

The Effectiveness of Hybrid Learning-Based Adaptive Media to Empower Student's Critical Thinking Skills: Is It Really for VARK Learning Style?

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Abstract: Students needed to understand more complex knowledge through critical thinking. The discovery of a good understanding could be directed with high critical thinking skills. This study intended to propose a new learning approach, namely a hybrid learning model that adapts the VARK learning style to empower students' critical thinking skills. The research used the Research and Development method which includes the stages of exploration, development, testing, and dissemination. Adaptive learning media had been designed to implement the proposed new learning model. Testing the research product used 98 elementary school students in Surakarta City who were taken through the cluster random sampling technique. Product effectiveness analysis used the Wilcoxon Signed Rank Test and the Mann-Whitney U test after knowing the results of the normality and homogeneity prerequisite tests. The score for increasing critical thinking skills in the aspect of interpretation was 94.18%, the inference was 77.74%, the explanation was 97.33%, the analysis was 98.87%, evaluation was 65.01%, and self-regulation was 97.13 %. The test results prove that adaptive media based on hybrid learning models has a very significant impact on improving students' critical thinking aspects. This implied that the application of the hybrid learning model by adjusting the VARK learning style is able to effectively improve students' critical thinking skills.

Keywords: Adaptive Media, Critical Thinking, Hybrid Learning, VARK

1. Introduction

In the era of global competition, students need to be encouraged to actively develop themselves according to their potential to be able to compete in the future. As a manifestation, in the learning process, it is necessary to change the learning paradigm from teacher-centered learning to student-centered learning so that students can think critically, deductively, and inductively in learning in this era of disruption (Afandi et al., 2018). One of the essential abilities that students must have in the future is critical thinking. Critical thinking reflects the wisdom of decision-making in problem-solving through an intellectual process (Elisanti et al., 2018)(Facione & Facione, 2013)(Dalim et al., 2022). However, this ability has not been widely used as the main goal in learning so far, except it is

only oriented to the achievement of memorization, understanding, and application. As a result, currently, there are still many students who have poor critical thinking skills.

Several previous studies paid less attention to efforts to find forms of learning that could improve students' critical thinking skills. HOTS was applied in learning through the habit of giving essay questions to improve students' critical thinking skills. The sample consisted of elementary school students in the city of Surakarta and the results showed an average positive increase (Sidiq et al., 2021)(Setyaningsih et al., 2022)(Kurniawan et al., 2022). In Rahmawati et al. (2019), Ishartono et al. (2021), and Ramli et al. (2022) The Science, Technology, Engineering, Arts, Mathematical (STEAM) model approach was used to direct students to develop problem-solving, critical thinking, and collaboration skills. Students' critical thinking had been successfully stimulated a little by this STEAM. Rusimamto et al. (2019) had researched the PLC programming learning process with the Problem Based Learning (PBL) model in the Electrical Engineering Education study program. The results of the study concluded that to improve students' competence in PLC programming, educators should apply the PBL model assisted by training kits to facilitate student understanding but have not succeeded in improving students' critical thinking skills. Wulansari et al. (2019) and Kiong et al. (2022) have also completed research to determine the improvement of student's cognitive abilities and critical thinking skills using the Project-Based Learning (PBL) model that is integrated with scientific creativity and LKS (SCCW) and Conventional Student Worksheet (CSW) for high school students. The use of SCCW was found to be more effective than the use of CSW in improving students' critical thinking and cognitive abilities. However, the effectiveness of SCCW has not had a significant impact on improving students' critical thinking. Although several popular approaches have been applied, some of the approaches in this research have not been able to provide fresh air to improve students' critical thinking skills in natural learning according to their potential. Natural learning conditions occur when students use their method according to the way that is considered the easiest to understand a new knowledge as a psychological factor and then implement it through the senses they usually use, as a physiological factor. These two factors are important to be actualized in the learning process because in principle each individual has a unique and different personal character. Actualization can be done in the form of exploring certain habits or ways of learning that are considered the easiest and most preferred when understanding new knowledge. This is known as a learning style (Jamian et al., 2022)(Alian & Shaout, 2017). However, the reality that occurs today is that when educators carry out the learning process, students are always presented with the subject matter in the form of the same presentation model for each student, meaning that they assume that all students have character and ways. understanding of science through the same path without ignoring the psychological and physiological factors of students. This assumption is certainly not true because, in reality, each student has different characteristics in terms of psychology, ability level, learning methods, background, and other factors (Alqunayeer & Zamir, 2015). This is also supported by survey reports (Rager, 2017)(Rinehart et al., 2015)(Willingham et al., 2015) which state that there were a very heterogeneous learning style from the average number of student samples that have been observed.

Learning style is a way that is preferred by students in a learning process. With a learning style, students will more easily understand lessons (Gholami & Bagheri, 2013)(Pereira et al., 2018)(Sulistiyanto et al., 2019). Not everyone uses the same way of learning (Vasileva-Stojanovska et al., 2015). According to Fleming (2016), learning styles are divided into four, namely visual, auditory, read/write, and kinesthetic (VARK). Students with a tendency towards visual modality generally enjoy using visual media such as charts, graphs, flowcharts, and models that represent visual information. Auditory learners prefer information heard, so the best way to learn is through discussion, lectures, and talking to yourself and others. Learners who tend to read/write prefer words and textbooks as a way to get information, so prefer textbooks, lecture notes, handouts, checklists, and glossaries. Furthermore, students with kinesthetic tendencies use a combination of sensory functions, they must feel or live their learning experiences, prefer practical simulations and real experiences, lessons that emphasize carrying out an activity, travel, exhibitions, samples, case studies, and role plays.

Based on the explanation above, in this study, an alternative idea emerged to develop a learning approach to increase the effectiveness of the learning process which aims to improve students' critical thinking skills. The factual problem that has not been taken seriously by the existing

learning approach, namely the diversity of student learning style preferences, is overcome by designing an adaptive learning approach. The focus on independent learning and adaptability to the characteristics of students' learning styles is the contribution of the current research.

The topic of developing a learning approach based on Visual, Auditory, Read/write, and Kinesthetic (VARK) learning styles to improve students' critical thinking skills using adaptive hypermedia is very interesting to be raised and carried out in-depth study in this research with the reasons and considerations, namely: 1) The presentation of learning materials will be more interesting when using a combination of text, sound, images, and the interactivity of an asynchronous navigation environment called hypermedia; 2) students can have different learning goals and objectives, different backgrounds, different levels of knowledge, varying competencies, and ways of learning things in different ways (Tsortanidou et al., 2017)(Hasibuan et al., 2016)(Drissi & Amirat, 2016).

2. Method

In this study, there were six aspects used in evaluating the empowerment of students' critical thinking skills. These aspects were interpretation, inference, explanation, analysis, evaluation, and self-regulation. The research method adopted was the Research and Development method using Luther's development model (Sulistyanto et al., 2022). This study wanted to know the improvement of students' critical thinking skills by applying hybrid learning-based adaptive media applications. The learning procedure embedded in adaptive media included seven steps, namely asking questions, formulating answers, applying case studies, motivating questions, activating debate, and giving awards. The procedure in the application media was carried out in four learning styles, namely VARK. So that each type of learning style would apply the seven learning steps. Several strategies and instruments were used to help complete the planned stages through some necessary modifications. Each type of learning style could do three repetitions of the learning process to obtain optimal results in empowering critical thinking skills.

2.1 Participants

The participants in this study were 98 elementary school students who were selected by cluster random sampling from several schools spread across Solo Raya, Central Java, Indonesia. They were between 10 and 11 years old in grade V with adequate literacy and numeracy skills. Gender was not taken into account at this time so neither girls nor boys were the focus when collecting data. By following the research objective to investigate the improvement of critical thinking skills, participants were randomly grouped into two groups, namely the experimental group and the control group.

2.2 Research Instruments

Several important instruments were used to obtain data in this study. Globally, the instruments are grouped into three categories, namely initial needs analysis instruments, design instruments and determining the type of learning style, and assessment instruments for the design of adaptive media applications. The groupings are shown in Table 1 below.

Table 1. Categories of research instruments

No.	Categories	Inst. Type	Description
1	Initial needs analysis instruments	teacher's perception of critical thinking skills	teacher's opinion about the need for critical thinking for students
		media needs for teachers	explore the specifications of the type of media needed by the teacher
		media needs for students	explore the specifications of the type of media needed by

2	Design and determination of the type of learning style instruments	Media expert validation Material expert validation System usability scale	the students Recommend app revision Recommend app revision acceptability level interpretation
3	Assessment instrument	usage assessment effectiveness assessment	interpretation of ease of use measuring the level of effectiveness of increasing critical thinking

In the development of learning models several elements should not be abandoned (Arquero et al., 2017)(Joyce et al., 2016), namely:

- Syntax; operational steps in learning;
- Social systems; atmosphere and norms that apply in learning;
- Principles of Reaction; give educators an idea of how to perceive and respond to student questions;
- Support systems; Facilities and infrastructure as well as a learning environment that supports the learning model;
- Instructional and nurtured effects; accompaniment results or results to be achieved by students after participating in learning.

The instrument was an adaptive media application product. The product media was used as an instrument to carry out the learning process in which it applied hybrid learning with the concept diagram shown in **Fig 1**.

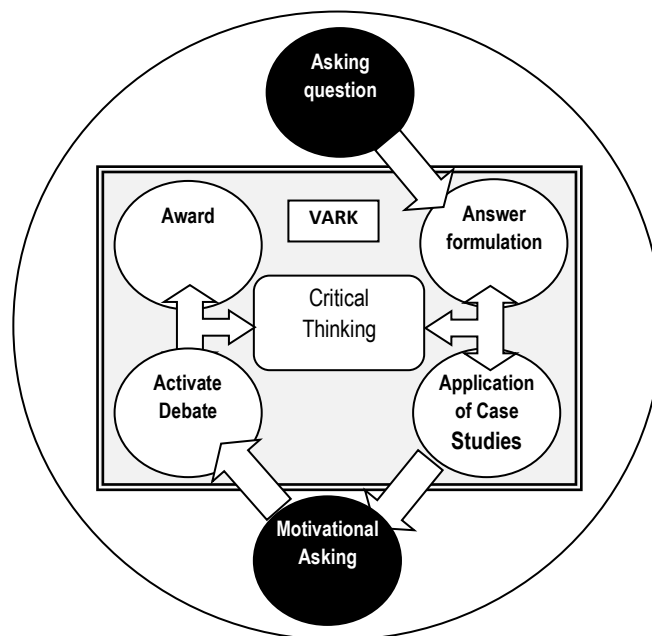


Fig. 1 Concept diagram of hybrid learning

Asking a question was the step of giving trigger questions to students at the beginning of learning. Formulating an answer was a step that allows students to formulate answers to the initial questions presented. Applying case studies was the step of presenting a problem in the form of a case study to

be solved by students. Motivating asking was a step to provoke students to ask questions to other friends in learning. The activating debate was a step to provide opportunities for students to carry out intensive discussions and argue over the questions posed in learning. Giving an award was a step of giving praise to students who successfully provide solutions to problems properly.

Based on the design concept of the hybrid learning model that was developed, students' activities from each stage were described which were oriented towards empowering critical thinking skills. Learning activities are described in Table 2.

Table 2. Stages of hybrid learning activities

Sequences	Stages	Learning activities
1	Asking question	<ul style="list-style-type: none"> - Students think through deductive and inductive reasoning processes. - Students internalize the habit of critical thinking through guided practice.
2	Answer formulation	<ul style="list-style-type: none"> - Students formulate answers to the questions in their own words.
3	App of case studies	<ul style="list-style-type: none"> - Students receive lesson content and apply it to the required chapters. - Students apply content to the grading criteria and give students higher marks for successful application.
4	Motivational asking	<ul style="list-style-type: none"> - Students ask questions related to ambiguous content, words, or phrases.
5	Activate debate	<ul style="list-style-type: none"> - Students get one topic and then present arguments to defend and respond to objections from other friends. - Other students have the opportunity to refute the arguments presented by friends.
6	Awards	<ul style="list-style-type: none"> - Students are rewarded in learning for their feedback.

The adaptive media application instrument has been designed with the display results shown in **Fig. 2** below.

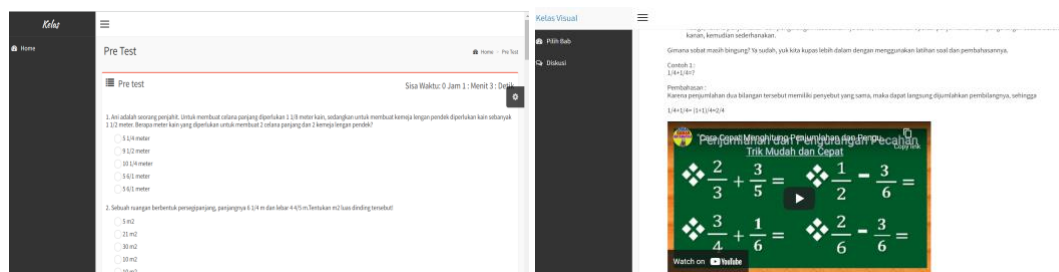


Fig. 2 Hybrid learning-based adaptive media application

The application display above includes the initial menu display, the results of the VARK learning style identification process, the pre-test process, and learning.

The normalized gain test (N-Gain) was carried out to determine the improvement in students' critical thinking aspects after being given treatment with the following equation (1).

$$Gain\ score = \frac{Post\ Test\ score}{Ideal\ score - Pre\ Test\ score} \times 100\% \quad (1)$$

Post test Score: post test scores obtained

Pre test Score: pre test scores obtained

Ideal Score: a maximum score that can be obtained

Category of the interpretation of the effectiveness of the gain score:

Gain score < 40 : Ineffective

40 ≤ gain score ≤ 55 : Less effective

56 ≤ gain score ≤ 75 : Effective enough

Gain score > 75 : Effective

3. Results and Discussion

3.1 Results

The results of the analysis of the normality test of pre-test and post-test scores in both groups, namely the control and experimental groups are presented in Table 4 below. Based on the results of the analysis of the data normality test using Kolmogorov Smirnov, the significance results of each group in the pre-test and post-test have a value of <0.05 so it can be concluded that the data distribution is not normally distributed.

Table 4. The results of the normality test of the pre-test and post-test scores of the two groups

Group		Test of Normality					
		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Pre test	Experiment	.153	50	.005	.938	50	.012
	Control	.170	50	.001	.920	50	.002
Post test	Experiment	.206	50	.000	.898	50	.000
	Control	.224	50	.000	.899	50	.000

a. Lilliefors Significance Correction

The results of the analysis of the homogeneity of the two groups, namely between the control and experimental groups on the pre-test and post-test scores are presented in Table 5 below.

Table 5. The results of the homogeneity test on the pre-test and post-test scores of the two groups

		Test of Homogeneity of Variance			
		Levene Statistic	df1	df2	Sig.
Pre test	Based on Mean	.051	1	98	.822
	Based on Median	.193	1	98	.661
	Based on Median and with adjusted df	.193	1	97.429	.661
	Based on trimmed mean	.070	1	98	.791
Post test	Based on Mean	4.757	1	98	.032

Test of Homogeneity of Variance

	Levene Statistic	df1	df2	Sig.
Based on Median	2.443	1	98	.121
Based on Median and with adjusted df	2.443	1	89.971	.122
Based on trimmed mean	4.953	1	98	.028

Based on the results of the homogeneity analysis in Table 5, it is known that the results of the pre-test between the two groups have a significance value of $0.822 > 0.05$, which means that the results of the pre-test scores in the experimental and control groups have a homogeneous distribution. This is an indication that the two groups have the same variance or in other words, there is not much difference in diversity. While the results of the homogeneity analysis on the post-test results between the two groups have a significance value of $0.032 < 0.05$, which means that the post-test scores between the experimental group and the control group have an inhomogeneous distribution. This is an indication that the two groups have different variances, in other words, there are differences in diversity.

The balance test was carried out on the experimental class and control class to determine whether the abilities of the experimental class and control class were balanced. Because the results of the prerequisite analysis found that the data were not normally distributed, the non-parametric Wilcoxon Signed Rank Test (paired test) and Mann-Whitney U test (unpaired test) were used. The results of the analysis are shown in Table 6 below.

Table 6. The results of the analysis of the balance test between the experimental group and the control group

Test Statistics ^a	
	Pretest
Mann-Whitney U	1118.500
Wilcoxon W	2393.500
Z	-.920
Asymp. Sig. (2-tailed)	.358

a. Grouping Variable: group

Based on the results of the non-parametric analysis in Table 6, it can be seen that the comparison of student scores in the experimental group and the control group obtained a pre-test score with a significance value of 0.358. Because the value of $\text{Sig} = 0.358 > 0.05$, it can be concluded that there is no significant difference between the experimental group and the control group. This means that in the two groups there is no difference in initial (balanced) ability before being treated in the experimental group. The test results using the Wilcoxon Signed Rank Test are shown in Table 7 below.

Table 7. Results of the non-parametric Wilcoxon Signed Rank Test in the experimental and control groups

Test Statistics ^a		
	Pre test experiment- Post test experiment	Pre test control- Post test control
Z	-6.186 ^b	-6.197 ^b
Asymp. Sig. (2-tailed)	.000	.000

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

Based on the results of the Wilcoxon Signed Rank Test analysis as presented in Table 5, the comparison of the pre-test and post-test scores in the experimental group was 0.000. Because the value of Sig = 0.000 < 0.05, it can be concluded that there is a significant difference between the pre-test and post-test mean values in the experimental group. Meanwhile, the comparison of pre-test and post-test scores in the control group was also 0.000. Because the value of Sig = 0.000 < 0.05, it can be concluded that there is a significant difference in the mean value between the pretest and post-test in the control group. This illustrates that in both the experimental group and the control group there is a difference between the pre-test and post-test scores. This means that both groups have a change in ability based on the pre-test to post-test scores.

Furthermore, the results of the test on the post-test scores between the two groups are shown in Table 8 below. Based on Table 8, it can be seen that the significance = 0.000 < 0.05 so it can be concluded that the results of the post-test scores between the two groups have differences due to the treatment in the experimental group.

Table 8. The results of the analysis of post-test scores between the experimental group and the control group

Test Statistics ^a	
	Post test
Mann-Whitney U	34.000
Wilcoxon W	1309.000
Z	-8.425
Asymp. Sig. (2-tailed)	.000
a. Grouping Variable: group	

The analysis was also carried out on the increase in the difference in the scores between the pre-test and post-test (gain) as an indicator of the effectiveness of enhanced-open learning used in learning. The description of the gain score per an aspect of critical thinking skills is shown in Table 9. The gain score obtained in the aspect of critical thinking skills in the control class has a range between 36.91% to 71.68% with an average of 58.37% in the sufficient category. Meanwhile, for the experimental class, the gain scores ranged from 65.01% to 97.33% with an average of 81.17% in the effective category. The conclusion obtained is that in the aspect of critical thinking skills the gain score increase in the experimental class is greater than in the control class, which indicates that hybrid learning-based adaptive media is effective in improving students' critical thinking skills.

Table 9. Description of the gain score on the aspect of critical thinking skills

Group	Aspects of Critical Thinking Ability (%)					
	Interpretation	Inference	Explanation	Analysis	Evaluation	Self-regulation
Experiment	94,18	77,74	97,33	98,87	65,01	97,13
Control	65,90	44,52	71,68	64,83	36,91	66,34

3.2 Discussion

The idea of developing a hybrid learning approach that is applied with learning style-based adaptive media to empower students' critical thinking skills arises based on many factors, both external and internal factors. The ability to think critically is a competency that students must have in the future to face the era of the industrial revolution 4.0 (Perdana et al., 2019)(Jerome et al., 2017). Jamian et al. (2022), Setyaningsih et al. (2022), and Utama et al. (2020) stated that one of the efforts that can be made to improve the quality of learning is to improve the quality of learning tools. Many studies have been carried out on the existence of learning devices, especially those related to the topic

of this research, namely learning approaches and platforms with various learning applications. In terms of quality, certain aspects are very good (Nagao & Nagao, 2019)(Lakshmanan, 2018). However, in future developments, the reliability of existing learning tools is deemed less relevant to the development of the learning process in the future. As have been stated by Khanal et al. (2019), Jamian et al. (2022), and Swe & Hann (2020) that to achieve accelerated learning outcomes naturally, the learning process must involve the emotions and sensory abilities of each student and how students can learn and understand something they learn easily. This factor has not been adopted by some of the current learning approaches.

The form of hybrid learning approach was developed by taking into account the specific needs of students. In this study, the main factor that forms the basis of development is the preferences of students' learning styles. The application of a hybrid learning approach is expected to achieve empowerment of students' critical thinking skills. In addition, independence in learning is also an important aspect, moreover, today's demands that learning can be carried out without any limitations of space, time, and content (Chiou et al., 2015). Following El-Rady et al. (2017) and El-Rady et al. (2017) an online learning approach forms the basis for further development that can be applied (Wang et al., 2014). These three factors as the basis for development are integrated into a hybrid learning model that is integrated with interactive adaptive media that has the advantages of navigation and operational environment. Adaptive media is the main key to development because this media is adaptable to the learning style preferences of student users so that it will present a learning environment by the identified learning style preferences, which can be visual, auditory, reading/writing learning styles, or kinesthetic (VARK).

Adaptive media for learning applications work by embedding a hybrid learning model, which takes advantage of the advantages of several elements of learning style preference and online learning. In implementing the learning process using adaptive media learning applications, the stages of the learning flow include: 1) asking questions; 2) formulating answers; 3) applying case studies; 4) motivating ask questions, 5) activating debate; and 6) giving award.

The first stage is asking questions. The purpose of this stage is to motivate students to explore things that are not yet known and then make connections with what is known through searching for answers creatively and cognitively. In the implementation of learning, students are encouraged to carry out thinking activities through reasoning processes, both inductive and deductive as well as internalizing the habitual behavior of critical thinking in guided learning so that they are motivated to think critically as conveyed by Tsai (2016) that the ability to think is triggered by an open question. Meanwhile, educators are required to have competence in compiling open-ended questions with the potential for more than one answer through various ways of finding answers.

The second stage is the formulating answers. The purpose of this stage is to improve students' skills in giving opinions in their own words and to encourage the habit of sparking various ideas (flexible) so that there is the possibility of more than one answer (fluency) through analysis and logical reasoning. In the implementation of learning, students are encouraged to formulate an answer with self-composed sentences so that creative thinking is formed (Chirico et al., 2018). However, if a student have not been able to do so, he can write other people's sentences by including citation markings. Meanwhile, educators are required to provide flexibility to the answers given by students in various ways of finding answers without focusing on the correctness or falsity of answers.

The third stage is the applying case studies. The purpose of this stage is to motivate so that students can apply a concept to a particular case that they get the opportunity to practice critical thinking in the application of a concept (Dalim et al., 2022)(Alifia et al., 2018)(Jerome et al., 2017). In the implementation of learning, students receive, understand, and examine the lecture content presented in the application and then map and apply this content to the criteria for the requested chapters with critical thinking. Educators are required to be able to provide an assessment of the application of content to successful case studies by assessing it higher than those that have not been successful.

The fourth stage is the motivating ask questions. The purpose of this stage is to provide effectiveness and self-direction for students to do critical thinking to produce additional information based on prior knowledge in improving reasoning and problem-solving. In the implementation of learning, students ask questions to themselves or others related to the content that is being studied and

has been studied as conveyed by Kiong et al. (2022) and Wechsler et al. (2018) that critical and creative thinking is formed through thought to gain new knowledge construction on self-asked questions. Educators are required as facilitators to provide opportunities and leeway for students to ask questions related to ambiguous content, words, or phrases.

The fifth stage is to bring up debate activities for students. The purpose of this stage is to provide opportunities for students to use their cognitive abilities by prioritizing analysis and logical reasoning, strengthening self-confidence and the habit of critical thinking, and developing the ability to articulate their ideas in front of other students. In line with Kurniawan et al. (2022) and Fazriyah et al. (2018) that the stimulation of critical thinking skills in the implementation of learning is carried out by students by presenting arguments from a topic to be defended and responding to objections from other friends. While other students had the opportunity to refute the arguments being presented. Educators are required to have the ability to manage learning classes by discussing and becoming mediators for the availability of various solutions for an argumentation topic.

The sixth stage is giving awards to students. The purpose of this stage is to motivate students to always try to do self-evaluation towards increasing abilities with self-efficacy through assessment criteria in discussions. Vong & Kaewurai (2017) stated that the ability to evaluate and self-efficacy is an indicator of improving critical and creative thinking abilities. In the implementation of learning students post a response to a topic of learning material. Educators are required to have the competence to provide an appreciation scale for responses submitted by students by categorizing them from very good responses to unacceptable responses.

After analyzing the test results, it was found that there were very significant differences in results where the experimental group was generally better at increasing the average post-test results compared to the control group. The results of the analysis of the increase in the gain score of the experimental group's critical thinking ability compared to the control group in the aspect of Interpretation 93.18 (65.90), Inference 76.74 (44.52), Explanation 96.33 (71.68), Analysis 97.87 (64,83).), Evaluation 63.01 (36.91), and Self-Regulation 98.13 (66.34). The overall results show that in the aspect of critical thinking skills, the experimental group gets a better gain score in the high category, while the control class is in the medium category. The results achieved are following the research presented by Nagao & Nagao (2019), Bimba et al. (2017), Tsortanidou et al. (2017), and El Janati et al. (2018) that critical thinking skills can be empowered or enhanced by providing learning tools that are following the natural way of learning and students' needs.

4. Conclusion

Based on the experimental results obtained, the following conclusions can be drawn:

1. Hybrid learning-based adaptive media has been developed to assist the implementation of the learning process for students with the operational stages of learning including asking questions, formulating answers, applying case studies, motivating questions, activating debate, and giving awards.
2. The hybrid learning model has proven effective in empowering and improving students' critical thinking skills. The gain score achieved in all aspects of critical thinking skills is in the range of values between 65.01% to 97.13% with an average of 81.17% in the high category. The existence of an adaptive hybrid learning approach based on learning styles has shown an impact that is very positive on the progress of the learning process applied in class. The main impact that stands out is that students are more intense in following the course of lectures because the learning model has been adapted to the preferences of each student's learning style. The creation of conducive and enjoyable conditions and conditions in learning has directed and motivated students in empowering critical thinking skills.
3. The aspect of independence in learning has also become a character that has been successfully resurrected through a series of stages of the learning model applied through the application of adaptive media. The independent character in learning that is formed is believed to have a significant impact on increasing students' self-efficacy so that opportunities for empowering critical thinking skills are getting bigger.

4. The adaptive hybrid learning model can be widely applied to any lesson by making slight modifications according to needs and conditions. Modification of the learning model in this adaptive media for other lessons will have the opportunity to become a form of further research for other researchers.
5. The adaptive hybrid model is very well applied to educate students to have critical thinking patterns, especially in lessons that contain very complex and abstract material.

5. Co-Author Contribution

There is no conflict of interest in this article. First author carried out the fieldwork, prepared the literature review, and overlook the writeup of the whole article. The other authors wrote the research methodology and did the data entry and carried out the statistical analysis and interpretation of the results.

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