

SI ODIK STOCOPIC (PERIODIC SYSTEM OF STORY WITH COLOR AND PICTURE): THE MEDIA IN DECREASING A MEMORIZING WAY OF CHEMISTRY ELEMENTS

Mey Melisa¹, Endang Herlina², Diah Syafitri³, Riska Bella⁴, Hartono⁵

*Chemistry Education, Faculty of Teacher Training and Education^{1,2,3}
English Education Study Program, faculty of Teacher Training and Education⁴
Lecturer of Chemistry Education, Faculty of Teacher Training and Education⁵
Sriwijaya University*

¹*mey_xinling@yahoo.co.id*, ²*Endangherlina_044@yahoo.co.id*,
³*diah_syafitri0035@yahoo.co.id*, ⁴*bellariska3@gmail.com*,
⁵*hartonosains@yahoo.co.id*

Abstract

The aimed of this research is to develop Si Odik Stocopic's medium to minimize the memorizing way in periodic table chemistry elements. The method used in this study is that research and development with the model ADDIE (Analysis, Design, Development, Implementation and Evaluation), which aims to produce a valid media chemistry learning, practical, and effective. Based on the data obtained and analyzed in this research, showed that the media is validated through a validator is considered valid, the test results One-to-One of 3.96 and test Small Group of 4.10 which means that the media has practical categories, and testing Field test was used to see the effectiveness of the media, the data were analyzed using SPSS 16 importance result of T-test significant value is 0.037 ($p < 0.05$), so it can be stated that there was influencing of using the Si Odik Stocopic media in order to minimize the memorizing way in periodic system of chemistry elements. Researchers suggested for schools and stakeholders in education, especially teachers, in order to choose an innovative instructional media as an attempt to make students interested in learning chemistry.

Keywords: Medium of Si Odik Stocopic, Right Brain, Element Periodic System

INTRODUCTION

Science's education in Indonesia was still lower achievement than the other country. As the result of TIMSS ((*Trends in Mathematics and Science Study*) followed by eighth graders Indonesia in 2011. Indonesia's scores dropped 11 points from the 2007 assessment and the sciences, Indonesia ranks 40th with a score of 406 from 42 countries whose students are tested in class VIII. Indonesian students' science test suspension was down 21 points compared to TIMSS 2007 (Kompas, 2012), furthermore based the study conducted by UNDP in 2005 showed that HDI (*Human Development Index*), Indonesia ranked the 110th from 177 countries which had been surveyed in contrast Singapore, Brunei, Malaysia and Thailand ranked the 25th, 33th, 61th and 73th (Suara Merdeka, 2009). The science in Indonesia especially chemistry is not be able to increase an ability in student's science

process, moreover it affected to the quality of students in correlated the concepts and daily context of chemistry which was became lower.

Chemistry subject is one of the lessons which seemed very scary and difficult for all of students in the school. This difficulty caused by that process chemistry learning still encountered conventionally, such as drill, or even lecture (Ashadi, 2009). One of the basic of the chemistry is periodic system. Furthermore, one of the solution which had been given is donkey bridge. This method is used for the periodic system material. Nevertheless, the student still get hardness to understand due this method aim to the thinking stage of taxonomy bloom C₁ which is memorizing (Kosasih, 2014).

In learning process student puts more focus in the use of the left side brain rather than right side brain, one of them is memorizing. The right side brain had 90 % capacity and the left side brain is only 10- 12 %. The result of a great research in US said, the role of logic in creating the people to become success only 4-6% besides 94-96% is the responsibility of the right side brain which much related with innovation, imagination, instinct, intuition, creative power, honesty, tenacity, responsibility, eagerness, spirit, discipline, ethic, empathy and others (Harahap, 2011). In the learning process, the right brain can facilitate the student in understand the material due the right brain can record faster and save forever in brain's memory. The human blood cell became the spare saving memory while the brain memory is full. The capacity of the ability of the right brain is in saving the memory until 10 degree 5 billion km. (Voaislam, 2011).

There some ways to train the learning by using the right brain which are 1) story, 2) color, and 3) picture. In the Odik Stocopic media, 1) story is used as the way to understand the periodic system, the story being made in serial between one another. The all shape of the table periodic system will design in pop up periodic system. 2) the picture media handed the important role in increasing student learning result because of the visual term have the big composition (75 %) in the average of information that being receiving by the people (Putra, 2005). Tarigan (1995) assists that the election of the picture should be accurate, interesting, and can stimulate the eagerness of student to study. The picture media which used in learning will make the learning being reminded longer by the student because the concrete shape and not abstract. Furthermore, the students will not saturate because of the serving of the attractive pictures. 3) Color helps the student to understand the learning material. In In the Si Odik Stocopic, color showed the specialty of each color in chemistry element, therefore the students become easier to remind the color of each part of the elements.

As the problems explain above, the aim of this study is to look for an effect in applying the Si Odik Stocopic in learning of the periodic system through the use of the right side brain, therefore it will decrease the memorizing culture in order to learn chemistry. This research also hopes to give the benefit for teachers where they can use the media of Si Odik Stocopic to explain the elements of chemistry which is served with story and color picture. Besides, it is more take the advantages of the right side brain therefore in finally

that will decrease the memorizing culture in chemistry learning and make that easier to understand the chemistry elements also happier to learn chemistry.

METHODS

This research's a development research with ADDIE model which a to goal produce a valid instructional learning chemistry , practical , and effective.

Development Model

The ADDIE model is an abbreviation of the Analysis, Design, Development, Implementation and Evaluation. The explanation of each a step is:

a. Analysis

At this step, the main activity is analyze for need a teaching materials to developed and analyzed the feasibility and the terms of the development of teaching materials.

b. Design

This steps do the first planning development which in the learning material development process the steps in the design planning is: 1) analysis of chemistry curriculum; 2) formulation of indicators and learning objectives; 3) determination of the number of learning activities; and 4) planning evaluation instrument.

c. Development

At this development step is a makes design media Si Odik Stocopic.

d. Implementation

This step in the form of the delivery of products that have been developed to test the product in the classroom.

e. Evaluation

In this evaluation phase following the formative evaluation measures Tessmer is expert review, one-to -one, small group, and field tests. Activities to do out test whether the product can be used as expected and effective. At this step of evaluation of the validity, practicality, and effectiveness.

Data Collecting Technique

The data collection techniques are used:

a. Validity test

Validation Test at this stage include the design of test media Si Odik Stocopic ,diligence test a materials and pedagogical test conducted by experts.

b. Questionnaire

Giving a questionnaire intended to determine the practicality of media Si Odik Stocopic developed. Questionnaire given directly to students after using teaching materials on stage one-to -one , small group , and field tests.

c. Test

Giving the test is given to the effectiveness of media Si Odik Stocopic used in the learning process. Test is given at the beginning of the meeting (pre-test) and at the end of the meeting (post-test).

RESULT

Empirical testing

In empirical tests conducted formative evaluation to determine the validity, practicality, and effectiveness, with the following results.

Validity Test

Validity test is done by a validator which is composed of three experts, namely the design validators, the validator content and pedagogical validator. Based on discussions with the validator, the media must be revised in several parts that can be used later.

Based on the analysis of the questionnaire data on the validation of the obtained value of 94, the value is included into the classification is very valid. Advice from the validator to the media Si Odik Stocopic ie student handbook for the use of media Si Odik Stocopic, so that students can learn anywhere, can be seen in picture 1.



Picture 1. Handbook of Media Si Odik Stocopic

One-To-One Test

The first prototype has been validated and revised, then tested in a test of one-to-one to determine the practicality of the media by involving 3 students who were selected based on the ability of high, medium, and low. From the test results of one-to-one, students give some suggestions regarding the applicability of media for later rectified to produce a second prototype. Results of revision can be seen in Table 1.

Table 1: Results of testing the revised one-to-one

Student Number	Comment/suggestion	Revision
1	The media display Odik Stocopic and the elemental	Before revision:

form odik very interesting, but the use of color Background in media media Si Si Odik Stocopic Odik yet kontras!

Background color used in the media Si Odik is white.



After Revision:

After reprinted, white background with black we replace the grounds of the color of the form element odik already using bright colors and full color so that the color of the element will be the focus of vision odik because black background used.



After students studying media, researchers gave a questionnaire regarding applicability media to get the data practicality. Recapitulation of the questionnaire data analysis can be seen in Table 2.

Table 2: Summary of Results of Data Analysis Test One-to-One

Student Number	Total Score
1	57
2	69
3	64
Total Score	190
Average	3,96
Practicality level	Practice




By looking at the classification of the classification of the practicality of the media, it can be concluded that the media Si Odik Stocopic developed included in the practical category.

Small Group Test

After the improvement of the suggestions given in the expert validation test and One-to-One, then produced a second prototype which is then tested to test small group. Test a small group conducted involving 10 students who were selected based on the ability of high, medium, and low. Stage small group aims to further improve the quality of

practicality modules developed. The results of the students' comments on the second prototype of the media developed in stages this small group are shown in Table 3.

Table 3. Results of testing the revised small group test

Student Number	Comment/Suggestion	Revision
1	The media cover Stocopic Odik nice and full color, but in my opinion it would be if each side of the media made such a frame	<p>Before revision</p> <p>On the edge of the section has not been given the cover.</p>  <p>After direvision</p> <p>On the edge of the section covered by the paper, so it looks like in the frame.</p> 
2	The media display Odik Stocopic is good because it is presented in the form of Kirigami, but should be given lifeline so easy on the folding process.	<p>Before revision</p> <p>The stairs in the media Kirigami Odik Stocopic not given rope.</p>  <p>After revision</p> <p>Given strap on stairs Odik Stocopic mediation to facilitate the folding process.</p>



- 3 In my opinion, the main group and transition group made separately.

Before revision

Main group elements and transition group elements are combined in one media still learning



After revision

Main group elements and transition group elements are made separately.



Main group elements



Transision group elements

If seen from the comments of the overall test of a small group of students, the students agree that the media developed attractive and facilitate the students in considering the elements in the periodic system of elements as it comes with a story, color, and shape of the elements that have meaning memorable.

Once the students learn the material by using the periodic system of elements Si Odik Stocopic media, researchers gave a questionnaire regarding applicability media to get the data practicality of the latter. Rekapitulasi questionnaire data analysis results can be seen of the overall data, , obtained an average score of 4,10 based on the classification of practicality (Widoyoko, 2012) media, it can be concluded that the media Si Odik Stocopic developed included in the practical category.

Field test

At this stage of field tests carried out the actual learning. This field trial aims to determine the effectiveness of the media developed. To determine the effectiveness of the control is done with the help of class and class experiments. Grades are given learning experiments using the third prototype of the media developed. While the class is given control of learning without the media developed, but only using regular periodic system of elements. Before starting the study are given a pretest in the experimental and control classes to determine the ability of the student early, after completion of the test is given back in the form of learning in class posttest experimental and control classes to see the ability of students after being given treatment. During the learning process, researchers and other observers who observe the percentage of student activity classroom experiments on the use of media and student activity that appears. Activity was observed, namely (1) read the handout, (2) move to form a group, (3) a discussion with other students about the material being studied, (3) record the teacher's explanations, (4) to answer questions posed by the teacher, (5) asking questions, (6) an opinion, (7) write a conclusion, and (8) presented the conclusions lesson. Pretest and posttest data is used to determine student learning outcomes in experimental and control classes. So it can be known to influence Si Odik Stocopic media in learning the periodic system of chemical elements. The data are presented in Table 4. While the observation data was conducted to observe the activity of students in learning activities. The data on the observation of students' active learning time for the experimental class and control class shown in Table 5.

Table 4: Summary of Results the average pretest and posttest in Experiment Class and Class Controls

Pretest Value		Posttest value		difference	
Pretest Control Class	Pretest Experiment Class	Posttest Control Class	Posttest Experiment Class	Control Class	Eksperiment Class
30.5	36.5	45.5	53.2	15	16.7

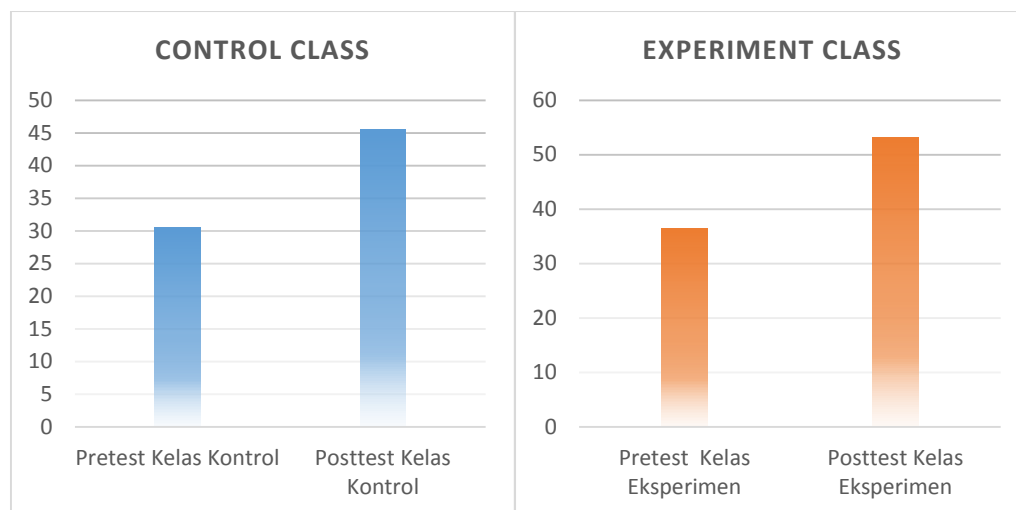


Table 5. Summary of Observations on the use of media student activity

Meeting	Class Activities	
	Experiment	Control
	64,65%	52,23%

Before the hypothesis testing is being conducted, firstly is conduct the hypothesis test and homogeneity for experiment class and control class. The second test was conducted using the data value of pretest and posttest. The results of tests of normality and homogeneity analysis using SPSS 16 can be seen in Table 6 and Table 7.

Tabel 6. Data Normality

	Pretest for Control Class	Posttest for Control Class	Pretest for Experiment Class	Posttest for Experiment Class
Asymp Sig	0,819	0.885	0,991	0,581

Table 7. Data Homogeneity

Levene's test	
Sig	0.172

Based on the analysis results of tests of normality in Table 6 it can be concluded that the data is normally distributed and based on the results of the analysis of homogeneity in Table 7 shown Levene value on test of 0.172. If the Levene's statistic values > 0.05 , it can be said that the variation in the data is homogeneous. It can be concluded that these data are homogeneous. Once it is known that both classes of normal distribution and homogeneous, so that hypothesis testing can be performed using these two classes. Hypothesis testing is done using t-test to determine the effect of independent variables on the dependent variable, the test used is two-tail test. Data used in hypothesis testing is the final test results of material periodic system of elements experimental classes and control classes. The results of t-test analysis was used SPSS 16.

The average value of the experimental class that follows the final test of 59.5, while the average value of the control class there are 15 that follows the end of the test well at 45.

Based on the results of t-test using SPSS 16 Data obtained $p\text{-value} = 0.037 < 0.05$ means reject H_0 which means no media influence Si Odik Stocopic in reducing cultural memorize the periodic system of elements.

CONCLUSION

The product of research is a periodic table that called Si Odik Stocopic (Periodic System of Story with Color and Picture) that have good validity, practicality, and effectiveness. As the data which got and analyzed in this research, therefore the result of the significant value was 0,037 ($p < 0,05$), moreover it assists that H_0 was rejected which means there was an influence of the use medium of Si Odik Stocopic in decreasing the memorizing in learning periodic system in X grade of SMA IT Raudhatul Ulum, Sakatiga Village. Suggestion, the media of Si Odik Stocopic can give the positive effect in decreasing the memorizing culture in learning periodic system therefore the researchers suggest to school and other education side especially teachers in choosing the learning media which is innovative as an effort to make the students interested in learning chemistry. The future research on the media of the Si Odik Stocopic is performance of media.

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