

# Developing Scrabble as a Chemistry Learning Media for Hydrocarbon Subject Matter Learning Using Problem Based Learning at SMK Muhammadiyah 3 Samarinda

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**Abstract**— This study aims to develop a learning media of Scrabble Hydrocarbon Chemistry on Subject Hydrocarbons which is effective and practical. The subjects of this study were class X students of SMK Muhammadiyah 3 Samarinda. This study applies the Research and Development (R & D) method using the Borg and Gall approach, which has the stages of research and information collecting, planning, developing preliminary form of products, preliminary field testing, operational field testing, product revision operations, main testing fields, main product revision, dissemination and implementation. The results showed that the use of learning media used had an effectiveness of 83% with good categories. From the results of the study also showed that the use of learning media had media practicality of 88.9% with a very practical category, which was obtained from the student response questionnaire. Based on the effectiveness and practicality of Scrabble Hydrocarbon Chemistry media that was developed, the product was declared suitable for use in the learning process on hydrocarbon material.

**Keywords**— *scrabble media, hydrocarbon subject matter.*

## I. INTRODUCTION

Learning media is an intermediary tool that is useful to facilitate the teaching and learning process, in order to streamline communication between teachers and students. By using learning media, it helps facilitate students in understanding the material presented.

The use of learning media can be used as an alternative to solve various problems that occur in the world of education. Media development in the chemistry teaching and learning process can be done by utilizing various aspects [1]. Media can be used to improve student creativity, so learning outcomes will increase.

The existence of learning media in the teaching and learning process can foster motivation to learn, not make students bored when learning takes place, and can improve students' understanding [2]. Trisanti and Sanjaya [3] stated that learning media get positive responses from students with an average percentage of 95.71%. Learning media in the form of educational games that are effective to use are using scrabble. During this time scrabble is used more as a

learning medium in language learning, be it Indonesian, English or regional languages.

Scrabble hydrocarbon chemistry is an innovation from scrabble media which is designed with colors that attract and add letters other than the alphabet, there are also C, CH, CH<sub>2</sub>, and CH<sub>3</sub>. Hydrocarbon is used in scrabble media, because the subject to be studied is hydrocarbon subject. Based on observations made by subject teachers that hydrocarbon material is one of the materials delivered in learning using the lecture method at SMK Negeri 2 and SMK Muhammadiyah 3 Samarinda.

Knowledge of class X hydrocarbon compounds including Alkana, Alkena, and Alkuna is the basis for understanding almost all the concepts of chemistry in class XI and XII science such as thermochemistry, stoichiometry, colligative properties of solutions, alkane derivatives, haloalkanes, reactions of carbon, benzene, polymer, carbohydrates, Proteins and Lipids. In addition, hydrocarbon compounds are chemicals that have many uses in everyday life [4].

One step of the teacher to make students active and motivated in learning hydrocarbons is to use Problem Based Learning (PBL) models. PBL learning model is a recommended learning model in the 2013 curriculum where this learning model is student-centered which aims to form active students. Nurun [5] reported that the application of PBL models can improve students' critical thinking skills in learning, namely by the category of very high critical thinking skills as many as 20 students 69%. In addition to improving critical thinking skills, the application of PBL models can also improve student learning outcomes by 31.03%, and student learning outcomes after using the PBL model to achieve KKM as many as 29 students (100%).

## II. METHODS

This research uses Borg and Gall approach, which has stages, namely: research and information collecting, planning, developing preliminary form of products, preliminary field testing, operational field testing, product revision operations, main field testing, main product

revision, dissemination and implementation. This research was conducted at SMK Muhammadiyah 3 Samarinda class X. Data collection techniques in this study were media validation sheets, evaluation questions, observation sheets and student response questionnaires.

The media validation sheet aims to measure media feasibility, the evaluation question aims to measure the effectiveness of student learning outcomes, while the student response questionnaire aims to measure the practicality aspects of the media. Validation sheet data and student response questionnaires obtained in this study were calculated using the formula according to Sugiyono [6] as follows:

$$\text{Percentage (\%)} = \frac{\text{jumlah skor yang diperoleh}}{\text{total skor maksimum}} \times 100 \dots\dots(1)$$

Then it was changed in the form of qualitative values based on the Ministry of Education and Culture:

**Table 1.1** Validity Criteria in Percent (%)

Percentage (%)	Category
0-54	Very Less Valid
55-64	Less Valid
65-79	Pretty Valid
80-89	Valid
90-100	Sangat Valid

**Table 1.2** Practical Criteria in Percent (%)

Percentage (%)	Category
54	Very Less Practical
55-59	Less Practical
60-75	Pretty Practical
76-85	Practical
86-100	Very practical

Data analysis of student learning outcomes using the formula according to Sugiyono [6] as follows:

$$NE = \frac{\text{jumlah siswa diatas KKM}}{\text{Jumlah seluruh siswa}} \times 100 \dots\dots\dots(2)$$

Student effectiveness value are as follows:

**Table 1.3** Percentage of Effectiveness of Learning Media

Percentage (%)	Category
1-54	Very Less
55-64	Less
65-79	Enough
80-89	Good
90-100	Very Good

The steps taken in making scrabble hydrocarbon chemistry media. Make a box for packing media. Do the design for inside and outside the box, then design the letters and alphabet letters as well as the letters of hydrocarbons consisting of C, CH, CH<sub>2</sub>, CH<sub>3</sub>. After doing the design for the inside and outside of the box, then printed using sticker paper and then attached to the side of the box. Boards, alphabet letters and hydrocarbon letters are also printed using A3 paper.

III. RESULT AND DISCUSSION

This research uses Borg and Gall approach, which has stages, namely: research and information collecting, planning, developing preliminary from of products,

preliminary field testing, operational field testing, product revision operations, main field testing, main product revision, dissemination and implementation.

a. Research and Information Collecting

The stage of information gathering is done by interviewing chemistry teachers in several vocational schools in Samarinda. Interviews conducted in the form of questions and answers to chemistry subject teachers.

Interviews were conducted to find out some information about chemistry subjects. After conducting interviews, several materials were obtained, one of which was hydrocarbons. Hydrocarbon subject is one of the Subject taught in schools without using learning media.

b. Planning

The second stage is the planning stage. This stage consists of making research instruments which are the criteria for learning media assessment. The research instrument that will be used is a validation sheet consisting of media and material validation as well as validation of learning devices that will be used when research. In addition to the validation sheet, student and teacher response questionnaires were also made to determine the practicality of learning media. And daily test questions are used to determine the effectiveness of learning media.

c. Development of Product

The form of scrabble hydrocarbon chemistry learning media obtained after the design stage is as follows:



Figure 1. Display of Outside Media Box

d. Validation

The next stage in this study is to validate the learning media by lecturer expert of media and practitioners to find out the validity of the developed learning media. There are two validation results data obtained. The first validation is validation by media expert validators. The second data is the validation obtained from the material validator expert. The validation results from media experts and practioners are as follows:

**Table 1.** Validation results from media experts and practitioners

Validator	Validation Results	Category
Media expert lecturer	87%	Good
Practitioner	84%	Good

The validation result from material experts and practitioners are as follows:

**Table 2.** Validation results for material experts and practitioners

Validator	Validation Results	Category
Material expert	86,5%	Good
Practitioner	85%	Good

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#### e. Field Testing

The trial was conducted at SMK Muhammadiyah 3 Samarinda. Large group trials were conducted to see the use of scrabble hydrocarbon chemistry learning media on hydrocarbon subject. To see the effectiveness of the media, it was given a test question. And to see the practicality of students were given a questionnaire response to learning media. From the test results obtained the practicality value of learning media is 88.9% in SMK Muhammadiyah 3 Samarinda with a very practical category. The value of the effectiveness of learning media obtained at SMKN 3 is 83% with good categories. This shows that student learning outcomes using scrabble hydrocarbon chemistry media using the problem based learning model can be said to be good.

#### f. Discussion

The use of scrabble hydrocarbon chemistry media can attract students' interest in learning. By using the media students become more enthusiastic in the teaching and learning process. From the research that has been done the use of scrabble hydrocarbon chemistry media has 83% effectiveness with good category and has 88.9% practicality with a very practical category.

### IV. CONCLUSION

Development of scrabble hydrocarbon chemistry media on hydrocarbon material is suitable for use with media validation values from media experts at 87% of good categories and 84% of practitioners. The value of media validation from material experts amounted to 86.5% of the good category and 85% of the practitioners of chemistry learning with good categories. The effectiveness of the media obtained a value of 83% in SMK Muhammadiyah 3 with good category. The practicality of the media obtained was 88.9% in the Muhammadiyah 3 Vocational School with a very good category, which means that students gave a good response to the media.

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