



The Effect of the Rumah Belajar Portal on Critical Thinking Skills of High School Students

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ABSTRACT.

In physics education, teachers and students have not fully utilized instructional media that can support critical thinking skills. This research aims to investigate the influence of the Home Learning Portal on the critical thinking abilities of high school students. The population of this study consists of eleventh-grade students at State Senior High School 3 Banda Aceh. The sample includes two classes, namely the experimental class and the control class, with 37 students in each class. The sample selection was conducted through simple random sampling. The research adopts a quantitative approach with an experimental research design. Data collection involves the use of test questions (pretest and posttest). Data analysis includes normality and homogeneity tests as prerequisites, and a t-test for statistical analysis. The critical thinking ability data are obtained from the percentage of indicator achievement. The results of the data analysis indicate that the obtained data are normally distributed and homogeneous. Furthermore, the t-test results show a higher score in the experimental class compared to the control class, with a calculated t-value of $4.191 >$ the tabulated t-value of 1.666. This means that the alternative hypothesis (H_a) is accepted, concluding that there is an influence of the Home Learning Portal on the critical thinking abilities of high school students. The improvement in students' critical thinking skills is evident, with the highest average score observed in the experimental class, particularly in the conclusion indicator, at 89.19% categorized as very good.

INTRODUCTION

Education is a deliberate and systematic endeavor aimed at facilitating a robust learning process, enabling learners to actively cultivate their potential to attain spiritual and religious fortitude, self-discipline, character integrity, intelligence, noble virtues, and essential skills necessary for their personal growth, societal contribution, national progress, and the advancement of the country as a whole (Chomaidi & Salamah, 2018). 21st-century learning primarily aims to strengthen students' learning abilities and support their development as lifelong, active, and independent learners. According to Morocco et al. (2008), the demands of the characteristics of the 21st century focus on thinking competencies. In the current century, students are expected to acquire proficiency in at least four essential learning competencies: high-level understanding, critical thinking, collaboration, and communication skills. Learning in this era must be based on these four competencies for the

characteristics of 21st-century learning to be achieved. Therefore, teachers must consider achieving learning goals in school through understanding and observing something to seek knowledge in various subjects, especially physics. This educational approach aims to augment students' learning capabilities, with teachers acting as facilitators to enhance students' critical thinking skills and attain optimal learning results.

For someone with thinking abilities, it is a process of brain work to achieve a desired goal through steps for a rational concept (Siswanto & Ratiningsih, 2020). The development of critical thinking skills is crucial for learners. Sulaiman & Syakarofath (2018) state that critical thinking involves evaluating interpretations, analyses, skills, and explanations regarding evidence, concepts, methodologies, and considerations that form the basis of an assessment. This reflects the ability to memorize information and apply and manipulate knowledge according to the required context. Critical thinking is interpreting, analyzing, and evaluating ideas or arguments. Critical thinking involves high-level thinking, where an individual can use and manipulate the material to fit the required situation rather than simply memorizing something (Prihartini et al., 2016). Critical thinking skills are crucial for students in solving problems, encompassing the ability to analyze, evaluate, and interpret. In addition to being essential for problem-solving, critical thinking is a fundamental skill that students must possess, such as reading, writing, and arithmetic. According to Sihotang (2019), critical thinking is reflective thinking and the ability to make decisions. Instilling critical thinking skills in the context of authentic activities helps students resurrect these skills later in life, both in the workplace and in other aspects of life when they become adults (Ennis, 2008). In this research, critical thinking skills can be assessed based on indicators of critical thinking abilities: elementary clarification, essential supports, inference, advance clarification, and strategy and tactics (Ennis, 2002). The five indicators should be ingrained early on, particularly in students. Critical thinking skills should also be instilled early, particularly in learners who are the future of human resources (Octaviana, 2020).

Learning focused on developing critical thinking is key to preparing learners to face challenges and complex life situations. The use of media in education can assist teachers in delivering messages and instructional content. Moreover, it can also help students enhance their understanding, facilitate data interpretation, and present engaging materials. One of the learning media that can improve critical thinking outcomes is the Rumah Belajar Portal.

Rumah Belajar is a technology-based educational portal launched by the Ministry of Education and Culture of Indonesia on July 15, 2011. Rumah Belajar can be downloaded through Google Playstore or Appstore and accessed on the web at <https://belajar.kemendikbud.go.id/Dashboard/> for free. This portal provides various learning materials, communication tools, and opportunities for interaction within the educational community. It provides resources for teachers, materials for students, forums for community activities, question banks, and a catalog of instructional media. Rumah Belajar caters to students, teachers, and the broader community, serving as a learning hub for anyone seeking knowledge (Nurhayati, 2012). According to Warsita (2019), learning activities are not limited to the physical world or classroom settings; they can also take place in the virtual world, commonly known as e-learning, as seen in the Rumah Belajar Portal, which functions as a Learning Management System (LMS).

According to the results of preliminary observations at State Senior High School 3 Banda Aceh, the researcher conducted interviews with teachers and some students in 10th-grade. It has been observed that the majority of students have not fully developed their critical thinking skills in the subject of physics. This is believed to be attributed to teachers and students relying heavily on textbooks, which may not adequately support the enhancement of critical thinking skills. In essence, teachers have yet to implement instructional media that effectively promotes the development of students' critical thinking abilities. As a result, student participation in the teaching and learning process becomes passive. Particularly when teachers present physics problems in everyday life, students are unable to analyze these physics problems. Consequently, this impacts the physics learning outcomes of the Eleventh grade at Public Senior High School 3 in Banda Aceh, with an average score of 45.6, while the minimum passing criteria are 76. Based on these observations, the identified problem is that teachers have not fully utilized instructional media to support students' critical thinking skills.

Based on this issue, instructional media needs to be designed to stimulate students' critical thinking skills, and thus, the researcher attempts to use media such as Rumah Belajar. Rumah Belajar emphasizes the importance of meaningful learning and students' critical thinking abilities. Critical thinking skills are necessary for connecting, organizing, deepening, managing, and developing acquired information.

Previous research conducted by Dewi (2020) indicated that the analysis of mathematics students' critical thinking abilities, who participated in e-learning as a supplementary learning tool, was better than that of conventional learning. Meanwhile, a study by Filoza et al. (2019) revealed that utilizing the Rumah Belajar portal had a notable impact on enhancing students' creative thinking skills compared to the direct learning model. The average score for creative thinking abilities utilizing the Rumah Belajar portal was significantly higher than the direct learning class. Rumah Belajar and the features found in Rumah Belajar, such as learning resource features and virtual classroom features, have also proven effective for students in increasing interest, quality of learning, and student learning outcomes (Kurnia, 2021).

Based on the description provided, this research aims to explore the influence of the Rumah Belajar portal on students' critical thinking abilities. Media platforms like Rumah Belajar can enhance students' critical thinking skills and stimulate their interest in learning new content presented by teachers, thereby facilitating improved comprehension. Additionally, Rumah Belajar can serve as a supplementary resource in the teaching and learning journey.

RESEARCH METHODS

Research Approach

This research employs a quantitative approach, which involves systematically collecting and analyzing numerical data to explore and understand the problem under investigation. The aim is to describe phenomena from field findings based on the research problem's focus, supported by field facts. The research design utilized is experimental research. Experimental research is intended to determine the effects of something applied to the research subjects. Experimental research is chosen for this study to investigate the influence of the Learning House portal on students' critical thinking abilities. The research design employed by the researcher is the nonequivalent control group design, involving the experimental and control classes (Muliani et al., 2021). The experimental class undergoes treatment using the Learning House portal, while the control class follows the conventional teaching model typically employed by teachers.

Research Participants

The population in this study consists of 10 eleventh-grade classes at Public High School 3 in Banda Aceh, with a total of approximately ± 345 students. A sample will be selected from the existing population for the research. Arikunto (2010) states, "A sample is a part or representative of the population under study." The determination of the sample is carried out using the simple random sampling technique. Kasmadi & Sunariah (2013:66) explain, "Simple random sampling is a simple sampling technique conducted randomly without considering existing strata within the population. This technique is used for random sample selection from population members. Although random, each member of the population has an equal opportunity to be chosen as a sample." In this research, the experimental class sample consists of 37 students from Eleventh grade 2, and the control class sample consists of 37 students from Eleventh grade 3.

Research Instruments

In this research, a test instrument is utilized. A test is a method or tool employed in education for measurement and assessment, typically involving the administration of tasks or a series of tasks (Syukri, 2022). Test measurement can accurately assess critical thinking abilities. An individual's essential abilities of thinking can be measured using multiple-choice tests, skill tests, and essay tests (Ennis, 1993). The type of test instrument used in this research is a critical thinking ability test with multiple-choice questions using a written or multiple-choice test method with 5 (five) options and a

total of 10 questions. The critical thinking ability test items include indicators of critical thinking skills: elementary clarification, basic support, inference, advanced clarification, strategy and tactics.

Data Collection

The data collection in this research involved giving pretest questions to the experimental and control classes, which assessed the initial critical thinking abilities of the students before the intervention was applied. Meanwhile, posttest questions were given to measure the final critical thinking abilities after the intervention, aiming to understand the impact of the Rumah Belajar portal on the experimental class and the direct learning model on the control class.

Data Analysis

Quantitative data were derived from the test outcomes, specifically the pretest and posttest scores of students from both the experimental and control groups. The data analysis technique in this study encompassed normality and homogeneity tests as preliminary steps, using the t-test for statistical analysis. Meanwhile, to examine the criteria for students' critical thinking ability indicators, the analysis utilized the percentage formula, as outlined by Zahra (2022):

$$\text{Percentage} = \frac{\text{total score for each indicator for students}}{\text{maximum score for each indicator for students}} \times 100\%$$

In hypothesis testing, the data used are the final test scores of students after the treatment. Hypothesis testing utilizes a one-tailed t-test. Arikunto (2010) states that if, in experimenting, the researcher expects that the treatment given will have a positive effect, then a one-tailed test is conducted.

To test the one-sided hypothesis, namely the right side, then:

$H_0 : \mu_1 \leq \mu_2$ (there is no effect of the rumah belajar portal on students' critical thinking abilities)

$H_a : \mu_1 > \mu_2$ (there is an effect of the rumah belajar portal on students' critical thinking abilities)

However, before hypothesis testing is conducted, each class's final test score data must first be tested for normality and homogeneity using Microsoft Office Excel.

RESULTS AND DISCUSSION

Results

This study is a quantitative research with a nonequivalent control group design. There are several stages in this research, namely the stage of normality test result, homogeneity test result, hypothesis test results, and analysis of critical thinking abilities based on indicators

1. Normality test results

The normality test is performed to assess whether the data in this study adhere to a normal distribution. The results of the normality test for both the experimental and control classes using the Kolmogorov-Smirnov test are as follows:

Table 1. Presents the results of the normality test calculations

	Pretest Scores		Posttest Scores	
	Eksperimental Class	Control Class	Eksperimental Class	Control Class
α	0,05	0,05	0,05	0,05
n	37	37	37	37
D_{count}	0,165	0,145	0,204	0,132
D_{table}	0,224	0,224	0,224	0,224
Distribution Properties	Normal	Normal	Normal	Normal

Based on the table above, it can be observed that in the experimental class, the pretest with the calculated value ($D_{\text{count pretest}}$) is $\leq$ the table value (nilai D_{table}), which is $0.165 \leq 0.224$. Similarly, for the posttest in the experimental class, the calculated value ($D_{\text{count posttest}}$) is $\leq$ the table value, which

is $0.204 \leq 0.224$. Both pretest and posttest results in accepting H_0 , and it can be concluded that the sample is from a population with a normal distribution. In the control class, the pretest with the calculated value (D_{count} pretest) is $\leq$ the table value of $0.145 \leq 0.224$. For the posttest in the control class, the calculated value (D_{count} posttest) is also $\leq$ the table value, which is $0.132 \leq 0.224$. Therefore, both the pretest and posttest results accept H_0 , and it can be concluded that the sample is from a population with a normal distribution.

2. Homogeneity test results

The homogeneity test is conducted to determine whether the two samples have the same variance (homogeneous) or not. If $F_{\text{count}} < F_{\text{table}}$ means the data is homogeneous; if $F_{\text{count}} > F_{\text{table}}$, it means the data is heterogeneous.

Table 2. Presents the results of the homogeneity test calculations

	Pretest Scores		Posttest Scores	
	Eksperimental Class	Control Class	Eksperimental Class	Control Class
Varians (S^2)	117,567	126,876	91,441	155,85
F_{count}	1,079		1,704	
F_{table}	4,12		4,12	
Properties of Variance	Homogen		Homogen	

Based on the table above, it can be seen that the homogeneity test results for the pretest values with F_{count} (1.079) $<$ F_{table} (4.12), while the homogeneity test results for the posttest values obtained F_{count} (1.704) $<$ F_{table} (4.12). Therefore, H_0 is accepted, indicating that there is no difference in variance between the experimental class and the control class. Thus, the variances are homogeneous for both pretest and posttest values.

3. Hypothesis test results

Next, since the obtained data is normally distributed and homogeneous, a hypothesis test is conducted to determine the presence or absence of the effects of the treatment given.

Tabel 3. Results of the hypothesis testing calculation

	Mean Scores	Mean Scores	Uji-t		Explanation
	Experimental Class	Control Class	$t_{\text{calculate}}$	t_{table}	
Pretest	28,649	28,108	0,210	1,666	H_0 accepted
Posttest	84,054	73,243	4,191	1,666	H_a accepted

Based on the table above, it can be observed that the result of the pretest critical thinking ability score is obtained $t_{\text{count}} < t_{\text{table}}$, which is $0.210 < 1.666$, so H_0 is accepted. It can be concluded that Rumah Belajar does not affect students' critical thinking abilities. Meanwhile, the result of the posttest critical thinking ability score is obtained $t_{\text{count}} > t_{\text{table}}$, which is $4.191 > 1.666$, so H_a is accepted. It can be concluded that the Rumah Belajar portal influences students' critical thinking abilities.

4. Analysis of critical thinking abilities based on indicators of critical thinking abilities

Improvement in students' critical thinking abilities is obtained from the pre-learning test (pretest) and the post-learning test (posttest). These tests are conducted in two classes: the experimental class and the control class. Critical thinking indicators consist of 5 elements: (I) elementary clarification, (II) basic supports, (III) inference, (IV) advance clarification, and (V) strategy and tactics.

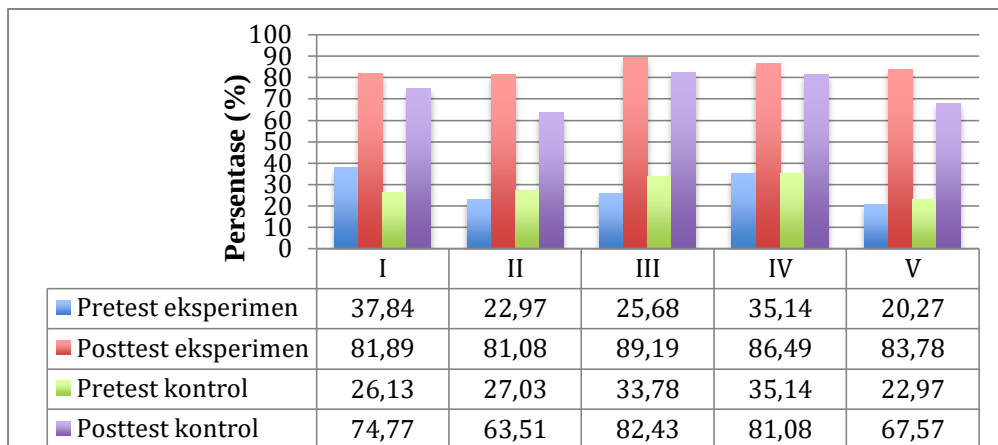


Figure 1. Average scores of students based on critical thinking indicators

The findings reveal that the rise in average scores across indicators in the experimental class surpasses that of the control class. This suggests that the implementation of the Rumah Belajar portal in the experimental class has a significant influence on enhancing students' critical thinking abilities.

Discussion

Critical thinking ability is measured through essential indicators of thinking when solving problems. These critical thinking indicators include (I) elementary clarification, (II) basic supports, (III) inference, (IV) advance clarification, and (V) strategy and tactics. The improvement in critical thinking abilities in the experimental class using the Rumah Belajar portal and the control class with a scientific approach will be explained as follows:

1. Elementary clarification

Based on the above Figure 1, in indicator, I, the experimental class showed a significant improvement after being treated with the Rumah Belajar portal. Before the treatment, the experimental class had an average percentage score of 37.84% with a category of less proficient. However, after the treatment, the score increased to 81.98% with an excellent category. Meanwhile, the control class also experienced an improvement in critical thinking ability after the treatment, although initially having a lower average percentage score, which was 26.13% with a category of less proficient. After the treatment, the control class score increased to 74.77% with a good category. The critical thinking ability of the experimental class is higher than that of the control class, and this improvement occurs because, during the learning process using the Rumah Belajar portal, students are trained to focus their questions by identifying or formulating criteria that consider the possibility of correct answers. As stated by Purbonugroho et al. (2020), students with high abilities can solve problems correctly

2. Basic supports

In indicator II, the experimental class experienced a significant improvement after being treated with the Rumah Belajar portal. Before the treatment, the experimental class had an average percentage score of 22.97% with a category of less proficient. However, after the treatment, the score increased to 81.08% with an excellent category. Meanwhile, the control class also experienced an improvement in critical thinking ability after the treatment, although initially having a higher average percentage score than the experimental class, which was 27.03% with a category of less proficient. After the treatment, the control class score increased to 63.51% with a good category. The enhanced critical thinking abilities noted in the experimental class exceed those observed in the control class, a discrepancy attributed to incorporating the Rumah Belajar portal into the learning process. The Rumah Belajar portal, as a supplementary learning tool, it effectively enhances students' critical thinking processes regarding the problems they encounter. This is because every problem presented to students allows them to observe and consider the observation results using accurate evidence. This

corresponds with the research conducted by Dwijonagoro & Suparno (2019), which suggests that in e-learning environments, students can participate in discussions akin to live performances, thus enhancing their critical thinking abilities. Furthermore, according to previous research by Ritonga (2021), training students in critical thinking skills to respond more critically to the concepts being studied can improve their capacity to solve increasingly complex and contextual problems. Offering opportunities for all students to construct their knowledge ensures the acquired knowledge is more meaningful.

3. Inference

In indicator III, the experimental class experienced a significant improvement after being treated with the Rumah Belajar portal. Before the treatment, the experimental class had an average percentage score of 25.68% with a category of less proficient. However, after the treatment, the score increased to 89.19% with an excellent category. Meanwhile, the control class also experienced an improvement in critical thinking ability after the treatment. Initially, the control class had an average percentage score of 33.7% with a category of less proficient, and after the treatment, the score increased to 82.43% with an excellent category. Compared to the control class, the enhanced critical thinking abilities observed in the experimental class are directly attributed to the utilization of the Rumah Belajar portal. During the learning process, students in the experimental class are trained to draw conclusions after discussions. At each session's end, students and teachers collectively summarize the learning outcomes, and this aligns with the research conducted by Mila et al. (2021), which suggests that students can better understand and draw conclusions from the material if the learning media is engaging and appropriate.

4. Advance clarification

In indicator IV, the experimental class experienced a significant improvement after being treated with the Rumah Belajar portal. Before the treatment, the experimental class had an average score of 35.14% with a category of less proficient. However, after the treatment, the score increased to 86.49% with an excellent category. Meanwhile, the control class also experienced an improvement in critical thinking ability after the treatment. Initially, the control class had an average score of 35.14% with a category of less proficient, and after the treatment, the score increased to 81.08% with an excellent category. The critical thinking abilities in the experimental class are higher than those in the control class, and this improvement is attributed to the use of the Rumah Belajar portal. During the learning process, teachers in the experimental class encourage students to provide arguments when engaging in question-and-answer sessions, requiring them to substantiate their responses to various issues. The presence of arguments among students fosters an open exchange of opinions, making students more receptive to different perspectives. This aligns with the research conducted by Murdani (2022), which suggests that having students answer questions individually stimulates critical thinking. Based on the results of previous research studies by Miftianah et al. (2017), it is stated that students can provide further explanations, as evidenced by students who ask questions, not only giving brief explanations but also detailed explanations with their abilities.

5. Strategy and tactics

In indicator V, the experimental class experienced a significant improvement after being treated with the Rumah Belajar portal. Before the treatment, the experimental class had an average score of 20.27% with a category of less proficient. However, after the treatment, the score increased to 83.78% with an excellent category. Meanwhile, the control class also experienced an improvement in critical thinking ability after the treatment. Initially, the control class had an average score of 22.97% with a category of less proficient, and after the treatment, the score increased to 67.57% with a good category. The improvement in critical thinking abilities observed in the experimental class compared to the control class is attributed to the utilization of the Rumah Belajar portal. During the learning process, students can determine appropriate actions for learning issues and employ logical strategies to decide what needs to be done to address these problems. This aligns with the research conducted by Murdani (2022), which indicates that in digital modules, a problem is presented in the form of a video simulation along with suitable tactics to effectively and efficiently solve the problem. According to

the research findings by Zaini (2018), individuals who exhibit high levels of curiosity, open-mindedness, broad knowledge, sound judgment, and a willingness to reevaluate problems can be classified as proficient in solving critical thinking challenges. So, to bolster students' critical thinking skills, there is a need for innovation in the learning process.

The comparison between the critical thinking ability indicators of the experimental class and the control class indicates that the experimental class had higher scores. This is because we are using the Rumah Belajar portal during the learning process. Based on the improvement in students' critical thinking skills shown in Figure 1, it can be concluded that the highest average scores for the indicators are found in the experimental class, particularly in the conclusion indicator, with a score of 89.19% categorized as very good. This is because students can create and determine conclusions based on factual backgrounds. Additionally, students can draw their own conclusions after engaging in discussion activities and learning outcomes. This is consistent with Aditya's (2021) research, which indicates that the high ability of students in the experimental group on the inference indicator is due to their proficiency in concluding, considering inductive and deductive reasoning, and making decisions, and based on the research findings by Wahyuni et al. (2020), it is stated that students can comprehend in making decisions regarding issues in the questions and can consider the decisions made and connect the material so that students can conclude the decisions to be made.

CONCLUSION

Based on the research results, it can be concluded that the data analysis and the improvement of students' critical thinking abilities conducted by the researcher regarding the Rumah Belajar portal's influence on critical thinking abilities, resulted in hypothesis testing using the t-test accepting the alternative hypothesis (H_a) and rejecting the null hypothesis (H_0). The highest average scores of indicators were found in the experimental class, specifically in the summarizing indicator at 89.19% with a category of excellent. Therefore, it can be concluded that the Rumah Belajar portal influences critical thinking abilities.

Several recommendations can be proposed to enhance education based on the research conducted. Firstly, teachers and students at State Senior High School 3 Banda Aceh can utilize the Rumah Belajar portal as a classroom learning tool to improve students' critical thinking abilities. Secondly, future researchers are encouraged to develop and utilize the features of the Rumah Belajar portal as a research source further by conducting deeper analyses to strengthen the findings of this research.

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