

## IMPLEMENTATION OF THE 5E LEARNING CYCLE MODEL THROUGH MAGIC CARD LEARNING MEDIA ON CRITICAL THINKING SKILLS

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### **Abstract**

*This study aims to determine: (1) the implementation of learning using the 5E learning cycle model through magic card learning media, (2) the development of critical thinking skills, and (3) student responses after receiving the lessons. This research uses a pre-experimental design. The study was conducted with 8th-grade students at Sugio 2 Middle School. The research design was a one-group pre-test post-test design. The sample consisted of 64 8th-grade students selected through purposive sampling. To measure critical thinking skills, a critical thinking ability test with 10 essay questions was used. The observation results yielded an average value of 3.95 using the Ricketts scale. Student responses showed an average percentage of 92.24. Data analysis was performed using the N-gain test with a score of 0.292. Based on the results of applying the 5E learning cycle model through magic card learning media, students' thinking skills are categorized as effective.*

**Keywords:** *Critical Thinking Ability, 5E Learning Cycle, Magic Card Learning Media.*

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Received: 2 January 2023 | Revised: 4 April 2023 | Accepted: 27 May 2023

### **INTRODUCTION**

Entering the digital revolution era, where everything is modern, every country plays a crucial role in advancing its resources. The education sector is equally important as it must produce individuals who are prepared for various future challenges (Razak, 2018). Education methods must meet certain quality and quantity standards and require a lengthy process. However, producing individuals who can maintain this quality is not easy. The 2013 curriculum emphasizes student-centered learning (Kartini et al., 2021). This approach encourages teachers to employ appropriate teaching methods to ensure that material delivery is effectively absorbed by students. Teachers should select teaching methods aligned with indicators that can develop students' critical thinking skills and interests, which will subsequently affect their achievements (Noviantika, 2022). Teaching methods alone are insufficient to achieve learning objectives without supporting learning models.

In a previous observation at SMP Negeri 2 Sugio, involving a sample of 32 8th-grade students, the ability to think critically was assessed using a test consisting of 10 essay questions. The results showed that only 5 students met the school's minimum passing grade of 75. This indicates that less than 50% of students met the expected grade, reflecting a low level of critical thinking ability. Thus, the researcher aims to introduce improvements to the learning process to enhance students' critical thinking skills by incorporating effective learning media that can be applied in daily life.

Learning models are stages or designs used as guidelines for teachers in planning classroom instruction (Adnyani et al., 2018). Relying solely on lecture-based models can result in lower critical thinking skills among students. Teachers must also consider educational tools that support learning objectives. Educational tools serve as guides for teachers in implementing learning stages (Miskan et al., 2022). The learning process consists of three stages: planning, implementation, and assessment of learning outcomes (Santoso & Prodjosantoso, 2020). Effective material delivery is facilitated by appropriate teaching aids. Teaching aids include not only lesson plans (RPP) and student worksheets (LKPD) but also learning media that can motivate students during lessons.

Learning media are techniques used by teachers to motivate students and engage them actively during lessons (Putu et al., 2018). This effort can foster critical thinking skills as students need to understand concepts and facts to develop scientific attitudes towards science education. To boost students' enthusiasm for learning, direct guidance and appropriate learning media are needed (Santoso et al., 2019). Observations indicate problems leading to low critical thinking skills among students despite simple and effective practices provided by teachers (Saputri et al., 2019). Students are expected to possess high-order thinking skills (HOTS) to master the material (Tania et al., 2017). Critical thinking

is essential in daily life as it helps individuals solve problems logically. This ability will be useful in the future. Critical thinking involves evaluating reality, analyzing opinions, and drawing conclusions based on facts (Agnafia, 2019).

Critical thinking involves evaluating reality, analyzing opinions, identifying differences, and drawing conclusions based on facts. This cognitive process is categorized by critical thinking ability up to the evaluation level (Saputri et al., 2019). Critical thinking refers to facts based on nature, rules, and laws (Ramdani et al., 2020). Critical thinking adapts easily to various situations and solves problems by finding the best solutions. Mastery of critical thinking indicators requires appropriate learning processes and media to train students' critical thinking skills. Therefore, teachers are expected to provide learning processes that can develop students' critical thinking abilities through innovative teaching methods that involve student engagement, making it easier for students to understand concepts and apply them in daily life. According to Facione (1984) and developed by Dennis (2008), the indicators of critical thinking ability are (1) Interpretation, (2) Analysis, (3) Evaluation, (4) Inference, and (5) Explanation.

The learning process requires not only methods but also learning media that can engage students actively in the classroom (Naf'atuzzahrah et al., 2022). Previous research (Ibrahim, 2018) indicates that the Learning Cycle 5E model is effective in enhancing critical thinking when combined with appropriate learning media. Based on observations and prior research, the researcher chose Magic Card media for teaching, which is considered effective. Magic Card is a rotating board containing material presented in an engaging and uniquely designed format (Mutmainnah et al., 2020). This media is intended as an innovative replacement for older techniques to quickly and accurately understand and memorize learning material. Magic Card is expected to enhance students' critical thinking skills in science, particularly in the human excretory system. Developing critical thinking skills in this area is crucial for providing accurate instructions and preventing misconceptions in the future.

The objectives of this study are to analyze the implementation process of learning, describe the results of implementation, and assess student responses after applying the Learning Cycle 5E model with Magic Card learning media. The benefits of this study include understanding the application of the Learning Cycle 5E model through Magic Card media to assess critical thinking abilities, creating a more active and enjoyable learning environment, and enabling students to think critically about the material. Additionally, the study provides recommendations for improving teaching quality, helping teachers refine old methods and models with new approaches, especially in science education, to achieve desired learning outcomes.

Based on the background outlined above, there is a need for a learning model that can engage students' interest. The Learning Cycle model is a constructivist-based teaching approach (Harefa, 2020). This model encourages creativity and active participation in learning, creating an enjoyable atmosphere. It also builds students' knowledge through its five-phase syntax: Engagement, Exploration, Explanation, Elaboration, and Evaluation (Septian et al., 2017). However, teachers often use LCD projectors in class, which may reduce student interest in learning (Fitriyani et al., 2016). Therefore, the researcher is interested in using the Learning Cycle 5E model with Magic Card learning media.

## RESEARCH METHOD

This study employs a quantitative approach. A quantitative approach involves data expressed in numerical form (Sugiono, 2019). The type of research used is Pre-Experimental Design. The design implemented is a One Group Pre-test Post-test design. This design is used to assess students' critical thinking skills through Magic Card learning media with the 5E Learning Cycle model, applied to a single group without a comparison group. The research design is illustrated in Table 1.

Table 1. Research Design

<i>Pre-test</i>	<i>Treatment</i>	<i>Post-test</i>
<b>O<sub>1</sub></b>	<b>X</b>	<b>O<sub>2</sub></b>

Note :

O<sub>1</sub> = Pre-test score

X = Treatment using the 5E Learning Cycle Model

O<sub>2</sub> = Post-test score

The research was conducted at SMP Negeri 2 Sugio, involving a population of all 8th-grade students, totaling 135 students distributed across 5 classes. The sample for this study included 2 classes: class VIII A with 32 students and class VIII B with 32 students. According to Arikunto (2012), if the number of subjects is less than 100, the entire population is sampled, making this a population study. For a population greater than 100, a sample can be taken. Arikunto (2012) suggests that samples can range from 10% to 15%, up to 20% to 25%, or more than 25% of the total population. Thus, in this study, with a population of 135 students, a sample of 10% to 15% was selected, totaling 64 students. The focus of sampling was on the implementation only. Sampling was conducted using purposive sampling, a technique based on specific criteria (Sugiyono, 2013). This technique was used to select samples according to the needs, where the classes were perceived to have many students not yet meeting the minimum passing grade (KKM). Before the research was conducted, each learning instrument was first tested by 2 validators to determine the instrument's suitability.

The research instruments included observations, tests, and questionnaires. The observation sheet for learning implementation was used to assess how well the 5E Learning Cycle model was executed. Critical thinking ability was measured using pre-tests and post-tests. The test sheets were used to gather data on the improvement of students' critical thinking skills before and after the implementation of the learning model. The questionnaire measured student responses. The questionnaire assessed students' responses to the Learning Cycle 5E model using Magic Card learning media and its impact on critical thinking skills. Data on learning implementation were analyzed by calculating the average percentage of each phase in the 5E Learning Cycle model. The data on conceptual understanding improvement were analyzed for validity. Subsequently, the data were tested using the N-Gain test to determine the improvement in critical thinking skills based on pre-test and post-test results (Asyhari, 2015). Questionnaire data were analyzed by calculating the average percentage of student responses.

## RESEARCH RESULTS AND DISCUSSION

Learning instruments are considered suitable if they meet the criteria of appropriateness. The validation test is used to measure the reliability and proficiency of a measurement instrument. The results of the instrument suitability test were analyzed using SPSS for Windows 25 and Microsoft Excel.

### 1. Implementation of Learning Using the 5E Learning Cycle Model Through Magic Card Learning Media

The research was conducted at SMPN 2 Sugio from April to May 2023. The study consisted of 3 meetings, with each session lasting 2 x 40 minutes. The implementation of the 5E Learning Cycle model was observed by 3 observers: a science teacher and 2 UNISLA science education students. The assessment of implementation was conducted through observations, tests, and questionnaires, focusing on the activities of both the teacher and the students from the beginning to the end of the teaching process. Observers marked a checklist (√) in the prepared scoring columns. The results of the implementation analysis are shown in Table 2.

Tabel 2 Percentage of Learning Implementation

Aspek Observed	Skor Penilaian			Average
	RPP I	RPP II	RPP III	
<b>Introduction</b>	142	141	142	3,94
<b>Core Activity</b>	282	282	282	3,92
<b>Closing</b>	72	72	72	4
<b>Average</b>				3,95

On the learning implementation sheet using the 5E Learning Cycle method, the average percentage of students' implementation was 3.94% during the introduction, 3.92% during the core activity, and 4.00% during the closing. The overall average for the implementation was 3.95%, indicating an excellent category. This suggests that student engagement increased due to the

involvement of the Magic Card learning media. Magic Card is a learning tool made of circular cardboard sheets that can be rotated and features various interesting and unique images. It also includes questions, and students receive cards corresponding to their answers. There are three card colors: red for scores between 80-100, yellow for scores between 50-70, and green for scores between 10-40. Students are divided into groups of 5-6 members. Each group uses the media by rotating it, and when it stops at a designated arrow, students pick a question according to the image obtained. This process is repeated four times in each meeting. Students then present their discussion results in front of the class, and the researcher provides a scorecard based on the answer quality. The Magic Card learning media is shown in Figure 1.



Figure 1 Magic Card Learning Media

## 2. Implementation of the 5E Learning Cycle Model Through Magic Card Learning Media on Students' Critical Thinking Skills

The enhancement of students' critical thinking skills was measured based on the results shown in Table 4.6, comparing pre-test and post-test scores from students who completed the provided questions. In class A, the pre-test score was 44.44, and after the intervention, the score was 96.43, with an N-Gain score of 75.74, categorized as high. In class B, the pre-test score was 69.33, and post-intervention, the score was 96.61, with an N-Gain score of 84.54, also categorized as high. The high categories achieved in the analysis indicate that after applying the 5E Learning Cycle model through Magic Card learning media, there was an improvement in students' critical thinking skills. The N-Gain test in this study was used to strengthen the application of the 5E Learning Cycle model on students' critical thinking skills by assessing the level of improvement from before to after the intervention. The average results of students' critical thinking skills are shown in Table 3.

Table 3 Average Results of Critical Thinking Skills

Group	N	Pretest	Posttest	Gain	N-Gain
Class A	32	44,44	96,43	51,99	75,74
Class B	32	69,33	96,61	27,28	84,54

Table 3 shows the pretest scores for students' critical thinking skills before implementing the Learning Cycle 5E model with Magic Card learning media. In Class A, the pretest score was 44.44 and the posttest score was 96.43. In Class B, the pretest score was 69.33 and the posttest score was 96.61.

The gain scores were 51.99 for Class A and 27.28 for Class B. The N-Gain values for Class A (75.74) and Class B (84.54) fall into the high category. These high N-Gain scores indicate that the application of the Learning Cycle 5E model through Magic Card learning media significantly improved students' critical thinking skills.

Table 4 Percentage of Critical Thinking Skill Indicators

Critical Thinking Skill Indicator	Class A %	Class B %
<i>Interpretation</i>	68,68	62,11
<i>Analysis</i>	71,78	78,11
<i>Evaluation</i>	57,89	61,84
<i>Inference</i>	69,05	69,45
<i>Explanation</i>	69,89	68,78
<i>Self-Regulation</i>	65,98	66,98
<b>Average</b>	<b>39,14</b>	<b>41,03</b>

Table 4 shows the percentage improvement in critical thinking skills. Class A achieved an average score of 39.14, while Class B achieved 41.03. The analysis indicator showed relatively high percentages, with Class A at 71.78 and Class B at 78.11. This improvement can be attributed to the repetitive and step-by-step nature of the learning process, supported by an effective learning model and media. Among the indicators of critical thinking skills—interpretation, analysis, evaluation, inference, explanation, and self-regulation—the highest improvement was in the analysis indicator, while the lowest was in evaluation. This could be due to difficulties in coordinating students in the classroom, as noted in previous research (Ramdani et al., 2020), which highlights the need for effective learning media to guide students.

In this phase, the researcher used the critical thinking skill indicators (Facione, 1984) developed by Dennis (2008). The interpretation indicator involves understanding and expressing the meaning of problem statements. To measure this, the researcher provided explanations about the human excretory system. The analysis indicator allows students to analyze problems and find results through relevant research data. The inference indicator enables students to draw accurate conclusions based on problem statements. The explanation indicator involves providing reasons supported by evidence from research data. The self-regulation indicator involves students monitoring their activities and analyzing their decision-making processes. The significant improvement in critical thinking skills was observed in the analysis indicator, while the evaluation indicator showed lower performance due to students' lack of attention in data collection.

Critical thinking is essential for students to adapt to changing conditions and challenges in life (Sari et al., 2018). Developing critical thinking should not only be an educational goal but also a fundamental process that helps students address future problems. The application of the Learning Cycle 5E model supports previous research (Khasanah & Ayu, 2017), showing that students are capable of formulating core problems and identifying what is known and what needs to be questioned. The use of Magic Card learning media supports earlier findings (Mutmainnah et al., 2020) that this media's unique and engaging design helps students memorize and understand lessons better.

Based on the above findings, it is evident that the Learning Cycle 5E model with Magic Card learning media effectively enhances students' critical thinking skills. The iterative, step-by-step learning approach reinforces students' understanding of concepts. This study is supported by previous research

indicating that the Learning Cycle 5E model positively affects students' critical thinking skills (Ramdani et al., 2020). The Learning Cycle 5E model builds on the concept that knowledge accumulates in students' minds, making learning more meaningful. Its strengths include enhancing students' critical thinking skills and actively involving them in the learning process, thereby supporting advanced thinking skills development.

### 3. Student Responses After Applying the Learning Cycle 5E Model Through Magic Card Learning Media

Student responses in this study were assessed using a Likert scale survey administered after the completion of the learning process. The application of the Learning Cycle 5E model with Magic Card learning media resulted in an overall average score of 92.24, categorized as very good. The percentage for each survey item is shown in Figure 2.

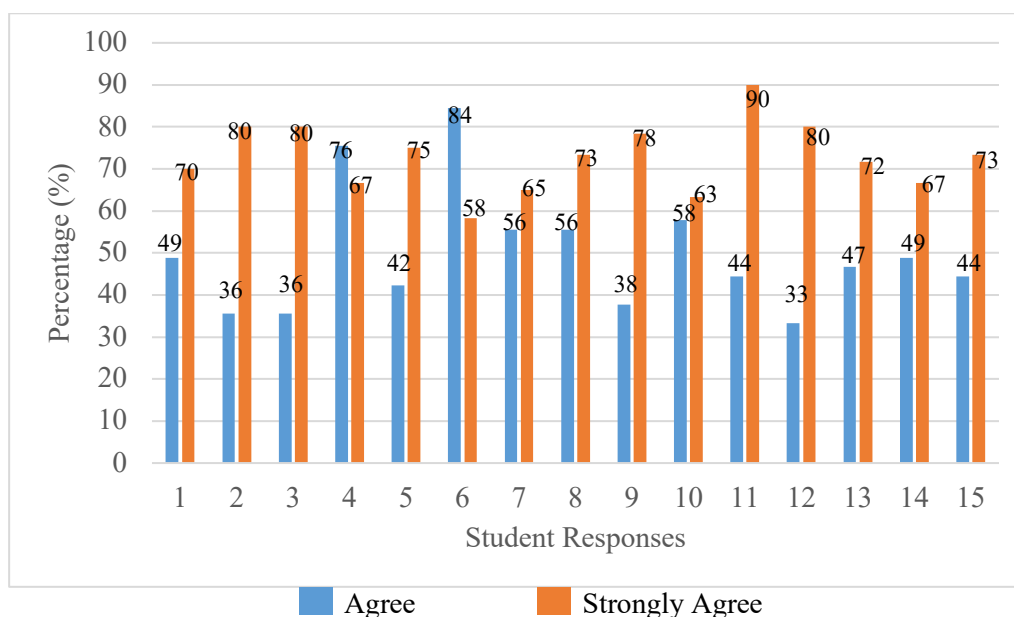


Figure 2 Percentage of Student Responses

Figure 2 illustrates the diagram of student response percentages, including the categories of agree and strongly agree. The percentage of students who strongly agreed is shown in indicator number 6, where the question indicates that students were more motivated to learn science (IPA) after using the Magic Card learning media, with a percentage of 84%. The strongly agree category is also present in indicator number 11, where the question shows that students were able to obtain data through trial questions using the Magic Card media, with a percentage of 90%.

It can be concluded that students' responses to the material on the human excretory system, after using the Magic Card learning media, indicate an enhancement in critical thinking through the provided questions. Additionally, students expressed satisfaction with what they learned and the activities conducted with the media. This study is supported by previous research (Fitriyani et al., 2016), which states that the use of Magic Card learning media is highly effective in improving students' critical thinking skills following instruction and final tests.

## CONCLUSION AND RECOMMEDATION

### A. Conclusion

Based on the observation of the implementation of the lesson plans using the Learning Cycle 5E model, the overall performance was categorized as very good, with an average implementation score of 3.95 on the Likert scale. Additionally, there was an improvement in students' critical

thinking skills with the Learning Cycle 5E model through Magic Card learning media, as indicated by a significance value of 0.292 and an N-Gain score of 75.74 for Class A and 84.54 for Class B, both categorized as high. The students' responses to the Learning Cycle 5E model were very positive, with an average response rate of 92.24%.

## B. Suggestion

Several recommendations related to the conducted research are as follows:

1. Educational practices should foster student independence by using student-centered learning models such as the Learning Cycle 5E.
2. Teachers should enhance the evaluation of learning outcomes, including the development of critical thinking questions, and students should be familiar with HOTS (Higher Order Thinking Skills) questions.
3. The study had limitations in terms of time during the implementation of the model and the use of media in teaching. Therefore, further research is needed to achieve optimal results.

## ACKNOWLEDGEMENT

All praise is due to Allah SWT, who has bestowed His grace, guidance, and blessings, allowing the author to complete this article. I would like to express my gratitude to my parents and my supervising lecturer in science education, who have guided and supported me in the preparation of this thesis until the completion of this scientific article. The author welcomes any constructive criticism and suggestions for future improvements.

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