

Effectiveness of the Application of Mind Maps in Learning Illustration in Elementary Schools

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Abstract—One of the problems in giving drawing lesson to children is how to help them develop ideas, because each child drawing is a personal expression. Teachers, therefore, should help him generate ideas for himself. The purpose of this research is to examine the effectiveness of mind mapping as a method included in the teaching of illustration drawing for elementary students. This research used the pre-experimental or one group pre-test post-test design. The students were 47 fifth grade students of Timuran Elementary School in Yogyakarta Regency. The data were collected using drawings before drawing and after the application of mind mapping or concept mapping. The students' drawing was then scored using the Education Educators of the Faculty of Languages and Arts, Yogyakarta State University. Data analysis was carried out using descriptive analysis and the sign test. (1) In drawing without mind mapping 3 (6.38%) students got excellent grades, 25 (53.19%) students got good grades, 18 (38.30%) students got fair grades, and 1 (2.2%) student got a poor grade; (2) In illustration drawing using mind mapping, 17 (36.17%) students got excellent grades and 30 others (63.83%) students got good grades; (3) The application of mind mapping method was influenced by the performance of students in illustration drawing ($Z = -6.247, p < 0.05$). Mind mapping is an effective method for teaching illustration drawing for elementary school students.

Keywords—mind mapping, illustration drawing, drawing lesson, art education.

I. PRELIMINARY

There is a misconception that art learning is only a skill that is easy for children and not challenging for children [1]. However, according to Lowenfeld in [2] stated that drawing, painting, or constructing shapes is a complex process, covering various elements of experience into a whole new and meaningful experience for children. Therefore, art education for children is a formal education task.

Learning art in elementary schools (SD) faces a fundamental problem, which is related to the ability of teachers. Art learning should be carried out by teachers who master knowledge of art and have the ability to create various forms of art, but this is not possible for elementary school teachers who are classroom teachers. Ideally, art teachers in elementary schools are special teachers such as religion and sports teachers [3]. Because of the limitations of the curriculum, teacher education for elementary schools is not possible to provide skills in accordance with these demands, especially in accordance with the 2013 curriculum, class teachers must teach three fields of art, namely art, music, and dance. Therefore, efforts are needed to contribute

various references to art learning for elementary school teachers, both in terms of concepts, material, learning methods, and assessment of learning outcomes.

In the field of fine arts, have done an about applying drawing art research elementary school in Yogyakarta middle. Based on focus group discussion (FGD) results in the framework of the implementation of the study, it can be seen that the assessment of paintings is a new thing for elementary school teachers in the region. In addition, in reality these teachers also felt they did not understand the problem of drawing in children and found it difficult to carry out its study. To understand learning to draw or hug for children, a study on drawing art coaching for children in Yogyakarta is conducted. The results of the study include showing that drawing learning for children requires a storytelling method to stimulate children in developing the idea of the object a tau theme of the drawing. Thus, giving the story as a stimulus and p Developing the idea of the child is an important first step in learning to draw for children.

The idea understanding in any field requires a child's ability to think about the concepts and relationships between concepts in a unified theme or topic. To develop these capabilities, the implementation of Curriculum 2013, teachers have been utilizing graphic regulator (graphic organizer), among others map concept (concept mapping) or a mind map (mind mapping) in the learning of various fields of knowledge. Several studies have been conducted, it show that in general the application of mind maps is useful for increasing creativity in thinking, making questions or asking questions (questioning), and strengthening memories.

Based on some of the results of these studies, it can be concluded that the making of concept maps or mind maps can be used as one of the effective knowledge learning methods. Drawing is not only a skill activity, but also involves knowledge, which is forming ideas. In drawing or painting, children should explore concepts or ideas related to the theme certain as a basis for drawing.

Relative to the this study was conducted to find out as follows: (1) the results of illustrating the Class V students of Timuran Elementary School in Yogyakarta before using concept maps, (2) the results of drawing illustrations of these students after using concept maps, and (3) influences the application of concept maps in illustrative learning on the quality of the work of these students.

The results of this study theoretically contribute to the knowledge of the application of concept maps in illustrative learning in elementary schools specifically and learning art in elementary schools in general. Practically, the results of

this study can be a reference for illustrative learning in elementary schools and further research on the application of concept maps in learning in elementary schools in general .

The rest of this paper is organized as follow: Section II presents literature review. Section III describes material & methodology. Section IV presents the obtained results and following by discussion. Finally, Section V concludes this work.

II. LITERATURE REVIEW

A. Cultural Arts Learning and Craft in 2013 Curriculum

Learning in elementary school (SD) in the 2013 curriculum is an integrated thematic learning. P integrated learning (integrated instruction) which is a learning system that allows students individually and actively groups to explore and discover concepts and scientific principles in a holistic, meaningful, and authentic way. Integrated thematic learning uses themes to associate several subjects so that students can provide meaningful experiences. Integration based on themes can connect one problem to another, so that a unity of knowledge is formed. Integration in learning is expected to give birth to a comprehensive understanding of students and their environment [4].

Thematic learning for students has several advantages among others: (1) To easier learners focusing on a specific theme; (2) To make students able to learn knowledge and develop various basic competencies between subjects in a particular theme ; (3) To make the subject matter more deeply and memorable; (4) To allow the basis of a subject can be developed better by linking it with other subjects and students' personal experience; (5) To make learning more useful and meaningful because the material is presented in the context of the theme clear [5].

Based on the learning approach, the SBDP learning aspects of Art and Craft are found in certain themes in the Student Book of 2013 Curriculum, V Class Teacher Book [6] includes an introduction to the experience of meaningful learning to build attitudes and behaviour positive, mastery of concepts, scientific thinking skills, level thinking high, ability to solve problems, inquiry, creativity, and personal reflective on students

B. Learning Illustration Drawing in Elementary School

Illustration drawing in elementary school is one of the learning materials of Cultural Arts and Crafts (SBDP). This learning material is better known as the term drawing story, because illustrated images contain stories. Drawing illustrations is a learning material for the basic competencies of Class V 1st Semester which reads "Expressing yourself through illustrated images with animal themes and their lives."

In the Class V textbook (student book) Semester 1, the material for basic competencies is given in Theme 1 of Sub-theme 1, with the theme "My Favourite Animal" [6]. In the description of the material, it is explained that illustrated images are used to clarify, beautify, and explain the contents of the reading, which includes elements of ideas, sketches, and colouring. Ideas include the characters told and the atmosphere. The sketch in question is the design of the image adapted to the idea. Colouring is the completion of sketches into images using colouring media such as coloured pencils, crayons, markers, or watercolours.

C. Concept maps

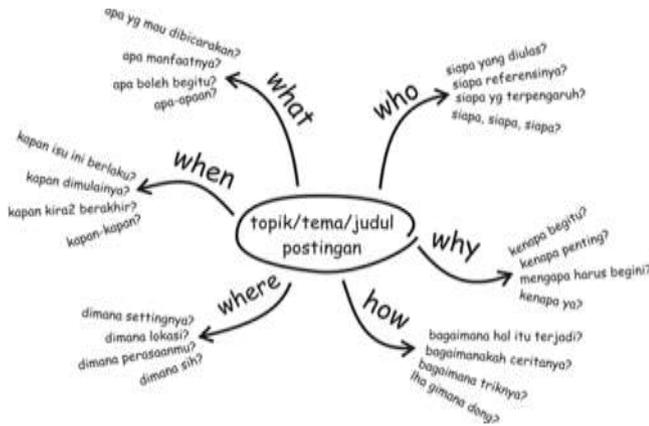
Concept maps are graphical tools for organizing and presenting knowledge. Concept maps contain concepts that are usually written in circles or squares and lines and words that indicate the inter-concept relationship [7] . Map concept (concept map) or also called mind maps (mind mapping) has been used for centuries to learn, think visually (visual thinking), and problem-solving by teachers, experts psychologist, and people in general. People use this radially graphical technique as a mind map in general in various fields [7].

Mind maps were first developed by mathematicians, psychologists, and brain researchers as a note-taking technique [8]. According to Buzan, mind maps are used to increase students' thinking power. When people read a page, he/she usually finds an outline of its contents by looking left to right and from top to bottom, while what actually happens is that the brain sees the whole page nonlinearly. This activity involves the right brain and left brain. Connecting the right brain hemisphere and the left brain is a very effective way of thinking. Human thinking ability will increase if the two hemispheres of the brain work in harmony . If one of them faces learning difficulties, it is usually caused by the absence of a connection between the brains of the two hemispheres . If both hemispheres can communicate well, information can be learned and remembered better [9] .

In addition, for students the mind mapping technique is a modern and fun way of learning, because with color and images it will guarantee a permanent memory of information [10] . Mind Mapping according to Buzan [11] has several functions: (1) provide a holistic view of the subject matter broadly, (2) allow route planning or selection direction to reach the destination, (3) collecting a lot of data in one place, (4) help solve problems by looking at new breakthrough alternatives, and (5) fun to see, read, digest, and remember. In addition, according to Buzan in [11], mind maps have several benefits: (1) activating the whole brain, (2) clearing the mind of mental tangles, focusing on the subject, (3) helping to show the relationship between information, (4) provides an overall picture, (5) allows the grouping of concepts and compare them.

How to make concept maps as follows: (1) Use lines, arrows, branches or other ways to show the relationship of ideas that come to mind; (2) Create maps with personal designs and symbols so that it is easy to remember or understand the interagency relations , (3) Use paper without lines to encourage thinking in a nonlinear and creative manner; (4) Write key ideas with capital letters and lowercase letters for captions; (5) Place the main idea in the center of the page (www.jcu.au/students/learning-centre). The use of concept maps can increase creativity. Creative people, among others characterized able to current thinking (fluency), capable think supple (flexibility), and capable thinking detailing (elaboration) [12].

Examples of mind maps can be seen in Figure 1. The main idea in mind maps is a topic / theme title / post , as for the elements shown by the six lines with keywords what, when, where, who, why, and how . These six keywords are each given a number of questions to provide further alternative ideas. Thus, the development of ideas here is explorative from general matters to specific matters (see Figure 1).



(Source: <http://darinholic.com/playing-with-mind-map.html>)

Fig. 1. Examples of Mind Maps

D. Thinking Framework and Research Hypothesis

As an art learning, drawing illustration is an activity that creates art that demands the creativity of the participants personally, starting from developing ideas, creating symbolic forms, composing images, and applying media (tools and materials). In expressive drawing based on a particular theme, the development of ideas involves concepts derived from various subjects related to the theme. Concept maps as a method of thinking can be used to help students develop ideas in creating illustrations. This is in accordance with the ability of Class V participants who have developed asthma thinking skills. Thus, the research hypothesis can be proposed that the application of concept maps in illustration drawing learning in Class V of Timuran Elementary School influences the quality of students' work.

III. RESEARCH METHODS

The research design used in this study was a pre-experiment namely one group pre-test post-test design (see Table I). In this design, before the treatment (treatment) is given first the sample is given a pre-test (initial test) and at the end of the learning sample is given post-test (final test). This design is used in accordance with the objectives to be achieved is to know the effect of the application of the results of early learning drawing in elementary school. The independent variable of this study is the treatment in the form of the application of concept maps, while the dependent variable is the ability to draw illustrations.

TABLE I. DESIGN ONE GROUP PRE-TESTS POST-TEST

O 1	X	O 2
Pre-test	Treatment	Post-test

The study population was all fourth grade students of Timuran Elementary School in Yogyakarta. The research sample was taken by intact group, which took all participants in one class.

Data collection is done by performance test techniques with assessment rubrics. The first performance test is a pre-test where students are asked to draw illustrations with the theme "My Favorite Animal", by previously studying the related material in the Student Book. After one week, in the second meeting, students are asked to draw illustrations with the same theme, but first they are asked to make a concept

map of what they want to draw, as a post-test. To make a concept map, a worksheet for making concept maps was made by researchers. The work of drawing illustrations of students in the first and second meetings was assessed by two lecturers at the UNY FBS Department of Fine Arts Education.

Test the validity of the instrument can be done by Pearson Product Moment correlation analysis, while the instrument reliability test can be done with Cronbach's Alpha analysis [13]. The instrument for collecting data in this study is the assessment rubric of the work of drawing illustrations of students. The rubric includes three assessment points, namely themes, forms, and techniques, with a scale of 4 (very good, good, sufficient, and lacking). To test the validity and reliability, the pre-test data is used, namely the results of the assessment of children's drawing work before being treated with concept maps. Validity and reliability analysis was carried out with the help of SPSS Version 23 on the data from the pre-test and post-test, while the results are summarized in Table II below.

TABLE II. RESULTS OF ANALYSIS OF VALIDITY OF THE ASSESSMENT RUBRIC OF THE RESULTS OF THE PREVIOUS ILLUSTRATION DRAWING

Item	Item-Total Statistics				
	Scale Mean if item Deleted	Scale Variance if the item is Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if item Deleted
Prior Treatment Theme	5.23	1.314	0.643	0.414	0.770
Form Before Treatment	5.17	1.492	0.691	0.482	0.709
Prior Treatment Techniques	5.38	1.589	0.661	0.447	0.743

For a sample of 47 subjects, $df = 47 - 2 = 45$ and r table is 0.288. For the validity of the instrument before treatment, in the theme the value of Corrected Item-Total Correlation is obtained $0.643 > 0.288$, which means that the item is valid. In the form item, the value of Corrected Item-Total Correlation is $0.691 > 0.288$, which means that the item is valid. In the technical aspects, the value of Corrected Item-Total Correlation is obtained $0.661 > 0.288$, which means that the item is valid. N use values Cronbach's Alpha based on Standardized Items is $0.810 > 0.288$. Thus, the instrument as a whole can be stated as reliable.

In accordance with the purpose of this study, data analysis was first carried out to describe the results of illustrative learning in Class V of Timuran Elementary School, both before and after the experimental treatment, namely the application of concept maps. Each picture of students is assessed using a rubric consisting of three aspects (themes, forms, and techniques) with a scale of 4, so that the scores obtained by students for each work of the image range from 3 to 12. To categorize the score into four levels of values, which are Very Good, Good, Enough, and Less, use the reference in Table III as follows:

TABLE III. CATEGORY VALUE RESULTS OF ILLUSTRATION DRAWING

Category	Lowest score	Highest score
Very good	1	12
Well	8	10
Enough	5	7
Less	3	4

Further data analysis was carried out to prove whether there was an effect of the application of concept maps in illustrative learning in Class V of Timuran Elementary School influencing the work of students. This data analysis was carried out by analyzing the different nonparametric mean sign test with the SPSS Version 23 Program.

IV. RESEARCH RESULTS AND DISCUSSION

A. Research Preparation and Implementation

To carry out this research, preparations included: (1) coordination of research time and procedures with principals and Class V teachers of Timuran Elementary School in Yogyakarta, (2) preparation of worksheets drawing illustrations, (3) procurement of materials and drawing tools (4) preparation of assessment instruments for drawing illustrations, and (5) teacher training for the implementation of learning in the context of this research.

This study involved 25 VA students and 22 VB Classes, all 47 respondents. The study was conducted in May 2018 as many as two learning meetings in May 2018, according to the lesson schedule at the school and the school has implemented the 2013 Curriculum.

At the first meeting, illustrative learning with the theme "My Favorite Animal" was delivered by the teacher without the application of concept maps. In this case the teacher carries out the learning in accordance with the scientific approach, with the material drawing illustrations (drawing stories) in accordance with the text book (student book) Class V Theme 1. Students create story images with the theme in accordance with their respective interpretations. Students complete the picture for three hours of lessons (105 minutes).

Furthermore, in the second meeting, which was the following week, students were asked to draw stories again with the same theme, but previously were asked to make concept maps with examples given by researchers. Students complete their respective concept maps for 8 to 10 minutes, then work on their respective drawings as long as the learning time is complete.

The implementation of the experiment can run smoothly, so that the data obtained from the illustration of the students with the theme "My Pets" was obtained before and after the application of the concept map. A total of 47 students each child completed two drawings, so that a total of 94 images were prepared to be analyzed according to the research objectives.

B. Data analysis

a) Descriptive Analysis

To find out the characteristics of the data about the results of drawing stories with the theme "My Favourite Animal" before and after the experimental treatment, a frequency and descriptive analysis was conducted. The results of frequency analysis of respondents' score data

before and after drawing treatment based on concept maps are presented in Table IV and are visually illustrated in the graph in Figure 3.

TABLE IV. RESULTS OF ASSESSMENT OF ILLUSTRATION DRAWING WORKS

Score Range	Category	Before treatment	After treatment
11-12	Very good	3 (6.40%)	17 (36.17%)
8-10	Well	25 (53.20%)	30 (63.83%)
5-7	Enough	18 (38.30%)	0 (0.00%)
3-4	Less	1 (2.10%)	0 (0.00%)

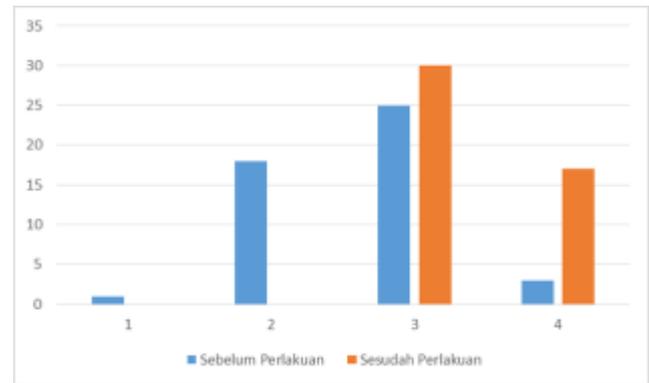


Fig. 3. Graph of Results of Assessment of Illustration Drawing Before and After Treatment Using Concept Maps

From the distribution of scores in Table 3 above, it can be seen that the results of drawing stories before using concept maps show 3 (6.40%) students scored very well, 25 (53.20%) got good, 18 (38.30%) students get good scores, and 1 (2.10%) students get good grades. Meanwhile, the results of drawing stories after using concept maps showed that 17 (36.17%) students scored very well, 30 (63.83%), and there were no more students who received enough or less grades. So, in drawing stories without concept maps, there are students who get less scores (3-4) and enough (5-7), whereas in drawing stories by applying concept maps there are no more students who get less scores (3 - 5) and sufficient (5-7), but with a minimum value of at least good (8-10). Thus, it can be concluded that in general the application of concept maps in illustrative drawing learning can improve student learning outcomes.

b) Signs Test Analysis (Sign Test)

The research hypothesis is that there is an influence of learning with concept maps on the results of illustration drawing in Class V of Timuran Elementary School. The research work hypothesis is as follows:

- Ho: There are no differences in the results of illustration drawing learning in Class V of Timuran Elementary School before and after the application of concept maps.
- Ha: There are differences in the results of illustration drawing learning in Class V of Timuran Elementary School before and after the application of concept maps.

The results of the analysis of the sign test using the SPSS Version 23 program can be seen in Appendix 7, while the summary of the results of the sign test analysis is shown in Table V. In the table, it can be seen that the application of concept maps in illustrative drawing learning shows an

increase in 41 subject scores, only 6 subject scores are fixed, and no subject score has decreased.

TABLE V. RESULTS OF FREQUENCY ANALYSIS AND SIGN TEST

Differences Before and After Treatment	total	Z value
Negative Difference	0	-6,247 (p = 0.00)
Positive difference	41	
Permanent	6	
Total	47	

The sign test produces a value of $Z = -6.247$ with $p < 0.05$. Thus, the null hypothesis which states that there is no difference in the results of illustrative learning in Class V of the Timuran Elementary School before and after the application of the concept map is rejected. This means that there is an influence of the application of concept maps in illustration drawing learning in Class V of Timuran Elementary School on the quality of the work of students.

c) Discussion

The results of descriptive data analysis showed that the experiment using concept maps in storytelling could improve the quality of the results of these activities, namely the increasing number of students who scored very well (score 11-12) from 6.4% to 36.2% and good grades (8-10) from 43.2% to 63.8%. In addition, by applying the concept map in drawing the story, there are no more or less values.

Improved learning outcomes in drawing illustrations are supported by the ability to identify and connect objects that are relevant to the theme determined through the use of concept maps. The results of these studies are in accordance with the results of previous studies which found that concept maps or mind maps can organize knowledge. For example conclude that the use of mind maps in increasing creativity and thinking are multifaceted and comprehensive. Found that mind maps can develop students' ability to ask questions (questioning). The concept maps help learners strengthen memory backward (retarded) aged 12-16 years the application of concept maps in social studies learning both in groups and in pairs can increase the learning outcomes of fifth grade elementary school students. Thus, the effect of applying concept maps in learning to draw stories in this study is in line with previous studies, namely being able to improve student learning outcomes.

V. CONCLUSION

Based on the implementation of the research on the application of concept maps in illustration drawing in Class V of Timuran Elementary School in Yogyakarta, conclusions of the results of this study can be drawn as follows:

- In drawing illustrations without applying concept maps, there were 3 (6.38%) students who scored very well, 25 (53.19 %) for Good, 18 (38.30%) for Enough, and 1 (2.2%) for Less.
- With the application of concept maps in drawing illustrations, there were 17 (36.17%) students who achieved Very Good scores and 30 (63.83%) participants scored Good. Thus, in general there is an increase in the value of drawing students after using concept maps.

- The application of concept maps in influencing the quality of the results of illustrative drawing learning ($Z = -6.247, p < 0.05$)

Thus, it can be concluded that the making of concept maps or mind maps is useful as a method in illustrative drawing learning for Class V students of Timuran Elementary School in Yogyakarta. Furthermore, relating to these conclusions, suggestions can be given as follows:

- Class V teachers at Timuran Elementary School can apply concept maps in illustrative learning or other types of drawing that require the development of ideas.
- To provide more accurate results about the effect of applying concept maps in illustrative learning, further research can be carried out using experimental research designs and parametric data analysis.

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