, but can be identified through a series of HOTs activities by determining learning resources in textbooks and appropriate learning settings for developing high-level thinking habits.

Keyword: Applied Science Textbooks, HOTs, Vocational School

1. Introduction

The Vocational Applied Science Study of Vocational School emphasizes the applicative concept in demanding 21st-century skills of vocational students, technology literacy, and the lives of students who are expected to be able to bridge through critical studies in empowering Higher Order Thinking Skills (HOTs). (Thomas, A. dan Thorn, 2019) state that HOTs can be learned, can be taught to students and can be improved skills and character of students, HOTs means the capacity to go beyond the information given, to adopt a critical stance, to evaluate, to have metacognitive awareness and problems solving
capacities. HOTs consists of problem-solving, making decisions, critical thinking, and creative thinking (Sajidan & Afandi, 2018).

Indications of the ability to train students with thinking process dimensions that include the domains: Analyzing (C4) as a form of activity to compare, examine, criticize, test a problem and the facts are made into a systematic concept, then evaluating (C5) is an activity in managing decisions and conclusions based on standards established through assessment criteria, assignments based on learning objectives to be achieved while creating (C6) is a cognitive process that involves the ability to realize new concepts or products, emphasizing creative thinking in synthesizing information into a more comprehensive form and the complex includes planning, formulating and creating (Anderson et al., 2001) based on bloom's taxonomy.

The fulfillment of the HOTs indicator from Anderson and Krathwohl can be described on sub-indicators and descriptors to analyze the HOTs integration with the Indicators of Science Learning Applied Vocational Schools with integrated assessment can increase HOTs (Barak, M., 2009; A. Khoiri, Sunarno, Sajidan, & Sukarmin, 2019) Based on the description above, that it is necessary to analyze the fulfillment of HOTs Indicators in the Applied Science Vocational School book to empower the high-level thinking skills of vocational students in learning, furthermore Basic Competence (KD) is determined based on the identification of the 2013 curriculum distribution through HOTs operational verbs as a case analysis on KD 3.6. "Analyzing Material and Its Changes" and KD. 4.6. "Conducting Material Change Experiments and Mixed Separation" (Suswanto, D.P M.Pd; Zainal Abdidin, S.Pd; Laila Novitasari, 2018). Whether or not HOTs criteria are met based on the framework of HOTs operations which can then be taken into consideration in determining learning settings in modes, media and sources of science learning.

2. Methodology

The research method used is mixed methods with a sequential explanatory design. Application of sequential explanatory design starting from the collection and analysis of quantitative data followed by qualitative data collection and analysis that builds on the initial results of the quantitative data (Creswel, 2013) as follows:

![Sequential Explanatory Research Design](Creswel, 2013)

Based on the Decree of the Director-General of Primary and Secondary Education Number 130 / D / KEP / KR / 2017 concerning the Vocational Curriculum Structure and the Decree of the Director-General of Primary and Secondary Education Number 330 / D.D5 / KEP / KR / 2017 concerning Core Competencies and Basic Competencies of Subjects in Vocational Schools. Basic Competence (KD) is chosen based on HOTs conceptual framework which indicates HOTs operational verb, KD. 3.6 and KD. 4.6 through Basic Competence and Taxonomy. Behavioral classification of learning outcomes used is Bloom's taxonomy in the 2013 curriculum used which has been refined by Anderson and Krathwohl by grouping into (1) Attitudes (affective) are behaviors, emotions, and feelings in attitude and feeling, (2) Knowledge (cognitive ) is an intellectual capability in the form of knowledge or thinking, (3) Skills (psychomotor) are manual or motor skills in the form of doing. The attitude dimension in the 2013 Curriculum is the first in the formulation of graduate competencies, followed by the formulation of the realm of knowledge and skills.(Suswanto, D.P M.Pd; Zainal Abdidin, S.Pd; Laila Novitasari, 2018).
Relationship between the Cognitive Process Dimension (cognitive process dimension) and the Knowledge Dimension (knowledge dimension)

The development of students' thinking which is known as the cognitive process dimension in the formulation of Basic Knowledge Competence (KD-3) has a relationship with the form of knowledge (knowledge dimension) with the development of analytical thinking (C4) to creating (C6) has a relationship with the form of metacognitive knowledge. More clearly the relationship is described in table 1.

| No. | Development of Bloom Revised Anderson Taxonomy (Cognitive Process Dimension) | Knowledge Dimension | Information |
|-----|--------------------------------------------------------------------------------|----------------------|-------------|
| 1.  | Bearing in mind (C1)                                                          | Factual Knowledge    | Lower Order Thinking Skills (LOTS) |
| 2.  | Understand (C2)                                                               | Conceptual Knowledge |             |
| 3.  | Apply (C3)                                                                    | Procedural Knowledge |             |
| 4.  | Analyze (C4)                                                                  | Metacognitive Knowledge | Higher Order Thinking Skills (HOTS) |
| 5.  | Evaluating (C5)                                                               |                      |             |
| 6.  | Creating (C6)                                                                 |                      |             |

After doing the conceptual framework of HOTs, the next steps are as follows:
- Then analyze the HOTs indicators based on bloom's taxonomy which was revised by Anderson, L., and Krathwohl, D. (eds.) (2001).
- Creating a descriptor for each indicator of each dimension into sub-indicators and determining keywords and coding to facilitate analysis.
- Creating a matrix of HOTs fullness development to determine the criteria of High, Medium and Low
- Analyzing the HOTs fulfillment component through Materials, student activities, self-test questions, and competency test questions.
- Make data interpretations based on the results of the analysis to draw conclusions.

To clarify the flow of analysis of HOTs fullness can be presented in Figure 1.
Figure 1. Flow Analysis of Fulfillment of HOTs Indicators in Applied Science / Vocational School Textbooks for Class X Semester 1 in KD 3.6 and 4.6 (Suswanto, D.P M.Pd; Zainal Abdidin, S.Pd; Laila Novitasari, 2018)

3. Result and Discussion
3.1. Conceptual Analysis of Higher Order Thinking Skills (HOTs) Indicators

After there is a conceptual framework of HOTs, the next step taken to analyze textbooks is to formulate conceptual indicators of Higher Order Thinking Skills (HOTS). Aspects of conceptual analysis HOTs indicators are elaborated based on bloom's taxonomy which was revised by (Anderson et al., 2001) including 1) Analyzing consists of three indicators namely: Differentiating, Organizing, Attribute; 2) Evaluating consists of two indicators, namely: Checking, Criticizing, and 3) Creating, consisting of three indicators, namely: Generating, Planning, Producing (Producing) which can be presented in Figure 2.
Based on Figure 2, HOTs indicators can then be analyzed which include conceptual definitions, operational definitions, aspects, indicators, and sub-indicators, as shown in Table 2.

**Table 2. Conceptual Analysis of Indicators HOTs**

| No | Conceptual Definitions | Operational Definitions | Aspect of Indicators | Sub Indicator | Descriptors | Concept |
|----|------------------------|-------------------------|----------------------|--------------|-------------|---------|
| 1. | High-level thinking is the ability to Analyze, Evaluate and Create (Anderson et al., 2001). | Breaking up the material into its constituent parts and determining the relationships between the parts and the whole structure or purpose. | Analysis (C4) | C4-A1 | To separate, choose, focus, choose | Distinguish relevant material from irrelevant, important parts from unimportant |
|    |                        |                         |                      |              | C4-A2 | Finding Coherence, Integrating, Outlining, Describing roles, Structuring | Assigning functional parts in a structure (compiling evidence in a series of questions that support or contradict each other) |
C4-A3 Deconstructing Determine the point of view, bias, value / intention behind the subject matter

Evaluating (C5) C5-E1 Coordinate, test the truth of information, coordinate, detect, monitor, test load activities or processes coordinate, test the truth of information based on certain criteria to find concepts.

C5-E2 Criticize and judge the truth of information Criticize and judge the truth of information based on certain criteria to find concepts.

Mencipta (C6) C6-Cr1 Test hypotheses Test hypotheses based on certain criteria to find concepts.

C6-Cr2 Designing or designing concepts Designing or designing based on certain criteria to find concepts.

C6-Cr3 Process concept construction Material contains. Construction activities or processes based on certain criteria to find concepts

3.2. Higher Order Thinking Skills Descriptions (HOTs)
Descriptors are used to describe and describe HOTs indicators to clarify the keywords and codes of each indicator, so that they will be able to identify when determining which HOTs indicators or not HOTs. The execution of HOTs is determined based on the descriptor

| HOTs Level | Descriptor | Keyword | Code |
|------------|------------|---------|------|
|            |            |         |      |
The material contains activities or processes for selecting important and relevant information that can be used to find concepts.

Select information that is important or not in finding concepts

The material contains activities or processes to find relationships (relationships) between information and group them according to certain criteria to find concepts.

Finding relationships between information

The material contains activities or processes to reconstruct information back based on certain criteria to find concepts.

Deconstructing information again

The material contains activities or processes to coordinate, test the truth of information based on certain criteria to find concepts.

Coordinate, test the truth of information, coordinate, detect, monitor, test

The material contains activities or processes to criticize and assess the truth of information based on certain criteria to find concepts.

Criticize and judge the truth of information

The material contains activities or processes to test hypotheses based on certain criteria to find concepts.

Test the hypothesis

The material contains activities or processes to design or designing based on certain criteria to find concepts.

Design or design concepts

The material contains activities or construction processes based on certain criteria to find concepts.

Concept construction process

Material does not contain the HOTS indicator N

Table 4. HOTs Indicator Descriptors on Tests of Self Ability and Competence "Material and its Changes"

| HOTs Level | Descriptor | Keyword | Code |
|------------|------------|---------|------|
| **C4**     | Questions explicitly or implicitly ask students to choose important and relevant information that will be used in solving problems. | Choosing information that is important or not in solving problems | C4.1 |
|            | Questions explicitly or implicitly ask students to find connections (relationships) between information and group them according to certain criteria. | Finding relationships between information | C4.2 |
|            | The question given asks students to deconstruct to solve the problem. | Deconstruct information again in order to solve the problem | C4.3 |
| **C5**     | Questions asking students to coordinate, test the truth of Information to be able to solve problems | Coordinate, test the truth of Information, Coordinate, Detect, Monitor, Test | C5.1 |
|            | Questions include activities or processes Criticizing and assessing the truth of information based on certain criteria. | Criticize and judge the truth of information in solving problems | C5.2 |
| **C6**     | questions are given that ask students to be able to test hypotheses based on certain criteria | Test hypotheses in solving problems | C6.1 |
Questions given in the framework of Designing or designing to solve problems.

| Number of Indicators that appear (I) | Compliance Criteria |
|--------------------------------------|---------------------|
| I > 4                                | High                |
| I : 2-3                              | Middle              |
| I : 0-1                              | Low                 |

Based on Table 3 and Table 4 it can be assumed that the HOTs Indicator can be developed through a matrix of integration and fulfillment of the HOTs indicator based on the applied science textbook of SMK/MAK Class X Semester I on KD 3.6 and KD 4.6. The intended cohesiveness includes the integration of learning indicators with existing HOTs indicators, then the completion of HOTs can be categorized into three criteria which are presented in Table 5 below:

Table 5. HOTs Compliance Criteria

| Number of Indicators that appear (I) | Compliance Criteria |
|--------------------------------------|---------------------|
| I > 4                                | High                |
| I : 2-3                              | Middle              |
| I : 0-1                              | Low                 |

The fulfillment criteria are used only to make it easier to read the HOTs indicator development matrix presented in Table 6 below:

Table 6. KD Development Indicators for Higher Order Thinking Skills (HOTs), 3.6 and 4.6

Basic Competence: 3.6. Analyzing Material and Changes

1 3.6.1. Describe material changes based on experimental results

| Learning Indicator | HOTs Indicator | Fullness* |
|--------------------|----------------|-----------|
| C4                 | C4.1 V         |           |
| C4.2 V             |               |           |
| C4.3 V             |               |           |
| C5                 | C5.1 V         |           |
| C5.2 V             |               |           |
| C6                 | C6.1 V         |           |
| C6.2 V             |               |           |
| C6.3 V             |               |           |

2 3.6.2. Grouping Changes in matter into changes in physics and chemistry based on experimental results

| Learning Indicator | HOTs Indicator | Fullness* |
|--------------------|----------------|-----------|
| C4                 | C4.1 V         |           |
| C4.2 V             |               |           |
| C4.3 V             |               |           |
| C5                 | C5.1 V         |           |
| C5.2 V             |               |           |
| C6                 | C6.1 V         |           |
| C6.2 V             |               |           |
| C6.3 V             |               |           |

3 3.6.3. Describe the physical changes shown by changing the form without changing the composition or identity of the substance through experiments

| Learning Indicator | HOTs Indicator | Fullness* |
|--------------------|----------------|-----------|
| C4                 | C4.1 V         |           |
| C4.2 V             |               |           |
| C4.3 V             |               |           |
| C5                 | C5.1 V         |           |
| C5.2 V             |               |           |
| C6                 | C6.1 V         |           |
| C6.2 V             |               |           |
| C6.3 V             |               |           |

4
3.6.4. Describe Chemical changes as indicated by changes in composition (changes in color, formation of sediment, or gas) through experiments

|   |   |   |
|---|---|---|
| C4 | C5.1 | V |
|   | C5.2 | V |
| C6 | C6.1 | V |
|   | C6.2 | V |
|   | C6.3 | V |

5

3.6.5. Identifying the characteristics of physical changes based on the results of the experiment

|   |   |   |
|---|---|---|
| C4 | C4.1 | V |
|   | C4.2 | V |
|   | C4.3 | V |
| C5 | C5.1 | V |
|   | C5.2 | V |
| C6 | C6.1 | V |
|   | C6.2 | V |
|   | C6.3 | V |

6

3.6.6. Identifying the characteristics of chemical changes based on experimental results

|   |   |   |
|---|---|---|
| C4 | C4.1 | V |
|   | C4.2 | V |
|   | C4.3 | V |
| C5 | C5.1 | V |
|   | C5.2 | V |
| C6 | C6.1 | V |
|   | C6.2 | V |
|   | C6.3 | V |

7

3.6.7. Distinguish changes in physics and chemistry based on changes in the shape of objects

|   |   |   |
|---|---|---|
| C4 | C4.1 | V |
|   | C4.2 | V |
|   | C4.3 | V |
| C5 | C5.1 | V |
|   | C5.2 | V |
| C6 | C6.1 | V |
|   | C6.2 | V |
|   | C6.3 | V |

8

3.6.8. Design experiments on changes in physics and chemistry independently

|   |   |   |
|---|---|---|
| C4 | C4.1 | V |
|   | C4.2 | V |
|   | C4.3 | V |
| C5 | C5.1 | V |
|   | C5.2 | V |
| C6 | C6.1 | V |
|   | C6.2 | V |
|   | C6.3 | V |

9

3.6.9. Formulate factors that affect physical and chemical changes in an object

|   |   |   |
|---|---|---|
| C4 | C4.1 | V |
|   | C4.2 | V |
|   | C4.3 | V |
| C5 | C5.1 | V |
|   | C5.2 | V |
| C6 | C6.1 | V |
|   | C6.2 | V |
|   | C6.3 | V |

10

3.6.10. Grouping objects classified as changes in physics and chemistry.
Basic Competence: 4.6. Conducting Experiments on Changing Material and Mixed Separation in the Field of Tourism

1 4.6.1. Designing experiments about the material and its changes.

2 4.6.2. Conduct experiments in accordance with the design made

3 4.6.3. Evaluate the results of material experiments and their changes

4 4.6.4. Create works based on material experiments and changes

Information:*)

The fullness of HOTs in the category

1) H = High (I ≥ 4)
2) M = Medium (I: 2-3)
3) L = Low (I: 0-1)
4) Cognitive Dimension Level: analyze (C4), or evaluate (C5),
5) Form of Dimension of Knowledge: factual, conceptual, procedural or metacognitive
6) Recommendation of taxonomic level (operational verb) and knowledge (material) that is an appropriate level for the relevant KD.
7) Looking at the harmony of the relationship between cognitive levels and the dimensions of knowledge namely C1 = factual, C2 = conceptual, C3 = procedural, C4, C5, and C6 = metacognitive.

8) HOTS (C4, C5) are in harmony with P3, P4, P5, or Reasoning / Associating and Communicating.

9) In the highest class of educational programs, metacognitive dimensions and thought processes are prioritized. Evaluation and Creation levels (C5 and C6) are aligned with the level of Naturalization skills.

Based on (Table 6) shows the fulfillment of the HOTs indicator can be indicated from the distribution of compliance criteria in KD.3.6 and 4.6 presented in the textbook on the integration of the HOTs indicator presented in (figure 3) below:

![Figure 3. HOTs Fullness Criteria](image)

3.3. Components of Fulfillment of HOTs Indicators based on Material and Competency Test Questions

At this stage, an evaluation of KD.3.6 and KD was carried out. 4.6 includes the HOTs fulfillment component, Knowledge dimension, Code descriptor, fulfillment level of each indicator can be presented in (table 7) below:

| NO | HOTs Fullness Components | Knowledge Dimension | Descriptor Code | Information |
|----|--------------------------|---------------------|----------------|-------------|
| A. LEARNING INDICATORS |
| 1. | 3.6.1. Describe material changes based on experimental results | Factual | N | |
| 2. | 3.6.2. Grouping Changes in matter into changes in physics and chemistry based on experimental results | Conceptual | N | |
| 3. | 3.6.3. Describe the physical changes shown by changing the form without changing the composition or identity of the substance through experiments | Conceptual | C4.2 | |
4. 3.6.4. Describe Chemical changes as indicated by changes in composition (changes in color, the formation of sediment, or gas) through experiments
   Conceptual C4.2

5. 3.6.5. Identifying the characteristics of physical changes based on the results of the experiment
   Conceptual C4.2

6. 3.6.6. Identifying the characteristics of chemical changes based on experimental results
   Conceptual C4.2

7. 3.6.7. Distinguish changes in physics and chemistry based on changes in the shape of objects
   Factual N

8. 3.6.8. Design experiments on changes in physics and chemistry independently
   Factual N

9. 3.6.9. Formulate factors that affect physical and chemical changes in an object
   Procedural C6.3

10. 3.6.10. Grouping objects classified as changes in physics and chemistry.
    Procedural C6.2

11. 4.6.1. Designing experiments about the material and its changes.
    Procedural C6.1

12. 4.6.2. Conduct experiments by the design made
    Procedural C6.3

13. 4.6.3. Evaluate the results of material experiments and their changes
    Procedural C5.1

14. 4.6.4. Create works based on material experiments and changes
    Metakognisi N

**B. THE CONCEPT OF "MATERIALS AND CHANGES"

1. Definition of Material and its changes
   Factual N

2. Classification of material based on its appearance and chemical composition (material form and nature)
   Conceptual C4.1

3. Identification of the characteristics of matter (matter)
   Conceptual C4.2

4. Definition of Concept of Material Change
   Factual N

5. **DISCUSSION ACTIVITIES**: identify material changes
   Conceptual C4.1

6. Classification of physical changes from changes in form, shape changes and dissolution
   Conceptual C4.2

7. Distinguishing physical changes in two different circumstances
   Conceptual C4.1

8. Identify by presenting a diagram figure changes in form
   Procedural N

9. Give examples of deformation
   Factual N

10. Informing again about changes in shape
    Conceptual C4.3

11. Define dissolution and set an example in life
    Factual N

12. Identify the types of chemical changes
    Conceptual N
|   | Differences in the characteristics of changes in physics and chemistry | Conceptual | C4.2 | Page 108 |
|---|---------------------------------------------------------------------|------------|------|----------|
| 14 | Identification of physical changes and examples                    | Factual    | N    | Page 109 |
| 15 | Identification of chemical changes and examples                    | Metacognition | C5.1 | Page 110 |
| 16 | EXPERIMENTAL ACTIVITIES: Designing and experimenting traits on material changes | Procedural | C6.3 | Page 111 |
| 17 | Definition of the cause of material changes                         | Factual    | N    | Page 112 |
| 18 | Identification of Factors affecting material changes (temperature, particle size and concentration of reacting substances) | Factual | C4.1 | Page 112 |
| 19 | Identify the effect of temperature on the change in melting form    | Conceptual | C4.3 | Page 113 |
| 20 | Presenting science info again as a deepening of students' abilities | Metacognition | C5.1 | Page 114 |
| 21 | Summarize the overall concept of matter and its changes             | Factual    | N    | Page 115 |

C. PROBLEMS OF SELF ABILITY

I Self Ability Test 1
1. Number 1. Definition of changes in physics and chemistry | Factual | N | Page 108 |
2. Number 2. Determine the application of changes in physics and chemistry | Conceptual | C4.1 | Page 108 |

II Self Ability Test 2
3. Number 1. Differences in changes in physics and chemistry | Factual | C4.1 | Page 110 |
4. Number 2. Symptoms of material change | Conceptual | C4.2 | Page 110 |

III Self Ability Test 3
5. Number 1. Identify the cause of material changes | Conceptual | N | Page 112 |
6. Number 2. The relationship of the causes of physical changes to chemistry and vice versa | Metacognition | C5.2 | Page 112 |

IV Self Ability Test 4
7. Number 1. Procedure for dissolving sugar | Procedural | C4.2 | Page 114 |
8. Number 2. Determination of the change in the form of tempeh frying pan | Conceptual | N | Page 114 |
9. Number 3. Analysis of the relationship of material changes with global warming | Conceptual | C6.1 | Page 114 |

D. COMPETENCE TEST PROBLEMS

I Multiple Choice
1. Number 1. Definition of material | Factual | N | Page 115 |
2. Number 2. Characteristics of material existence | Conceptual | C4.2 | Page 115
3. Number 3. Analysis of material properties | Conceptual | C5.1 | Page 115
4. Number 4. Analysis of material intensive nature | Factual | N | Page 116
5. Number 5. Relationship to material properties | Factual | N | Page 116
6. Number 6. Events of physics change | Factual | N | Page 116
7. Number 7. Application of physics change | Metacognition | C6.3 | Page 116
8. Number 8. Classification of chemical reactions | Conceptual | N | Page 116
9. Number 9. Application of chemical changes | Factual | N | Page 116
10. Number 10. Classification of changes | Procedural | N | Page 116
11. Number 11. Identification of chemical reactions | Factual | C4.2 | Page 116
12. Number 12. Evaporation process diagram | Procedural | C6.1 | Page 116
13. Number 13. Classification of physical changes | Conceptual | C6.1 | Page 116
14. Number 14. Classification of chemical changes | Conceptual | C6.1 | Page 116
15. Number 15. Application of chemical change | Factual | N | Page 117
16. Number 16. Application of material changes on ice | Metacognition | C4.1 | Page 117
17. Number 17. Identify the characteristics of changes in physics | Factual | N | Page 117
18. Number 18. Application of material changes in making cakes | Metacognition | C6.3 | Page 117
19. Number 19. Analysis of changes in material in food dough | Procedural | C5.2 | Page 117
20. Number 20. Definition of condensation | Factual | N | Page 117
21. Number 1. Differences in changes in physics and chemistry | Factual | C4.1 | Page 117
22. Number 2. LPG combustion equation | Procedural | N | Page 117
23. Number 3. Symptoms of material change | Procedural | C4.3 | Page 117
24. Number 4. Causes of material changes | Factual | N | Page 117
25. Number 5. Factors affecting material change | Factual | N | Page 117

Note:
Components of Fulfillment HOTs:
1. There are 10 KD 3.6 indicators and 4 KD Indicators. 4.6
2. 21 Conceptual Elements "Material and Changes" and 2 discussion activities and student experiments
3. The items consist of 9 Self Ability Test Questions and 25 Competency Test Questions
Based on Table 7, the recapitulation of the results of HOTs fulfillment is presented in table 8.

Table 8. Recapitulation of HOTs Compliance Results

| Basic Competency | Component | C4 | C5 | C6 | N | HO Ts | Amo unt |
|------------------|-----------|----|----|----|---|-------|--------|

14
### 3.6. Analyzing the Material and its Changes

| Indicator   | C4.1 | C4.2 | C4.3 | C5.1 | C5.2 | C5.3 | C6.1 | C6.2 | C6.3 | C6.4 |
|-------------|------|------|------|------|------|------|------|------|------|------|
| A. Indicator| 0    | 4    | 0    | 1    | 0    | 1    | 1    | 2    | 5    | 9    |
| B. Concept  | 4    | 3    | 2    | 1    | 0    | 0    | 0    | 1    | 1    | 11   |
| C. Self-Test| 2    | 2    | 0    | 0    | 1    | 1    | 0    | 0    | 3    | 6    |
| Test Questions|     |      |      |      |      |      |      |      |      |      |
| D. Compete ncy Test Questions |     |      |      |      |      |      |      |      |      |      |

| 4.6. Conducting Experiments on Changing Material and Mixed Separation in the Field of Tourism |
|-------------------------------------------------------------------------------------------|

| 1. Multiple Choice | 1 | 2 | 0 | 1 | 1 | 2 | 0 | 2 | 1 | 10 | 20 |
|-------------------|---|---|---|---|---|---|---|---|---|----|----|
| 2. Essay          | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 3  | 5  |

To identify trends in the HOTs indicator that appears a lot can be presented in (figure 4).

![Figure 4. Distribution of IndiCatOr HOTs](image1)

![Figure 5. Percentage of HOTs](image2)

Based on (Table 8 and Figure 4) shows Level C4.1 Differentiating and C4.2 Organizing has the highest amount of fulfillment compared to other levels. Furthermore, it can also be presented the process of each indicator to determine the tendency of the dominant cognitive level is presented in Figure 5.

![Figure 6. Indicators for each Level C.](image3)

![Figure 7. The Fulfillment Results of HOTs](image4)

(Figure 5) shows the different criteria of 112 descriptor items analyzed in the assessment component based on 14 learning indicators out of 10 learning indicators from KD 3.6 "Analyzing Material and Changes" and 4 Indicators from KD. 4.6 "Conduct material experiments and changes as well as mixed
separation", 8 HOTs Indicators based on knowledge level, and 21 items "material and changes", 9 self-ability tests on each sub-material, 20 Multiple Choice competency test questions and 5 essay questions as a final assessment learning. With the recapitulation results of HOTs fulfillment of 30.4% high criteria, 42.9% medium criteria, and 26.8% low criteria. This means that the fulfillment of HOTs is more dominant in the Medium criteria.

(Figure 6) shows the C4.2 level "Organizing" has the most widespread distribution of HOTs arising because most of the material is presented by organizing ideas in the form of categorization, characteristics, a grouping of materials, and their changes in both physical or chemical changes. While level C6.2 "Planning" at this level is almost in the textbook there is no structured experimental planning of activities, in student activities both discussion and experimental activities are directly described.

(Figure 7) That the fulfillment of HOTs was 50.7% based on an analysis of 112 assessment component descriptors. The integration between learning indicators and HOTs indicators is in the medium category. Furthermore, the process of yields that did not meet HOTs (N) was 49.3%. It is assumed by the researcher that the analysis of the applied science textbook of SMK / MAK class X semester 1 on KD 3.6 and KD 4.6 has not met the maximum HOTs indicator as evidenced by the results of the percentage of HOTs and N. Based on the results, the fulfillment of HOTs is still low, only 50.7% in KD 3.6 and KD 4.6, meaning that it has not been fulfilled based on Anderson's HOTs level. Textbooks as a source of student learning need to be supported by learning designs that can foster student HOTs. Student textbooks as one of the dominant learning materials or sources of learning if the learning model is conventional .. some studies state that the development of hots is not just thinking but can be applied in real life of students. The level of creating requires creative ideas that cannot be produced in an ordinary way. Learning resources become determinants of nature that can develop at level 6.

HOTs put more emphasis on thinking skills that combine critical thinking and creative thinking. Strengthened research (HD Ayu, AJufri, Miterianifa, Y Trisnayanti, 2019; Ahmad Khoiri, 2018; Miterianifa, Trisnayanti, Khoiri, & Ayu, 2019) that Critical Thinking is rational thinking about something. Rational in accordance with the facts of building a new paradigm that is more creative and can create concepts into something or something new (Anderson et al., 2001) HOTs are indeed very difficult to be identified in a short time because they are not immediate, but can be known through a series of activities that are correlating HOTs themselves. The activity in question is an activity of high-level thinking habits through the cognitive dimension when evaluating, analyzing, and creating continuously. HOTs include the realm of analyzing, evaluating, and creating. The development of modules or textbooks must be able to stimulate students in understanding facts, grouping, drawing conclusions, connecting them with other facts and concepts, making generalizations, and applying them by finding new solutions to new problems (Cintang, 2016; Ichsan, Sigit, & Miarsyah, 2019). Thinking and skilled at solving every problem is a means to overcome educational problems. The teacher will develop learning resources in accordance with the situation and condition of students (winarno) to achieve the specified learning completeness. Not just following the material in textbooks, but there are modifications to learning in the 21st century to answer global challenges. Preparing the millennial generation through HOTs is urgently needed to overcome the problems and challenges of modernization (Heong et al., 2012).

4. Conclusion
Based on the analysis of the fulfillment of HOTs Indicators, that: There are 10 (ten) Learning Indicators about "Material and Changes" in KD 3.6 and 4 (four) Learning Indicators in KD.4.6. the percentage of cognitive level HOTs for the level of analyzing (C4) at C4.1, C4.2 and C4.3 is 62.9%, evaluating (C5) at C5.1 and C5.2 is 14.3% and Creating (C6) in C6.1, C6.2, and C6.3 of 22.9%. With the highest component at level C4.1 "Differentiating" and C4.2 "Organizing". Furthermore, there were 112 descriptors for the assessment component based on 14 learning indicators, 8 HOTs indicators, 21 material items, 9 self-ability tests, 20 Multiple Choice competency test questions, and 5 essay questions. With the recapitulation results of HOTs fulfillment of 30.4% high criteria, 42.9% medium criteria, and
26.8% low criteria. The fullness of HOTs Indicator by 50.7% in the study of the Applied Science Textbook of Vocational School / MAK Class X Semester I in KD.3.6 Analyzing the Material and its Changes and BC. 4.6 Conducting Experiments on Material Change and Mixed Separation. HOTs are difficult to identify in a short time because they are not immediate, but can be identified through a series of activities that correlate HOTs in the analysis of textbooks at the Natural Science Vocational School showing textual evidence, which can then be set up in learning that fosters high-level thinking habits through cognitive dimensions when evaluating, analyzing and creating continuously.

5. Recommendation

It is recommended that before analyzing the fulfillment of HOTs be considered operational definitions of the theories used. Determination of HOTs fulfillment indicator descriptors greatly affects the yield process, so it needs to be considered for the analyzer. The method of determining the material and basic competencies to be analyzed must be precise, to see the high levels of HOTs being fulfilled.

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