

Analysis of Eligibility Contents of Chemical Equilibrium in Text Books Chemical Study of Class XI Senior High School Curriculum 2013 Revision

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Abstract - This study aims to describe the eligibility of content in chemical equilibrium material in the class XI SMA / MA chemistry textbook published by the Ministry of Education and Culture. This type of research is descriptive research with qualitative research methods. The data collection technique is through documentation studies and research instruments that are used in the form of a description table of the feasibility of the contents of the textbooks that include the suitability of the material descriptions with Core Competencies (KI) and Basic Competencies (KD), the accuracy of learning support materials and materials. Based on the results of the analysis, it can be concluded that, in general, textbooks, especially chemical equilibrium materials, are appropriate for use in the learning process. However, the spiritual aspects and material sequence have not yet been found Le Chatelier's principle should be explained as an introduction to the material factors that cause a shift in chemical equilibrium.

Keywords - Chemical Equilibrium, Analysis Textbook, Eligibility of Contents.

I. INTRODUCTION

Textbooks are one of the written teaching materials that function as learning resources to achieve learning goals. Until now, lesson text books are still used as the main source of information for teachers and students in the process learning. Textbooks are closely related to the curriculum (Tarigan, 2009: 67). The curriculum that applies now is the 2013 Revised Curriculum. One difference between the 2013 curriculum and the previous curriculum is that the textbooks used in schools today consist of teacher books and student books issued directly by the Ministry of Education and Culture as a source of learning in schools. The teacher's book is a learning support book that is the teacher's handbook. While the student book is a book intended for students that is used as a guide activities to learning to facilitate students in mastering certain competencies (Puskurbuk, 2013).

Student books are guidebooks for students in learning

activities that contain subject matter, investigation activities based on concepts, science activities, containing information, and examples of the application of science in everyday life (Trianto, 2010: 227). Student books have an important role in the learning process, including: as a guide for students in conducting learning activities, facilitating continuity of learning, fostering student creativity, as a neatly organized and learning resource gradual, facilitating the making of material records and can be used as one reference in doing assignments.

Textbooks are one of the most important factors to support the success of the learning process. Textbooks, especially student books, must meet the criteria for quality textbooks. If the textbooks do not meet these criteria, then there may be many mistakes in the preparation of the textbooks. Possible errors include; the contents of the textbooks are not yet in accordance with the applicable curriculum, the use of EYD is not appropriate, the concepts

in the textbooks are not yet in accordance with the applicable science international and so on. As a result of the incompatibility of textbooks with curriculum, students will find it difficult to achieve the learning objectives of the curriculum. While the consequences that will occur if the material in the textbook is not accurate, students will experience an understanding of the concept that is not right so that misconception can occur.

To avoid the consequences of mistakes in the textbooks, it is necessary to analyze the content feasibility of the textbooks before they are used in the learning process. There are three indicators in the assessment of the feasibility of the textbook content: 1) the suitability of the description of the material with the competency standard (SK) and basic competencies (KD) contained in the curriculum of the subject matter concerned; 2) material accuracy; and 3) learning support material (Muslich, 2010: 292).

In the 2013 curriculum, competency standards were replaced with core competencies (KI), so that the feasibility test for the contents of this textbook was seen from the suitability of the material descriptions with KI (core competencies) and basic competencies (KD). Indicators of material suitability with KI and KD are: completeness of material, breadth of material and depth of material. Indicators of accuracy material can be seen from the accuracy of the concepts and definitions in the textbooks. While indicators of learning support material can be seen from the existence of supporting material in textbooks (Beslina, 2015: 78).

One of the material contained in chemistry subjects is chemical equilibrium, this material is one material that contains concepts and chemical reactions, so that from the aspect of content, the material must be in accordance with the demands of the 2013 curriculum and the material presented is also accurate and can support learning. Analysis of student books needs to accommodate all the above aspects. The analysis was carried out in one unit in the form of "Analysis of the Content of the Material of Chemical Equilibrium in the Chemistry Textbook Class XI High School ". From this, it is expected to provide analysis knowledge about the method of analyzing student textbooks on chemistry subjects before being used in the learning process.

The purpose of this study is to describe the feasibility of the contents of the chemistry study textbook on chemical equilibrium material from three indicators, namely: the suitability of the material with KI and KD, the accuracy of the material and supporting material learning. The textbooks

that were analyzed were textbooks of chemistry lessons instudents of the eleventh grade SMA curriculum 2013, which were published by the Ministry of Education and Culture with the publishers of Tiga Serangkai by Sentot Budi Rahardjo and Ispriyanto with the title of Student Book Experimental Based Chemistry. The material to be analyzed is chemical equilibrium where, in this textbook, there are pages 129 to 158.

II. METHOD

Type of research is descriptive research. Descriptive research is a method research that seeks to describe and interpret objects according to what they are (Darmadi, 2011: 145). The purpose of descriptive research is to describe the systematically facts and characteristics of objects or subjects that are examined quickly. The approach research taken is qualitative research, where data collected is inform the of words and does not use statistical analysis procedures as well as research quantitative (Irawan, 1999: 77). The data described in this study are the results of the analysis of chemistry study textbooks for high school class XI students (2013 revised curriculum) from the aspect of eligibility content. The object in this study is in the form of paragraph text chapters of chemical equilibrium in chemistry textbooks of class XI SMA / MA Sources of data in this study are textbooks chemistry class XI SMA / MA curriculum in 2013 published by Kemendikbud and standard textbook *Chemistry 10th Edition* by Raymond Chang.

The purpose of this study was to analyze chemistry textbooks of class XI students in terms of content eligibility. The indicators used in the content feasibility test are:

- 1) Conformity to the contents of the textbook with KI and KD. This analysis includes: completeness of material, breadth of material, depth of material and sequence of material presentation,
- 2) Accuracy of material, this analysis is done by comparing concepts, explanations, symbols, tables and drawings in textbooks with textbooks standard,
- 3) Supporting material learning. This analysis includes the completeness of textbooks in terms of: conformity with the development of science and technology, the excellence of features, examples and references, reasoning, problem solving, inter conceptual linkages, communication, material attractiveness, encouraging further information and enrichment material.

The research instrument used in this analysis is in the form of a analysis. Analysis table Feasibility of the three indicators above.

III. RESULTS AND DISCUSSION

A. Analysis of the suitability of the content of textbooks with KI and KD

1. Compliance with Core Competence (KI)

Aspects of Core Competence (KI)	Description Chemistry Textbooks
KI 1 (Aspects of Spiritual) Appreciate and practice the teachings of their religion	none
KI 2 (Aspects of Attitude) Developing behavior (honest, disciplined, responsible, caring, polite, environmentally friendly, mutual cooperation, cooperation, peace-loving, responsive and proactive) and showing attitude as part of the solution or various natural problems interacting effectively with the environment social and nature and in placing themselves as a reflection of the nation in world relations	Page 130: The author writes the application of honesty, tolerance, discipline and hard work can be applied through experiments 5.1 Page 136: There is a solidarity column that contains the application of chemical equilibrium to social life
KI 3 (Knowledge Aspects) Understand, apply, and analyze factual knowledge, concepts al, procedural, and metacognitive based on his curiosity about science, technology, art, culture, and humanities with humanity, nationality, state, and civilization insights regarding the causes of phenomena and events, and applying procedural knowledge to specific fields of study according to talent and his interest in solving problems.	Factual Knowledge: Page 131; about: the effect of the catalyst on the equilibrium of the reaction Conceptual Knowledge: Page 138; about: Le Chatelier Principle Procedural Knowledge: Page 130; about: Experiments 5.1 Metacognitive Knowledge: None
KI 4 (Skills Aspect) Processing, reasoning, and presenting in the concrete and abstract realms related to the development of what he learned in school independently, acting effectively and creatively, and being able to use methods according to the rules science	Through project and practicum assignments page 130; about: experiment 5.1 page 138; about: project task

Core Competency (KI) is the level of ability to achieve SKL (Standard Competency) that must be possessed by a student at each grade level (PP No.32 of 2013). In general, textbooks include the four Competencies Core (KI), namely, KI 1, KI 2, KI 3 and KI 4. However, in the textbooks the spiritual aspects have not been included. If the spiritual aspect does not yet exist in the textbook, the teacher can apply it to the learning process in the classroom. In addition,

in the aspect of knowledge, metacognitive knowledge has not been seen. Metacognitive knowledge can be obtained through the experience of students in learning something (Endang, 2013: 44). Therefore, teachers play an important role in building students' cognitive knowledge through learning processes such as discussions on chemical equilibrium material.

2. Conformity with Basic Competencies (KD)

Aspects of Basic Competence (KD)	Main material of Chemical Equilibrium in the Curriculum	Material of Chemical Chemistry Study Textbook
3.8 explain the equilibrium reaction in the relationship between reagents and reaction results 4.8 presents the results of data processing to determine the equilibrium constant value of a reaction 3.9 analyze the factors that influence the shift in equilibrium direction and its application in industry 4.9 design, carry out, and conclude and present the experimental results of factors that influence the shift in equilibrium direction	1. Dynamic Balance a. Reversible reaction and dynamic equilibrium b. React the equilibrium of lead sulfate with potassium iodide c. Dynamic equilibrium reactions that occur based on observations 2. Equilibrium constant 3. Calculation and application of chemical equilibrium a. Quantitative calculations relating to chemical equilibrium b. Degree of dissociation (α). equilibrium constant (K_c and K_p) and the relationship of K_c with K_p 4. Factors that affect chemical shifts a. Concentration b. Volume c. Pressure d. Temperature 5. Equilibrium in industry	1. Equilibrium Constant a. Homogeneous balance b. Heterogeneous balance 2. Factors that affect the shift in equilibrium a. Concentration b. Pressure and Volume c. Temperature 3. Le Chatelier's Principle 4. Application of chemical equilibrium in the industry a. Making ammonia (NH_3) b. Making sulfuric acid (H_2SO_4) 5. Quantitative relationship between reagents and reaction results from an equilibrium reaction a. Equilibrium determination expressed as molar concentration (K_c) b. Equilibrium determination expressed as partial pressure (K_p) c. Relationship between K_p and K_c 6. Dissociation balance (α)

The suitability analysis of material descriptions with KI and KD includes three aspects, namely:

a) Material Completeness

Based on the results of the analysis in table 2, chemical equilibrium material presented in the textbook published by the Ministry of Education and Culture has been complete and contains all the subject matter that supports the achievement of KI and KD formulated in the 2013 Revised curriculum.

b) Extent of Material

The presentation of concepts, definitions, principles, procedures, examples and exercises contained in the chemistry study textbook on this chemical equilibrium material has supported the achievement of the expected KI and KD. This can be seen in the number of exercises and examples of questions that can improve students' understanding of equilibrium material chemical.

c) Depth of Material

The depth of chemical equilibrium material in this textbook has met the criteria for the depth of material that must be achieved by students. This can be seen in table 2, which describes the sub-material in each subject matter of the textbook the lesson has fulfilled all the sub-material in Basic Competence.

d) Sequence of Material

Presentation The results of analysis of aspects of the order in which chemical equilibrium material is presented in the textbooks in general are coherent. It's just in the discussion of Le Chatelier's Principle. In chemistry study textbooks, the material of Le Chatelier's principle is explained after the shifting equilibrium factors, while in standard textbooks. Le Chatelier's principle is an introduction to the discussion of shifting factors chemical equilibrium. Le Chatelier's principle contains "*if an external*

pressure is given to a system of equilibrium, this system will adjust to such a degree as to compensate for some of this pressure when the system tries to balance it again". According to a standard textbook, the word "pressure" here means a change in concentration, pressure, volume or temperature that affects equilibrium. Therefore the discussion of the chatelier principle is better placed as an introduction to the factor shifting in chemical equilibrium.

B. Material Accuracy

The accuracy of chemical equilibrium material analysis is done by looking at concepts, tables, drawings and explanations in the sub-subject text lesson material published by the Ministry of Education and Culture then comparing it with the standard textbook 10Chemistryth Edition by Raymond Chang. From the analysis that has been done, it was found that concepts, tables, images and explanations regarding material chemical equilibrium were in accordance with the explanations in the standard textbook.

C. Learning Supporting Materials

Aspects of Learning Support Materials	Description of Textbooks
Conformity with the development of science and technology	1. Ammonia making process (page: 138) 2. The process of making sulfuric acid (page: 139) 3. Regarding chemistry: oxygen balance-hemoglobin and hypoxia (page: 158)
Linkages of features, examples and references	Features, examples and references to textbooks are in accordance with the needs of chemical equilibrium material
Reasoning	Has directed students to good reasoning through the scientific approach. This can be seen in the critical thinking column and the way the writer directs students to find their own concepts, namely in the experimental observations of decomposition of N_2O_4 into NO_2 (pages 129-130).
Solution to problem	Problem solving is in line with a good reasoning process. This can be seen in the scientific approach through observing the decomposition of N_2O_4 into NO_2 (pages 129-130).
Inter-concept connection	The connection of material between each other in chemical equilibrium material in the textbooks is appropriate.
Communication	Textbooks have directed students to be able to communicate chemical equilibrium material. This can be seen in the concentration table of Ag^+ , NH_3 , and $[Ag(NH_3)_2]^+$ ions which guide students to communicate the meaning of the table.

Material withdrawal	There are many images that can explain the material of chemical imbalances that are abstract in order to be more easily understood by students. For example: experiment with the effect of temperature on equilibrium (page: 137)
Encourage further information	Basically, the material in this lesson textbook directs students to work independently, this can be seen in project assignments (page: 138)
Training material	Textbooks have been equipped with enrichment materials such as tests of understanding and examples of chemical equilibrium problems

In addition to the two previous indicators, learning support material is also the thing most important in assessing the appropriateness of the contents of textbooks. Based on the analysis of the lesson textbook, this textbook has fulfilled all the criteria in the aspects of learning support material.

IV. CONCLUSIONS

Based on the analysis that has been done it can be concluded that material the chemical equilibrium in the student book entitled Experimental Based Chemistry published by the Ministry of Education and Culture from the aspect of content feasibility, this textbook is worthy of being used as teaching material for the learning process in school. However, the spiritual aspect has not been written in the book. In addition, in terms of the order of presentation of the material, principle should be Le Chatelier's explained as an introduction to the material of shifting chemical equilibrium factors.

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