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Analysis of The Need for Applied Science Teaching Materials in Chemical Materials in Vocational School, Department of Culinary, Tangerang District

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ABSTRACT

This study aims to explain the need for teaching materials in the culinary arts vocational school which will be developed using the 4S TMD method. This research is based on the problem of not integrating chemistry subjects in supporting vocational subjects with culinary skills competence. So there are no teaching materials that are relevant to the competence of culinary expertise. The data collection instrument used was the relevance format between chemical content and vocational content. This type of research is descriptive with a qualitative approach. The subjects in this study were two lecturers of chemistry education, two teachers of applied science, and three teachers of productive culinary arts who acted as validators. The results of this study became the basis for researchers in developing chemistry books using the 4S TMD method on applied science teaching materials for chemistry relevant to vocational skills in culinary skills.

1. Introduction

The purpose of vocational schools (SMK) is to prepare students for the world of work. So that most vocational schools only focus on special skills subjects compared to other subjects. In vocational schools in the field of tourism expertise, students are less interested in subjects other than their competency skills, such as chemistry. Students in the field of tourism expertise feel that chemistry is not related to their special skills and chemical concepts are difficult to understand as reported by Wiyarsi (2019).

In Vocational High Schools in the field of tourism expertise, chemistry subjects are not studied directly as subjects, but are integrated into applied science subjects. The scope of the chemistry material is also not as wide as the material studied by high school students, but only material that can be integrated with their

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field of expertise as reported by Muharomi (2018). Chemistry learning that is relevant to culinary arts cannot be separated from the presence of relevant chemistry teaching materials. According to Anwar (2023), teaching materials are one of the main components of learning, apart from teachers and students. Therefore, in supporting the achievement of optimal learning, teaching materials (teaching materials) are a very important component. Birisçi (2010) stated that teaching materials developed for learning have an important role in making active learning.

One of the principles used in making teaching materials for students in the culinary arts field is to demonstrate the relevance of chemistry to real life students and the culinary profession so as to increase student motivation in learning chemistry as reported by Hall (2006). This is supported by Holbrook (2005) which states that teachers must provide teaching materials that are relevant to the real world of students so that learning becomes meaningful for students. The use of teaching materials that are relevant to the field of culinary arts and students daily lives in learning chemistry has been shown to significantly increase high school students' chemistry scores and increase student motivation (Godin et al., 2014; Haryani et al., 2022; Schwartz-Bloom et al., 2011; Vaino et al., 2012).

Currently the existing chemistry books are less relevant for SMK. Chemistry books relevant to SMK are difficult to obtain. As research conducted by Fauziah Eva as reported by (2018), the chemistry textbook used contains more basic chemical materials in general, as is the case in high school. This causes there to be no relationship between chemistry and the competence of his expertise, even though chemistry is a basic subject in his competence. Based on some of the problems that have been described previously, it is necessary for chemistry teaching materials for culinary skills competency vocational school students to be processed in such a way as to produce relevant teaching materials, easily understood by students, in accordance with the eligibility criteria for content, presentation, language, and graphics.

2. Methodology

This study uses a qualitative research method with a descriptive approach. This research was conducted in one of the Tangerang Regency Public Vocational Schools with culinary expertise competencies. Data on the need for teaching materials was collected using an instrument of relevance format between chemical content and vocational content which was given to two chemistry education lecturers, two teachers of applied science subjects, and three teachers of productive culinary subjects who acted as validators. The data analysis technique used is qualitative analysis based on the data obtained. Data analysis in this study was conducted on the results of internal testing conducted by validators, namely lecturers from the Department of Chemistry Education UPI, Applied Science teachers, and productive subject teachers.

3. Results and Discussion

The formulation of chemical content is carried out based on the integrated chemistry Basic Competence (KD) that has been developed by Kusumaningtyas (2020). The development of KD is carried out to obtain KD in chemistry that is in accordance with the needs of Vocational Schools with Catering expertise competencies. The chemistry material in the culinary skill competency is still difficult for students to understand because they feel that the chemical concept is not relevant to the field of expertise being pursued. Whereas chemistry learning is used as basic knowledge to master special skills in culinary expertise. The formulation of chemical content based on the KD that has been developed is obtained from the relevance of integrated chemical content with the vocational content of Vocational High Schools of culinary expertise based on the vocational KD. Learning material is one of the supports for students to achieve learning objectives based on Core Competencies and Basic Competencies. The relevance of chemical content to the vocational content of culinary expertise is listed in Table 1.

Table 1. Relevance of Chemical Content to Vocational Content Catering Skills Competence

Vocational Content	Integrated Chemistry Content										
	Kim 1	Kim 2	Kim 3	Kim 4	Kim 5	Kim 6	Kim 7	Kim 8	Kim 9	Kim 10	Kim 11
KP											
PBM											
BD											
IG											
PPM											
PPB											

Description: Kim: Chemistry (KD developed by Kusumaningtyas (2019)); KP: Food safety; PBM: Foodstuff Management; BD: Basic Catering; IG: Nutrition Science; PPM: Food Management and Serving; PPB: Pastry and Bakery Products.

	<i>Relevance of Chemical Content to Vocational Content</i>
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Based on these data, vocational subjects have different needs for chemical content to support them. The difference in the placement of chemistry content in vocational subjects shows that the material in each vocational content is different. The results of the percentage composition of chemical content required by the Culinary Skills Competency Vocational School are listed in Table 2.

Table 2. Results of the Percentage of Chemical Content Composition Required by Vocational Schools of Culinary Skills Competence

Code	Chemical Content	Amount of Chemical Content Relevant to Vocational Content	Percentage (%)
Kim 1	The nature of the chemical content of food and inspection of the quality of food ingredients	4	17
Kim 2	Chemical properties of eggs, the concept of colloids in egg preparation, the effect of egg quantity on food processing	1	4
Kim 3	Chemicals and their influence on food processing	5	21
Kim 4	Properties of fats and oils, types and their quality effects on processed foods	1	4
Kim 5	Types and properties of chemicals in seasonings, spices, and food additives (BTM) as food additives	1	4
Kim 6	Analysis of the content of foods containing carbohydrates, fats, and proteins, macro and micro minerals in the body	3	12
Kim 7	Diseases of deficiency and excess of nutrients in the body and calculation of the menu of nutritional needs for the body	3	13
Kim 8	The causes of physical and chemical food spoilage and how to prevent them	1	4
Kim 9	Causes of food poisoning and how to prevent it	1	4
Kim 10	Chemicals for food processing equipment and how to maintain them	1	4
Kim 11	Types of colloids in food	3	13

Based on Table 2 and Figure 1, the largest percentage of chemical content required by the Culinary Skills Competency Vocational School is Chemicals in Food Processing. This shows that the KD productive subjects of culinary expertise require content or material regarding chemicals in food processing as a support. The culinary expertise competency learns about food processing, one of which is the use of chemicals or compounds, in PBM and PPM subjects, so that chemical content relevant to food processing is related to chemical content or materials in food processing. The second largest percentage of chemical content required by the Culinary Skills Competency Vocational School is Chemicals in Foodstuffs, where the content or materials are used in PBM subjects. These subjects study the nature of the chemical content (macromolecules) in meat, poultry, milk, and fish food ingredients. Chemical content or materials about Chemicals in Foodstuffs are relevant to support PBM subjects.

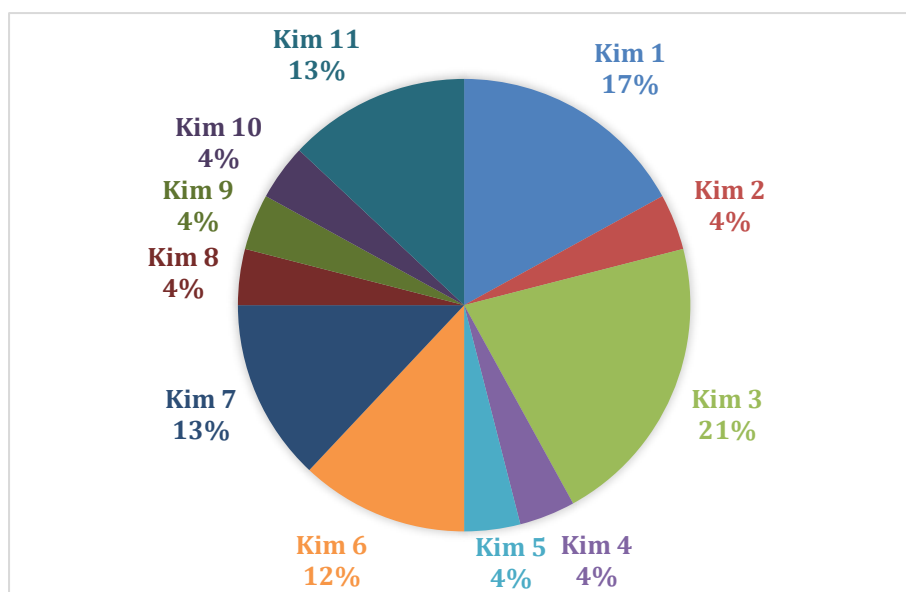


Figure 1. Diagram of Chemical Content Composition that is Relevant to Vocational Content of Vocational High Schools Culinary Skills Competence

The next largest percentage of chemical content required by the Culinary Skills Competency Vocational School is the Analysis of Nutrient Content in Food, Malnutrition Diseases and Nutrient Needs in the Body. This chemical content is needed to support IG subjects, which learn about nutrients in the body. The chemical content of Colloidal Types in Food also has the same percentage. The rest of the chemistry content only supports one or two vocational course content, so the percentage is relatively low. However, these contents remain relevant to the content of existing vocational subjects.

The chemical content in this research is integrated chemistry content with culinary expertise competencies. Chemical content that is relevant to the need for culinary expertise consists of Chemicals in Food Ingredients, Eggs and Food Processing, Chemicals in Food Processing, Properties of Fats and Oils, Food Additives, Nutrients in Food, Malnutrition Diseases and Nutritional Needs, Food spoilage, food poisoning, chemicals in food processing equipment, and colloids in food. With this chemistry content, educators can show horizontal relationships between learning experiences, so that students have a comprehensive, broader, and deeper view. Both conceptually and in application of knowledge, skills and values in real life.

Based on the results of the validation of the integrated chemical content formulation of the Culinary Expertise Competence, all validators agreed to the vocational integrated chemical content formulation developed by the researchers adapted from Kusumaningtyas (2020). Integrated chemistry content has good relevance to the content of vocational subjects. The results of the validation of the formulation of chemical content that are relevant to the needs of the Culinary Competency Vocational School are used as a reference for making teaching materials that are relevant to their expertise competencies.

4. Conclusion

This research is an analysis of the need for chemistry teaching materials for the Culinary Skills Competency Vocational School. Based on the results of the analysis of teaching material needs, it can be concluded that the chemical content in this study is integrated chemical content with the competence of culinary expertise. Chemical content that is relevant to the need for culinary expertise consists of Chemicals in Food Ingredients, Eggs and Food Processing, Chemicals in Food Processing, Properties of Fats and Oils, Food Additives, Nutrients in Food, Malnutrition Diseases and Nutritional Needs, Food spoilage, food poisoning, chemicals in food processing equipment, and colloids in food. The formulation of chemical content that is relevant to the needs of the Culinary Competence Vocational School is used as a reference for making teaching materials that are relevant to the competence of its expertise.

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