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THE EFFECT OF MULTILITERACY LEARNING MODEL ON CRITICAL THINKING SKILLS REVIEWED FROM SELF-REGULATION

(PENGARUH MODEL PEMBELAJARAN MULTILITERASI TERHADAP KETERAMPILAN BERPIKIR KRITIS DITINJAU DARI SELF-REGULATION)

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Abstract

As a prospective teacher, it is important for a student to master the 21st century skills, namely the 4Cs. Critical thinking is one of the directions of education in the 21st century. As prospective educators, students need to master critical thinking skills supported by good independent learning as a provision so that they will be able to do meaningful learning in the classroom. This study aims to determine the effect of the application of the multiliteracy learning model on critical thinking skills reviewed from the self-regulation of students. The research uses a quantitative approach, with a type of quasi-experiment design research with a test test research design. Based on the result of the hypothesis test using a two-way ANOVA test with different cells, that is, the result if p−Value ≤0.05 so H_0 rejected, but if p−Value >0.05 so H_0 Accepted. With the details namely, H_0A:0,000≤0,05 which means H_0 rejected, H0B:0,000≤0,05 which means H_0 rejected, and H_0AB accepted because of the value p−Value (Sig.) on self-regulation and multiliteracy learning model = 0.374 more than α=0.05 (p−Value (Sig.)>α). Referring to these results, it can be seen that the multiliteracy learning model has an effect on students' critical thinking skills, self-regulation has an effect on students' critical thinking skills, and there is no interaction between the multiliteracy learning model and the level of self-regulation on critical thinking skills.

Keywords: *Multiliteracy, Critical Thinking Skills, Self-Regulation*

Abstrak

Sebagai *calon* guru, penting bagi seorang mahasiswa untuk menguasai keterampilan abad ke-21, yaitu 4C. Berpikir kritis merupakan salah satu arah utama dalam pendidikan abad ke-21. Sebagai calon pendidik, mahasiswa perlu menguasai keterampilan berpikir kritis yang didukung oleh kemampuan belajar mandiri yang baik sebagai bekal agar dapat melaksanakan pembelajaran yang bermakna di dalam kelas. Penelitian ini bertujuan untuk mengetahui pengaruh penerapan model pembelajaran multiliterasi terhadap keterampilan berpikir kritis ditinjau dari regulasi diri mahasiswa. Penelitian ini menggunakan pendekatan kuantitatif dengan jenis penelitian desain kuasi-eksperimen dan desain penelitian uji-tes. Berdasarkan hasil uji hipotesis menggunakan uji ANOVA dua arah dengan sel berbeda, diperoleh hasil sebagai berikut: jika nilai p ≤ 0,05 maka H_0 ditolak, namun jika nilai p > 0,05 maka H_0

diterima. Dengan rincian sebagai berikut: H_0 A: 0,000 ≤ 0,05 yang berarti H_0 ditolak, H_0 B: 0,000 ≤ 0,05 yang berarti H_0 ditolak, dan H_0 AB diterima karena nilai p (Sig.) pada interaksi antara regulasi diri dan model pembelajaran multiliterasi sebesar 0,374 lebih besar dari α = 0,05 (p > α). Berdasarkan hasil tersebut, dapat disimpulkan bahwa model pembelajaran multiliterasi berpengaruh terhadap keterampilan berpikir kritis mahasiswa, regulasi diri berpengaruh terhadap keterampilan berpikir kritis mahasiswa, dan tidak terdapat interaksi antara model pembelajaran multiliterasi dengan tingkat regulasi diri terhadap keterampilan berpikir kritis.

Kata kunci: *Multiliterasi, Keterampilan Berpikir Kritis, Regulasi Diri*

Introduction

Critical thinking skills are one of the essential competencies of the 21st century that students must have to face global challenges. This critical thinking skill is very useful in a variety of everyday life situations, such as making important decisions, solving problems, and making plans. Critical thinking skills are also increasingly important for students to have in order to be able to analyze information in depth, solve problems, and make the right decisions. However, the reality in the field shows that students' critical thinking skills are still low.

The low critical thinking skills of students are caused by the lack of critical thinking skills of students at school, not only that students also still consider mathematics and physics subjects to be difficult to understand so that students prefer to memorize formulas and lack understanding of mathematical and physical concepts (Rahmat, *et al*.. 2018). Education in schools is expected to train students to explore their abilities and skills in searching, processing, and critically assessing various information.

Critical thinking skills are acquired through an exercise or situation that is deliberately created to stimulate a person to think critically, for example through learning activities (Wahyu, *et al*. 2017). Students are said to have critical thinking skills if students always ask questions about everything. Thus, students are more critical when they see a problem. Critical thinking skills are influenced by several factors. Such as the habit factor of activities using reason to consider and decide something or weigh in memory (Miftahul & Yuniar, 2020). In this case, it shows that the knowledge that humans gain through stimulation and attention is not only stored in memory. Stimuli that are not considered important will be immediately removed from memory. The more memories contain things that are not useful, the more knowledge will be erased.

Based on data released by PISA (*Programe for International Studentd Assessed*) in 2018 which placed Indonesia ranked 72nd out of 77 countries in reading, mathematics, and science skills. The results of the PISA study show that the ability of Indonesian students to read, achieved an average score of 371, with an average score of 487 OECD (Organisation for Economic Co-operation and

Development). Then for the average score of mathematics reached 379 with an average score of 487 OECD. Furthermore, for science, the average score of Indonesian students reached 389 with the OECD average score of 489.

Research conducted by Arista Suriati et al., showed that the critical thinking skills of class X MIPA 2 students of SMA Islam Kepanjen obtained an average of 70.06, and the level of students' critical thinking skills on the interpretation indicator was 87.64, analysis 73.3, explanation 62.64 evaluation 56.67. So it can be concluded that class X MIPA 2 SMA Islam Kepanjen the level of critical thinking skills on the evaluation indicator is in the very critical category. This is also in line with the results of pre-research at SMA Negeri 12 Bandar Lampung, where students' critical thinking skills are still low, this can be seen from the critical thinking skills test. The test results are presented as follows:

Table 1. Critical Thinking Skills Test Results: Class X at State Senior High School 12 Bandar Lampung Academic Year 2023/2024

Class	KKM	Mark		Amount
		$0 \leq X < 70$	$70 \leq X \leq 100$	
XB	70	30	3	33
XC	70	26	5	31
XD	70	30	0	30
Total number				94

Data source: Pre-research at State Senior High School 12 Bandar Lampung

Based on the data from the critical thinking skills test results, it shows that there are still many students who have not mastered critical thinking skills. Most students in answering questions do not meet the criteria of the critical thinking skills indicator. The indicators used in the pre-research consist of providing simple explanations, building basic skills, concluding, considering further explanations and arranging strategies and techniques. From the test results, it can be seen that students are less skilled in building basic skills and concluding in answering questions. In addition, the steps in working on the questions are not systematic. This makes many students have not achieved and exceeded the minimum completeness (KKM) set.

Based on the results of an interview with one of the mathematics subject teachers, related to the learning model applied during the teaching and learning process, educators apply a lecture, question and answer, and discussion learning model. The use of this learning model has received various responses from students. Such as there are active students and there are also passive students. The obstacles encountered in passive students are the lack of interaction which causes confusion experienced by educators in understanding students, such as whether students have understood or not the material being taught.

Based on the description above, the low critical thinking skills of students can be caused by other factors, one of the other factors that influences critical thinking skills is the learning model applied (Rany Widyastuti, *et al*. 2020). The multiliteracy learning model is one of the learning models that can improve students' critical thinking skills (Abidin Y. 2015). The multiliteracy learning model is very important to apply in learning because the multiliteracy learning model can develop students' independence as creative, innovative, productive and character learners. This learning can also form students who are ready from various aspects in living life both at school, work and society.

The multiliteracy learning model emphasizes the use of various types of literacy, such as numeracy literacy and cultural literacy in the learning process (Risda Risda, *et al.* 2023). Numeracy literacy is the ability to think using concepts, procedures, facts, and mathematical tools to solve everyday problems in various types of contexts that are relevant to individuals as Indonesian citizens and world citizens (Kurniawan Indra and Andri Rahadyan, 2021). Meanwhile, cultural literacy is the ability to understand and act towards Indonesian culture as a national identity (Marlina T, *et al*. 2022).

In this research the author will combine numeracy literacy, science and cultural literacy which is called ethnomath science. Ethnomathscience is a collaboration between ethnomathematics and ethnoscience, so that local culture is integrated synergistically. Ethnomathematics is an approach to mathematics through cultural elements. Combining numeracy literacy and cultural literacy (ethnomathematics) can provide a deeper understanding because ethnomathematics uses mathematical concepts that are already known and used in students' daily lives.

This makes mathematics learning more contextual and relevant to their experiences. In addition, increasing learning motivation by using local culture that is familiar to students, mathematics learning becomes more interesting and enjoyable. The importance of combining numeracy literacy and cultural literacy can be an effective approach in research for students because it can increase their motivation, understanding, and critical thinking skills in learning mathematics.

Meanwhile, the term ethnoscience is an activity of transforming between indigenous community science and scientific science. Indigenous science is reflected in local wisdom as an understanding of nature and culture that develops among the community. Ethnomathematics and ethnoscience are one of the forms of culture-based education, which are then collaborated into ethnomathscience. Ethno is a description of all things that form the cultural identity of a group, namely language, code, values, jargon, beliefs, food and clothing, habits, and physical characteristics (Dwi Warli and Suryani Musa, (2022).

Ethnomathscience in this study is intended to collaborate mathematics and science materials with culture. The objectives to be achieved from this study are to provide an understanding related to ethnomathematics and ethnoscience (ethnomathscience) and to provide skills for teachers in analyzing teaching

materials that can be integrated with local culture and are expected to be a means of information for the community.

When students do not have adequate literacy, it can be a challenge to apply the ethnomathscience approach in learning. However, there are several strategies that can be used to overcome this, including; building basic literacy before applying ethnomathscience, using simple and familiar language, visualization and demonstration using visual media such as pictures, diagrams, or concrete models. Then, using collaborative learning as well as scaffolding and intensive guidance (Karerina N., (2021). By implementing these strategies, it is hoped that students who lack literacy can remain involved and understand ethnomathscience-based mathematics learning well.

In addition to the learning model, another factor that influences critical thinking skills is Self-Regulation. Self-Regulation is a process by which a person can regulate their own achievements and actions. Self-Regulation basically does not only involve oneself to always be active and independent of one's own learning behavior, but also involves oneself in the social sphere and the use of information resources.

Self-Regulation the rules we set to control ourselves. According to Bandura, there are three steps that can be taken, including: 1. Self-observation. We see ourselves, recognize ourselves, 2. Assessment. We compare what we see with what is the standard, 3. Self-response. If we have compared it with the standard, we give a reward if it reaches the standard, or we give punishment if it does not reach the standard.

If students do not have good self-regulation, they may have difficulty monitoring and evaluating their own thinking effectively, are less motivated to engage deeply in the learning process, have difficulty managing their time, resources, and learning strategies. As a result, the development of their critical thinking skills will be hampered. Therefore, it is important for educators to help students develop self-regulation skills in order to support their critical thinking progress. However, students who have good self-regulation tend to have better critical thinking skills (Rahmawati Eka Saputri*, et al*. (2023).

Previously, there has been limited research exploring between multiliteracy learning and self-regulation in developing critical thinking skills in PGSD students. This research was conducted by Milenia Suci Rahmawati, et al., in her research showed an influence by the application of multiliteracy learning models on critical thinking skills, self-regulated learning has an influence on critical thinking skills, and there is an interaction between multiliteracy learning models and self-regulated learning on students.

From the explanation above, this study aims to determine "The Effect of Multiliteracy Learning Model on Students' Critical Thinking Skills Reviewed from Self-Regulation". The results of this study are expected to contribute to the

development of effective learning models to improve students' critical thinking skills.

Theoritical review

1) Multiliteracy Learning Model

The concept of multiliteracy as an important concept of 21st century education states that in the 21st century the most important competencies that humans must have are 21st century competencies. Learning and living competencies in the 21st century are characterized by four important things, namely high understanding competencies, critical thinking competencies, collaboration and communication competencies, and critical thinking competencies.

Multiliteracy learning is one of the learning designs used in the context of the 2013 curriculum. The concept of multiliteracy is designed to answer the need for skills required in the 21st century. Multiliteracy learning is designed to be able to connect 4 multiliteracy skills (reading, writing, oral language, and IT) with 10 learning competencies specifically for the 21st century.

Ivanic in Abidin, stated that "Multiliteracy learning is challenging learning so that students are able to study and apply practical literacy, this has a role as a link to learn various cross-curricular concepts".

Baguley, Pullen and Short, as cited by Abidin, et al. view multiliteracy as a way to understand more broadly the literacy curriculum studied in formal schools that encourage students to be able to participate productively in the community. Conceptually, multiliteracy is a plan that can be used to understand various types of texts and various forms of media produced by various new technologies through a learning concept that provides teachers to present information to students using various forms of text and media.

The multiliteracy learning model is a learning model that can improve high-level thinking skills, namely solving mathematical problems that are in the cognitive domain of Bloom's taxonomy including analyzing, evaluating, and creating. From the several definitions above, it can be concluded that the multiliteracy learning model is a learning model that optimizes multiliteracy skills in realizing a better learning situation towards achieving 21st century learning skills.

2) Critical Thinking

Facione (2011) defines critical thinking as the process of determining what to believe and do. The definition put forward by Facione (2011) is supported by Norris' (1989) statement that critical thinking must be based on efforts to find reasons, try to gather the information needed, find alternatives, consider the views of others, which is necessary to believe before doing something.

Robert Ennis (1996) argues that critical thinking is reflective thinking and the ability to make decisions. Ennis pressure is a reflection process. This means that critical attitudes do not stop only at proficiency in concluding or arguing, but also

on the ability to evaluate questions. People's critical power is not only in their reasoning, but also in their ability to reflect on themselves and others. With evaluation, people can sort out what is good and what is wrong, what is good and what is bad.

Critical thinking is a directed and clear process that is used in mental activities such as solving problems, making decisions, persuading, analyzing opinions, and conducting scientific research (Sani, R. A. 2019). The initial goal of critical thinking is to reveal the truth and eliminate all errors, so that the truth can be seen. This is important to prevent the use of wrong arguments due to carelessness.

Critical thinking is closely related to sound decision-making skills. Critical thinking is a term that is often discussed in the educational and psychological sphere. Although there are currently various limitations in critical thinking, in general, people have chosen the understanding that they can dig deeper into a problem, be open to different methods and views, and determine what they want, what to believe or do.

Another opinion is that critical thinking is an important aspect of everyday reasoning (Sihotang, K. 2019). Not only inside but also outside the classroom, young people must also be encouraged to think critically. So critical thinking is an activity to describe and improve understanding of information, such as when determining whether the existence of information is right or wrong.

Critical thinking according to Ennis in Nurotun Mumtahanah, critical thinking indicators are grouped into five activities as follows; (1) Providing a simple explanation, which includes focusing questions, analyzing questions and asking and answering questions about an explanation or statement. (2) Building basic skills, which consist of considering whether a source is reliable or not and considering a report of observation results. (3) Concluding, which consists of dedicating and considering the results of dedication, inducing and considering the results of induction, and making and determining the value of consideration. (4) Providing further explanation, which consists of identifying terms and considering definitions in three dimensions, and identifying assumptions. (5) Arranging strategies and techniques, which consist of determining actions and interacting with others.

3) *Self-Regulation*

Self Regulation in English has the meaning of self-regulation. Regulation itself means regulation, which when combined with the word self then has the meaning of regulating oneself. Self-regulation or self-regulation can be defined as direction or self-regulation in behaving. Self-regulation is a person's ability to direct their behavior to achieve goals and allows the person to delay gratification in the short term to achieve what they want in the future.

According to Zimmerman, Self-Regulation is a person's ability to activate and maintain their cognition, behavior, and feelings that aim to influence the achievement of goals systematically. Self-Regulation in learning is called Self-

Regulation Learning which means the ability of students to evaluate, regulate, and control aspects of knowledge, motivation, and behavior in themselves in learning.

Self-Regulation Ability (self-regulation) is the same as the ability of students to be independent in the learning process. The indicators of Self-Regulation Learning according to Hidayati and Listyani are as follows (Kana Hidayati and Endang Listyani, 2013); (1) Independence from others. (2) Having self-confidence. (3) Behaving in a disciplined manner. (4) Having a sense of responsibility. (5) Behaving based on one's own initiative. (6) Exercising self-control.

Research Methods

The research uses a quantitative approach, with a quasi-experiment design type of research. The sampling technique in this study uses cluster random sampling. The sample was divided into two groups : an experimental class and a control class, selected through a random drawing process. The experimental class was given the application of the multiliteracy learning model while the control class received instruction using the conventional national curriculum model. The subject of the study was a student of class XI of SMA Negeri 12 Bandar Lampung. The variables used are independent variables in the form of the application of multiliteracy learning models, moderator variables in the form of self-regulation, and dependent variable in the form of critical thinking skills.

The research instruments include a critical thinking skills test to measure analysis, evaluation, and decision-making skills, as well as a self-regulation questionnaire to measure students' learning independence. The data were analyzed using a two-way ANOVA to test the influence of each variable and its interaction on critical thinking skills. The research procedure carried out by the researcher is divided into 4 stages, namely pre-research, research implementation, data analysis and interpretation, followed by the stage of designing conclusions.

Results and Discussion

This study explores how multiliteracy and self-regulation learning models affect students' critical thinking skills. Data analysis was carried out to understand the extent to which these two variables, both individually and in combination, are able to improve students' ability to analyze, evaluate, and make decisions based on the data provided. The results of data processing are presented through statistical analysis using two-way ANOVA, as summarized in the following table:

Table 2. Results of Two-Way ANOVA Analysis

Factor	p−Value	Conclusion

Multiliteracy Learning Model (A)	0,000	Significantly, multiliteracy has an effect on critical thinking skills
Self-Regulation (B)	0,000	Significantly, Self-Regulation has an effect on critical thinking skills
A x B Interaction	0,374	The interaction between the multiliteracy learning model and self-regulation was not statistically significant (p = 0,374)

Based on Table 1, it can be concluded that the multiliteracy learning model significantly improves critical thinking skills compared to conventional learning. This can be attributed to the diversity of literacy approaches used, such as numeracy, culture, and science literacy, which allow students to be actively involved in the learning process. The level of self-regulation is also significant in influencing students' learning outcomes, showing that the ability to monitor and control the learning process independently is an important aspect in improving critical thinking skills.

Table 3. Critical Thinking Skills Data Description

Group	Number of Students	Average Score	Standard Deviation
Multiliteracy, High Self-Regulation	30	85,2	4,5
Multiliteracy, Low Self-Regulation	30	78,4	5,1
Conventional, High Self-Regulation	30	74,3	6,2
Conventional, Low Self-Regulation	30	68,5	6,8

The data in Table 2 shows that students who use a multiliteracy learning model and have high self-regulation have the highest average score (85.2) with a lower variation in value (standard deviation of 4.5). On the other hand, students with conventional learning and low self-regulation had the lowest score (68.5) with a greater variation in value (standard deviation of 6.8). This emphasizes that a learning approach that involves the context of literacy and student independence simultaneously improves learning outcomes.

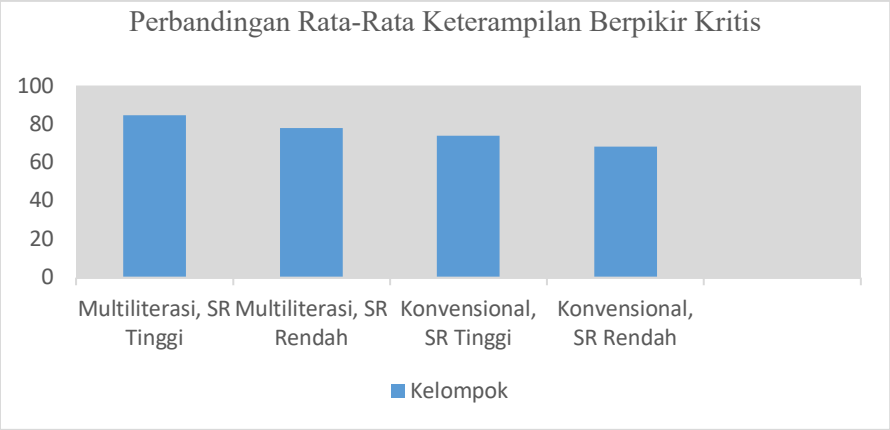

Figure 1. Comparison of Critical Thinking Skills Average

This visualization shows that the group with the multiliteracy and high self-regulation learning model has the highest average score (85.2), while the group with conventional learning and low self-regulation has the lowest average score (68.5). Lower standard deviations in the multiliteracy group showed more consistent variation in values. This suggests that while both factors independently contribute to critical thinking, their combined effect does not produce a synergistic interaction. Therefore, each factor may enhance learning outcomes through distinct mechanisms.

Conclusion

Based on the results of the analysis, the following conclusions can be drawn: it shows that (1) the multiliteracy learning model has a significant influence on students' critical thinking skills, (2) self-regulation significantly affects students' critical thinking skills, (3) there is no interaction between the multiliteracy learning model and self-regulation on students' critical thinking skills.

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