

## Empowering Metacognition Competence and Critical Thinking in Multiethnic School Students in Ternate City through Scientific Approach PBMP Integrated Learning Model

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### Abstract

*This study using Quasi experiment research, purpose to determine the efficiency of integrated Learning Thinking Through Question (PBMP) learning model of a scientific approach to empower metacognition and critical thinking skills in students with multiethnic characteristics. The results showed an increase in the ability of metacognition and critical thinking skills in the multiethnic student group that carried out PBMP integration learning and scientific approach. The integrated scientific approach patterned PBMP learning model has the potential to empower metacognition and critical thinking in multiethnic students compared to the implementation of conventional learning models. In this study it was found that there were differences in critical thinking skills in the Tidore ethnic students most different from ethnic Ternate students and Makian ethnic students in the class that applied the PBMP integrated Scientific Approach learning model. These differences appear in students of each ethnic group having different learning patterned and communication styles.*

**Keywords:** Multiethnic, PBMP, scientific approach, metacognition, critical thinking

### 1. Introduction

Learning in Primary Schools with multiethnic characteristics is a challenge for classroom teachers. Diversity or multiethnic conditions can be seen as strengths and/or strengths in the ecology of society (Bustami & Corebima, 2017). But pluralism can also save potential conflicts. In the archipelago in North Maluku there is a phenomenon that the implementation of learning in elementary schools that have very diverse ethnicities is very unique. This multiethnic is a challenge that needs to be considered by a teacher. Community pluralism becomes the potential and wealth of national identity. Diversity of society is an advantage and strength in society. But this plurality can save potential conflicts for community life and also influence the learning process in multiethnic classes

Haerullah (2012<sup>a</sup>) states that multiethnic learning is more difficult to implement than the non-ethnic class. Every student who comes from a certain ethnicity brings the views and behavior of their respective culture in

receiving learning materials and accepting friends or teachers. Teachers are expected to play a positive role so that the acceptance of friends from different ethnicities requires a good stimulus. Furthermore Haerullah (2012<sup>b</sup>) states that to overcome this weakness, a better teaching strategy should be found, namely strategi that is relevant to the characteristics of multiethnic groups.

Furthermore Hacker et al (2009) states that the learning process that must be developed in multiethnic schools is a learning process that places students in the social reality around them. Wade (2000) states that one strategy and teaching technique that is suitable for applying to multiethnic classes is the cooperative learning model. The statement is supported by the results of a study Haerullah (2012<sup>b</sup>) which suggests that PBMP pattern learning combined with TPS is very appropriate to be applied in multiethnic schools and has the potential to develop critical thinking, metacognitive skills, and social attitudes of students. Furthermore Munadlir, (2016); Stassen (2003) argues that the most appropriate teacher teaching style in multiethnic schools is cooperative learning methods or cooperative learning. Critical thinking of students is one of the high-level thinking skills.

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According to Haerullah (2012<sup>a</sup>), reasoning empowerment is almost never/very rarely noticed and implemented in every learning move in Indonesia.

According to Aini, (2013), the related phenomenon has not been empowered by high level thinking skills, especially critical thinking skills. Critical thinking skills also occur at every level of education in North Maluku, especially in Elementary Schools in Ternate City. The Pattern of Empowering Thinking Through Questions (PBMP) encourages students to organize students' thinking processes through questions arranged systematically and directed (Ardila et al, 2013). PBMP patterned learning is able to empower students to answer systematically structured questions. PBMP patterned learning does not take place informally. The learning pattern is able to trigger children to think so that if the PBMP pattern is applied continuously it is believed to be able to improve thinking skills and children are able to regulate their thinking processes. Setting this thinking process can then be referred to as students' critical thinking skills.

One of the advantages of PBMP pattern learning is that it can be applied using many methods, models, and approaches. One approach that has the potential to be combined with PBMP learning patterns is a scientific approach. A combination of the scientific approach with PBMP can be done because both have the same learning characteristics, both of which empower students to think critically and creatively. Several studies have succeeded in uncovering the potential of PBMP learning in the learning process including (Ardila et al, 2013) that PBMP is able to improve students' cognitive learning outcomes and increase high thinking skills (critical thinking and metacognition). But how the potential of critical thinking and metacognition of multiethnic school students through integrated scientific approach PBMP learning models has not been widely revealed, especially at the elementary school level with multiethnic student characteristics.

Based on the results of a survey of elementary school teachers in Ternate City, it was shown that: (1) 75% of teachers had applied cooperative learning models, but had never applied PBMP learning models; (2) the teacher designs learning devices not based on the characteristics of a particular learning model, and does not pay attention to the characteristics of students who are ethnically diverse; (3) teachers have not fully applied the scientific approach, let alone integrate into other learning models, (4) teachers have not empowered students to think critically and metacognition during learning. The survey results, it can be interpreted that so far the teachers still ignore the empowerment of critical thinking and multiethnic metacognition students. Based on the facts, the learning process of Science-Biology in Ternate City Elementary School needs to apply the PBMP learning model which is expected to be able to empower critical thinking skills and multi-ethnic metacognition students. This study aims to determine the potential of the pattern

of learning model Empowerment Thinking Through Questions (PBMP) integrated scientific approach in empowering critical thinking and student metacognition of different ethnicities in fifth grade students of elementary school in Ternate City.

## 2. Research Method

The study was a quasi experiment with a pretest-posttest non equivalent control group design pattern (Ary et al., 1982; Charles 1998; Jaya & Ardat (2013). Quasi experiment was carried out in class V SD with a 2x3 factorial design. PBMP learning model and student ethnic types are independent variables in the study. The ethnic group consists of three local ethnicities, namely ethnic Ternate, Tidore, and Makian. Learning strategies consist of two levels, namely PBMP learning model integrated scientific approach and conventional models. The application of the learning model in the four schools that have been determined are: 1) learning model patterned with integrated scientific PBMP applied in the State Ibtidaiyah Madrasah (MIN) 1 Ternate city, 2) PBMP patterned learning model applied at Madrasah Ibtidaiyah Negeri (MIN) 1 Ternate city, 3) scientific learning is applied in Ibtidaiyah Alma'arif 1 Madrasa Ternate city and model 4) conventional learning is applied in Almaarif 2 city of Ternate.

The variables measured in this study were critical thinking skills and metacognition. Measurement of critical thinking and metacognition is integrated in essay tests. Critical thinking is measured using the critical thinking skills rubric that refers to Hart (1994), while the metacognition rubric is used to score metacognition skills that are integrated with conceptual understanding essay tests.

Analysis of research data for hypothesis testing was carried out with Anakova in the SPSS 16.0 program. If the probability value (p) is smaller than the value  $\alpha = 0.05$ , then a further test is performed using the LSD test. On the basis of the data analysis, it is then known which learning strategies have the most potential to empower critical thinking skills and metacognition in multiethnic students

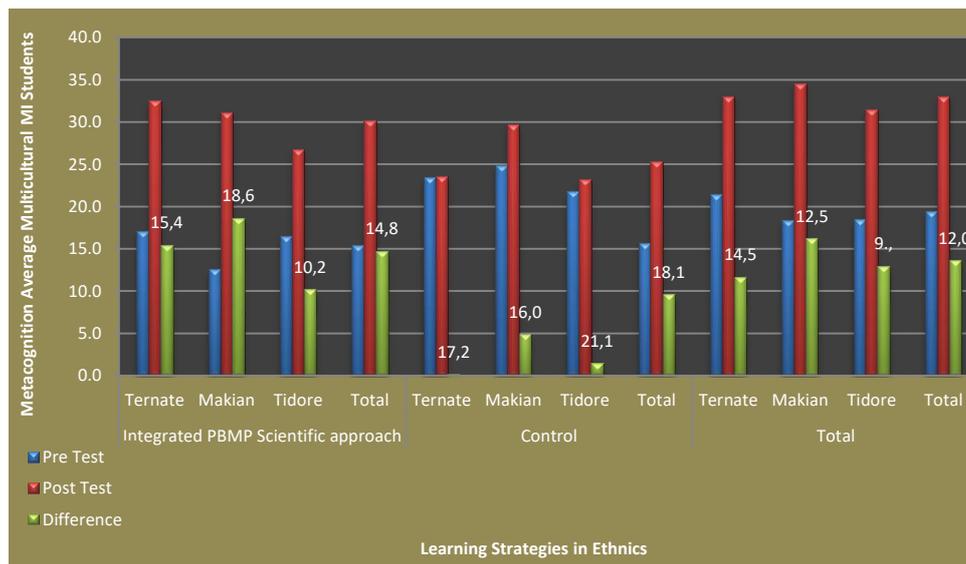
## 3. Result

### *a. Influence of PBMP Integrated Saintific Approach to Metacognition of Multiethnic Madrasah Ibtidaiyah (MI) Students*

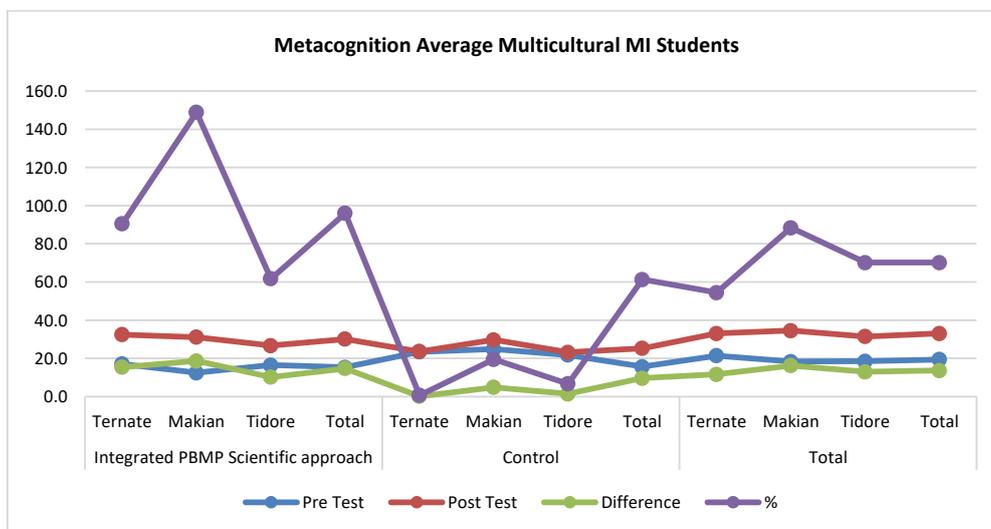
Based on the results of descriptive stastic analysis (table 1), it shows that: 1) there is an increase in the average value of metacognitive awareness of students after being treated sequentially from the highest to the lowest of 24.6-4.2, 2) there is an increase in the average value metacognition in multiethnic groups before and after being treated sequentially from highest to lowest 17.0-15.7 and 3) there was an increase in the average metacognition in the strategy and ethnic interaction groups after being treated as much as sequentially from highest to lowest 27.2- 3.3.

**Table 1.** Metacognition Average Multiethnic MI Students

Learning Model Variables	Ethnic variables	Pre Test	Post Test	Difference	%
Integrated PBMP Scientific approach	Ternate	17,0	32,5	15,4	90,5
	Makian	12,5	31,2	18,6	148,9
	Tidore	16,5	26,7	10,2	61,7
	<b>Total</b>	<b>15,4</b>	<b>30,1</b>	<b>14,8</b>	<b>96,0</b>
Control	Ternate	23,4	23,6	0,2	0,7
	Makian	24,9	29,7	4,8	19,5
	Tidore	21,7	23,2	1,5	6,7
	<b>Total</b>	<b>15,7</b>	<b>25,3</b>	<b>9,6</b>	<b>61,3</b>
Total	Ternate	21,4	33,0	11,6	54,4
	Makian	18,4	34,6	16,2	88,4
	Tidore	18,5	31,4	13,0	70,2
	<b>Total</b>	<b>19,4</b>	<b>33,0</b>	<b>13,6</b>	<b>70,1</b>



**Figure 1.** PBMP integrated Saint Approach & learning strategies on ethnicity



**Figure 2.** PBMP integrated Saint Approach & learning strategies on ethnicity

Changes in the value of metacognition at pretest and posttest showed that there was an increase in students' metacognition in the strategy group by 6.9% -45.0%, and ethnic groups by 26.6%-29.2%. This increased metacognitive awareness in the strategy and ethnic

interaction group by 5.3% -50.8%. Based on the results of the Anokova analysis and continued with LSD's follow-up test (Table 1), it was shown that the average student metacognition in the PBMP learning model group was significantly different from conventional learning.

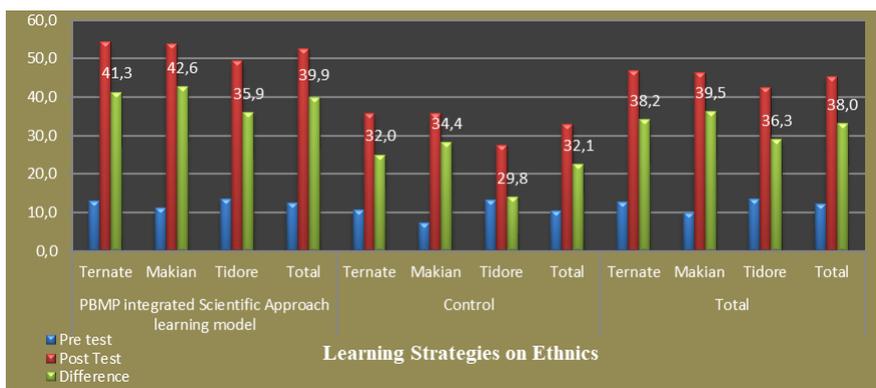
Furthermore, the results of the covariance analysis showed that ethnic groups did not influence student metacognition. That is, it can be explained that each ethnicity has a different level of learning adjustment for the scientific learning integrated PBMP patterned learning model applied by the teacher. Based on the results of the anasis it was seen that the combination group of PBMP learning models integrated scientific approach with ethnicity was higher than other combination groups.

*b. The Influence of PBMP Integrated Scientific approach to Against Critical Thinking in Multiethnic Student Madrasah (MI)*

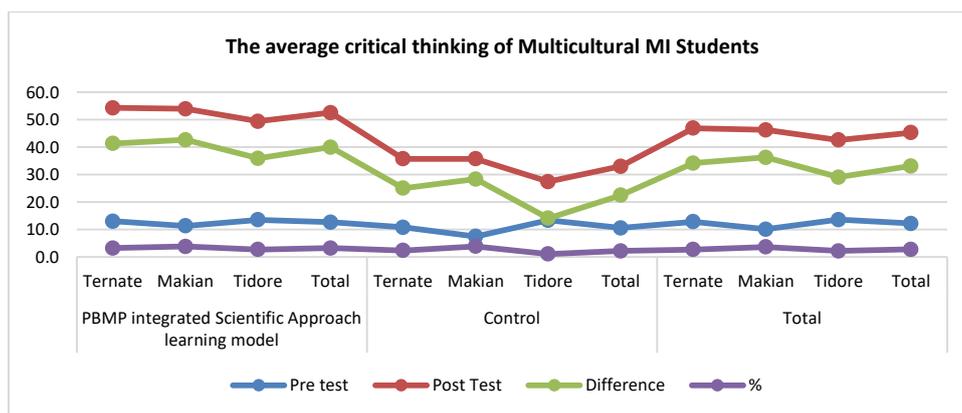
Based on the results of descriptive stastic analysis (Table 2), it shows that: (1) an increase in the average value of critical thinking in the strategy group after being treated sequentially from lowest to highest is sequentially from highest to lowest of 39.9-22.5 , (2) there was an increase in the average value of critical thinking skills in ethnic groups after being treated sequentially from the highest to the lowest at 36.2-29.0, and (3) an increase in the average critical thinking skills in the strategy and ethnic interaction groups after being treated sequentially from lowest to highest sequentially from the highest to the lowest at 42.6-14.1.

**Table 2.** The Average Critical Thinking of Multiethnic MI Students

Learning Model Variables	Ethnic variables	Pre Test	Post Test	Difference	%
Integrated PBMP Scientific approach	Ternate	13,0	54,3	41,3	3,2
	Makian	11,3	53,9	42,6	3,8
	Tidore	13,5	49,4	35,9	2,7
	<b>Total</b>	<b>12,6</b>	<b>52,5</b>	<b>39,9</b>	<b>3,2</b>
Control	Ternate	10,7	35,7	25,0	2,3
	Makian	7,4	35,7	28,3	3,8
	Tidore	13,3	27,4	14,1	1,1
	<b>Total</b>	<b>10,5</b>	<b>33,0</b>	<b>22,5</b>	<b>2,1</b>
Total	Ternate	12,8	46,9	34,1	2,7
	Makian	10,0	46,3	36,2	3,6
	Tidore	13,6	42,6	29,0	2,1
	<b>Total</b>	<b>12,1</b>	<b>45,2</b>	<b>33,1</b>	<b>2,7</b>



**Figure 3.** PBMP integrated Saint Approach & learning strategies on ethnicity



**Figure 4.** PBMP integrated Saint Approach & learning strategies on ethnicity

The percentage of multiethnic student critics' thinking scores showed that the percentage change in value in the model group was 3.2-2.1%, ethnic groups were 3.6% - 1.1%, and in the combination model and ethnic groups, 1.1% -3.8%. This can be explained that; (1) there is a model influence on critical thinking skills, (2) there is no ethnic influence on students' critical thinking skills, and (3) there is no influence of model and ethnic interaction on students' critical thinking skills.

Based on the results of the covariance analysis, it can be explained that the interaction of the model and ethnicity did not significantly influence critical thinking skills, but continued with the LSD test to determine the differences in the average critical thinking skills at each level of interaction indicating that each ethnicity had a level of learning adjustment different on the learning model applied by the teacher. Based on the results of the LSD test it can be concluded that critical thinking skills in the combination group of scientifically integrated ethnic PBMP models are higher than the group combining conventional learning strategies with ethnicity. The percentage of multiethnic student critics' thinking scores showed that the percentage change in value in the model group was 3.2-2.1%, ethnic groups were 3.6% -1.1%, and in the combination model and ethnic groups, 1.1% -3.8%. This can be explained that; (1) there is a model influence on critical thinking skills, (2) there is no ethnic influence on students' critical thinking skills, and (3) there is no influence of model and ethnic interaction on students' critical thinking skills.

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#### 4. Discussion

The results of data analysis described in the results of the study show that the integrated PBMP learning strategy scientific approach has a significant effect on student metacognition. The influence of applying a patterned PBMP learning model integrated scientific approach to metacognition is caused by various factors. One of the contributing factors is the advantages and advantages of the characteristics of the model. The results of this study are not in line with some of the results of previous studies conducted by Danial, (2012); Prayitno, (2010); Jahidin, (2009) who reported that the model had no significant effect on metacognition. The causes of differences in the results of this study with the results of previous studies

are the use of different learning models, different research locations, and different times. In addition, what causes the model to influence student metacognition in the results of this study is the innocence of students in answering or filling out questionnaires or Metacognitive Junior Inventory (MJI).

The potential of PBMP patterned learners shows that in the learning process, this learning model gives students time to think and evaluate their answers when doing and discussing, this model also encourages students to organize their thinking processes through questions arranged systematically and directed towards LS PBMP and LKS. Activities carried out by students in the learning process at the "do" stage in the PBMP syntax can increase students' awareness, because these stages will encourage students to interact and cooperate with their peers. This happens because in PBMP pattern learning, there is no learning process that takes place informally.

The results of this study are in line with the research of Bahri & Corebima (2015) which shows that the application of various types of learning models can train students to talk to themselves and make students always help and regulate their own behavior. Furthermore Haerullah (2012<sup>a</sup>) reported that PBMP patterned learning proved to also have the potential to empower student metacognition. The results of the LSD test show that PBMP patterned learning is significantly different and has the potential to develop student metacognition awareness rather than conventional learning. This is in line with the results of his research Iskandar (2016) who reported that there was an influence of learning strategies on metacognition awareness, metacognition skills and cognitive learning outcomes of students. This finding is reinforced by Aisyah & Ridlo (2015) that students' metacognitive abilities are also influenced by cooperative learning.

Activities carried out by students in the learning process by following the syntax of PBMP patterned learners cause students to learn and improve their learning outcomes by correcting their mistakes through monitoring and evaluating the results of their thoughts (Slavin, 2011). Ausubel, & Hanesian (1968); Slavin, & Davis, (2006) argue that the same when children develop, the child becomes more careful in understanding how to control and monitor the child's own learning and how to use language to communicate. Aisyah, & Ridlo, (2015) explains that metacognitive skills need to be empowered through learning strategies in schools to monitor student learning outcomes themselves, in order to develop. Arends (2008) states that metacognitive knowledge is one's knowledge of self-learning or the ability to use certain learning strategies correctly.

Furthermore Hacker et al (2009); Coutinho (2007) explain that students who are skilled at evaluating themselves are students who are aware of their abilities. Based on the results of data analysis, it can be concluded that ethnicity has no significant effect on students'

metacognition awareness. It can be interpreted that the students' different metacognition, because ethnic students of Ternate, Makian, and Tidore have the same ability in reducing differences between them, are open to each other from ethnic to ethnic, increasing the unity of actions and attitudes to achieve common goals. For example, using standard Indonesian language and Malay Ternate in building inter-ethnic relations. The results of this study are in line with Liliweri (2009) that the ability to build interethnic relationships through the process of assimilation and acculturation is due to the presence of driving factors such as; tolerance, balanced opportunities in the social and economic fields, respect for others, open attitude from one ethnic group to another, and joint efforts to equate cultural elements in a place. Furthermore, according to Karim (2007) that if there are two ethnic groups or two cultural groups meet in a society, then each will carry out the process of acculturation and assimilation. Acculturation in the sense of a two way adaptation process while assimilation is a one way adaptation process

Asba, & Hasanuddin, (2011) stated that the characteristics of ethnic Ternate were a little too influenced by ancient and feudal traditions, especially for people who were in the royal bases. However, ethnic Ternate always prioritizes tolerance, attitude towards respecting the ethnicity of migrants, and an open attitude towards other ethnicities, thus ethnic Ternate easily interact with other ethnic groups through the process of assimilation and acculturation. This is proven to date, various kinds of ethnic groups such as ethnic Chinese, Javanese, Sumatran, Bugis, Buton, Madurese, Balinese, Kalimantan, Ambon, and a number of other local ethnic groups can inhabit the city of Ternate and can build inter-ethnic relations well. Ternate's ethnic ability in an effort to build inter-ethnic relations such as this also took place at school.

Metacognition of ethnic Makian and Tidore students (ethnic immigrants), also proved to be no different from the metacognition awareness of ethnic Ternate students (native to Ternate). This is because the two ethnic groups have the ability to interact to build ethnic relations. Haerullah (2012<sup>a</sup>) found in the results of his research that as ethnic immigrants, the Makian and Tidore ethnic groups must have good social interaction skills through the process of acculturation and assimilation. Through the process of acculturation and assimilation, the ethnic communities of Makian and Tidore were able to transform their ethnic identity and adapt their culture to Ternate's ethnic culture. Furthermore Karim (2007) states that interethnic relations can be balanced or equal, if there is an interethnic social relationship through cultural adaptation. Each ethnic group can adapt its culture to other ethnic cultures. The results of this study illustrate that these three ethnic groups share the ability to engage in interethnic social interaction through assimilation and acculturation processes, so that they accept each other, are open to one another, and always build an attitude of

tolerance among ethnic groups, and are able to reduce ethnic differences one with other ethnicities. The results of this study are also in line with the statement of Chen, (2006); Vijayaratnam, (2009); Amirin, (2012) that cooperative learning can not only affect tolerance and broader acceptance of students with special needs, but can also support the creation of better relationships among students with diverse races and ethnicities.

The results of the covariance analysis show that there is a strategic influence on the critical thinking skills of multiethnic elementary students. Furthermore, the LSD test results show that the average critical thinking skills of students in the PBMP learning model are significantly different from conventional strategies. The results of this study indicate a relationship between metacognition and critical thinking skills. The relationship is with increasing metacognition awareness and increasing critical thinking skills. Schraw, & Robinson, (2011) report that the relationship between metacognition and critical thinking skills is related to self-regulated learning. Schraw et al (2006) view that self-regulated learning has three components, namely cognitive, metacognition and motivation. Lee (2009); Schraw, & Robinson (2011) refer to cognitive on self-regulated learning as critical thinking skills. Furthermore Schraw et al (2006) explain that metacognition can be seen as a supportive condition for critical thinking. Increased or decreased metacognition, influences students' critical thinking skills. This statement is illustrated in the results of this study. Students given PBMP cooperative learning showed higher metacognition than students who were given conventional learning, as well as the results of research related to critical thinking skills.

Based on the results of the covariance analysis it was concluded that each ethnic group had varied critical thinking skills. The results of this study are in line with the research of Maasawet (2010) that applying learning strategies that are Snowballing cooperative learning strategies and Number Head Together (NHT), states that ethnicity influences students' critical thinking skills. Furthermore Eggen, & Kauchak, (2006) states that diversity of students can influence student learning outcomes. Eggen, & Kauchak, (2006) states that the influence of student diversity causes differences in achievement. The difference is because students have a tendency to be careful with other people who come from different backgrounds, but it is commonplace in social shutter, and this tendency also appears in schools. Richards, & Rodgers, (2014). stated that what students bring into the classroom will greatly affect the learning climate. The results of the Anakova test also showed that interaction between learning strategies and ethnicities did not affect students' critical thinking skills. Furthermore, further testing using the LSD test showed that the combination of conventional strategies and ethnicities of Ternate, Makian, and Tidore had lower potential compared to the potential of other combination strategy groups in empowering students' critical thinking skills.

Conventional learning or learning with the lecture system, makes students gain rote knowledge. According to Khan (2008) that the memorization method emphasized in conventional learning, causes students' understanding of the ability to understand subject matter to be weak, and the students' weak understanding of the material is associated with the achievement of academic learning outcomes (Khan, 2008). The condition of learning is also one of the obstacles to achieving learning success (Zuo, 2011). Furthermore, Chen (2009) argues that students with negative affective development (low learning motivation and feeling worried in the learning environment), will have an impact on cognitive learning outcomes. In addition, PBMP learning strategies in developing critical thinking skills can improve student learning outcomes, critical thinking students and students are more enthusiastic about answering questions, using more coherent and complete sentences, and students also dare to express their opinions with good sentences

### Conclusion

There is a strategic influence on metacognition skills and critical thinking skills in multiethnic elementary students. The average critical thinking skills of students in the PBMP learning model are significantly different from conventional strategies. (1) PBMP patterned learning model affects the metacognition of multiethnic MI students in Ternate; (2) PBMP learning model affects the critical thinking skills of multiethnic MI students in Ternate City; (3) PBMP and Ethnic Learning models together have a significant effect on critical thinking skills and metacognition of multiethnic MI students in Ternate City; (4) ethnicity has no significant effect on critical thinking skills and metacognition of multiethnic MI students in Ternate City; (5) each ethnic group has a different learning style.

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