THE DEVELOPMENT OF *CHEM VS ZOMBIE* GAME AS LEARNING MEDIA ON COMPOUND NOMENCLATURE MATTER

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Abstract

The aims of this study to know the feasibility of Chem vs Zombie game that has been developed as a learning media on compound nomenclature matter. The research method that used was research and development (R&D) that consist of 10 steps. But in this research was just limited until product testing. This media had been reviewed by 3 chemistry lecturers and validated by a chemistry lecturer and 2 chemistry teachers then has been tested on 10th grade student in Public Senior High School 1 Tuban. The result of this research showed that Chem vs Zombie game had been developed as a learning media on compound nomenclature matter feasibility used to be learning media. It was shown based on overall lecturer and teacher of chemistry assessment is 82%, in terms of the suitability of the matter, presentation and linguistic in a row are 82.66%, 80% and 83.33%. As well as student response was very positive with percentage of 91.71% and mastery learning aspect with percentage of 100%. Thus, Chem vs Zombie game was expressed very feasible and can be used as learning media on compound nomenclature matter.

Key words: Chem vs Zombie game, compound nomenclature

Abstrak

Penelitian ini bertujuan untuk mengetahui kelayakan permainan *Chem vs Zombie* yang dikembangkan sebagai media pembelajaran pada materi tata nama senyawa. Metode penelitian yang digunakan adalah *Research and Development*(R&D) yang terdiri dari 10 langkah. Namun pada penelitian ini hanya terbatas sampai enam langkah saja yaitu ujicoba produk. Media ini ditelaah oleh 3 dosen kimia dan divalidasi oleh 1 orang dosen kimia dan 2 guru kimia serta diujicobakan pada 13 siswa kelas X SMA Negeri 1 Tuban. Hasil penelitian menunjukkan bahwa media permainan *Chem vs Zombie* pada materi tata nama senyawa yang dikembangkan layak digunakan sebagai media pembelajaran. Hal ini ditunjukkan dari persentase hasil penilaian dosen kimia dan guru kimia secara keseluruhan sebesar 82%, yang ditinjau dari aspek kesesuaian materi, penyajian dan kebahasaan yang memperoleh presentase berturut-turut sebesar 82,66%, 80% dan 83,33%. Serta respon siswa yang sangat positif dengan persentase sebesar 91,71% dan ketuntasan hasil belajar siswa sebesar 100%. Sehingga dapat disimpulkan bahwa permainan *Chem vs Zombie* dinyatakan sangat layak dan dapat digunakan sebagai media pembelajaran pada materi tata nama senyawa.

Kata Kunci : Permainan *Chem vs Zombie*, tata nama senyawa

INTRODUCTION

Indonesia has implemented some of the curriculum in order to improve the quality of human resources through education in order to compete in the era of globalization. Recent curriculum applied was Curriculum 2013.

Curriculum 2013 aimed to prepare the Indonesian people to live as independent person and citizens who believe, productive, creative, innovative, and affective also contribute to society, nation, nation, and world civilization [1]. In addition, this curriculum requires single tool learning pattern was converted into multimedia-based learning tool that was expected to increase the ability of student in learning, especially in chemistry.

Chemistry is a branch of science which studies the structure, composition, properties, matter changes, and energy

changes [2]. Nowadays most student have difficulty in understanding the basic concepts of chemistry that are largely microscopic (invisible) [3]. Beside that, chemistry was a basic knowledge for the acquisition and development of the newest technology. Therefore, it becomes very important to enhance the student's understanding of chemistry in order to compete in the era of globalization. Implicitly students are expected to understand and master the chemistry subject.

Compound nomenclature was the subject matter that requires understanding, accuracy and precision for the study, because the concept of compound nomenclature are used as the basic concepts and supporting concepts such as electrochemistry. In an effort to increase interest and understanding of student in chemistry lesson, the teacher must be active and creative to give an interesting impression in chemistry learning.

Based on questionnaire result that was distributed to 30 student of X-science 7 class in Public Senior High School 1 Tuban as much as 46.67% of student stated that compound nomenclature was difficult to be learnt and understand.

Based on interview with chemistry teacher at Public Senior High School 1 Tuban, many students found difficulties in learning compound nomenclature because this matter require much memorization and a lot of student get score ≤75. They not mastering yet the matter because their score thoroughness minimum standard specified. Based on interview with the student of X-science 7 class in Public Senior High School 1 Tuban, the student stated that have difficulty in understanding compound nomenclature matter, especially binary compound. Student also admitted very rarely to practice chemistry problems. Compound nomenclature matter was closely related to the memory capabilities so require practice to do the problems of this matter [4]. Intensity of practice was severely lacking in solving problems of

this matter because the questions presented in the book only so less varied. Student became less interested in studying chemistry. Therefore required a more innovative, fun and interesting learning by using a computer-based learning, one of them was through a game.

As an educational medium, the game has several advantages. The game was something fun to do, something that was entertaining and interesting, allowing the active participation of students in learning, provide immediate feedback, enabling the application of concepts, flexible, easily created and propagated [5]. So with the medium of education in the form of an enjoyable game that was expected to help students learn difficult with the lecture method.

Beside that, game was very fun and expected to make the student to be more active learner and can reach mastery learning. In addition, *Chem vs Zombie* game that developed can use as learning media for teacher. Existence of computer games in education can make student happy and enjoy to learn, so that student will be more interested have much desire to learning [6].

Based on description above, it is required to be developed *Chem vs Zombie* game as learning media on compound nomenclature matter.

METHOD

This research included into development research. The method used was Research and Development (R&D).

There are 10 steps in the method of R&D, namely the potential and problems, data collection, product design, design validation, design revisions, product testing, product revision, trial usage, product revision, and mass production [6]. But in this study is confined to the sixth step was limited trial. The subject of development *Chem vs Zombie* game was student of SMAN 1 Tuban grade X.

Before conducting a limited trial, the media was reviewed by 3 chemistry

lecturers using review sheet. After that media was evaluated by 1 chemistry lecturer and 2 chemistry teachers using validatn sheet. In addition there are also questionnaire responses that will be filled by students after conducting tests on the media. As well as a pretest achievement test conducted before students are given the media game and posttest given to students after using the media game to determine improvement of learning outcomes.

Methods of Data Analysis

The data obtained in this study consisted of qualitative and quantitative data. After all the data was collected the next step was analyzed descriptively.

Analysis of data from the media review by chemistry lecturers like suggestions will be used for repair *Chem vs Zombie* game. While the result for matter review data used to enter question into game and make improvements to the matter. All questions and matters in accordance with the indicators on the curriculum 2013 and then put in the game. For language review, matter and questions in good spelling, grammar and according to the age of the students then put into the game.

Analysis of data validation by a chemistry lecturer and teacher scores were descriptively analyzed quantitatively using score in the table below [8]:

Table 1. Specification Likert Scale Score

Criteria	Score
Very Good	5
Good	4
Good Enough	3
Bad	2
Very Bad	1
Nothing	0

Media assessment score data were analyzed by using the equation:

$$P (\%) = \frac{F}{N \, x \, I \, x \, R} \text{ x } 100 \%$$

Description: K=Percentage of eligibility, F=Number of respondents, N= the highest scores in the questionnaire, I=Number of questions in the questionnaire, R= Number of respondents.

Feasibility criteria used are as follows [7]:

Table 2. Percentage Validation

Percentage	Criteria
0% - 20%	Very Less
21% - 40%	Less
41% - 60%	Good Enough
61% - 80%	Good
81% - 100%	Very Good

Based on the percentage criteria, the media was feasible if the validation percentage $\leq 61\%$. For the results of the results of student questionnaire responses are analyzed quantitatively assess of the media based on a percentage. Obtained by calculating the percentage using score below [8]:

Table 3. Guttman Scale Scores

Answer	Score
Yes	1
No	0

Response of student were analyzed by the criteria in Table 2. Based on these criteria the percentage of the media feasible if the percentage of student responses $\geq 61\%$.

RESULT AND DISCUSSION

After the media has been reviewed by reviewers and media improvements have been made, the next step was assessing the feasibility of the media by the teacher and lecturer in chemistry. Feasibility assessment given by the validator will be shown in the following table:

Table 4. Validation Result

Aspect	Feasibility (%)	Criteria
Suitability of the indicators and objectives of the curriculum in 2013	80	Good
Suitability of the age and level of understanding of students	86,67	Very Good
Systematics of the matter in the game has been sequentially	80	Good
The matter was complete so that users do not need to look for other sources	80	Good
Accuracy of nomenclature of chemical elements and	86,67	Very Good

Continue of Table 4

Aspect	Feasibility (%)	Criteria
compounds		
Suitability of matter	**82,66**	**Very Good**
Suitability election video, images, and animations	80	Good
Clarity of colors, sizes, and types of letters	73,33	Good
The picture quality was clear and smooth	73,33	Good
Story that presented are coherent	86,67	Very Good
The selection of the type of music that supports	80	Good
Easy operation of media	86,67	Very Good
Clarity game instructions	80	Good
Quality of presentation	**80**	**Good**
The use of sentence structure, grammar and spelling in accordance with the rules of correct Indonesian	80	Good
The use of sentence structure, grammar and spelling in accordance with the rules of correct English	80	Good
The language used in accordance with the age and level of understanding of students	86,67	Very Good
The use of appropriate terms and symbols	86,67	Very Good
Linguistic criteria	**83,33**	**Very Good**
Overall Validator Assessment	**82**	**Very Good**

Chemistry lecturer and teacher assessment against *Chem vs Zombie* game on the matter compound nomenclature of the three aspects assessed by the validator, the data obtained for the aspect of the presentation that gets the value of 80% that has been found to be feasible, but the result was smaller than the suitability of the matter and linguistic aspects of the value of 82.66% and 83.33% with very good criteria. That was because in the aspects of the presentation, one of which was still rigid image quality and color of the letters are less contrast with the background. But overall it has met eligibility with a total percentage of 82%, with very good criteria. This suggests that the media developed a very good use for student learning. Feasibility of this media becomes very important, because one uses the medium of education in the learning process was to clarify the presentation of the message that was not too be verbalistic [5].

After the media has been declared valid, the media deserves to be tested. Limited trial was conducted in Public Senior High School 1 Tuban at X-Science 7 class by 13 children with heterogeneous capabilities. It was begun by checking students' initial understanding by giving a pretest and then given treatment *Chem vs Zombie* game media after the posttest was conducted to determine the increase in student understanding. From these tests, the value of student learning outcomes were presented in the following table:

Table 5. Student Learning Outcomes

Name	Pretest		Posttest	
	Score	Criteria	Score	Criteria
AAR	75	Completed	95	Completed
YWP	75	Completed	90	Completed
PRO	55	Failed	85	Completed
WAS	55	Failed	80	Completed
AZK	65	Failed	90	Completed
LRI	65	Failed	90	Completed
KRD	75	Completed	100	Completed
DPS	75	Complete	100	Completed
RCA	70	Failed	95	Completed
APS	65	Failed	90	Completed
FNM	65	Failed	90	Completed
RPP	80	Completed	100	Completed
HSN	80	Completed	100	Completed

Based on that data, before being given a lesson on compound nomenclature using *Chem vs Zombie* game, there were only 6 students who otherwise completed the pretest. Student difficulty in giving the name of the binary compound composed of elements that have more than one oxidation number. Then treated with a given media *Chem vs Zombie* game.

Students taught how to give the name of the compound according to International Union of Pure and Applied Chemistry (IUPAC) rule and the use of matter contained in the video game stage by stage. After that the students were directed to practice questions using *Chem vs Zombie* game. Students understand the matter and when given posttest, all students scored ≥75 and otherwise completed 100%. It was proved that using computer games to teach can create a positive attitude, active participation, more efficient and produce better quality of the teaching process as seen from the increase in student learning outcomes [9].

In addition, based on the activities that have been conducted media trial, the data was also obtained in the form of student responses were presented in the following table:

Table 6. Results of Student Response

Statement	Feasibility (%)	Criteria
Game instruction was easy to understand	92,31	Very Good
The language used was easy to understand	100	Very Good
The text used was easy to read	92,31	Very Good
Clarity media display	**94,87**	**Very Good**
The game was fun	100	Very Good
I prefer learning with media game	100	Very Good
This game can help in understanding concepts compound nomenclature matter	84,61	Very Good
Student interest	**94,81**	**Very Good**
The way to play this game are very interesting	92,31	Very Good
Appearance / design color, text, and images in the game are interesting	92,31	Very Good
Images, video and animations in the game to support the understanding of the matter compound nomenclature	76,92	Good
Attractiveness of the Media	**87,18**	**Very Good**
Student are happy to do the questions in game	76,92	Good

Continue of Table 6

Statement	Feasibility (%)	Criteria
Learn use the media very enjoyable	100	Very Good
This game can improve learning spirit	92,31	Very Good
This game makes are interested in learning chemistry	92,31	Very Good
Student spirit	**90,38**	**Very Good**
Overall results student response	**91,71**	**Very Good**

Based on the results of student responses in the Table 6 above was showed that students responded very well to the presence of the media *Chem vs Zombie* game. This was evidenced by as much as 100% of students stated that the game Chem vs. Zombies was a fun game. Because by creating a fun learning environment students are more motivated and active in learning [10]. However, only 76.92% of students expressed pleasure do the questions contained within the game. This was due to the number of questions used in the media was considered too much.

CONCLUSION

Based on the result of this research about the development of *Chem vs Zombie* game as learning media on compound nomenclature matter, conclusions can be stated as follows:

1. *Chem vs Zombie* media that developed was very feasible according to chemistry lecturer and teacher assessment with the overall percentage of 82%, in terms of the suitability of the matter aspect with a percentage of 82.66%, the presentation aspect was feasible with a percentage of 80%, the language aspect with percentage of 83.33% which very feasible.

2. *Chem vs Zombie* media that developed was very feasible according to student responses that got a percentage of 91.71% and declared a great response;

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