Research Article

The Effect of Station Rotation Learning Model on Critical Thinking in Elementary School-level Students

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Abstract.
The research aimed to determine the effect of the station rotation learning model on critical thinking skills at elementary school level. This research involved 5 elementary schools in Malang. The number of samples in this research amounted to 217 pupils who were divided into 2 classes; 105 pupils for the experimental class and 112 pupils for the control class. Cluster random sampling was used which further divided the sample based on the area in Malang. The design of this research used a posttest-only control group design. Data collection used critical thinking instruments. Data were analyzed using an independent T-test. The outcomes of this research indicated that there was a significant effect on pupils using the station rotation learning model on pupils critical thinking skills. The outcomes obtained could provide alternative choices for educators using this learning model with various materials.

Keywords: model station rotation, critical thinking, student, elementary school

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1. INTRODUCTION

To critically think about what to do or what to believe requires the independent and reflective thought processes. Critical thinkers can also use logic and reason to make decisions. Everyone with critical thinking skills can mostly do the following activity things: When we think critically, we think for ourselves because we are more confident. Critical thinking is the key to create independence, and encouraging pupils to make their own decisions and make their own opinions [1]–[3].

Citing the National Education Association [4], 21st century learning requires pupils to have four important components to compete in life. This component consists of critical thinking, creativity, communication, and collaboration. Critical thinking means that pupils are able to answer various complex questions in life or the environment by planning and analyzing using logical reasoning skills [5]. Pupils must also be able to solve these

problems individually or in groups. This kind of ability must be obtained by every pupil in learning.

With technology advances in education field makes the learning process and sharing knowledge become more interactive [6], [7]. Changes in education due to new technology take place in the form of more global views instead of local ones. This is because new technology makes people see the world differently than before. Learning and teaching are greatly improved when tech is added to current curriculums. Providing pupils with access to online education during a COVID-19 pandemic is an excellent example of this. [8]–[10].

In Indonesia, there are still some learning problems at the elementary level. Several studies reveal that educators tend to focus on using conventional learning models where the pupils listening to the educator's explanation. As a outcome, pupil learning outcomes also still do not meet the KKM [11]–[13]. The outcomes of another research by Tangkearung [14] on the outcomes of observations at the elementary school in North Toraja Regency also stated that fifth grade pupils, especially in science material, showed difficulties in processing and understanding the material taught by educators. In other words, most of the implementation of learning has not implemented a teaching method that can train pupils' critical thinking skills. So, we need a suitable learning model for use in both offline and online learning.

If we see the outcomes of the Indonesian Digital Literacy Index organized by the Ministry of Communication and Information (Kemkominfo) and the Katadata Insight Center (KIC) in 2020 [15], the Indonesian digital literacy index was at 3.49. This score when compared with a score interval consisting of a score of 0 as low to 5 as high score, Indonesia is included in the medium category. The outcomes of this research revealed that most Indonesian people were ready to use online-based learning.

To make pupils can learn through different learning styles, this learning model called station rotation can answer these problems. Since there is a "learning checkpoint" feature that can accommodate all learning styles of pupils [16], [17]. In the station rotation learning model application, there are several steps. In each lesson, pupils are asked to study a number of topics grouped into three or more headings. In each post, educators can combine online and offline learning. Activities in each post have varied activities, such as group study, individual study, case studies or answering several questions [18]. This station rotation learning model requires each pupil to enter all the checkpoints in turn and in groups. In its journey, this learning model called station rotation has developed from blended learning to full online learning [19]. This research used a syntax developed by Julie Mason and Catlin Tucker which consists of virtual educator led

instruction, collaborative activities, and offline station [20], [21]. With this development, it is possible to implement the Station rotation learning model flexibly, both offline and online blended, or fully online only.

This learning model has many benefits. For educators, this learning model provides a new experience for the educator's teaching system, allowing pupils to feel that the new learning environment has changed [22]–[24]. Furthermore, it allows educators to study in groups in classes with many pupils. In this way, pupils will get the same share of knowledge input for everyone [25]. According to Govindaraj and Anandraj [26] stated that there are many benefits of using this station rotation learning model, including increasing learning interactions, allowing pupils to learn according to their own learning speed abilities, introducing pupils to various learning models, reducing pupils' feelings of isolation and increasing the pupils' ability of each pupil when working in groups. Seeing the enormous benefits of this kind of learning also presents challenges for educators to face. In addition to the educator becoming familiar with this new learning model, the educator got to be able to estimate the learning space that provides good learning management to help each pupil with learning related to online learning so the pupils can generate and send learning reports to the educator for the best communication possible.

Based on the interpretation and presentation of existing evidence, the effect of the station rotation learning model on critical thinking skills needs to be studied. The use of the station rotation learning model combined with online media such as Zoom Meeting makes the use of this learning model easier, cheaper, more interesting, and pupil-friendly. It is expected that pupils will enjoy learning, and thus maximize the transfer of material.

2. METHOD

This quasi-experimental research used a post-test only control group design. This research was conducted in 2022. The sampling locations for this research were five elementary schools in Malang, Indonesia. The sampling technique used cluster random sampling by categorizing schools based on their area. So, we get five schools representing five sub-districts (regions) in Malang, Indonesia. Then from each school two classes were randomly selected, consisting of one experimental class and one control class. The number of pupils used in this research were 217 of fifth grade elementary school pupils consisting of 105 pupils in the station rotation model (experiment), and 112 pupils in the conventional model (control).

Data were collected using a critical thinking ability test instrument that had been validated in advance by two expert validators. Then the instrument was re-validated by testing it on 50 sixth grade pupils randomly in five schools that had been set. The critical thinking ability instrument test contains several descriptive questions consisted of five variables, including: Basic Clarification, Bases for a decision, Inference, Advance Clarification, Auxiliary abilities. After confirming that it was valid, the instrument was then used to collect research data in the experimental and control classes. The data that has been obtained was then analyzed using the normality test and homogeneity test as a condition for the influence test. Testing the effect using the independent T-Test test. The level of significance set at 0.05.

3. RESULTS AND DISCUSSION

3.1. Results

The learning carried out in this research used the station rotation learning model. Online learning in this research used Zoom meetings. This zoom meeting was used because of its breakout room feature, which had the advantage of dividing all pupils into group posts and allowing pupils to freely choose the available room for postal activities. The research was conducted in two meetings.

Pupils who took part in learning using the station rotation model and conventional models each took a post-test. This instrument was conducted by pupils to measure pupils' critical thinking skills on the material of animal and human movement organs. Pupils answered every question given by the educator based on indicators of critical thinking skills.

Analysis of research data was tested using a different test. Prior to the difference test was implemented, a precondition test was implemented which consisted of a normality test and a homogeneity test. The outcome of the normality test on the posttest value of pupils' critical thinking skills on the material of animal and human movement organs showed the Kolmogorov-Smirnov test for the experimental class was 0.62 while the control class was 0.71. The outcome of the Kolmogorov-Smirnov test was greater than 0.05. So, the conclusion is that the post-test data of pupils' critical thinking skills in the experimental class and control class were normally distributed.

Moreover, the outcome of the homogeneity test analysis in the experimental class and control class resulted in a Based on Mean value of 0.705. The homogeneity test outcome was greater than 0.05. So, the conclusion that this research data was homogeneous.

After the prerequisite test was implemented, the data was then tested for differences using the independent T test. The outcomes of the descriptive data on the posttest outcomes of pupils' critical thinking skills showed a t coefficient of 6.918 with a significance value of different tests in both classes (Sig. 2-tailed) of 0.000. The significance value of the difference test was smaller than 0.05. Thus, the outcomes of the different test indicated that there was a significant difference in pupils' critical thinking skills in pupils who were taught using the station rotation model compared to pupils who were only taught using conventional methods. Then seen from the magnitude of the difference in the average of each group on the mean difference showed 12,801. The outcome of the average difference was positive. This means that the average value of the experimental class was higher than the control class.

3.2. Discussion

Station rotation is one of the learning models that can be done both face-to-face learning and online learning [27]. The first stage carried out in this model was the educator providing materials and videos. Furthermore, pupils were divided into three equal groups with the available posts. Each available post had several different activities as well. There was one post that pupils were asked to do individually as well. Next, pupils entered the post that has been provided. They were asked to read the instructions provided in the questions and work on the questions. The educator guided the duration of the work. After the time ended, pupils rotated from the initial post to the post that have not been passed by them, and worked on the questions in the post. This rotation was carried out continuously until each group has entered the available posts. After that, the pupils were asked to present their work in front of the class.

The implementation of the station rotation learning model in this research has advantages. The advantages of implementing the station rotation learning model carried out in this research included that this model allowed pupils to be able to learn according to the characteristics that pupils were interested in [28]–[30]. Pupils could explore the material being studied independently or in groups. In addition, this station rotation model could also be a model of choice in providing pupils with critical thinking skills. This can be observed from the positive difference in pupils' critical thinking skills in classes taught with the station rotation learning model which have a higher post-test average value compared to pupils taught using conventional methods.

Learning by providing flexibility in face-to-face learning and online learning could affect pupils' critical thinking skills [31]. Pupils who were taught using the station rotation

learning model got more knowledge than pupils who were only coached using the conventional model [32], [33]. Pupils who studied using the station rotation learning model got additional information in deepening material, learning videos, deepening material through discussion, and trying the discussion outcome themselves through working on activities independently. Pupils obtained the deepening material after the first stage of learning was carried out, so in the activities, pupils could learn independently, both in groups and individually. This was different for control class pupils who both used a group-based model, but pupils did not receive the deepening material provided by the educator. Pupils only received assignments and were only conducted in groups. For individual tasks, it was only used as a task that was done at home. So, it was not just an activity in learning.

Depend on the analysis outcome that the station rotation model which was included in the class of blended learning models can affect pupils' critical thinking skills. This research outcome were in accordance with the research by Munzil, Suwono and Nida which stated that blended learning could affect pupils' critical thinking skills [34]–[36]. In addition, the pupils' learning at the high school and college level using the blended learning model could provide differences in pupils' critical thinking abilities compared to pupils who only learned using conventional models [37]–[39]. This can be observe from the average scores of the post-test outcomes in the two research classes. The conclusion of this research could provide an illustration that this station rotation learning model could be used at the elementary school level by providing critical thinking skills that were different from conventional group-based learning models. However, the average outcomes of the two classes were still not optimal. This was because pupils were not accustomed to exploring the material provided by the educator, but pupils were only accustomed to receiving information. Several previous research such as Hidayah, Anggraeni, and Utami also agreed to explain that the factors that caused the pupils' critical thinking skills to be less than optimal were that pupils still had difficulty in connecting the problems with the solutions they had obtained and difficulties in linking equations to the problems given [40]–[42]. Relevant to the obstacle, this station rotation model tries to solve it by combining group learning and individual learning. So, after they discuss with their group friends in order to help them relate the knowledge, they have to the problems they face, then pupils automatically try to solve the problems individually.

4. CONCLUSION

Based on this interpretation, it can be concluded that the station rotation learning model can significantly affect critical thinking skills. Pupils who learn to use this learning model have higher critical thinking skills than learning using conventional learning models. This can be seen from the average post-test score of pupils in the experimental class which is higher than in the control class.

This research does not know for sure the level of individual confidence in ability to do something from each pupil so it is suggested that further research can be done using these variables. Furthermore, the sample used in this research was classified as one city only. Thus, it is recommended to use a larger research sample to draw more accurate conclusions based on the differences in the characteristics of pupils.

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