

# The Effect of Formative Evaluation and Cognitive Style toward Learning Achievement

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**Abstract:** *This experimental investigated the effect of formative evaluation (in form of multiple choices and essay test) and cognitive styles (field dependent and field independent) toward learning achievement of Citizen Education subject. The target population consisted of 275 students of seventh graders of Junior Secondary School 193 and 309 students of Junior Secondary School 256 in academic-year 2013/2014. Using multistage random sampling, the research obtained 11 students with high learning achievement and 11 students with low learning achievement who were placed at the experimental and control groups. Two-ways variant analysis (ANOVA) with 2 x 2 factorial design was applied to analyze data. The result of the research revealed that: (1) Civic Education learning achievement of students who did essay test is better than the achievement of those doing multiple-choice test; (2) Civic Education learning achievement of field independent students is better than the achievement of field dependent students; (3) there is interaction between formative evaluation and cognitive style toward Civic Education learning achievement; (4) Civic Education learning achievement of field independent students doing essay test is better than the achievement of those doing multiple-choice test; (5) Civic Education learning achievement of field dependent students doing essay test is smaller than those doing multiple-choice test; (6) Field independent students get better score in doing essay test than field dependent students in Civic Education subject learning achievement; (7) in terms of multiple-choice question, field independent student get smaller score than field dependent students.*

**Keywords:** cognitive style, essay, multiple choices, learning achievement

## 1. Introduction

The glory of a nation is determined by not only its abundant natural resources but also its quality of human resources. In order to achieve qualified human resources, schools are considered as a potential social institution. The regulation of the Republic of Indonesia Number 20 Year 2003 regarding National Education System states that national education aims to develop the potential of learners to make them religious, noble, knowledgeable, skillful, creative, and make them to be a democratic and responsible citizen.<sup>1</sup> In relation to the statement Civic Education subject, which is taught for all level of education in this country, aims to increase students' learning creativity in order to produce citizens who are religious, intelligent, democratic, peaceful, prosperous, and modern.<sup>2</sup>

Learning is one of factors which determines whether the graduates of education system are good or bad.<sup>3</sup> It can be assumed as the heart of education. Therefore, good learning could produce good graduates and vice versa. Learning is a system whose components are a synergy as a unit. Learning components include learners, teachers, materials, facilities & infrastructure, evaluation system, and environment.<sup>4</sup> Every teacher should master those components and apply them in learning processes.

In learning, there have been various methods and strategies implemented by teachers, and students can actively participate in learning processes using teaching techniques they are interested in. However, most students still do not know the best way for them to learn.

Students' inability to achieve learning objectives has an effect upon low quality of education.<sup>5</sup> One of the indicators showing this is the unsatisfying score of Civic Education subject subject for Final Semester Exam (FSA) at 193 and 256 State Junior Secondary Schools (SJSS), as can be seen in the table below:

**Table 1:** Mean of FSA for Civic Education subject at 193 and 256 State Junior Secondary Schools, Cakung Subdistrict, East Jakarta

No.	Year	MAC 193 SJSS	FSA Score 193 SJSS	MAC 256 SJSS	FSA Score 256 SJSS
1	2007	6,5	6,15	6,5	5,58
2	2008	6,8	6,23	7,0	6,04
3	2009	7,0	6,58	7,2	6,25
4	2010	7,4	6,87	7,5	6,67
5	2011	7,5	7,37	7,7	7,35
6	2012	7,53	7,53	7,8	7,58

Note: MAC = Minimum Achievement Criteria

The data show that the success of Civic Education subject in these two schools from year to year could be considered low. The assumed cause is the teachers' inaccuracy in giving formative evaluation in this subject because a correct evaluation result is the strong foundation for scoring. Therefore, teachers are expected to be able to not only master learning materials but also give correct evaluation. A study on learning achievement of Natural Science subject by Daydy (2013) shows that after controlling students' IQ, the mean score of students given formative test using essay questions was better than those given multiple-choice questions.<sup>6</sup> The results of study conducted by Iryana (2009)

showed a significant correlation between contextual learning and the development of students' character.<sup>7</sup>

Instead of the accuracy in giving evaluation, cognitive style of students can be one of the determinant factors of the success teaching and learning. Cognitive styles are among the factors that play a vital role in affecting students' academic performance.<sup>8</sup> Understanding students' cognitive styles may help teachers identify and solve learning problems among students; thus, teachers may help their students to become more effective learners.<sup>9</sup> The use of different learning method have different impact on learning performance of students with different learning styles.<sup>10</sup> The study conducted by Yessy Harun (2009) also revealed that students' field independent learning style was more influential than field dependent learning style.<sup>11</sup>

Based on the information above, the research problems can be formulated as follows: (1) Is there the difference in Civic Education subject learning achievement between students doing formative evaluation in the form of essay questions and those doing multiple-choice questions? (2) Is there the difference between students with field independent style and those with field dependent style toward Civic Education learning achievement? (3) Is there the interaction effect between essay formative evaluation, multiple-choice formative evaluation, and cognitive style toward Civic Education learning achievement? (4) Is there the difference in Civic Education learning achievement of students with field dependent style learning with essay and multiple-choice formative evaluation? (5) Is there the difference in learning achievement of students with field independent style learning with essay and multiple-choice formative evaluation? (6) Is there the difference in Civic Education learning achievement between students with field independence and dependence learning with essay formative evaluation? and (7) Is there the difference in Civic Education learning achievement between students with field independence and dependence learning with multiple-choice formative evaluation?

## 2. Research Method

The research took place at State Junior Secondary 193 Schools and State Junior Secondary Schools 256 for 5 months. This experimental research had 3 essential steps: manipulation, observation, and control. This research used factorial design 2x2, which aimed to know if there was a cause-effect relation after giving treatment to the experimental group whose results were then compared to the control groups.<sup>12</sup>

There were 2 variables: dependent and independent variables. Independent variables were  $X_1$  (formative evaluation) and  $X_2$  (cognitive style). Formative evaluation was classified into 2: essay and multiple-choice, and cognitive style consisted of field independence and field dependence. One dependent variable was  $Y$  = Civic Education learning achievement. The factorial design is shown in the Table 2.

**Table 2: Factorial Design 2 x 2**

	Formative Evaluation	Essay (A <sub>1</sub> )	Multiple Choice (A <sub>2</sub> )
Cognitive Style			
Field Independence (B <sub>1</sub> )		A <sub>1</sub> B <sub>1</sub>	A <sub>2</sub> B <sub>1</sub>
Field Dependence (B <sub>2</sub> )		A <sub>1</sub> B <sub>2</sub>	A <sub>2</sub> B <sub>2</sub>

The target population was 275 students seventh graders of Junior Secondary School 193 and 309 students of Junior Secondary School 256 in academic-year 2013/2014. Using multistage random sampling, the research obtained 11 students with high learning achievement and 11 students with low learning achievement who were placed at the experimental and control groups. The instrument of learning achievement used in post-test was 35 multiple-choice questions with 4 choices (A, B, C, D) for each question. Correct answer got 1, while wrong answer was 0. So, theoretically the range was 0 - 35. For essay questions, the score ranged from 4 - 1, depending on whether the answer was correct or almost correct. The wrong answer got 0. Learning materials of this research was about positive attitude to norms prevailing in society and nation.

The instrument of attitude scale consisted of 5 options. The scoring was as follows: 5 for 'completely agree' (CA), 4 for 'agree' (A), 3 for 'less agree' (LA), 2 for 'disagree' (D), and 1 for 'completely disagree' (CD).

Conceptually, Civic Education learning achievement was a students' ability after doing learning processes in a certain period of time. There were six aspects: knowledge (C1), understanding (C2), implementation (C3), analysis (C4), synthesis (C5), and evaluation (C6). Operationally, Civic Education subject achievement was the score obtained by students after doing learning processes in a certain period of time, shown by the score after doing the test. The mastery level measured was cognitive abilities covering such aspects as knowledge, understanding, implementation, analysis, synthesis, and evaluation.

As mentioned, the test used was 35 objective multiple-choice questions with 4 alternatives (A, B, C, and D). 1 was for a correct answer, while 0 was for a wrong answer. Essay questions consisted of 5 points. Question number one was scored 30, number two 20, number three 30, number four 10, and number five 10. The score for correct and almost correct answers depended on the teachers' policy, while a wrong answer was given 0. As mentioned, learning materials in this research covered positive attitude to norms prevailing in society and nation.

To obtain a valid instrument, the validation of Civic Education learning achievement was conducted by analyzing item analysis using Biserual Point. Because the instrument had a concept of dichotomy with accepted statement being  $F_{\text{count}} > F_{\text{table}} = 0.361$  and the number of participants reaching 30, the items were considered valid. Reliability becomes the requirement which must be fulfilled in using an instrument. The instrument is considered reliable if it can be trusted, is consistent, and shows stable result in measuring something it should measure.

Conceptually, cognitive style is the relatively permanent attitude of someone in accepting, remembering, thinking, storing, forming, and utilizing information. Cognitive style is categorized into field independence and field dependence. Operationally, students' cognitive style has dimension and indicators: 1. Activity; tend to do activities in reaching a goal, 2. Getting along with people; similar to the tendency to socialize, depending on conscience and fun, 3. Being brave to take a risk; having better condition to respond to emerging problems and having strong power in doing a task, 4. Feeling statement; being dependent on psychological emotion and having positive views, 5. Following feeling; tend to follow feeling before taking action or doing activity, 6. Thinking deeply; deciding something effectively and efficiently and tend to think practically without involving emotion, 7. Responsibility; being perfect in completing a task and having confidence and responsibility in doing the task.

To determine whether the items of instrument were valid or not,  $r_{\text{count}}$  compared to  $r_{\text{table}}$  equaled to 0.312 at the significant level  $\alpha = 0.05$ . If  $r_{\text{count}}$  was more than  $r_{\text{table}}$ , instrument items were valid, and vice versa. Before being used as a data collection tool, the instrument was tried out to 30 students. Therefore, coefficient  $r_{\text{table}}$  to determine whether the items were valid or not at significant level  $\alpha = 0.05$  could be done. To find instrument reliability of students' cognitive style, reliability test was done. It was done using KR 20.

Cognitive style instrument was considered reliable by comparing reliability coefficient ( $r_{11}$ ) with 0.7. If the calculation result shows that  $r_{11} > 0.07$ , the instrument is reliable, and if  $r_{11} < 0.07$ , it is not reliable. Based on the calculation, the score obtained was 0.93, and the total variants were 428 with reliability ( $r_{11}$ ) = 0,950. This showed that ( $r_{11}$ ) = 0,950 > 0.70 was reliable.

Conceptually, an essay test is a question with an expanded answer. The answer could almost be unlimited. Students' answer is open and flexible, showing their skill in synthesizing and evaluating. Besides this, the essay test could increase students' motivation, is easier to make, gives little room for speculation, and encourages students to be courageous in giving written opinion.

To generate an ideal essay test, there should be some points taken into account: 1) using essay questions only to measure meaningful learning achievement, 2) making questions which have certain answers, 3) not asking attitude or opinion, 4) starting questions with words such as compare, give reason, etc., 5) not giving a chance for students to only select a part of questions, 6) firstly writing an ideal answer, then making questions.

The process of the research was divided into two stages: (1) treatment process, and (2) control process of internal and external validity. Treatment process covers: *First*, selecting 2 out of 8 classes used for experiment based on homogenous students' ability. Based on the data of Civic Education learning achievement and the results of Likert-scaled cognitive style, seventh grade students were chosen. *Second*, choosing the experimental and control groups by doing

lottery. The result was that grade seven 1 was an experimental class, which was given essay questions, and grade seven 4 was a control class, which was given multiple-choice questions.

The treatment in experimental research was implemented in two groups. The first group was taught using essay questions (experimental class), and the second group was taught using multiple-choice questions (control group). The treatment of these two groups was conducted by Civic Education teachers at Junior Secondary School 193 and Junior Secondary School 256. The learning materials taught were norms prevailing in society and nation taken from School-Based Curriculum 2016.

The treatment covered three aspects: a. This research focused on Civic Education subject, b. Formative evaluation was given using essay and multiple-choice questions, c. Treatment for two groups was conducted from January to March for 8 sessions, and 1 session was for test.

**Table 3: Treatment for the Experimental and Control Groups**

Activities	Essay Test (Experimental Group)	Multiple Choice (Control Group)
Preparation	1. Delivering materials	1. Delivering materials
	2. Giving essay questions to students	
	3. Determining an essay test	
	4. Determining the scoring criteria for the essay test	
	5. Making agreement on the time for doing the test	
Implementation	1. Delivering materials suitable to the determined basic competency	1. Explaining materials in detail
	2. After learning, students make summary and write comments. All answers are stored in folder	2. Students listen and make notes
	3. Teacher observes and scores students' learning development in every meeting session	3. Giving a chance to students to ask questions
	1. Students are asked to give comments on their friends' answers	1. Giving test to know students' learning achievement

To make sure that the results of the research were the real effect of treatment, variables influencing the results of the research were controlled. The control process consisted of: a. Internal control validity, which was done to control the experiment processes in order that the emerging differences were really due to the essay and multiple-choice questions, not because of distraction factors such as the influence of history (e.g. school environment, time allotment, learning schedule), students' absences, measuring instrument, the influence of group members, test, and research instrument. b. External validity control, which was done in order that the results could be representative and generalized. External validity control was categorized into two parts: (1) Population validity, which was obtained due to the control of population as research subjects. This validity was controlled by taking samples suitable to population characteristics. Sample technique used was multistage random sampling, (2)



Ecology validity, which covered: a. not telling students that they were the research objects, b. Making classroom similar to daily condition, c. Treatment was given by their teachers, and d. Giving treatment similar to daily condition, (3)Test treatment, which was done by giving test carefully, and the experiment was conducted similar to daily learning model, (4) Test procedure, which means not telling students that the test was part of the research.

Data was analyzed using two-way variant analysis (ANAVA) with 2 x 2 factorial design. Before using ANAVA, normality and homogenous tests were conducted. To test the normality of data Liliefors formula was applied, and Bartlett formula was applied to test data homogeneity of data.

### 3. Results and Discussion

#### A. Data Description

- 1) The results of students given essay formative test ( $A_1$ )  
Maximum score obtained from this group was 86, minimum 60, mean score 72.82, standard deviation 9.58, variance 91.77. The range between maximum and minimum scores was 26, class interval 6 and the number of classes 5.
- 2) The results of students given multiple-choice formative evaluation ( $A_2$ )  
Maximum score for this group was 83, minimum 60, mean score 70.18, standard deviation 7.58, variance 57.39. The range between maximum and minimum scores was 23, class interval 5 and the number of classes 5.
- 3) The results of students with cognitive field independence ( $B_1$ )  
Maximum score for this group was 86, minimum 60, mean score 72.68, standard deviation 9.80, variance 96.18. The range of maximum and minimum scores was 26, class interval 6 and the number of classes 5.
- 4) The results of students with field dependence ( $B_2$ )  
Maximum score for this group was 83, minimum 60, mean score 70.32, standard deviation 7.33, variance 53.75. The range between maximum and minimum scores was 23, class interval 5 and the number of classes 5.
- 5) The results of students with cognitive field independence who were given essay formative evaluation ( $A_1B_1$ )  
Maximum score for this group was 86, minimum 76, mean score 81.73, standard deviation 3.00, variance 9.02. The range between maximum and minimum scores was 10, class interval 3 and the number of classes 4.
- 6) The results of students with cognitive field dependence who were given essay formative evaluation ( $A_1B_2$ )  
Maximum score for this group was 69, minimum 60, mean score 63.91, standard deviation 3.01, variance 9.09. The range between maximum and minimum scores was 9, class interval 3 and the number of classes 4.
- 7) The results of students with cognitive field independence who were given multiple choice formative evaluation ( $A_2B_1$ )

Maximum score for this group was 70, minimum 60, mean score 63.64, standard deviation 3.58, variance 12.58. The range between maximum and minimum scores was 10, class interval 3 and the number of classes 4.

- 8) The results of students with cognitive field dependence who were given multiple-choice formative evaluation ( $A_2B_2$ )  
Maximum score for this group was 83, minimum 70, mean score 76.73, standard deviation 3.66, variance 13.42. The range between maximum and minimum scores was 13, class interval 4 and the number of classes 4.

#### B. Analysis of Testing Requirement

##### a) Test of Data Normality

Normality test was conducted using Liliefors, at significant level  $\alpha = 0.05$ . Utilizing *Excel for Windows 2007*,  $L_0$  obtained from 8 groups ( $A_1$ ,  $A_2$ ,  $B_1$ ,  $B_2$ ,  $A_1B_1$ ,  $A_1B_2$ ,  $A_2B_1$ ,  $A_2B_2$ ) was smaller than  $L_t$  at significant level  $\alpha = 0.05$ . Thus, this can be concluded that research samples came from the population with normal distribution.

##### b) Test of Data Homogeneity

Based on calculation results,  $\chi^2_{count}$  obtained was 0.726, while  $\chi^2_{table}$  with  $dk = 3$  at significant level  $\alpha = 0.05$  was 7.81. This shows that  $\chi^2_{count} < \chi^2_{table}$  or  $0.440 < 7.81$ . With regard to accepted criteria,  $H_0$  was accepted. Thereby, the four groups came from homogenous population.

#### C. Hypothesis Testing

Hypothesis testing in this research was conducted by two-way analysis of variance (ANAVA), followed by Tuckey test, if there was interaction in the test. Two-way ANAVA was used to test main influence and interaction between formative evaluation and cognitive style toward Civic Education learning achievement. By using ANAVA, the research obtained the following analysis.

**Table 4: The result of two-way ANAVA**

Source of Variants	db	JK	RJK	$F_{count}$	$F_{table}$	
					$\alpha = 0,05$	$\alpha = 0,01$
Formative evaluation	1	76,45	74,45	6,89*	4,08	7,31
Cognitive style	1	61,45	61,45	5,54*	4,08	7,31
Interaction ( $A \times B$ )	1	2627,27	2627,27	236,79**	4,08	7,31
Error	40	443,82	11,10			
Total	43	3209,00				

Note:

\*\* = significant  $\alpha = 0.01$

\* = significant  $\alpha = 0.05$

dk = degrees of freedom

JK = sum squares

RJK = mean of sum squares

Based on the data above, it can explained as follows:

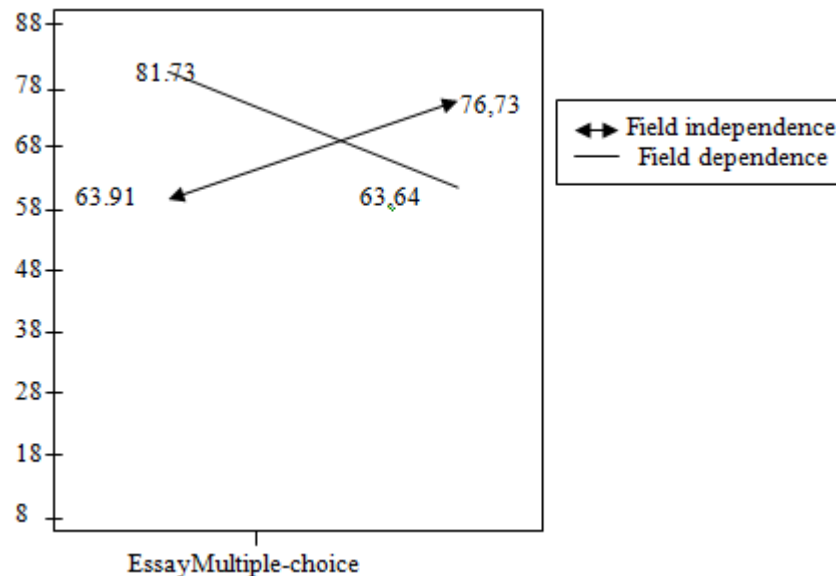
- 1) The analysis result of two-way ANAVA between column showed that  $F_{count} = 6.89$  was more than  $F_{table} = 4.08$  at significant level  $\alpha = 0.05$ . Based on the calculation above, it can be concluded that  $H_0$  was rejected, so  $H_1$  was accepted, namely: Civic Education learning achievement of students given essay formative evaluation was higher

than the learning achievement of those given multiple-choice formative evaluation. After finding the significant difference, the next step was finding which treatment was better toward Civic Education learning achievement. Based on the result of calculation, the mean score of students given essay formative evaluation (A1) was 72.82. It was higher than students given multiple-choice test (A2) at 70.18.

- 2) The analysis result of two-way ANAVA between line showed that  $F_{\text{count}} = 5.54$  was more than  $F_{\text{table}} = 4.08$  at significant level  $\alpha = 0.05$ . It means  $H_0$  was rejected, so  $H_1$  was accepted: Civic Education learning achievement of students with cognitive field independence was higher

that the learning achievement of those with cognitive field dependence.

- 3) The analysis result of two-way ANAVA between column and line showed that  $F_{\text{count}} = 236.79$  was higher than  $F_{\text{table}} = 7.31$  at significant level  $\alpha = 0.01$ . It means  $H_0$  was rejected, so  $H_1$  was accepted, namely: There was interactional influence between formative evaluation and cognitive style toward Civic Education learning achievement. Thereby, the third hypothesis stating that there was interaction between formative evaluation and cognitive style was accepted at significant level  $\alpha = 0.01$ . The interaction is illustrated in the picture below:



**Figure 1:** Interaction between Essay Formative Evaluation and Cognitive Style

Since it has been proven that there was significant interaction between formative evaluation and cognitive style toward Civic Education learning achievement, the next step was doing further test. Because the number of subjects in cell (group) was the same, Tuckey test was conducted.

- 4) For groups  $A_1B_1$  and  $A_2B_1$ ;  $Q_h$  was more than  $Q_i$  or  $18.01 > 3.82$  at  $\alpha = 0.05$ . It means  $H_0$  was rejected, and  $H_1$  was accepted. Thereby, the first hypothesis stating that Civic Education learning achievement of a group of students with cognitive field independence who were given essay formative evaluation was higher than a group of students given multiple-choice evaluation. This was accepted significantly at  $\alpha = 0.05$ .
- 5) For groups  $A_2B_1$  and  $A_2B_2$ ;  $Q_h$  was more than  $Q_i$  or  $12.76 > 3.82$  at  $\alpha = 0.05$ . It means that  $H_0$  was rejected, and  $H_1$  was accepted, namely: Civic Education learning achievement of a group of students with cognitive field dependence who were given essay formative evaluation was smaller than a group of students with cognitive field dependence who were given multiple-choice formative evaluation. This was accepted at  $\alpha = 0.05$ .
- 6) For groups  $A_1B_1$  and  $A_1B_2$ ;  $Q_h$  was more than  $Q_i$  or  $17.74 > 3.82$  at  $\alpha = 0.05$ . It means that  $H_1$  was accepted, and  $H_0$  was rejected, namely: Civic Education learning achievement of students with cognitive field independence was more than those with field dependence given essay formative evaluation. It was accepted significantly at  $\alpha = 0.05$ . Thereby, students with

cognitive field independence had higher score if given essay formative evaluation.

- 7) For groups  $A_2B_1$  and  $A_2B_2$ ;  $Q_h$  was more than  $Q_i$  or  $13.03 > 3.82$  at  $\alpha = 0.05$ . It means that  $H_1$  was accepted, and  $H_0$  was rejected, namely: Civic Education learning achievement of students with cognitive field independence given essay formative evaluation was higher than those given multiple-choice evaluation. Thereby, the fourth hypothesis stating that Civic Education learning achievement of students with cognitive field dependence who were given essay formative evaluation was accepted significantly at  $\alpha = 0.05$ . Thereby, students with cognitive field independence had higher score if given multiple-choice formative evaluation.

**Table 5:** The Results of Tuckey Test

No.	Statistical Hypothesis	$Q_{\text{count}}$	$Q_{\text{table}} (\alpha = 0,05)$
1.	$\mu A_1B_1 > \mu A_2B_1$	18,01*	3,82
2.	$\mu A_2B_1 < \mu A_2B_2$	12,76*	3,82
3.	$\mu A_1B_1 > \mu A_1B_2$	17,74*	3,82
4.	$\mu A_2B_1 < \mu A_2B_2$	13,03*	3,82

Note:

\* = significant

Based on the results of analysis of variance and Tuckey test above, it can be concluded that:

- 1) The first hypothesis stating that Civic Education of students with cognitive field independence given essay formative evaluation was higher than those given multiple-choice formative evaluation proved significantly at  $\alpha = 0.05$ .
- 2) The second hypothesis stating that Civic Education of students with cognitive field independence was higher than those with field dependence proved significantly at  $\alpha = 0.05$ .
- 3) The third hypothesis stating that there was interaction between formative evaluation and cognitive style toward Civic Education learning achievement proved significantly at  $\alpha = 0.05$ .
- 4) Civic Education learning achievement of students with field independence given essay formative evaluation was higher than those given multiple-choice questions; this was accepted significantly at  $\alpha = 0.05$ .
- 5) Civic Education learning achievement of students with cognitive field dependence given essay formative evaluation was smaller than those given multiple-choice evaluation. This was accepted significantly at  $\alpha = 0.05$ .
- 6) That Civic Education learning achievement of students with field independence given essay formative evaluation was higher than those with field dependence proved significantly at  $\alpha = 0.05$ .
- 7) That Civic Education learning achievement of students with field independence given formative evaluation was smaller than those with field dependence was accepted significantly at  $\alpha = 0.05$ .

#### 4. Discussion

##### 1) The First Hypothesis

This research found that there was the difference in Civic Education learning achievement between a group of students given essay formative evaluation and those given multiple-choice evaluation. This was shown by two-way ANOVA:  $F_{\text{count}} = 6.89 > F_{\text{table}} = 4.08$  proven significantly at  $\alpha = 0.05$ .

According to Grounland (1985), this is because essay formative evaluation is a kind of test which asks students to formulate an answer and state it using their own words. This activity is related to application, analysis, synthesis, evaluation, ability to express written expression, and elaboration.<sup>13</sup>

Different from multiple-choice formative evaluation, students need more time to understand every test item. This is because a number of items in multiple-choice need their own solution and analysis to answer.

##### 2) The Second Hypothesis

The second hypothesis which states that Civic Education learning achievement of students with cognitive field independence was higher than those with field dependence was accepted. This can be seen from the significant difference of mean score between those two groups.

According to Wockfolk (1993), field independence and dependence have some differences.<sup>14</sup> One of the differences is that field independent students can analyze and reconstruct a situation, and can solve the problem without supervision. Therefore, field independent students can

respond better to an essay test as the test can be done by students who are serious in study.

The finding of this study is in agreement with the research by Harun who found that field independent style greatly influences History learning achievement of students taught using quantum teaching method, compared to inquiry method.<sup>15</sup>

The characteristics of essay and multiple-choice formative evaluation connected to field independent and dependent styles are predicted to give different result. Field independent students will achieve better result in Civic Education if given essay test, while field dependent students will get higher score if given multiple-choice test. Thereby, it is predicted that there is a difference in Civic Education learning achievement between students with cognitive field independence and those with field dependence.

##### 3) The Third Hypothesis

The third hypothesis which states that there was interaction between formative evaluation and cognitive style toward Civic Education learning achievement was true. This was proven by  $F_{\text{count}} = 236.79$  which was higher than  $F_{\text{table}} = 7.31$ . This can be concluded that giving formative evaluation needs to take students' cognitive styles into account.

Formative evaluation is part of learning strategy which includes some techniques given periodically during learning processes in order to monitor students' progress and give feedback to students and teachers. Connecting students' cognitive style to essay test in formative evaluation, cognitive style is suitable for essay test, namely the sequence in problem solving and organizing skill. Field independent students can respond better to essay test because this kind of test has characteristics which can be achieved by students serious in study. Essay test asks students to express their opinion using their own words. Generally, this test is used to measure higher order learning achievement such as analysis, synthesis, and evaluation.

On the other hand, multiple-choice test asks students to select one of correct choices. The merit of this test is that it can be constructed to measure learning objectives of all levels, except the ability to demonstrate skill. The alternative answers in this test can reduce the possibility of choosing a correct answer if students guess. Item difficulty, however, can be controlled by changing the level of homogenous answers.

If essay and multiple-choice formative evaluation is connected to field independence and dependence, it can be guessed that the result can be different. Field independent students will get higher score in essay test, while field dependent students will get better score in multiple-choice test. To get a maximum learning achievement, teachers need to know students' cognitive style, so teachers can choose and decide an appropriate formative test. Thereby, there is interaction between cognitive style and formative evaluation toward Civic Education learning achievement.

#### 4) The Fourth Hypothesis

The fourth hypothesis stating that Civic Education learning achievement of students with cognitive field independence who were given essay writing formative evaluation was higher than those given journal formative evaluation was accepted.

Students' cognitive style will greatly influence how they process information. Field independent students tend to analyze and synthesize information when they are faced by complex and unstructured problems without being helped by a teacher to solve them. Field independent students learn unstructured learning materials easily. It means that materials not explained in detail by teacher can be understood. Also, during learning processes, field dependent students like to write down the summary of lesson. They have more time and opportunity to analyze and synthesize learning materials. So, when a teacher finishes explaining, they can ask questions about the material they do not understand.

The characteristic of field independent students is that they are independent in study. There is a similarity between students' character and essay test which demands seriousness in study. This is because the form of essay test itself can be achieved by students who are serious in study. Essay test requires students to express opinion using their own words because Civic Education does not only require memorization. Field independent students do not use their spare time to learn with other students in the classroom by having discussion under a teacher's supervision, but they try to solve their problem by themselves.

Comparing essay test with students having high independence, field independent students will respond to essay test well. The characteristics explained above also show that essay test needs deep thinking to answer. It means that the characteristic of essay test is suitable for students with cognitive field independence.

If connected to Civic Education, students with cognitive field independence given essay formative evaluation are related to the characteristic of learning autonomy. This is because essay formative evaluation also asks students to learn independently to find their own answer confidently. A teacher asks students to listen to his/her explanation, make the summary of learning materials, and analyze and synthesize the materials. Students can ask a teacher about the materials they do not understand. This can stimulate independent students to work harder.

#### 5) The Fifth Hypothesis

Civic Education learning achievement of students with field dependence who were given essay formative evaluation was smaller than learning achievement of those given multiple-choice formative evaluation. It was accepted significantly at  $\alpha = 0.05$ .

Field dependent students tend to take information as it is. All information coming from teachers is treated as a precious thing which should be kept and applied in learning activities. Therefore, students with cognitive field dependence heavily rely on teachers. It means that students can learn well when

teachers optimize students' learning moment. Another characteristic is external motivation. Students want appreciation during learning processes. The appreciation can be praise, support, and reward. Another characteristic is that students need study group. During study, they can absorb materials well if there is interpersonal interaction with a teacher and other students. Multiple-choice formative evaluation gives better result for field dependent students. Multiple-choice test requires students to select a correct answer of several available alternatives. The merit of this test is that it can be constructed to measure learning objectives of all levels, except the ability to demonstrate skill. The available choices of answer in this test which are usually four or five can reduce the possibility of choosing a correct answer if students guess. The difficulty of test items can be controlled by only changing the homogenous level of alternative answers.

If connected to Civic Education, students who tend to be field dependent will get more advantages using multiple-choice formative evaluation. It will be easier for them to learn Civic Education. This is similar to the characteristic of field dependent people who tend to think thoroughly and see an object as a unity of environment, so their perception will be easily influenced by the environment. Besides, they also have a good memory on society and constitution. Therefore, multiple choice test can be constructed to measure learning objectives of all levels, in which test items are many so that in limited time the topic coverage is wider, and it can be constructed to differentiate various levels of truth at the same time. This is done by asking the test takers to select a correct answer of alternative choices. The choices which are usually more than two can reduce the possibility of choosing the right answer if the test taker guesses. The level of difficulty can be controlled by changing the homogeneous level of alternative answers.

#### 6) The Sixth Hypothesis

That Civic Education learning achievement of students with field independence who were given essay formative evaluation was higher than the achievement of those with field dependence proved significantly at  $\alpha = 0.05$ .

Essay formative evaluation is a measuring tool which gives students a chance to develop their intellectual potential in an activity arranged by themselves as a convincing answer to problem through data & information tracing process and logical, critical, & systematical thinking.<sup>16</sup>

Field dependent students heavily rely on a teacher.<sup>17</sup> It means that they can learn better if a teacher optimizes their learning moment. Another characteristic is external motivation. Students want recognition or appreciation during learning processes. The appreciation can be praise, support, or reward. Students tend to think holistically and view an object as an integral unit of environment, so their perception is easily influenced by environment. Besides that, they have good memory on social information.

To optimize Civic Education learning achievement, field dependent students who were given essay formative evaluation in learning processes could learn more seriously and fun. It means that students can be motivated to learn



seriously because they learn without a teacher's pressure in fun situation.

Civic Education learning achievement of students with field independence who are given essay formative evaluation will be higher than the achievement of students with cognitive field dependence.

### 7) The Seventh Hypothesis

That Civic Education learning achievement of students with field independence who were given multiple-choice formative evaluation was smaller than the achievement of those with field dependence was significantly accepted at  $\alpha = 0.05$ .

Doing formative evaluation, a teacher will give students more opportunity to ask questions. Implementing multiple-choice formative evaluation as a tool to measure learning achievement is very appropriate for students with cognitive field dependence.<sup>18</sup>

Students with cognitive field dependence will find Civic Education easier to learn.<sup>19</sup> This is similar to the characteristic of field dependent students who tend to think holistically and view an object as an integral unit of environment, so their perception is easily influenced by environment. Besides this, they have good memory on social and constitutional information. Therefore, this kind of test can be used to measure learning objectives of all levels in which test items are many so that in limited time the topic coverage is wider, and it can be constructed to differentiate various levels of truth at the same time. This is done by asking the test takers to select a correct answer of alternative choices. The choices which are usually more than two can reduce the possibility of choosing the right answer if the test taker guesses. The level of difficulty can be controlled by changing the homogeneous level of alternative answers.

Thereby, Civic Education learning achievement of students with cognitive field independence who answer multiple-choice questions is assumed to be different from the achievement of those with cognitive field dependence. It is predicted that field independent students will get higher score.

## 5. Conclusions, Implications, and Suggestions

Based on the result of hypothesis testing which has been elaborated above, it can be concluded as follows:

- 1) Civic Education learning achievement of students who did essay test is better than the achievement of those doing multiple-choice test.
- 2) Civic Education learning achievement of field independent students is better than the achievement of field dependent students.
- 3) There is interaction between formative evaluation and cognitive style toward Civic Education learning achievement.
- 4) Civic Education learning achievement of field independent students doing essay test is better than the achievement of those doing multiple-choice test.

- 5) Civic Education learning achievement of field dependent students doing essay test is smaller than those doing multiple-choice test.
- 6) Field independent students get better score in doing essay test than field dependent students in Civic Education subject learning achievement.
- 7) In terms of multiple-choice question, field independent student get smaller score than field dependent students.

## 6. Implications

Based on the results of the research, test and cognitive style have significant effect on Civic Education learning achievement. Thereby, this research has the implication especially for test planning and development which will be used in improving learning achievement of Civic Education subject.

The result showing that students doing the essay test is better than those doing multiple-choice test has the implication for giving appropriate test. The teachers' role is important in increasing Civic Education learning achievement by deciding appropriate test, for example by considering students' cognitive styles. Field independent students could get better result by doing essay test, while field dependent students could get better score when doing multiple choice test.

This research shows that there is interaction between test and cognitive style toward Civic Education subject learning achievement. The interaction has some implications: (1). Giving similar test to all student may not be beneficial since students have different cognitive style; (2). even though students' cognitive style has been taken into account, inappropriate test can influence their learning achievement. Thereby, giving appropriate test can increase students' learning achievement when it takes students' cognitive style into account.

## 7. Suggestions

- 1) To increase learning achievement of Civic Education subject, teachers need to give appropriate test. Teachers also need to know and consider students' cognitive styles.
- 2) School principals need to give teachers the opportunity to develop their own test, so that learning activities can be varied and fun for students.
- 3) Further research need to develop another research which involves other factors not included in this research. There are still many factors which can increase learning achievement of Civic Education subject, for example evaluating if students already practice norms in their lives, so that the objective of this subject can be achieved.

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