

## Observing Debate in Learning on Students' Critical Thinking

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**Abstract:** The objective of this research prove of difference between the limited critical thinking ability and the general critical thinking ability of learners using the methods of debate and discussion with learners who have different learning styles. Using a quasi-experimental design with testing and rating scales, the results showed: (1) there is no difference between the limited critical thinking ability of learners between students who use the method of debate and discussion. There is a difference between the general critical thinking ability of learners between students using the method of debate and those who are using discussion method (2) there is a difference in limited critical thinking ability and the general critical thinking ability between converging learning styles and divergent learning styles; (3) there is an interaction between instructional methods and learning styles on the limited critical thinking ability. The effect of learning methods to the general critical thinking ability is not influenced by the style of learning.

**Key Words:** debate methods, discussion methods, learning styles, critical thinking

**Abstrak:** Tujuan penelitian ini adalah untuk membuktikan perbedaan antara kemampuan berpikir kritis terbatas dan kemampuan berpikir kritis umum peserta didik menggunakan metode debat dan diskusi dengan gaya belajar yang berbeda. Penelitian ini menggunakan desain kuasi-eksperimental dengan skala pengujian dan penilaian. Hasil menunjukkan: (1) tidak ada perbedaan antara kemampuan berpikir kritis terbatas peserta didik di antara siswa yang menggunakan metode debat dan diskusi. Ada perbedaan antara kemampuan berpikir kritis umum peserta didik di antara siswa yang menggunakan metode debat dan diskusi; (2) ada perbedaan dalam kemampuan berpikir kritis terbatas dan kemampuan berpikir kritis umum antara siswa dengan gaya belajar konvergen dan divergen; (3) ada interaksi antara metode pembelajaran dan gaya belajar pada kemampuan berpikir kritis terbatas. Pengaruh metode pembelajaran terhadap kemampuan berpikir kritis umum tidak dipengaruhi oleh gaya belajar.

**Kata kunci:** metode debat, metode diskusi, gaya belajar, berpikir kritis

### INTRODUCTION

Active learning methods are useful in increasing understanding, retention and critical thinking compared to passive learning generated from conventional learning (Hall, 2011). The use of various learning methods can help students develop critical thinking skills (Yildirim & Ozkahraman, 2011). The ability to think critically can be improved through learning methods that promote active learning (Walker, 2003; Kennedy, 2007; Snyder & Snyder, 2008; Mandernach, Forrest, Babutzke & Manker, 2009; Alexander, 2010). Critical thinking as thinking is explicitly based on judgment of appropriate reasons and standards in order to reveal truth,

profit, and value of a certain notion (Paul & Elder, 2001b; 2006).

The debate process in the classroom can effectively facilitate critical thinking. Therefore, the debate is a way to increase critical thinking through investigating arguments, engaging in research, gathering information, conducting analysis, assessing arguments, questioning assumptions, and showing interpersonal skills. A debate method is a form of oral controversy that consists of systematic presentations against arguments on topics understood by others. This process involves discussion that is contrary to their views and involved in arguments (Roy & Macchiette, 2005).

They argue with each other between two parties who have different views.

The debate has been used successfully in various disciplines including sociology, history, psychology, biotechnology, mathematics, health, dentistry, nursing, marketing, and social work (Kennedy, 2007; 2009). Students believe that debate helps them understand better topics, learn new knowledge, and gain an understanding of the process of debate. In addition, students think that debate can improve their critical thinking skills (Scott, 2008). Debate methods can prepare students to become critical thinkers and become communicators in a broad environment, confident to communicate, improve critical thinking and problem solving (Hall, 2011).

Furthermore, the debate provides numerous benefits as follows: (1) increasing the ability of students to communicate, both verbal and non-verbal, (2) familiarizing teamwork and time management, (3) increasing student self-confidence in public speaking, (4) learners can also benefit from enriching interesting experiences (Roy & Macchiette, 2005). Test results show that students gain a better understanding, application, and critical evaluation skills when controversial topics are taught in the form of debate (Omelicheva & Avdeyeva, 2008).

In addition to the debate method, there is also a discussion method as one method that actively encourages student involvement. Even the discussion method has similarities with the debate method. The method of discussion is part of learning, for many reasons; (1) subjective and controversial topics, (2) complex and new concepts, and (3) effective goals, for example: discussing new themes, controversies and developing oral abilities (Slavin, 2006). The discussion method has a greater effect on students if they are encouraged to engage in controversy rather than just looking for equality of views (Johnson & Johnson, 1999). The discussion method is superior to conventional methods because in discussion learning students are faced with intellectual conflict hence there is an increase in critical thinking skills (Gillman, 2003).

Debate methods and discussions are parallel as a method used in learning to classify and evaluate large amounts of available information. Learners need to provide active learning activities to help students practice critical thinking (Braun, 2004). The results of the study explain that students record debates discussing material from various viewpoints of study, whereas in discussions this is not always the case. The debate requires the use of logic and common sense not just free expression in opinion. Debate partic-

ipants prepare their abilities hence they know what they are talking about (Goodwin, 2003). The results of the study report that the debate in class can encourage students' participation with higher intensity than the discussion in class (Osborne, 2005). The two studies concluded that the debate method was more favored than the method of discussion.

Another aspect that influences the effectiveness of the use of learning methods is the learning style (Woolfolk, 2008); learning styles relate to learning models (Joyce, Weil & Calhoun, 2009). Learning style is approaching the task of learning and managing information in certain ways (Slavin, 2006). This study focuses more on Kolb's learning style since it has conformity with critical thinking skills. The results of the study concluded that Kolb's learning style has a relationship with critical thinking (Cetin, 2014). Kolb's learning style is divided into four dimensions: diverging, assimilation, convergence and accommodation (Kolb & Kolb, 2005; Hay Group, 2006).

Researchers understand the relationship between the use of debate and discussion methods in divergent and convergent learning styles. Both of these learning styles can accommodate learning experiences that use debate and discussion methods. Furthermore, the dimensions of divergent learning styles are often compared to convergent learning styles, some studies compare both (Kuncoro, 2012; Kade, 2014). Individuals with divergent learning styles are able to see concrete situations from a variety of perspectives. They are often interpreted as creative thinking (giving lots of ideas), with the characteristics of creating ideas, recognizing, alternative possibilities, seeing unexpected combinations, original abilities, open, resilient, self-assertive and sensitive. While individuals with convergent learning styles are best at finding practical uses of ideas and theories. They are able to solve problems and make decisions effectively. Convergence is often interpreted as critical thinking (choosing the best ideas), with good memory characteristics, logical thinking, factual knowledge, and precision.

The research problem formulations are as follows: (1) are there differences in limited critical thinking skills and general critical thinking between students who use the debate and discussion method? (2) are there differences in limited critical thinking skills and general critical thinking between students with dimensions of divergent learning styles and convergent learning styles? (3) are there interactions between learning (debate versus discussion) methods and learning styles (divergent and convergent) towards limited critical thinking skills and general critical thinking?

## METHOD

This study used a quasi-experimental design and factorial design in analyzing the research data. The experimental group used the debate method while the control group used the discussion method, while the selection factor was the moderator variable divergent and convergent learning style. The subjects in this study were students in the Faculty of Education, Educational Technology Study Program and Faculty of Letters, English Language Teaching Study Program in the second semester of the 2015/2016 academic year at the Universitas Negeri Malang. The researcher gave treatment to two different parallel classes. For this reason, this study requires four classes, two Educational Technology Classes and two English Language Teaching classes.

Learning styles measurement in this study was using the Kolb's Learning Style Inventory (LSI) that has been translated. This instrument consists of 12 items in the form of multiple choice statements consisting of four alternative response options. This instrument has been widely used and several reliability tests have been carried out. Indicators of critical thinking can be used both as a formative guide for improving student reasoning and summative tools for evaluating quality at the end of learning (Ash & Clayton, 2009; Kaupp, Frank, & Chen, 2014). Thus researchers develop instruments of critical thinking skills into two. First, developing the instrument of limited critical thinking ability is based on the learning process in the class that uses the debate method and the discussion method. This instrument was developed in the form of rating scales. Second, the instrument of general critical thinking ability, this instrument was developed in the form of tests used by students. Instruments used to collect data that are informative-factual (concrete facts).

Hypothesis testing was carried out by employing manova statistical analysis techniques. Data analysis

techniques are used to determine the differences in the use of learning methods (debate method versus discussion method) on students' critical thinking skills who have learning styles. The analysis was using a two-track MANOVA (2x2). This statistical analysis technique is also used to explain the interactions between variables. The criteria for decision making is the difference between the independent variable and the dependent variable based on the error rate of 5%.

## RESULTS

The researcher conducted an analysis by utilizing SPSS on data regarding limited critical thinking skills. Each learning group is described in mean size and standard deviation. Based on the description presented in Table 1, a general picture of limited critical thinking skills can be obtained between groups of learning methods (debate and discussion) and learning styles (divergent and convergent).

Table 2 shows general critical thinking skills. Each learning group is described in mean size and standard deviation.

The hypothesis testing was performed by analyzing the data of limited critical thinking and general critical thinking skills as the dependent variable; debate and discussion learning methods as independent variables; while divergent and convergent learning styles as moderator variables. MANOVA analysis can only analyze differences (not hypotheses which state higher), then in the analysis of variants of hypothesis 1, hypothesis 2, hypothesis 4, and hypothesis 5, it is expressed in the formulation of statistical hypotheses, namely the null hypothesis ( $H_0$ ) and the alternative hypothesis ( $H_a$ ). The hypothesis will be formulated according to the order of Manova's analysis, namely the analysis of differences between groups simultaneously which is presented in Table 3 and the main effects presented in Table 3 (see the significance of

**Table 1. Limited Critical Thinking in terms of Learning Methods and Learning**

Learning Methods	Learning Styles	Limited Critical Thinking Skill		
		Mean	Std. Deviation	N
Debate	divergent	33.4091	3.30453	22
	convergent	37.3750	3.20435	8
	Total	34.4667	3.68345	30
Discussion	divergent	36.8421	1.95116	19
	convergent	36.8889	3.51584	9
	Total	36.8571	2.49019	28
Total	divergent	35.0000	3.23265	41
	convergent	37.1176	3.27648	17
	Total	35.6207	3.36039	58

**Table 2. General Critical Thinking in terms of Learning Methods and Learning Styles**

Learning Methods	Learning Styles	General Critical Thinking Skill		
		Mean	Std. Deviation	N
Debate	divergent	33.6364	3.59292	22
	convergent	36.1250	2.69590	8
	Total	34.3000	3.51499	30
Discussion	divergent	35.6842	3.91653	19
	convergent	38.3333	2.23607	9
	Total	36.5357	3.64623	28
Total	divergent	34.5854	3.84041	41
	convergent	37.2941	2.64019	17
	Total	35.3793	3.72204	58

**Table 3. Main Effect Outcome**

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Limited_critical_thinking	175.047 <sup>a</sup>	3	58.349	6.724	.001
	General_critical_thinking	151.584 <sup>b</sup>	3	50.528	4.276	.009
Intercept	Limited_critical_thinking	62491.869	1	62491.869	7201.239	.000
	General_critical_thinking	61856.808	1	61856.808	5234.945	.000
Learning method	Limited_critical_thinking	25.985	1	25.985	2.994	.089
	General_critical_thinking	54.205	1	54.205	4.587	.037
Learning style	Limited_critical_thinking	48.180	1	48.180	5.552	.022
	General_critical_thinking	78.985	1	78.985	6.685	.012
Learning Method * Style	Limited_critical_thinking	45.960	1	45.960	5.296	.025
	General_critical_thinking	.077	1	.077	.007	.936
Error	Limited_critical_thinking	468.608	54	8.678		
	General_critical_thinking	638.071	54	11.816		
Total	Limited_critical_thinking	74236.000	58			
	General_critical_thinking	73388.000	58			
Corrected Total	Limited_critical_thinking	643.655	57			
	General_critical_thinking	789.655	57			

a. R Squared = .272 (Adjusted R Squared = .232)

b. R Squared = .192 (Adjusted R Squared = .147)

each factor to the dependent variable). In testing this hypothesis a significance level = 0.05 is determined.

Hypothesis testing is presented in Table 3. Drawing conclusions from hypotheses are formulated as follows; Ho is accepted if sig. > 0.05 (meaning there is no difference). Ha is accepted if sig. < 0.05 (meaning there are differences), as for the conclusions of the proposed hypothesis formulation namely:

First, Table 3 explains that limited critical thinking skills between students who employ the debate and discussion learning method have no difference (F = 2.994 with the sig. 0.089 > 0.05). The learning group that uses the debate method is lower than the learning group that uses the discussion method (debate method mean = 34.4667 < discussion method mean = 36.857), with a mean difference = 2.3903.

Table 3 explains that general critical thinking skills between students who employ the debate and discussion learning method are different (F = 4.587 with the sig. 0.037 < 0.05). The learning group that uses the debate method is lower than the learning group that

employs the discussion method (debate method mean = 34,300 < discussion method mean 36,5357), with a mean difference = 2,2357.

Second, Table 3 explains that limited critical thinking skills between students who have divergent learning styles and students who have convergent learning styles have differences (F = 5.552 with the sig. 0.012 < 0.05). Students' limited critical thinking ability scores that have divergent learning styles are lower than convergent learning styles (mean divergent learning styles = 35.00 < convergent learning style mean = 37.1176), with a mean difference = 2.1176.

Table 3 explains that general critical thinking skills between students who have divergent learning styles and students have convergent learning styles there are differences (F = 6.685 with the sig. 0.022 < 0.05). Students' general critical thinking skills scores that have divergent learning styles are lower than convergent learning styles (divergent learning styles mean = 34.5854 < convergent learning styles mean = 37.2941), with a mean difference of 2.7087.

Third, Table 3 explains that there is an interaction between learning methods (debate and discussion) and learning styles (divergent and convergent) on limited critical thinking skills ( $F = 5.296$  with sig.  $0.025 < 0.05$ ). Table 1 explains that the divergent debate mean =  $33,409 <$  convergent debate mean =  $37,375$  with a mean difference =  $3,966$ , while the divergent discussion mean =  $36,842 <$  convergent discussion mean =  $36,889$  with a mean difference =  $0,047$ . This interaction is seen in the convergent debate mean =  $37.375$  with the convergent discussion mean =  $36.889$ .

Table 3 explains that there is no interaction between the method of learning (debate and discussion) and learning style (divergent and convergent) on general critical thinking skills ( $F = 0.007$  with sig.  $0.936 > 0.05$ ). Table 2 describes the divergent debate =  $33,636 <$  the convergent debate mean =  $36,125$  with the mean difference =  $2,489$ , while the divergent discussion mean =  $35,684 <$  convergent discussion mean =  $38,333$  with mean difference =  $2,649$ . From the mean of each, it does not address the interaction between variables.

## DISCUSSION

### Limited Critical Thinking Skill between Discussion and Debate Learning Method

Braun (2004) places debate and discussion in parallel as a method used in business learning to classify and evaluate large amounts of available information. Instructors need to provide active learning activities to help students practice critical thinking. Students can be taught to identify problems and classify information to make intelligent decisions. The business curriculum needs to clearly state the critical thinking skills taught and assess skills improvement. It is a difficult task, but a fast-paced environment in the business world requires executives and workers to be able to handle large amounts of information and make wise decisions quickly.

Braun's (2004) findings if it is related to the results of this study, which states that students' limited critical thinking skills using the debate and discussion methods are identical. Another study found that debate encourages students to practice presentation skills and teamwork. All students enjoy participation in debates. Debate methods can measure student achievement, diagnose learning problems, learn more about the perspective and attitude towards the material being studied. However, the debate is not applicable to learning method in every situation. Debates conducted in class provides unequal results among students. Some

students fail to gain more understanding of controversial issues or practice critical thinking skills, and others report fear and anxiety over academic debates (Omeliicheva, 2007).

The results of other studies that reinforce the rejection of hypothesis 1, that the discussion method is superior to conventional methods because in discussion learning students are faced with intellectual conflict hence there is an increase in critical thinking skills (Gillman, 2003). The discussion method is perceived to accelerate gaining knowledge; improve critical thinking skills; facilitate understanding facts and opinions, and help students think logically. The results of the above research can confirm that not only the debate method can improve students' critical thinking skills but the method of discussion also has identical outcomes.

### General Critical Thinking Skill between Discussion and Debate Learning Method

The hypothesis that is expected in this study is that students who employ a debate learning method are higher in achieving general critical thinking skills than students who employ discussion learning methods. However, the results confirmed different outcomes. Students who employ the discussion learning method are higher or more favored in achieving general critical thinking skills than a debate learning method. The hypothesis proposed in this study is inversely confirmed.

The results of this study can be explained from the results of several previous studies. One of the effects of learning is to realize the promised benefits of critical thinking skills from the debate after several attempts have been put in to design the conditions of the debate and clarify the learning objectives. Furthermore, students must try to distinguish academic debates and contest debates (debates used in schools and colleges or debate competitively in debate tournaments). Emphasis on academic debate must be placed on developing thinking abilities and attitudes, such as interest in social problems, tolerance at different points of view, and conditions of the academic debate must be established for the achievement of these goals (Omeliicheva, 2007).

As mentioned above, class debates are a new learning method that requires examples of debate processions. Druckman (2003) conducted an experiment in which debate participants by watching television debate versus listening to the audio version of the de-

bate. This research was conducted in America, he found that television shows had a significant influence on learning activities in debate classes when compared to those who listened to the debate using audio. One thing, not only requires to offer a clear normative model but in this case, it must also consider the relationship between problems, images, and information. Thus the debate process that will be carried out by students first needs to be visualized hence they understand the mechanism of the debate that will be carried out.

Researchers should not expect major changes in students' thinking in one or two semesters. Learning methods do not change students into critical thinkers. However, the practice of learning this debate can develop their skills and plays as an important capital in their lives (Omelicheva, 2007).

The results of further research show that students gain a better understanding, application, and critical evaluation skills when controversial topics are taught in the debate learning method. With regard to basic knowledge, memorization, remembering, expressing opinions, this finding is only significant at the level of 0.10. The findings of this study confirm that traditional learning methods (lectures) and active learning (debate) can produce different learning goals. The debate seems to be more effective in developing students' understanding of complex concepts and applications and critical evaluation skills. The combination of both conventional learning and active learning can provide the most effective training for students. He wants to emphasize, however, that debate is not the only way to get students to think more critically and analytically, and there may not be the most effective active learning methods to improve student critical thinking (Omelicheva & Avdeyeva, 2008).

Freeley (1990) does not claim that experience in the debate is superior to other methods, even though there are differences. The argument for debate is not the only way, it only offers a set of characteristics that distinguish it from other methods and stimulates the growth of student thinking. He said the typical debate in a dialectical form, provided an opportunity for intellectual clashes in testing ideas. Greenstreet (1993) further explains that empirical research does not find a causal relationship between participation in debate and improving critical thinking skills.

Besides, there are several factors theoretically which make the discussion method is superior to the debate method in this study, or at least the method has theoretical similarities. First, the discussion method develops the perspective of student thinking because in

the discussion the learners practice to raise problems, express opinions, and answer questions. Learners practice facing problems and dealing with other opinions that have different perspectives hence different interpretations emerge because they are based on different arguments. The emergence of various different opinions in the implementation of the discussion actually enriched the mastery of the concepts of the issues discussed. In answering a problem students may have prepared an argument, but on the same occasion, students can be faced with new problems that are not expected. This condition ultimately requires students to develop their thinking perspective so that they are able to adapt to differences in concepts and problems, and raise awareness of how to share ideas about one general topic with other discussion participants (Gibson, 2009; Eggen & Kauchak, 2012). Discussion methods have characteristics that are consistent with constructivist understandings (Degeng, 1998). Such learning conditions also occur in classes that use the debate method.

Second, the discussion method allows learners to construct new knowledge that is established through the process of discussion. The interaction that is established by bringing together the arguments of each participant allows the learner to accumulate knowledge that comes from different perspectives. Hence new knowledge is formed. Well-designed discussions by raising topics that provoke different opinions lead to discussions development. In such conditions, students can increase their understanding of the problems discussed based on the interactions that occur. The diversity of opinions enriches the entry of new information while providing thoughtful material for students in constructing their knowledge (Gibson, 2009). The discussion method create an authentic context that has conformity with constructive learning theory, where learner knowledge is obtained through realistic contraction through interaction in the discussion process (Lisenco, 2006). Students must be given guidance on the procedures and contents of the discussion, therefore, constructive discussions are created to build critical thinking skills and high-level learning outcomes (Sautter, 2007).

Third, the method of discussion promotes awareness and willingness to accept differences that exist in the learning environment. The difference is not only in terms of thinking and understanding of concepts, but also differences in socio-economic, physical, ethnicity and environmental background. In carrying out the discussion, thinking factors should play a role, but the thoughts that arise from a student can be influ-

enced by the economic, ethnic and environmental background as mentioned above. These factors play a role in influencing the arguments they composed. Another factor that plays a role is the thought that the majority thoughts which overwhelmed a minority one. People who have thoughts that are considered different from general thoughts are often seen as strange because they are considered against the mainstream. In such conditions learners can help justify the reasoning for different opinions, thus students can learn to face different opinions (McMurray, 2007). However, there are concerns that the use of the discussion method will give rise to an understanding that is not in accordance with understanding in general, consequently, it confuses the students (Chowning, 2005).

### ***Between Convergent and Divergent Learning Style in Achieving Limited and General Critical Thinking Skill***

The results of this study indicate that students with convergent learning styles are more favored in achieving limited critical thinking skills than students who have divergent learning styles. Furthermore, students with convergent learning styles are more favored in achieving general critical thinking skills than students who have divergent learning styles.

Learning styles are an important part of the professional mentality and it is a learning competency that promotes the achievement of special skills needed for effectiveness in the learning process (Kolb, 1984). Learning styles refer to behavioral actions, a way of arranging individuals, synthesizing, analyzing, storing and the source of information provided. Critical thinking consists of mental tendencies and the ability of individuals to draw conclusions about the information provided, identify issues and assumptions in arguments and evaluate their evidence. Both the capacity of learning and critical thinking styles involves the management of individual habits and the transformation of information provided; the first is the action and the second is the disposition and skills of the action (Andreou, Papastavrou, & Merkouris, 2014). Furthermore, there is a positive relationship between learning styles and critical thinking skills if total learning styles are considered as the focus of research (Karamloo, 2014).

These results are identical with the previous research, that affirms students who have convergent learning styles have the ability to organize and receive information received from the text. They can learn from their own work, use their own strategies to take notes and underline the parts that are considered important. They can also read parts that are less clear

or missing. They are also actively involved in discussions with the help of questions given and with instructions given. Furthermore, students who have a convergent learning style have the opportunity to use narratives, create their own learning strategies and ask questions about points that are not understood and together with learners using their own communication styles (Yılmaz-Soylu & Akkoyunlu, 2002).

Additionally, these are in line with Kuncoro's (2012) research findings concluding that different types of learning styles generate different effects on problem-solving. Convergent learning style groups are superior to divergent learning style groups in problem-solving. Furthermore, Kade (2014) concludes that students who have convergent learning styles have a better understanding of concepts compared to students who have divergent learning styles in high school students. Thus students who have different learning styles allow having different thinking skills. Convergent learning styles are more favored than divergent learning styles in the development of limited critical thinking skills and general critical thinking skills.

Convergent learning styles places in the conceptual position of abstraction and are actively conducting experiments. An individual with an orientation to abstract conceptualization focuses on using logic, ideas, and concepts. This orientation emphasizes thinking rather than feelings, scientific approaches, and systemic planning. While individuals who are oriented towards active experiments focus on changing situations. This person is able to take risks to achieve their goals. The emphasis is on doing and seeing results (Kolb, 1984). It is emphasized that learning is an interactive process that occurs in several environments and in various ways. Learning is defined as "a relatively permanent change in attitude or behavior that occurs as a result of repeated experience". More clarifying learning as an active process that results in the acquisition of additional information or skills (Sims, & Sims, 1995).

The positive relationship between convergent learning styles and critical thinking is also explained by other studies. Students who prefer to learn by thinking and doing the possibility to combine critical thinking capacity, anticipate the situation to change new information (Gyeong & Myung, 2008). Convergent learning styles as preferences for solving problems that have definite answers (Ross & Lukow, 2004). Likewise, the high value of divergers on critical thinking shows that people who prefer learning through reflective observation and effective feelings to concrete experiences may be able to understand and jus-

tify the knowledge gained from the information provided through their judgment, a reasonable question (self-confidence), objectivity (truth), sensitivity and tolerance for different views (open-mindedness).

### ***Research Variables Interaction***

#### ***Interaction between learning styles and limited critical thinking skill***

Hair, Black, Babin, Anderson & Tatham (2006) suggest that interactions can occur if the independent variables do not carry causation separately or individually. Franzoni & Assar (2009) explain learning styles combined with the selection of appropriate learning methods, hence students can learn efficiently and improve their learning process. Novin, Arjomand, and Jourdan, (2003) emphasize that learners are aware of the importance of exposing students to various learning styles, in addition to the style they prefer. By attending only to the style that students prefer, students strengthen their strengths and ignore their weaknesses. The results of this study underscore the importance of distinguishing learning methods that address all learning styles. Jones, Reichard, & Mokhtari (2003) conclude that learning styles play an important role in the learning process. Franzoni & Assar (2009) explain the possibility that both learning styles groups can do the same thing well with one of the learning methods.

Some people learn by seeing; some learn by thinking; some learn by saying and so on. The ways in which an individual typically acquires, retains, and retrieves information collectively are called individual learning styles (Felder & Henriques, 1995). The relationship between critical thinking and the use of direct and indirect learning methods. The findings show a statistically significant relationship between direct and indirect learning methods (Nikoopour, Farsani and Nasiri, 2011). The results of another study conducted by McCann (2006) about the relationship between learning styles, learning environments and the suitability of student performance in different types of learning environments.

The results explained that optimal learning requires students to receive learning in accordance with their own learning styles. This study reveals a specific type of interaction between learning styles and learning methods: students with one learning style achieve the best learning goals when given different learning methods. A good learning method is one that can accommodate different learning styles. In other words, learning methods that prove the most effective for students with a certain learning style are not

the most effective method for students with different learning styles. Furthermore, they found that there was almost no evidence for the interaction pattern mentioned above, which was considered to be a prerequisite for validating learning applications with learning styles. We, therefore conclude, that at present, there is no sufficient evidence base to justify combining the assessment of styles in educational practice (Pashler, McDaniel, Rohrer & Bjork, 2009).

The results by Baldwin & Sabry (2003) confirm that the learning styles need to be developed in order to accommodate students certain skills of each learning style in the group as a whole. Learning methods can not only help students to be able to respond more effectively to different learning situations but can also act as the formation of more autonomous learners. Franzoni, & Assar, (2009) recent research on the learning process has shown that students tend to learn in different ways and that they prefer to use different resources.

The study of interactions that arise between methods and learning styles performs as the basis for understanding the results of testing the third hypothesis. This implies that the influence of learning methods on limited critical thinking skills is influenced by learning styles. The above study is the basis for generating the idea that the interaction of learning methods and learning styles towards critical thinking skills appears presumably because of the strong influence of each variable, namely the independent variables (debate method and discussion method) affect moderator variables (divergent learning styles and convergent learning styles) on the dependent variable, limited critical thinking skills.

#### ***The interaction between learning styles and general critical thinking skill***

The research results present that the learning method has a strong influence on learning objectives. It indicates that learning methods can be oriented to increase learning acquisition, therefore learning methods must be designed to provoke the emergence of numerous different opinions that are able to develop critical thinking skills (Goodman & Lesnick, 2004). In social learning, discussion methods can increase learning goals about problems based on the results of interactions of different opinions (Nucci & Narvaez, 2008). The discussion topics presented correctly will stimulate students' thinking hence they are involved in intellectual conflicts that lead to increased critical thinking skills (Sajjad, 2010; & Hurtado, Ruiz, & Whang, 2012).

Several similar studies have been conducted on the effects of learning styles on critical thinking skills.

The results showed that there were no significant inconsistencies between students' critical thinking skills and learning styles. However, this study identifies which learning styles are preferred by people who are considered critical thinkers (Myers & Dyer, 2006). Furthermore, there is no interaction between the learning method and Kolb's learning style towards the learning objectives. This is due to the weak influence of the learning style moderator variables on learning objectives because of the excessive learning styles used in the study (Rais, 2010).

Based on the explanation above, it can be seen that learning methods and learning styles separately influence general critical thinking skills. Likewise, the findings reveal in this study. However, simultaneously the findings in this study show there is no interaction between learning methods and learning styles towards general critical thinking skills. This implies that the influence of learning methods on learning objectives is not affected by learning styles, whereas the influence of learning styles on general critical thinking skills is not affected by learning methods. This is in line with the research findings of Young, Klemz, and Murphy (2003) and Freeman, Fell, and Muellenberg, (1998) which state that there is no interaction between learning methods and learning styles, this occurs because what determines learning goals is not just a method and learning styles. Numerous other factors in learning should be taken into account for students' learning outcomes.

### CONCLUSION

The conclusions in this study can be presented in the following three points. There is no difference in students' limited critical thinking skills using the debate and discussion method. Students' limited critical thinking skill using the debate method is not higher than discussion. There are differences in the general critical thinking skills between students who employ the debate and discussion method. Students' general critical thinking skills employing the discussion method are higher than the debate method.

There are differences in the limited critical thinking skills between students who have convergent learning styles and students who have divergent learning styles. Students' limited critical thinking skill in a convergent learning style is higher than students who have divergent learning styles. There are differences in the general critical thinking skills between students who have convergent learning styles and students who have

divergent learning styles. Students' general critical thinking skills who have convergent learning styles are higher than students who have divergent learning styles.

There is an interaction between learning methods and learning styles towards limited critical thinking skills. This means that the influence of learning methods on limited critical thinking skills is influenced by learning styles. There is no interaction between learning methods and learning styles towards general critical thinking skills. This means that the influence of learning methods on general critical thinking skills is not affected by learning styles.

It is suggested that the future research can apply the use of methods of discussion and debate in other fields of study, which have themes of controversy as characters from both methods. In addition, the future research can take into account moderator variables other than Kolb's learning style, to determine the interaction between independent variables and moderator variables on the dependent variable, using other moderator variables such as: self efficacy, achievement motivation.

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