Unesa Journal of Chemical Education *ISSN: 2252-9454*
Vol.8, No.3, pp. 436-442 September 2019

IMPLEMENTATION OF BEACH BALL TYPE DISCUSSION LEARNING MODEL WITH MIND MAPPING STRATEGY TO TRAIN CREATIVE THINKING SKILL IN CLASS X ON CHEMICAL BOND MATTER

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Abstract

This study aimed to train students' creative thinking skills through the implementation of beach ball type discussion learning model with mind mapping strategy in class X on chemical bond matter. The method of this research used pre-experimental with one group pretest posttest design. Instruments used observation sheets (implementation of learning activity and student activity), assessment sheets (mind map and pretest posttest), and questionnaire sheets (student responses). The implementation conducted in three meeting. Data analysis technique used quantitative and qualitative. The results of this research showed that: 1) the percentage result of the implementation beach ball type discussion learning model with mind mapping strategy for all aspects in every meeting was in very good category, 2) the dominant students' activity in implementation beach ball type discussion learning model with mind mapping strategy at the first meeting, students paid attention to the teachers explanation of 39.23%, the second meetings, students had discussions of 26.59% and the third, students had discussions of 28.95%, 3) the creative thinking skill to create mind mapping had variation category, 79% in very creative (state 4) category and 21% in creative (state 3) category. Meanwhile in the task, they had in very creative category, 4) the learning outcome showed that the creativity increased 100% in concept (high category) and mind mapping 97% in high category meanwhile the other 3% in medium category, 5) good response from students with an average percentage of positive responses as 83.76% after implementation of beach ball type discussion learning model with mind mapping strategy.

Keywords: Mind mapping, Beach Ball, Chemical Bond

INTRODUCTION

Covering future needs to welcome Indonesian Gold Generation in 2045, Graduates' Competency Standards based on 21st Century Competence have been established [1]. The 2013 curriculum aimed to prepare Indonesian people to have the ability in live as individuals and citizens who are faithful, productive, creative, innovative, and affective and able to contribute in life community, nationhood, state, and world civilization. The role of the teacher is as a facilitator in learning, which is able to educate, guide, direct, train, and evaluate the learning process.

Chemistry subjects are classified as difficult subjects for some of high school (SMA/ MA) students [2]. The characteristics of chemistry lesson in three levels of chemical representation, are: macroscopic level, submicroscopic level and symbolic level [3]. Students' difficulties in learning chemistry are caused by students not understanding the concept [4].

One of the difficult chemical matter is a chemical bond. Students grade 12 were not understand ionic bonding matter, for an example, students assumed electron transfer from sodium chloride, and not understand the three-dimensional nature of ionic bonds for solid sodium chloride [5].

Based on the results of the pre-research was conducted in class XI IPA 1 consisting of 39 students at state of senior high school (SMA Negeri) 2 Lamongan on Friday, August 24, 2018 showed 43.59% of students stated that chemistry learning was not interesting because 64.10% of students stated that the learning model used in learning by the lecture method so that students feel bored during learning processed and the material cannot receive well. 29.41% of the students stated that chemistry has a lot of memorization.

A learning process held interactive, inspiring, fun, challenging, motivating students to actively participate, and providing sufficient space for initiatives, creativity, and independence in accordance with the talents, interests and physical and psychological development of students. For this reason, each education unit conducts learning planning,

implementation and evaluation of the learning process to improve the efficient and effectiveness of the achievement of graduate competencies [6].

The results of the pre-research questionnaire showed that as many as 46.15% of students wanted the learning activity using a discussion model in order to exchange ideas and 35.90% wanted fun and not boring learning with games. 35.90% of students stated that chemical bonding material had a lot of memorization and 69.23% of students agreed that learning in chemical bonding material used discussion learning models within playing.

Discussion that can be applied to learning chemical bonding matter is a beach ball type of discussion class learning model. Discussion class is a learning model that is used by exchanging opinions and information between students and students or students and teachers. Discussion class in learning model is used to achieve three important instructional objectives, namely conceptual understanding; engagement and engagement; as well as communication skills and thought processes [7]. Beach ball method is discussion learning by giving a ball to one of the students to start a discussion with the understanding that only students who hold the ball can speak [8]. Other students raise their hands to get the ball if they want to get a talk so that this method can lead the student learning activities by competing with talk to each other. Beach ball strategies involve students actively in learning so as to create a learning atmosphere that is not rigid, fun and train students creativity.

Based on the pre-research questionnaire as much as 64.10% of students did not understand to connect between subjects in learning well because the recording technique used in the form of paragraphs that only contained the writing. While the most important aspect that needs to be improved in students to study chemical bonding material is the understanding of concepts. It is necessary to develop chemical learning that leads to the process of acquiring knowledge based on students own experiences and mentally active with strategies for acquiring concepts so that a strategy is needed to make students easier understand the matter.

The learning strategy is essentially the real action of the teacher in carrying out learning through certain methods that are considered more effective and efficient [9]. Therefore, one way to understand a concept can be to use mind mapping strategies. Mind mapping is a recording technique developed by Tony Buzan in 1970. Mind mapping is a creative and effective way of recording to make it easier for us to remember a lot of information.

Mind mapping is a person's mind mapping which is written in the form of a simple diagram and can describe the entire matter [10]. A total of 74.36% of students based on the pre-research results stated that they did not know mind mapping and 58.97% of students liked it when in the notes using colors and images. The mind mapping strategy could be applied in learning.

Mind-mapping is designed to help the whole brain that must include not only words, numbers, sequences, but also lines with colors, images, dimensions, symbols [11]. The advantages of mind mapping can help us planning, communicating, be more creative, focusing attention, solving problems, and saving time because we can learn faster [12]. Mind mapping can train the students' creative thinking because students are free to create the ideas to produce an understanding of a concept that is consistent with the objectives of the 2013 curriculum.

The results of interviews with teachers at SMA 2 Lamongan showed that students had never been given the task to practice creative thinking skills so that students' creative thinking skills were still lacking. The creativity of someone is someone who can think synthetically meaning. They can see relationships where other people are unable to see who has the ability to analyze his own ideas and evaluate the value or quality of their personal work, able to translate theories and things that abstract into practical ideas so that the individual is able to convince others about the ideas [13]. Creative thinking skills are individual skills using a thought process to produce constructive new ideas based on rational concepts and principles as well as individual perception and intuition [14].

Students will understand the matter and have creative thinking skills. If in the learning process a fun learning model is used, it will make students to be active and appropriate strategies. So, a solution needs to be done by making a study entitled "Implementation of Learning Models Discussion Beach Ball Types with Strategies Mind Mapping to Train Students' Creative Thinking Skills in Class X Chemical Bonding Matter".

METHOD

The type of research was pre-experiment design with one group pretest posttest design. Students had gotten a pretest before given treatment. It used to train students' creative thinking skills and proceed with giving posttest. The target of this study was 38 students in class X with odd semester, in July-December at SMA Negeri 2 Lamongan. The instruments were observation sheets (learning and student activities), tests (pretest and posttest), and questionnaires (student responses).

The technique of analyzing the implementation observation data to find out the management of learning by teachers in each phase used formula:

$$\%\ management\ of\ learning = \frac{\sum score\ of\ aspects\ observed}{\sum total\ aspect\ score} \text{ x } 100\%$$

After obtained the results of the data, then the percentage value would be converted according to Table 1 below.

Table 1. Learning of Implementation Category

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

Management of learning by teachers will be strong or good, if the percentage of learning implementation reaches ≥61% [15].

Analysis of student observation data during the implementation of learning is calculated as the percentage of dominant activity using the formula:

$$\%\ student\ activity = \frac{\sum frequency\ of\ activity\ that\ appears}{\sum total\ frequency\ of\ overall\ activity} \text{ x } 100\%$$

Analysis of students' ability to make mind map by calculating the number of scores obtained then calculate the values as follows:

$$\%\ score = \frac{\sum score\ of\ mind\ map}{\sum\ total\ score\ of\ mind\ map} \text{ x } 100\%$$

Then these values converted into Table 1.

The pretest and posttest analysis calculated using the formula:

$$\%\ student\ scores = \frac{\sum getting\ score}{\sum total\ score} \text{ x } 100\%$$

Then these values converted into Table 1.

The score that obtained after the pretest and posttest analyzed with gain score calculation to determine the differentiation of students' value in creative thinking skills at the pretest and posttest with the following formula:

$$< g >= \frac{\%G}{\%G\ maks} = \frac{\%S_f - \%S_i}{100 - \%S_i}$$

Information:
<g> = Increasing individual creative thinking skills
Sf = posttest score
Si = pretest score
Then it was converted into Table 2 below.

Table 2. Category N-Gain Score

G	Category
<g> ≥ 0,7	High
0,7 > <g> ≥ 0,3	Medium
<g> < 0,3	Low

[16]

Analysis of students' response questionnaires used the Guttman scale assessment criteria with the scale in Table 3.

Table 3. Criteria for Students' Response

Answer	Score
Yes	1
No	0

The formula to calculate students' response questionnaires as follows:

$$\%\ response = \frac{\sum students\ that\ answered\ yes/no}{\sum total\ of\ students} \text{x } 100\%$$

Furthermore, these results will be converted into Table 1. Student responses are positive or good towards the model applied, if the percentage of student responses reaches ≥61%.

RESEARCH RESULTS AND DISCUSSIONS

Implementation of Beach Ball Type Discussion Learning Model with Mind Mapping Strategy

The implementation of beach ball type discussion learning model is the activity of the teacher to complete each stage in the learning model during the learning activities. There were some stages that conducted in the implementation of beach ball type discussion learning model with mind mapping strategy. The activity was resumed in Figure 1.

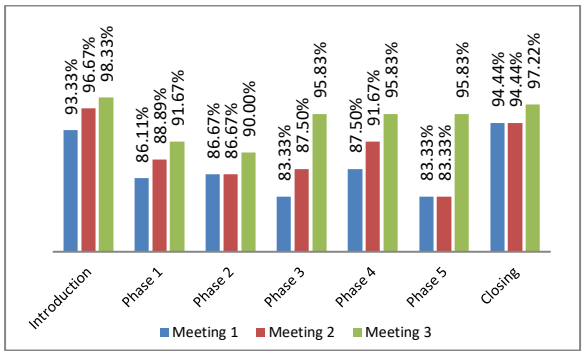

Figure 1. Diagram Implementation of Learning Models Discussion of Beach Ball Types with Mind Mapping Strategy

Based on the Figure 1. The result of learning implementation of beach ball type discussion learning model with mind mapping strategy in each meeting got in very good category. The percentage value of each learning phase had increasing except in stages 2 and 5 in the first and second meetings which had a fixed percentage value as 86.67% and 83.33%. The implementation of stage 3 increased for each meeting, indicated by increasing the value of the implementation percentage as 83.33%, 87.50% and 95.83% from the first meeting to the third meeting.

Holding the discussion activity increased the percentage value at each meeting because the students had trained. Meanwhile, to hold on focusing discussion was difficult activity because the characteristics of students were not conducive so it would need a few minutes.

Students' Activity

Student activities are activities carried out by students during the implementation of learning activities. Observations were observed by three observers. It would make within giving check mark at the observation column, if the activity during the implementation appeared every 4 minutes. The results of observation showed on the Table 4.

Table 4. Data of Students' Activity

Student Activity	Percentage at meeting		
	1	2	3
A	39.23%	24.80%	26.32%
B	8.45%	9.7%	9.65%
C	5.63%	8.82%	9.65%
D	23.29%	26.59%	28.95%
E	3.67%	6.2%	5.26%
F	8.55%	12.36%	9.65%
G	9.31%	9.7%	8.77%
H	1.86%	2%	1.75%

Information:
A: Students pay attention to the teacher's explanation
B: Students read matter and mark a text using stationery on worksheet
C: Students ask questions
D: Students hold discussion class
E: Students write keywords
F: Students make mind maps
G: Students do an exercise on worksheet
H: Students do an irrelevant activity (playing cell phone, making noise, disturbing other students)

Based on the data in Table 4, discussion activity at each meeting increased. This evidenced by increasing the percentage of activities at meetings 1, 2, and 3 respectively as 23.29%, 26.59% and 28.95% because students had been trained to hold discussion. This statement same with the previous research showed that the creative thinking was important for students to solve the problem [19].

Discussion activity of students increased from the first meeting to the third meeting. In the first meeting, it was few minutes as 23.29% to conduct the discussion. The dominant activity of students listened the direction from teacher as 39.23%. One of the advantages of discussion was it can create creative thinking skill. This statement same with the previous research showed that the question can prelude to creative thinking skill [22].

In the second meeting, it discussed the covalent matter such as polar, non polar and coordination which needed more time to conduct. Students were getting percentage 26.59% to conduct discussion activity. Meanwhile, the matter in the third meeting was metallic bond. Some of students asked and stated an idea in the discussion activity. This activity got 28.95%.

The other dominant activity, students made mind map. The percentage that got at the second meeting was 12.36% because students had filled not complete key words and branch of mind map. Meanwhile in the first meeting, it got percentage as 8.55%. Students had filled lost key words. In the third meeting, it got 9.65%. Students made mind map based on personal creativity because it provided the main idea.

Students' Creative Thinking Skill

Creative thinking is the ability of students to understand the problems and find the solutions to various strategies or methods.

Creative thinking skills have aspects of thinking fluently, flexibility, and originality. Creative thinking arises from logical thinking which then logical thinking will influence students' thinking skills in discussion activities [21].

Assessment used pretest posttest sheet in the form of questions to make mind mapping and problem description forming of the concept of chemical bond matter. Learning use student worksheets containing sheets of mind mapping as an exercise to make mind mapping. According with previous research stated that worksheets contain sheets of mind mapping can train students' creative thinking skills [18].

Data on the results of students' creative thinking skills to create mind mapping was showed in Table 5.

Table 5. Data of Students' Creative Thinking Skills of Mind Mapping

Pretest		Posttest	
Creative Thinking Level	**Percentage**	**Creative Thinking Level**	**Percentage**
Less Creative	5%	Creative	21%
Enough Creative	84%	Very Creative	79%
Creative	11%		

Based on the data contained in the Table 5, students' creative thinking skills after learning have increased level from enough creative thinking into very creative category as 79%. Mind map can help students to understand the information that had received and to connect between one and others concept. This result same with the previous research showed that mind mapping strategy is more effective than traditional method [20].

Problem description consists of four questions that have the characteristics of creative thinking skills were fluently, flexibility and originality. The result of the assessment questions when implementing the pretest in less creative category into posttest in very creative category was 100%. It means that students have trained creative thinking skills.

Students' Learning Outcomes

Students' learning outcomes was the formation of increasing the value of students at posttest, namely in making mind mapping and completing the problem description. Results data of increasing student grades after being carried out posttest in making mind mapping showed in Table 6.

Table 6. Result Data of increasing value in Pretest Posttest of Mind Mapping

Category	Range Score	Percentage
Low	$\langle g \rangle < 0,3$	0%
Medium	$0,7 > \langle g \rangle \geq 0,3$	3%
High	$\langle g \rangle \geq 0,7$	97%

Based on Table 6, students' score had increased in high category if posttest as 97% because the acquisition of n-gain score were ≥0.7. Increasing the medium category as 3% was due to the acquisition of n-gain scores in the range of values $0.7> \langle g \rangle \geq 0.3$. This result same with the results of previous studies which showed that there was an increase in the ability from less category into think creatively in high category [17].

In the other hand, increasing score of students at pretest and posttest of description questions also showed the result of understanding of students to the matter. The students have increased posttest in high category as 100%. It showed that students be able to understand the information that had been received.

Every students was stated that the learning outcomes would complete, if they got posttest score ≥80. Based on increasing the percentage of students score in high category and students score ≥80 so the learning outcomes stated completely. Classical completeness got 100% so it can be stated that all of students in the class were stated completed.

Students' Response Questionnaire

Questionnaire response is student responses after the implementation of beach ball type discussion learning model with mind mapping strategy to train creative thinking skill on chemical bond matter was applied, so it can show the success or effectiveness of the implementation.

The results of the students' response questionnaire can be seen in Table 7.

Table 7. Results of Students' Response Questionnaire

Question	Percentage (%)	
	Yes	**No**
Is discussion of the type of beach ball discussion interesting when applied to chemical bond matter?	97.44	2.56

Question	Percentage (%)	
	Yes	No
Do you understand the matter well after learning activities with a discussion model on chemical bond matter?	94.87	5.13
Does the mind mapping strategy make it easier for you to understand chemical bond matter?	76.92	23.08
Do you like recording with mind mapping?	74.36	25.64
Do you agree if mind mapping is applied in chemistry learning?	74.36	25.64
Do you agree if the beach ball type discussion model is applied again to chemistry learning, especially chemical bond matter?	84.62	15.38

Based on the results of the questionnaire response data in the Table 7, the implementation of beach ball type in learning implementation models with mind mapping strategies got positive responses from students and got good criteria. It showed that learning has been successfully implemented properly and correctly.

Students as 97.44% liked the implementation of discussion model of beach ball type because it used a ball. The part of the discussion activity that was liked by students when throwing the ball to other students, if they would answer the questions or add answers to other students. Students also agreed that discussion model was implemented again in the chemistry learning especially chemical bond matter as 84.62%.

CLOSURE

Conclusion

The results of this research study and data analysis can be concluded that:

1. The implementation of beach ball type discussion learning model with mind mapping strategy in learning activity for all aspect got percentages in very good category at every meeting.
2. The dominant students' activity carried out by students during the learning process of beach ball type discussion learning model with mind mapping strategy at the first meeting paid attention to the teacher's explanation as 39.23%, the second meeting had a discussion of 26.59% and the third meeting had a discussion of 28.95%.
3. Students' creative thinking skills at posttest of mind mapping questions there were 79% of students getting level 4 in creative thinking category (very creative) and 21% level 3 (creative). Creative thinking skills in filling out the description questions got level 4 (very creative).
4. Students' learning outcomes in making mind mapping and doing the description questions at posttest had increased. It had seen from the n-gain value. 97% of students experienced increase from less category into high category and 3% in medium category.
5. Positive responses of students with an average percentage as 83.76% to beach ball type discussion learning with mind mapping strategy.

Suggestion

Based on the research that had been done. In conditioning the class took a long time because students have not been trained to conduct discussions. Therefore it should be noted in managing class time and conditions so that all matter can be conveyed.

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