The Effect of Remap Cooperative Script (Remap-CS) Learning with Wordwall Assistance on Students' Critical Thinking Ability

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Abstract

The learning model that can improve students' critical thinking skills is the Remap Cooperative Script model with the help of Wordwall. This study aims to determine the effect of Remap Cooperative Script assisted by Wordwall on critical thinking skills and to determine student responses from the application of the model. The research method used is a quasi-experimental design. The sample in this study was taken by cluster random sampling technique. The effect of the Wordwall-assisted Remap Cooperative Script model was analyzed using the related t-test. Improvements in critical thinking skills were measured using N-Gain, and measured the results of student response analysis. The influence of Remap Cooperative Script assisted by Wordwall on students' critical thinking skills as measured by the final related t-test test of 4.12 indicates that there is an influence from the application of the model on students' critical thinking skills. The increase in students' critical thinking skills as measured using N-gain in the experimental class was 0.53 while the control class was 0.38. These results indicate that there is a difference in the increase between the experimental class and the control class due to the treatment given. The results of the study were also supported by a very good student response of 82.11%. Based on this, it is concluded that learning using the Remap Cooperative Script model with the help of Wordwall has an effect on increasing students' critical thinking skills
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INTRODUCTION

The development of life in the 21st century requires a person to master various skills. Therefore, education is expected to prepare students' to master these various skills so that they are ready to face the challenges in the future. According to the 21-st Century Education framework developed by the World Economic Forum (WEF), there are 16 important skills that children need to prepare and possess in order for them to survive and succeed today.

These skills include (1) Literacy (literacy, skills related to text and languages) (2) Numeracy (numeration, skills related to numbers) (3) Scientific literacy (scientific literacy, skills related to scientific thinking) (4) ICT literacy (skills related to the use of information technology) (5) Financial literacy (financial literacy, skills related to decision-making related to personal finance) (6) Cultural and civic literacy (skills related to cultural understanding and rights as citizens). (7) *Critical thinking/problem-solving* (critical thinking skills and solving problems that are in front of them) (8) Creativity (creativity, skills to use new perspectives and solutions to solve challenges) (9) Communication (skills related to communication capacity with various different people) (10) Collaboration (skills related to the capacity to synergize and collaborate with team members to achieve common goals) (11) Curiosity (skills related to natural curiosity to find out about new things that are happening around them) (12) Initiative (related skills with the capacity to start a thing or take the initiative without waiting for orders from others) (13) Persistence/grit (skills related to self-management that are able to overcome problems until they finally survive and can finish until the end) (14) Adaptability (skills related to the capacity to adapt and flexibility in dealing with external changes what happens) (15) Leadership (skills to lead groups towards common goals) (16) Social and cultural awareness (skills to recognize and respond to the diversity of social and cultural phenomena).

The ability to think critically is one that is needed in this 21st century (Samihah & Savitri, 2021). According to Ennis (2013), critical thinking ability itself can be interpreted as reasonable and reflective thinking to determine what is believed or done. Likewise, according to Duron (2016) Critical thinking ability can also be interpreted as the ability to be able to analyze and evaluate information. and according to Facione (2013)

Critical thinking ability also implies the existence of an interpretation, analysis, evaluation, conclusion, explanation, and self-regulation.

Thinking skills are abilities that are indispensable in facing life's challenges. These skills include critical thinking skills, creative thinking, and problem solving abilities (Kalelioglu & Gulbahar, 2014). Currently critical thinking skills are very important in everyday life, because to develop other thinking skills, such as the ability to make decisions and solve problems. There are so many phenomena in everyday life that need to be criticized. Facione (2011) states that critical thinking is self-regulation in deciding something that results in interpretation, analysis, evaluation, and inference, as well as exposure using evidence, concepts, methodologies, criteria, or contextual considerations that form the basis for making decisions. Learning outcomes are behavioral changes that students get after experiencing learning activities. There are three domains of learning, namely the cognitive domain, affective domain, and psychomotor domain (Rachmawati et al., 2015).

Ennis (2011) adds that critical thinking is the ability to think reflectively and reasoned that is focused on what is believed or done. Critical thinking skills include basic clarification skills, basic decision making, conclusions, providing further explanation, estimation and integration, as well as additional abilities. Supporting factors in the learning process include: teacher creativity, with various models, methods, strategies, media, learning resources and approaches in learning (Ismirianti et al, 2016).

The Remap-CS (Reading - concept map - cooperative - script) learning model is a combination of reading activities, concept mapping and the application of the Cooperative Script cooperative learning model with the stages of developing themes, summarizing readings and making concept maps, reading and correcting each other, working on questions, compiling summaries that will empower students' critical thinking skills (Pangestuti, 2014). The Remap Cooperative Script learning model is a learning model developed by Pangestuti from the previous researcher, namely Robert Slavin. The difference lies in the early stages of this learning model, which is asking students' to

read the material and then compile a concept map first. The preparation of this concept map is expected to make students' understand and remember a large amount of information related to the concepts they learn while reading (Pangestuti, 2015).

Wordwall is a web application that we use to create fun quiz-based games. With a wordwall of various kinds of game models we can create, this web application is suitable for educators who want to use other approaches in designing and reviewing a learning assessment with online media. Wordwall is structured in an easy-to-use method for both teachers and students', wordwall is also easily accessible using a personal computer or android. So that this wordwall website is very appropriate to use during the learning process. Wordwall activities can be used as student-completed assignments.

The learning website is a guided website used by learners in learning activities to find material classification of objects and classification of living things. In the website there are instructions for activities that stimulate learners to be able to conduct observation and experiment activities independently, and can be accessed at any time (Akhlis et al., 2014). Use of computer-based technology It is a way to produce or convey material using microprocessor-based sources, where the information or material conveyed is stored in digital form, not in print (Susanto et al., 2013; Listiaji et. al, 2019).

METHOD

This type of research is an experimental study with a quasi-experimental design and a nonequivalent control group design. The sampling technique used in this study is a cluster random sampling technique. The cluster random sampling technique is taking several groups from the existing population by taking two classes, one class as the experimental class, one class as the control class the research was conducted at SMP N 27 Semarang, located at Ngesrep Timur Raya VI No. 4, Sumurboto, Banyumanik District, Semarang City, Central Java Province. The research subjects in this case are students', namely: 26 students' in class IX D of SMP Negeri 27 Semarang (one class) in the test phase test, class VIII G SMP Negeri 27 Semarang as many as 32 students' (one class) at the research stage as an experimental class, and the students' of class VIII

H of SMP Negeri 27 Semarang were 32 students' (one class) at the research stage as the control class.

The data collection technique used multiple-choice questions based on a grid containing indicators of critical thinking skills, meanwhile critical thinking skills were also observed using an observation sheet on indicators of critical thinking skills carried out by an observer. The instrument tested at the time of the trial consisted of 25 reasoned multiple choice questions. Furthermore, at the implementation stage, the questions are reduced to 16 items based on the results of expert assessments and empirical validation in the form of reliability values, differentiating power and level of difficulty.

The procedure carried out in the research process is in the form of interviews and observations, followed by the validation stage of learning tools, the test-testing stage, and the implementation stage of learning which includes (1) giving pretest questions before the learning process, (2) implementing the learning process with the Remap Cooperative Script model, (3) provide a review of learning using Wordwall games, (4) provide posttest questions at the end of the meeting, (5) provide a questionnaire for student responses to the learning process, (6) the last stage of data processing. The data collection technique was carried out by test and non-test techniques. The test instrument was used to measure students' thinking ability, the test instrument in this study were pretest and posttest, while non-test instruments were used to obtain an assessment from the observer and the students' responses to the applied learning model. Data analysis was carried out quantitatively. Learning tools in the form of syllabus, lesson plans, and LKPD as well as pretest and posttest questions were validated by experts. The questions that have been validated by 5 experts are analyzed for general characteristics including validity, reliability, discriminating power and level of difficulty and items are selected based on predetermined criteria.

RESULT AND DISCUSSION

Students' are able to apply the knowledge they have and are able to think critically in finding concepts through the learning process. Critical thinking is a reflective and reasonable

mindset by focusing on what to believe and do (Ennis, 2011). Critical thinking ability itself is an attitude of students' to think reflectively on problems that involve cognitive, analytical, rational, and logical processes (Ningsih, et al. 2012). Aspects of students' critical thinking skills in research, namely giving simple explanations (elementary clarification), building basic skills (basic support), concluding (inference), making further explanations (advance clarification), strategies and tactics (Ennis, 2011).

Science learning in junior high schools in accordance with the 2013 curriculum is no longer teacher-centered but student-centered and the teacher becomes a passive party while students are active parties in seeking, processing, and constructing the knowledge received and will affect their critical thinking skills if students' construct their own knowledge. received. This provides an innovation in the application of Wordwall-assisted Remap Cooperative Script learning by involving IT along with critical thinking skills needed in the 21st century. The Remap Cooperative Script model with the help of Wordwall can be used in Integrated Science learning to improve students' critical thinking skills.

The results of the study the influence of students' critical thinking skills in this study was measured using the test method and also the observation method, the test method used was pretest and posttest. Pretest data is used to determine the initial condition of students', while posttest data is used to determine the final condition of students' in critical thinking skills after being given the treatment of Remap Cooperative Script learning assisted by Wordwall. The results of the pretest and posttest data analysis of students' critical thinking skills obtained that the average pretest in the experimental class and control class was 61.87 in the experimental class and 55.37 in the control class. The posttest results showed differences between the two classes, where the experimental class had an average of 81.87 and 71.84 in the control class. The pretest and posttest data that have been tested for normality are then tested using parametric statistics, namely the t-test related test. The results of the t-test pretest and posttest can be seen in tables 1.

Table 1. T-test results related to Posttest Data

Class	Average	dk	t_{count}	t_{table}
Experiment	81,87	62	4,12	1,66
Control	71,84			

Based on table 1 shows that the t-test related data posttest there is a difference in the effect on students' critical thinking skills between the experimental class and the control class after the treatment of the Remap Cooperative Script learning model assisted by Wordwall.

The improvement of students' critical thinking skills was also analyzed using N-Gain to find out the improvement of students' critical thinking skills from the initial meeting to the last meeting. The results of the N-Gain analysis test can be seen in table 2. below.

Table 2. The results of the N-Gain analysis test

Experiment		N-Gain	Control		N-Gain
Pre	Post		Pre	Post	
61,87	81,87	0,53	55,37	71,84	0,38

The N-Gain value in table 2. shows that the experimental class is higher than the control class. The experimental class got an N-Gain value of 0.53 in the Medium category, and the control class got an N-Gain value of 0.38 in the medium category. This category is appropriate according to Meltzer (2002). The results obtained by the experimental class were higher than the control class. This proves that the increase in students' critical thinking results in the experimental class is higher than in the control class. Based on the results of this increase, it can be seen clearly in Figure 1.
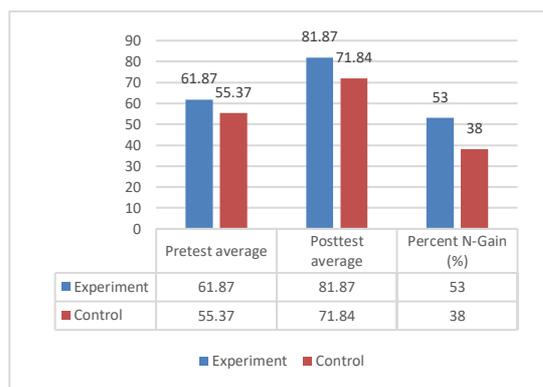
Figure 1. Improving Critical Thinking Ability

The pretest and posttest data obtained contain five aspects of critical thinking skills, namely providing simple explanations, building basic skills, concluding, making further explanations, and managing strategies and tactics (Ennis, 2011). These five aspects are divided into 10 indicators which are then applied to the making of questions. The questions consist of 25 reasoned multiple choice questions which are then tested. Then the questions were validated to 5 experts. This question is then used for pretest and posttest to analyze the improvement in each indicator and can be seen in table 3.

Table 3. Analysis of Critical Thinking Skills Indicator Improvement

Indicator	No.	N-Gain	
		Exp	Control
Focus on the question	3	0,63	0,63
Analyze questions	1	0,11	0,00
	10	0,82	0,67
Asking and answer about some challenge or clarify	12	0,53	0,44
Observing and considering reports from observations	2	0,86	0,60
	11	0,59	0,66
	16	0,61	0,51
Deducing and considering the results of the deduction	5	0,05	0,03
Induce and consider the results of induction	4	0,74	0,67
	7	0,12	0,13

Create and determine from the considered value	6	0,41	0,33
Define the various terms used	13	0,14	0,07
Deciding on an action	8	0,12	0,06
	15	0,15	0,18
Interact with various other people	9	0,85	0,74
	14	0,74	0,75

Critical thinking skills in this study were also analyzed using observation sheets. The observer's critical thinking ability was carried out for three observations. The observation sheet consists of nine indicators of critical thinking skills as follows: (1) Focusing on the question, (2) Analyzing the question, (3) Asking and answering a challenge or explanation, (4) Considering a source used, (5) Observing and consider reports from observations, (6) Create and determine from the values under consideration, (7) Define various terms used, (8) Decide on a actions, (9) Interact with various other people. Students' critical thinking skills can be seen in table 4.

Table 4. Results of Observation of Students' Critical Thinking Ability

Observation Results (%)			
Experiment	Type	Control	Type
76,56	Good	57,81	Enough
80,47	Good	58,59	Enough
81,25	Good	60,42	Enough
79,69	Good	60,16	Enough
81,25	Good	60,16	Enough
77,08	Good	56,25	Enough
78,91	Good	58,59	Enough
80,21	Good	60,42	Enough
81,77	Very good	60,68	Enough

Based on the results of the per-indicator observations, it shows that the experimental class gets higher results than the control class, so it can be concluded that the critical thinking ability of the experimental class students' is higher than the control class. The results of this analysis also show an increase in students' critical thinking skills at each meeting between

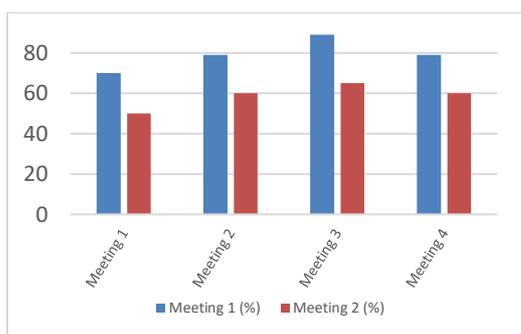the experimental and control classes which can be seen in Figure 2.

Figure 2. Results of Observation of Thinking Ability

Figure 2. Shows that the results of observing students' critical thinking skills in the experimental class from the first meeting to the last meeting have a higher position than the control class. These results indicate that the critical thinking ability of the experimental class students' is higher than the control class based on the results of observations.

Student response questionnaires were used to determine the effectiveness of the application of the Remap-CS learning model during online learning. The questionnaire can be seen in table 5.

Based on table 5. Shows that the results of the student response questionnaire related to the application of the Remap-CS model with Wordwall got a very good response. The results of this analysis indicate that the learning model applied has a positive impact and is accepted by students'.

The Remap-CS (Reading - concept map - cooperative - script) learning model is a combination of reading activities, concept mapping and the application of the Cooperative Script cooperative learning model with the stages of developing themes, summarizing readings and making concept maps, reading and correcting each other, working on questions, compiling summaries that will empower students' critical thinking skills (Pangestuti, 2014). The Remap-CS learning model has many advantages, namely: 1) groups have richer ideas than those owned by individuals, 2) group members are motivated by the presence of other group members, 3) shy members are free to express their thoughts in small groups, 4) produce better decisions, 5) participation in

discussions increases understanding of oneself and others (Erlinda, 2017).

This learning model is combined with learning media in the form of Wordwall games to improve students' critical thinking skills. The addition of learning media through a game is a natural way to increase one's knowledge and thinking skills (Cai et al, 2006). Critical thinking ability according to Ennis (2011) is something that is done with full awareness and leads to a goal, where one of the main goals that is very important is to help someone make the right and best decisions in life.

Based on the research that has been done, it shows that the critical thinking ability of the experimental class is better than the control class. This is because the learning process of the learning process applied to the two classes is different. Learning in the experimental class uses the Remap-CS model with the help of Wordwall, while the control class uses the Direct Instruction method. The learning in this study begins with a pretest at the initial meeting and then continues with three meetings using learning that applies the Remap-CS model with the help of Wordwall and one final meeting in the form of a posttest. Learning in the experimental class is better because the learning model provided is combined with games that attract students' interest in learning so as to improve students' critical thinking skills.

The results of students' critical thinking skills were measured using the t-test related and N-gain as well as the observation sheet by the observer which can be seen in Table 3, Table 4, and Figure 2. The results of the related t-test show that tcount = 4.12 > ttable = 1.6 so that it is known that there is a significant difference between the experimental class and the control class because tcount > t table and Ho is rejected. Based on the data analysis, it can be concluded that learning using the Remap-CS model assisted by Wordwall has an effect on students' critical thinking skills. These results are supported by an increase in the treatment given between the experimental class and the control class, which is 0.53 for the experimental class and 0.38 for the control class which can be seen in Table 4.

Table 5. Student Response Questionnaire Results,

No.	Statement		Persentase (%)	Type
4.	The discussion learning model can help students' express their opinions critically		85,16	**Very good**
5.	LKPD language is clear and easy to understand.		83,59	**Very good**
6.	Playing Wordwall can practice self-confidence and teamwork.		85,16	**Very good**
Negative Question				
7.	The learning process carried out in the classroom does not foster interest in learning and activeness in students'.		78,13	**Very good**
8.	Science learning by making concept maps and Wordwall games affects science lessons in students' materi light and human optical instruments make students' feel bored and depressed.		74,22	**Very good**
9.	Wordwall media used in the learning process is very scary.		81,25	**Very good**
10.	Games displayed in learning activities are less clear and difficult to understand.		79,13	**Very good**
Mean			82,11	Very good

These results are in accordance with Armita's (2016) research, the effect of the cooperative model of the teams games tournament type can improve student achievement and critical thinking. In addition, Susriyati Mahanal et al. (2018) revealed that the Remap Cooperative Script type cooperative model is a learning model that can improve one's thinking, cooperation, and add a dimension of joy for students' in learning because it can be combined with a game. According to Cai et al. (2006) added that learning through a game is a natural way to increase one's knowledge and thinking skills.

The results of critical thinking skills that were analyzed based on observations with indicators of critical thinking skills that had been carried out by observers in the experimental class and control class showed significant differences. Where the experimental class got 78.93% results and 59.23% in the control class. This shows that the critical thinking ability of students' in the experimental class is higher than students' in the control class. So it can be concluded that learning using the Remap Cooperative Script model assisted by

No.	Statement	Persentase (%)	Type
Positive Question			
1.	Science learning by making concept maps and playing Wordwall games makes science learning on Light and Optical Instruments more interesting and fun	86,72	Very good
2.	The material that has been delivered by making concept maps can be easily understood by students'.	86,72	**Very good**
3.	Wordwall media can make it easier for students' to understand the material on light systems and optical devices	82,03	**Very good**

Wordwall has an effect on students' critical thinking skills.

The combination of learning models with interesting media such as Remap Cooperative Script assisted by Wordwall increased students' critical thinking skills by 0.53 while those that did not combine them with media only increased by 0.38 based on the results of N-gain. The results of this study are in accordance with Faris et al. (2018) where the technique of combining the learning process with games is a strategy that teachers can do in facilitating the learning process in the classroom. Students' feel happy to learn, increase their knowledge and improve students' skills when using the game method in the learning process. The learning activities in this study are made as interesting as possible by combining the learning model with a game and prioritizing the student center which makes the classroom atmosphere lively or conducive. This is in accordance with the research of Kurniawan & Maryani (2015) which states that a conducive environment can increase activeness and critical thinking skills, whereas if the environment is not conducive it will reduce students' activeness and critical thinking skills, making it difficult to instill concepts in students'.

The effect of the Remap-CS model assisted by Wordwall is supported by analysis in the form of student responses to the learning process. The questionnaire analysis consisted of 10 statements which were divided into 2 categories, namely positive aspects and negative aspects. The positive aspects include

the following: the first statement is "Science learning model by making concept maps and playing Wordwall games on Light and Optical Instruments makes me more interested and fun" This statement gets a percentage of 86.72% with very good criteria. The second question is "The material that has been presented by making a concept map I can easily understand gets a percentage of 86.72% with very good criteria. The third statement is "Wordwall media can make it easier for me to understand the material of light systems and optical instruments." This statement gets a percentage of 82.03% with very good criteria.

The fourth statement is "The discussion learning model can help me help me find answers with statements" This statement gets a percentage of 85.16% with very good criteria. The fifth statement "The LKPD's language is clear and easy for me to understand." This statement received a percentage of 83.59% with very good criteria. The sixth statement is "Playing Wordwall can train my self-confidence and improve teamwork." This question gets a score of 85.16% with very good criteria.

The negative aspects include the following: The seventh statement is "The learning process carried out in class does not foster interest in learning and also my activity." This statement gets a score of 78.13% with good criteria. The eighth statement is "Science learning by making concept maps and Wordwall games on light materials and human optical instruments makes me feel bored and depressed". This statement gets a percentage of 74.22% with good criteria. The ninth statement is "Wordwall media used in the learning process is very scary for me". This statement gets a percentage of 81.25% with good criteria. The tenth statement is "The games displayed in the learning activities are less clear and difficult for me to understand". This statement gets a score of 79.13% with good criteria

The results of the students' response questionnaire can be seen in Table 5 where most of the students' gave very good responses with an average percentage of 82.10%. Based on the results of the questionnaire analysis of student responses to the Remap Cooperative Script model with the help of Wordwall, it can be concluded that it is very good in improving students' critical thinking skills. In addition, students' also provide suggestions and open comments which can be seen in the appendix.

CONCLUSION

The Remap Cooperative Script-assisted learning model that is applied has an effect on students' critical thinking skills as evidenced the results of the t-test related to the posttest of 4, 12 > 1.66 = ttable. In addition, the results of increasing students' critical thinking skills were analyzed using N-Gain. The results showed that the experimental class got a higher N-Gain score than the control class. The experimental class got an N-Gain value of 0.53 in the Medium category, and the control class got an N-Gain value of 0.38 in the medium category. Critical thinking ability was also analyzed using observation where the results of observations in the experimental class got a higher score than the control class. Where the average observation result in the experimental class is 78.93% while in the control class it is only 59.23%.Student responses to learning using the Remap Cooperative Script model are very good, as evidenced by a questionnaire filled out by students' and getting a percentage of 82.10% with very good criteria
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