

Empowering Critical Thinking Skills in Indonesia Archipelago: Study on Elementary School Students in Ternate

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Abstract: A quasi experimental research had been conducted to uncover the potency of STAD, TGT, STAD+TGT, and conventional learning, on critical thinking skills of fifth grade elementary school students in Ternate-Indonesia. Research data had been analyzed in non-factorial ancova and pos-hoc analysis had been carried out in LSD test. Data analysis result showed that STAD+TGT have highest potency to empower student critical thinking skills, followed by TGT and STA; conventional learning strategy had the lowest potency. TGT, STAD, and conventional learning had corrected critical thinking skills scores respectively 5.93%, 8.45%, 40.21% lower significantly than STAD+TGT. It is strongly advised for teachers to use STAD+TGT learning as well as STAD and TGT learning in their daily learning in order to empower critical thinking skills of students.

Key words: critical thinking skills, TGT learning, STAD learning, elementary school, archipelago area

1. Introduction

Critical thinking skills is a process of intellectual discipline that actively and skillfully conceptualising, applying, analyzing, synthesizing, and or evaluating the information that had been collected/gathered (Elder, 2012; Snyder & Snyder, 2008). Teaching learners to perform high order thinking skills, including critical thinking is a primary goal of education (Lee, 2009). Various references had reported a positive correlation between thinking skills and concept gaining (Meha, 2006; Yuanita, 2006; Hilmiah, 2006). The development of formal reasoning is very important for the mastery of concepts, as conceptual knowledge is the result of a constructive process, and the reasoning is a necessary instrument (Lawsons, 1992).

High order thinking skills, including critical thinking skills, can be empowered through deliberate teaching (Azevedo, 2005). Such statements can be interpreted that there should be a learning situations as a space for “thought experiments” of learners (de Bono, 1992). Providing an opportunity for learners to conduct social interaction is a conscious and deliberate act to give space for thought experiment. Cooperative learning is a form of learning that makes it possible for learners to perform their social interactions (Brown, 2007).

Recent phenomena indicate that conventional learning/teacher-centered learning still dominate the learning process in Indonesia (Sanjaya, 2007; Hanafiah, 2010; Mularsih, 2010), including Biology learning (Aswandi,

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2009). Domination of conventional learning implementation had been uncovered too at elementary schools in Ternate archipelago, Indonesia. Survey conducted by Hasan in January 2011 upon 43 fifth grade teachers from 105 teachers of elementary schools in Ternate city revealed that in the days before: (1) 90.69% teachers never implemented cooperative learning strategies, (2) 65.11% teachers never knew about cooperative learning strategies, and (3) 88.37% teachers used traditional/conventional learning strategies. The survey also had uncovered that the average of student's cognitive learning outcomes remained low at 16.49.

Based on those survey results, it can be interpreted that until right now, the empowerment of higher order thinking, including critical thinking skills, had never been carried out by the majority of the teachers in Ternate archipelago, Indonesia. Based on this fact, the learning process, including natural science especially Biology learning, particularly at elementary schools in Ternate archipelago, should immediately implement learning strategies having potency to empower higher order thinking skills, especially critical thinking skills.

Learning strategies that relatively easy to be implemented at the elementary school level is STAD (Student Team Achievement Division) and TGT (Team Games Tournament) (Slavin, 1995). The advantages of those cooperative learning strategies are: (1) learning steps are easily implemented by teachers, (2) both learning strategies are the simplest learning strategies compared to the other cooperative learning strategies; and (3) both learning strategies are the best instructional strategies for teachers who had never implemented any cooperative learning strategy.

Associated with the role of critical thinking skills in the learning process, and the potency of cooperative learning in empowering high order thinking skills, and other learning problems that occur at the elementary school in Ternate archipelago, Indonesia; research had been conducted to compare the potency of those cooperative learning strategies as well as conventional learning in empowering critical thinking skills of the elementary school students in the archipelago territory.

2. Research Method

The research had been carried out in quasi-experimental design at fifth grade of elementary schools in Ternate-Indonesia during odd semester of academic year 2011/2012. The quasi-experimental design was shown on Figure 1 (Tuckman, 1999).

O ₁	X ₁	O ₂
O ₃	X ₂	O ₄
O ₅	X ₃	O ₆
O ₇	X ₄	O ₈

Notes:

O ₁ , O ₃ , O ₅ , O ₇	:	Pretest
O ₂ , O ₄ , O ₆ , O ₈	:	Posttest
X ₁	:	STAD
X ₂	:	TGT
X ₃	:	STAD + TGT
X ₄	:	Conventional learning

Figure 1 Quasi-Experimental Design of the Research

Four classes used in this research was equivalent based on achievement test score analyzed by anova. The learning strategies implemented at the 4 elementary schools will be described further.

- (1) State Elementary School of Sulamadaha: Conventional learning strategy
- (2) State Elementary School of Tabam: STAD+TGT
- (3) Islamic Elementary Schoof of Kulaba: TGT
- (4) Presidential Elementary School of Tarau: STAD

The independent variable was learning strategy consisting of four levels, i.e. STAD, TGT, STAD+TGT, as well as conventional learning. The dependent variable of this research was critical thinking skills. Critical thinking skills had been measured by essay test and scored with the rubric referred to Hart (1994). The research data related to the effect of learning strategy on the critical thinking skills had been analyzed by in non-factorial ancova; and post-hoc analysis had been carried out by LSD test.

3. Research Result

The research results showed that the three cooperative learning strategies (STAD + TGT, STAD as well as TGT) had greater potency in empowering critical thinking skills of the students than conventional learning (Tables 1–2).

Table 1 The Ancova Test Summary of Learning Strategy Effect on Student Crical Thinking Skills (CTS)

Source	Type III Sum of square	df	Mean square	F	Sig.
Corrected model	235.020 (a)	4	58.755	51.175	.000
Intercept	216.284	1	216.284	188.381	.000
XCTS	41.511	1	41.511	36.155	.000
Strategy	232.062	3	77.354	67.375	.000
Error	122.182	116	1.148		
Total	4493.227	121			
Corrected total	368.202	120			

Table 2 LSD Posthoc Test Summary of Learning Strategy Effect on Student Critical Thinking Skills (CTS)

Learning strategy	Average value of CTS (Pretest = X)	Average value of CTS (Posttest = Y)	Gain score	Corrected value of CTS	LSD Notation
Control	4.60	3.53	-1.07 (decreased)	3.00	a
STAD	3.20	5.84	2.63 (increased)	5.96	b
TGT	2.71	5.92	3.20 (increased)	6.27	b
STAD+TGT	3.50	7.07	3.57 (increased)	7.06	c

Corrected values of critical thinking skills uncovered in STAD, TGT, and conventional learning strategy respectively were 5.93%, 8.45%, 40.21% lower than the values in STAD + TGT learning strategy (Figure 2). Based on the corrected values of critical thinking skills, it was uncovered that conventional learning could not empower student critical thinking skills, even decreased as much as 23% (Table 2).

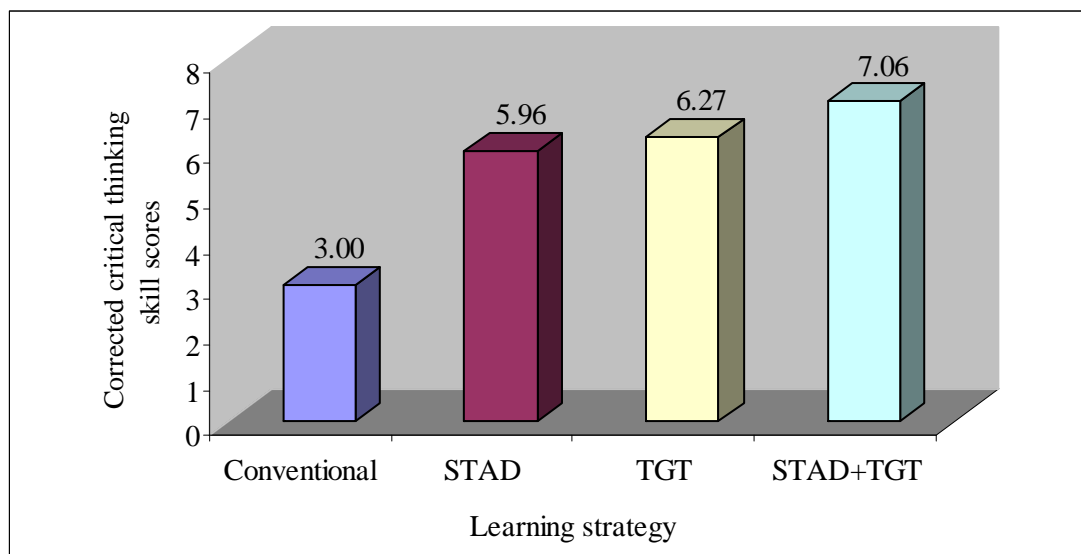


Figure 2 The Comparison of Conventional and Cooperative Learning Strategies Potency in Empowering Critical Thinking Skills of the Students Based on the Corrected Critical Thinking Skill Scores

4. Discussion

It had been reported before that based on the research results, the three cooperative learning implemented, either STAD, TGT, as well as STAD+TGT, having greater potency to empower critical thinking skills of the students than conventional learning (Tables 1–2). These results can be interpreted that cooperative learning strategies have better potency to empower critical thinking skills of the students than conventional learning. Several studies had reported that generally, cooperative learning strategies were more effective to empower critical thinking skills of the students than conventional learning (Chen, 2008; Brown & Cert, 2007; Ghaith, 2003; Lindow, 2000). Therefore, it is very reasonable to see in this research that the STAD, TGT, as well as STAD + TGT learning strategies had more potency to empower critical thinking skills of the students than conventional learning.

Vijayaratnam (2009) stated that in order to develop an effective thinking skills, teachers should pay special attention to learners to develop their thinking skills. Furthermore, Vijayaratnam explained that to make the learners think, there should be any space for “thought experiments”. Such idea accords with the Schafersman statements (1991) arguing that learners need real practice in order to have higher order thinking skill.

Citing the concept of Vygotsky, Brown (2007) explained the importance of social interaction for the development of the child’s thinking. One type of learning in the classroom supporting social interaction among learners is any learning designed in cooperative groups. Cooperation among group members is a form of social interaction that can trigger the development of learner thinking skills (Brown, 2007). Furthermore, Brown explained that the cooperation among group members can trigger cognitive development of learners, including the critical thinking skills. Citing this opinion strengthened by Vygotsky Chen (2008) stated that social interaction is a prerequisite of cognitive development. Explanation regarding to how the cooperative learning can empower students’ critical thinking skills will be explained further.

Critical thinking skills is a process of intellectual discipline that actively and skillfully conceptualising, applying, analyzing, synthesizing, and or evaluating the information that has been collected/gathered (Elder, 2012;

Snyder & Snyder, 2008). On cooperative learning, including STAD, TGT, as well as STAD + TGT; learners critical thinking skills is empowered in the fourth phase of STAD, TGT, as well as STAD + TGT learning process, i.e., discussion and learning in groups. The statement was supported by the Brown concept (2007) stating that the collaboration done through the cooperation and discussing the subject matter, be able to trigger the development of ways to understand the subject matter by thinking activity. At another point, Chen (2008) stated that the talk (on discussion forum) is a medium of reasoning as well as an important tool for learning. How do the learners perform conceptualization, application, analysis, synthesis, and evaluation of information will be described further.

By working in groups, tutors and tutees have more opportunities to talk and listen at the discussion forum and exchange their ideas, knowledges, or informations (Suwantarathip & Wichadee, 2010; Chen, 2008; Brown & Cert, 2007). These discussion forums is done as an efforts to complete the task as a basic attempt to understand the subject matter. Chen (2008) stated, providing an explanation is believed to have a crucial role in stimulating cognitive development.

During the period of explanation, the tutor applies his/her concepts as well as gets confirmation upon his/her own knowledge, as described by Chen (1998). During the period of explanation tutor, basically clarifies, his/her own knowledge related to a concept to be explained and constructed or built to get a deeper understanding.

Hartman (2001) explains that at the period time of information exchange, tutees will undergo unification of new information into the scheme already existing. Alexander et al. (2008) explained that on students (tutees) themselves, there will be a process of information evaluation already existing with the the new information gained from other group members. Such evaluation will result in a conclusion (synthesis), whether the new information is a correction of preexisting tutees knowledge or vice versa (Alexander et al., 2008). Through the activities carried out during the group discussion, the critical thinking skills of learners are believed to be empowered. The critical thinking skills of learners will develop better after they undergo group discussion repeatedly.

The main reason that the conventional learning has lower potency to empower critical thinking skills of learners than cooperative learning, is that there is no or insufficient opportunity for learners to develop their critical thinking skills in conventional learning situation (Khan, 2008). Domination of teacher lectures during any learning by talking all the time have indirectly limited the time for learners to develop their critical thinking skills (Khan, 2008). Such conditions are contradictory to the de Bono argument (1992) stating that in order to encourage the learner to think, the teacher must deliberately give time to the learners to think in order to discover new knowledge. In the classroom mostly dominated by teachers, students just listen and be passive learners. McDonell (1992) stated, that passive students would inhibit their capacity to think.

Vijayaratnam (2009) explained that the emphasis of critical thinking especially related to logical thinking focused on an argument would logically react to the argument. If the Vijayaratnam concept is put in contact with De Bono argument then to empower student critical thinking skills, teachers should give more time for learners to propose their arguments and react logically to the argument. Such conditions rarely or even are not found in conventional learning. These explanations agree with the results of this study showing hat the conventional learning has the lowest potency in empowering critical thinking skills of students.

Results of this study had proved that cooperative learning of STAD, TGT, as well as STAD + TGT, were able to empower the critical thinking skills of the elementary school students in the Ternate archipelago. It is believed that the cooperative learning of STAD, TGT, as well as STAD + TGT can be recommended to be implemented at elementary schools in East Indonesia areas, especially those having the same characteristics as the Ternate archipelago.

5. Conclusion

STAD + TGT, STAD, as well as TGT, are more effective in empowering the critical thinking skills of the elementary school students in Ternate Archipelago than conventional learning. It is recommended for the teachers of elementary schools in the Ternate archipelago as well as in any such archipelago area to implement the three learning strategies in order to empower the critical thinking skills of students, although it is possible to implement other cooperative learning strategies.

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