



## The Factors of Creative Thinking High School Students In West Java

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**Abstract.** Creative thinking skills is one of the fundamental components of 21st-century education that needs to be possessed and developed by students. Thus, the students have the ability to find many alternative solutions to solve problems in economics learning. The study aimed to describe the students' creative thinking skill on the role economics actors topics. The method used is descriptive research with data collection techniques through test deployment (Torrance Test of Creative Thinking) in one school in west java. The participants in this study are 3 classes which consist of 96 K-10 students . The instrument of creative thinking test has been validated by the experts. The result shows that the creative thinking of students is in very less aspect of originality which have the minimum scores is 7.39. That is the ability of students to produce new and unique phrases. It is the most difficult aspect to be trained. In conclusion, students' creative thinking skill on the role of economics actors is still very less, hence, the students are still needed to develop creative thinking ability in the role of economics actors topic.

**Keywords:** creative thinking skills, economics learning, 21<sup>st</sup>-century education

**INTRODUCTION** ~ Creative thinking skills become an important discussion issue in the world because with the ability to think creatively can meet the needs of students to learn problems, as stated in the 21st Century Education Framework (White, A. M. J, 2019; Partnership for 21st Century Learning, 2016; Hung-chun Wang, 2019). Young people especially students must be prepared to face the challenges of the industrial revolution 4.0 by having the ability to think creatively (Ananto, P., Susanto, A., Wahyudi, E. N., Mulyani, S., Listiyono, H., Anis, Y., ... & Mohammed, N. A., 2019). This skill is very necessary to have so that students are able to compete globally in this industrial revolution 4.0 (Yusuf, B., & Nur, A. H. B, 2019; McNulty, M. M., 2019). The results of students' creative thinking skills need to measure and find effectiveness and provide innovative learning methods (Vally, Z., Salloum, L., AlQedra, D., El Shazly, S., Albloshi, M., Alsheraifi, S., & Alkaabi, A., 2019). This skill is

measured to determine the readiness of students in facing the challenges of industrial revolution 4.0, creative thinking becomes important for the development of human resources in a country (Amponsah, 2019). Creative thinking is not the same as intelligence (Sternberg, R. J., 1985, Webster, P. R., 1990; Paul, R., & Elder, L., 2019) because the ability to think creatively can be improved by being trained.

Higher level thinking skills (higher-order thinking skills) divided into three aspects such as critical thinking, creative thinking, and reflective thinking, meanwhile, thinking skills high level is a very important skill prepared for teachers in education in the 21st century (Hasan, R., Lukitasari, M., Utami, S., & Anizar, A, 2019; Reimers, F. M., & Chung, C. K. (Eds.), 2019; Temen, S., 2014). High-level thinking is characterized by thinking skills that go beyond basic observations of a fact and only memorize, but are abilities related to evaluative,



## ICEE-2

creative and innovative abilities (Reimers, F. M., & Chung, C. K. (Eds.), 2019; Sheninger, E, 2019). Basic thinking is very necessary on economic subjects, where teachers and students are required to be able to develop learning materials that are easily understood by students, therefore learning methods become one of the determinants of learning success (Fix, G. M., Ritzen, H. T. M., Pieters, J. M., & Kuiper, W. A. J. M, 2019; Wahyuni, M., Gistituati, N, & Fauzan, A, 2019).

Creative Thinking Skills indication the cognitive processes of an individual in manipulating to produce new ideas and useful insights resulting from a process of divergent and convergent thinking on a problem (Runco, M. A., & Acar, S., 2019; Jang, S. H., Oh, B., Hong, S., & Kim, J. 2019; Partnership for 21st Century Learning, 2016). Creative thinking can be defined as various things, such as processes, products, personalities, or environmental conditions. As a process, creative thinking involves sensing problems, finding information, making hypothesis, testing hypothesis, revising, and re-testing them, and communicate results (Okes, D., 2019; Lu, S., Bartol, K. M., Venkataramani, V., Zheng, X., & Botella, M., & Lubart, T., 2019). While as a product, creative thinking involves discovery, scientific theory, improving products (Calic, G., Hélie, S., Bontis, N., & Mosakowski, E., 2019). In creative learning includes three abilities of the principal, namely evaluation (feeling a problem or missing elements), different products (fluency, flexibility, originality and

elaboration), and redefinition (Kiritsis, P., 2019).

The essence of developing creative thinking skills becomes more interesting with the flow of technological advancements, especially in artificial intelligence and nanotechnology. Students' creative thinking ability low in solving non-routine problems in both national and international examinations (Sari, T. H. N. I., 2019; Singh, P., Teoh, S. H., Cheong, T. H., Rasid, N. S. M., Kor, L. K., & Nasir, N. A. M., 2018; Amponsah, S., Kwesi, A. B., & Ernest, A., 2019).

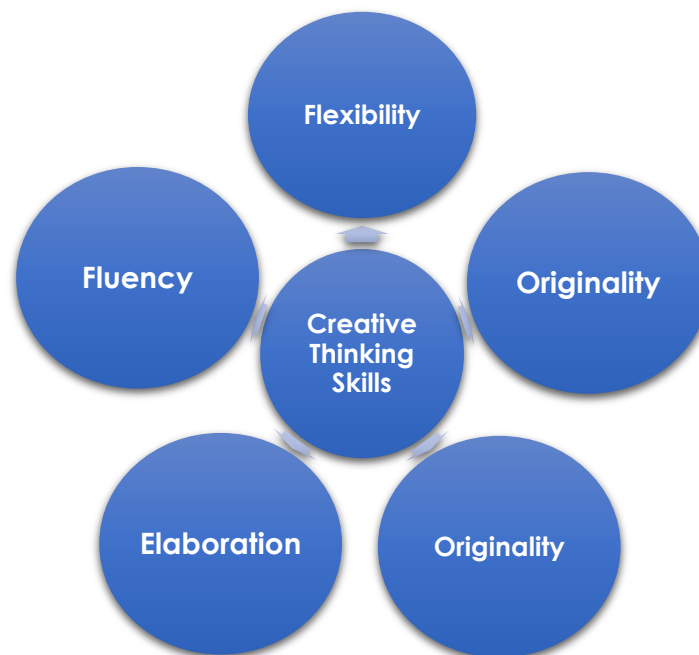
The purpose of creative thinking skills to develop new ideas, find solutions to problems, evaluate existing ideas, aesthetically and constructively related to views and concepts, and emphasize aspects of intuitive and rational thinking, especially in using information technology and materials that bring up or explain it with the original perspective of thinkers (Runco and Chand, 1995; Fairweather and Cramond, 2010; Kalimullin, A. M., & Utemov, V. V., 2017).

The instruments used to measure creative thinking skills commonly used are TTCT (Torrance Tests of Creative Thinking) (Torrance, 1993), and the development of TTCT is TCT-DP (Test for Creative-Drawing Production) (Torrance, 1993) . These tests are usually used to measure student psychology. Besides the instruments that can be used to measure other creative thinking skills are Task-Specific thinking-divergent training (Dalke, M, 2019), but

## ICEE-2

furthermore, it turns out that this instrument still has many criticisms because it is considered less valid and cannot assess certain creative thinking abilities in certain domain (Baer, J., 2010). In addition, this test instrument is widely used in the social and linguistic fields. This instrument has also developed self-report instruments about the ability to think creatively about the transition from associative thinking to analytical thinking, called Shifting Index (MSI) (Hanni, I. U., Hasanah, L., & Samsudin, A., 2018). At present, digital media-based instruments have been developed to measure creative thinking skills (Wahyuni, S., & Husein, S., 2019).

Based on the literature study the model proposed in this study as in Figure 1 where there are four factors independent variables that affect students' the creative thinking skills (fluency, flexibility, originality and elaboration). This study aims to look at the relationship between creative thinking skills with the factors that influence it. After conducting a literature review, the researcher will propose several hypotheses based on construct there is. The hypothesis will submitted in this study which describes the relationship between creative thinking skills with the factors that influence it. The following is the hypothesis proposed by the researcher.



**Figure 1.** Picture of Caption Usage

## METHOD

Participants in this research were 96 of K-10 students, involving of 54 girls and 42 boys, whose age was around 16-17 years old. The students generally have a good economic background, they have

comprehensive learning facilities from subject guidebooks to advanced gadgets that could help them to access the information about topics from the internet. The research used TCT-TREA (Test for Creative Thinking-The Role of Economic Actor) for instrument. It was



**ICEE-2**

established refers to Torrance, involved part of fluency (able to make a lot of questions), flexibility (be able to produce various ideas, answers, or questions), originality (be able to create new and

unique phrases), and elaboration (able to enhance and build an idea or product). The questions' distribution for the creative thinking skills test is shown in Table 1 below.

**Table 1.** The Questions' Distribution For The Creative Thinking Skills Test.

Indicators of Creative Thinking Skills	Description of Creative Thinking Skill's Indicator	Number of Problems	Question Number
Fluency	able to make a lot of questions	1	1 and 4
Flexibility	be able to produce various ideas, answers, or questions	1	2
Originality	be able to create new and unique phrases	1	3
Elaboration	able to enhance and build an idea or product	1	5

The test instrument contains of 5 items of each aspect in the form of essays, with the maximum value for each item is 4. A sample of the rubric for creative thinking

test is exposed in Figure 2. The test results handled by calculating the average score obtained.

Indicator	Question	Expected Answer
Elaboration: able to enhance and build an idea or product	A shoemaker manager in Cibaduyut Bandung, in the new school year, received a lot of good shoe orders that came from public and private campus students in the city of Bandung. In addition, orders also come from foreign communities such as Singapore and Japan. Because many orders of business turnover shoes rose 30% from before. Seeing this promising business prospect, the BNI bank-provided credit assistance of Rp. 45.000.000 to the businessman. In addition to getting a large	<pre> graph TD     A[Singapore and Japan people] -- 5 --&gt; B[Shoes Entrepreneur Cibaduyut]     B -- 6 --&gt; A     C[Employee] -- 2 --&gt; B     B -- 1 --&gt; C     D[Domestic and foreign students] -- 3 --&gt; B     B -- 4 --&gt; D     E[Drinking Water Company] -- 7 --&gt; B     B -- 8 --&gt; E     F[Bank BNI] -- 10 --&gt; B     B -- 9 --&gt; F     G[State Electricity Company] -- 12 --&gt; B     B -- 11 --&gt; G           </pre>



turnover, entrepreneurs also spend quite expensive operational costs to pursue the order of shoes. Costs incurred by employers include electricity costs that must be paid to PLN, the cost of water to be paid to the PDAM and the cost of wages to be paid to employees. Unfortunately, when orders increase, entrepreneurs are confused to find wood-making shoes. Which is usually used to beautify shoes. In the market only less quality wood is available. For this reason, the entrepreneur must play a brain, how to produce quality shoes at affordable prices so that the product is still accepted by consumers.

Draw an interaction diagram that occurs in the article described above!

**Figure 2.** A Sample of rubrics for creative thinking test

Before applied to the students, this instrument was strained for validity, both theoretical and criteria validity. Validity test, complicated content validity, and face validity were done by checking the instrument by the experts, and there were

some parts to be fixed. The criterion validity was done by using an alpha-Cronbach correlation test with SPSS-22. The results of the validity test with alpha-Cronbach are shown in Table 2.

**Table 2.** The result of test instrument validity with Cronbach-alpha from SPSS output.

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
No_1	28.80	275.655	0.092	0.027	0.521
No_2	33.02	211.831	0.329	0.197	0.412
No_3	31.25	160.000	0.502	0.289	0.257
No_4	27.34	162.081	0.302	0.131	0.436



**ICEE-2**

No_5	34.17	222.456	0.161	0.058	0.513
Cronb Alpha for 5				0.767	

The result shows that the alpha value obtained is 0.867 greater than the r-table with a significance of 5%, ie 0.202 (N=96). That is, the items on the test instrument used can be said reliable. Provide a rule of glance at for alpha values above 0.7 are categorized as acceptable. In other words, the Cronbach alpha value obtained indications a good internal consistency of the items used.

The method used is descriptive research with data collection techniques through test deployment (Torrance Test of Creative Thinking) to Senior High School Labschool UPI students on the role of economic actors topic. The variable measure of

**RESULTS**

The result of the students' creative thinking ability test on the role of economic actors is shown by the average student score in general, that is 31.25. While the maximum mean score if all students answered correctly is 50, with the maximum value

creative thinking skills the indicators used refer to research Vally, Z., et. al, 2019; Humble, Dixon & Mpofu, 2018; Wang & Kokotsaki, 2018; Lucchiari, Sala, & Vanutelli, 2018; Kuo, Tseng, & Yang, 2018. Based on the results of the five researches, it can be identified that there are four influencing variables which are identified as creative thinking indicators, namely fluency, flexibility, originality, and answers based on own ideas, and elaboration skills. This test takes two hours of lessons, where one hour of lessons is 45 minutes. This test is given to students who have previously studied the concepts tested in this test. Then the results were processed statistically and then analyzed.

for each item is 20. In other words, the students' creative thinking ability gained from the test results were only 38.65%. Table 3 shows the average score of each aspect of creative thinking ability.

**Table 3.** The average score of each aspect of creative thinking ability.

Aspects of Creative Thinking Ability	Average score
Fluency	9.84
Flexibility	9.60
Originality	7.39
Elaboration	8.45

**DISCUSSION**

Based on Table 3, the aspect with the highest summary is flexibility (9.84), that is students are able to generate several ideas, answers, or questions. Sides with the second highest profile with the score

difference only 0.24 of the highest feature is flexibility (9.60). These two questions relate to the concept of economic actors. Some students can give the desired answer even though almost all the students answered did not reach the maximum score. It can



### ICEE-2

be caused by teachers usually educated the flexibility and fluency by providing opportunities for students to ask questions and answer or reply to questions or statements that assumed by teachers in the learning activities (Hutner, T. L., Petrosino, A. J., & Salinas, C, 2019).

The third highest aspect is the elaboration aspect (8.45), that is the students' ability to improve or progress an idea. This question relates to the concept of The Role of Economic Actors (R. Beunen & J.J. Patterson, 2019). Based on the answers assumed by the students, it is known that almost all students cannot progress the product on the given problem. Only a few students can describe the product development design they want to create and explain the working principle of the product design (Viswanathan, M., Yassine, A., & Clarke, J., 2011). But few students can only describe the design alone without explanation the working principle of the product. In fact, most of the diagrams of product development design are incorrect.

Meanwhile, other aspects that have the lowest score are in the aspect of originality (7.39), that is the ability of students to produce new and unique phrases. It is the most difficult aspect to be trained. It is a higher level of complexity than evaluating, requiring more complex thinking ability among other cognitive domains.

This aspect is equivalent to the create an aspect of cognitive dimension of revision in Revised Bloom's Taxonomy. It is at the

highest level of complexity of thinking, that is C6, in which the creating category is to integrate the elements into something new and whole or to make an original product. More than that, the originality aspect of creative thinking must have unique and effective (usefulness, merit, or eligibility) (Runco and Jaeger, 2012; Artz and Armour, 2011; Callan, G. L., Rubenstein, L. D., Ridgley, L. M., & McCall, J. R., 2019). The reason behind it is in the high school, most of the teacher does not familiarize the students to think until the stage of assessing/evaluating, usually the teacher only trained to the stage of analyzing (Hanni, I. U., Hasanah, L., & Samsudin, A, 2018; Karlin, M., Ottenbreit-Leftwich, A., Ozogul, G., & Liao, Y. C, 2018) . Even, the learning activity in the classroom as based on observations and interviews of high-level students, they learn Economics just with following instruction from Teacher. Besides that, students are rarely using other ways to solve a problem. Ideally, teachers should provide opportunities for students to do discussion, work together as a group, both collaboratively and cooperatively, or occasionally conduct learning activities such as lab work outside the classroom, in the open environment to help students spark their creativity (Davidson, M. A., Dewey, C. M., & Fleming, A. E, 2019; Xing, W., Popov, V., Zhu, G., Horwitz, P., & McIntyre, C, 2019; Perry and Karpova E, 2017).

Not only that, teachers also should build positive relationships between teacher and students, such as mutual respect,



## ICEE-2

exemplify creative attitude, encourage students to leave their comfort zone, and growth their self-confidence in their own creative abilities (Oppezzo and Schwartz, 2014; Meintjes and Grosser, 2010; Davies, et al, 2013; Daly, et al, 2016). Therefore, the creative thinking ability students' average score is low, especially in the aspect of originality. It can be known from the student's answer that most of the answer given does not match the expected answer.

## CONCLUSION

Based on the results of research that had been conducted, it is known that the teacher had provided creative thinking ability s in Economics learning activities. But only on the aspects of fluency, flexibility, and elaboration, and it is also very minimal. Students' creative thinking ability is generally low, indicated by the average score of 38.65% of the maximum score. Similarly, the students' creative thinking ability of each aspect is still relatively low. This is indicated by the average score of each aspect of students' creative thinking ability, that is 9.84 for the fluency aspect, 9.60 for the flexibility aspect, 8.45 for the elaboration aspect, 7.39 for the originality aspect.

## ACKNOWLEDGMENTS

Husien Bastary and Dra. Yati thank for contributing as parents. Dr. H. Dadang Dahlan, M.Pd. thanks for guide and Desty Rupalestari, S.Pd. and Atika Suri, S.Pd. thanks for help the author in complete this article

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