

Model of Creative Thinking Skills for Elementary School Students

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Abstract

This study aims at proposing a model of creative thinking skills for elementary school students. This model can develop creative thinking skills by encouraging fluency, flexibility, elaboration, and originality. The sample group of 205 students represented grades 4-6 from 12 elementary schools in West Jakarta. The students were requested to respond to the questionnaires of creative thinking skills carried out in their school in the context of fluency, flexibility, elaboration, and originality. Data analysis in this study used the structural equation model (SEM). The result of this study is that fluency, flexibility, elaboration, and originality had predictive effects on student creative thinking skills. This study has a practical contribution by pointing out that fluency, flexibility, elaboration, and originality develop student creative thinking skills by supplying this model. Implementing this model, the student creative thinking skills can be enhanced so that the student potentials related to creativity can be realized optimally.

Keywords creative thinking skills; fluency; flexibility; elaboration; originality

1. Introduction

Awamleh, Farah, & Zraigat (2012) presented that originality, flexibility, elaboration, and originality promoted creative thinking skills. Alkathiri, Alshreef, Alajmi, Alsowayan, & Alahmad (2018) found that some academics could accept the importance of creative thinking skills. A research done by Ucus (2017) stated that student creative thinking skills were essential to be implemented in the classrooms. Nami, Marsooli, & Ashouri (2014) recognized that student creative thinking skills improved learning outcomes. Eishani, Saa'd, Nami (2014) stated that subjective experience, abstract concepts, active experimental, and reflective observation encouraged student creative thinking skills. However, there is only few explanation about measurements of student creative thinking skills in these research.

The data of the Indonesian Ministry of Education and Culture on 10 May 2018 showed that 148,856 elementary schools, 1,480,710 teachers, 25,395,436 students, 117,314 educational staff, and 1,114,408 learning groups were present in Indonesia. There were 1,537 state and 914 private elementary schools, 10,747 male and 27,903 female teachers, 420,539 male and 392,327 female students, 2,130 male and 1,536 female educational staff, and 29,116 learning groups in Jakarta. There were 176 state and 197 private elementary schools in the north Jakarta region, 352 state and 179 private elementary schools in the south Jakarta region, 445 state and 197 private elementary schools in the east Jakarta region, 360 state and 241 private elementary schools in the west Jakarta region, and 190 state and 100 private elementary schools in the central Jakarta region.

Based on the constitution in Indonesia Number 20 in 2003, the purpose of national education is to develop student potentials, one of which is student creativity. In fact, student creativity has not been realized optimally at elementary schools in West Jakarta. This study was conducted at elementary schools in the west Jakarta regions consisting of 12 public elementary schools, Meruya Utara 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, and 15.

2. Literature Review

The study conducted by Awamleh, Farah, &Zraigat (2012) found that dimensions of student creative thinking skills were fluency, flexibility, elaboration, and originality. This study indicated that the creative thinking skills were most predicted by fluency, flexibility, and elaboration and less estimated by originality. Alkathiri, Alshreef, Alajmi, Alsowayan, &Alahmad (2018) stated that student achievement was negatively correlated with creative thinking skills. However, creative thinking skills were still accepted among some academics. A study conducted by Ucus (2017) suggested that student creative thinking skills were promoted in the classrooms. Nami, Marsooli, &Ashouri (2014) found that student creative thinking skills were significantly positively correlated with academic achievement. Eishani, Saa'd, Nami (2014) stated that student creative thinking skills had significant correlation with learning styles related to subjective experience, abstract concepts, active experimental, and reflective observation. However, there is less detail explanation about indicators of student creative thinking skills in these studies.

Theoretical framework

This study hypothesizes that fluency, flexibility, elaboration, and originality predict creative thinking skills (Awamleh, Farah, &Zraigat 2012; Alkathiri, Alshreef, Alajmi, Alsowayan, &Alahmad, 2018). Indicators of the students answering questions with a number of replies, the students smoothly revealing their ideas, and the students quickly see the mistakes and weaknesses from the objects will support fluency (Awamleh, Farah, &Zraigat, 2012; Alkathiri, Alshreef, Alajmi, Alsowayan, &Alahmad, 2018). The quality of flexibility will be predicted by indicators of the students giving estimation variety of picture, story, or problem, the students thinking about various solutions of the problems given, and the students finding solution of the problems suitable in the certain condition (Awamleh, Farah, &Zraigat, 2012; Alkathiri, Alshreef, Alajmi, Alsowayan, &Alahmad, 2018). Effectiveness of elaboration is encouraged by indicators of the students finding the deeper solution with detail steps, the students developing other person ideas, and the students testing details to see the direction to be taken (Awamleh, Farah, &Zraigat, 2012). Originality is supported by indicators of the students working to find the new solutions after listening the ideas, the students giving unique answers, and the students solving the problems with the new ways (Awamleh, Farah, &Zraigat, 2012). Figure 1 shows the theoretical framework of this study.

3. Research Design

This survey research was conducted using questionnaires in collecting data regarding fluency flexibility, elaboration, and originality predicting creative thinking skills. A total of 205 students from elementary schools in West Jakarta in DKI Jakarta province responded the survey.

Literature content analysis of creative thinking skills was done based on the study of Awamleh, Farah, &Zraigat (2012), and Alkathiri, Alshreef, Alajmi, Alsowayan, &Alahmad (2018), which composed of four dimensions as follows: fluency, flexibility, elaboration, and originality. These ideals were changed into statements in the questionnaires.

The questions regarding fluency consisted of three indicators: the students answering questions with a number of replies, the students smoothly revealing their ideas, and the students quickly see the mistakes and weaknesses from the objects. The questions of flexibility consisted of three indicators: the students giving estimation variety of picture, story, or problem, the students thinking about various solutions of the problems given, and the students finding solution of the problems suitable in the certain condition. The questions of elaboration consisted of three indicators: the students finding the deeper solution with detail steps, the students developing other person ideas, and the students testing details to see the direction to be taken. The questions of originality consisted of three indicators: the students working to find the new solutions after listening the ideas, the students giving unique answers, and the students solving the problems with the new ways. The summary of relationships hypothesized is represented in a model shown in Figure 1.

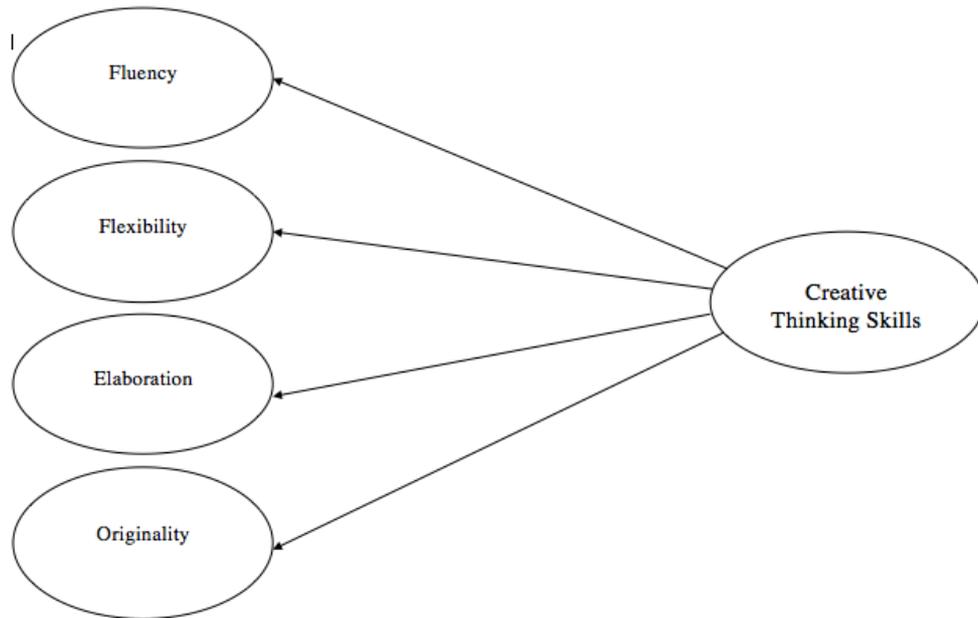


Figure 1. Theoretical framework of the study

Analysis of the structural equation model (SEM) applying IBM SPSS Statistics 24 and SPSS AMOS 24 with 2017 Edition was carried out to find the set of relationships between fluency, flexibility, elaboration, and originality as the exogenous variable and creative thinking skills as the endogenous variable. Data input was done using Excel by inputting the scores of each item based on the responses of the 205 participants with “strongly agree”, “agree”, “neutral”, “disagree”, and “strongly disagree” (scored 5, 4, 3, 2, and 1, respectively, for positive questions and 1, 2, 3, 4, and 5, respectively, for negative questions).

Findings

Table I exhibits the goodness-of-fit statistical analysis results. These results displayed that Normed Fit Index (NFI) value achieved 0.714 indicating that the model offered is good fit. The Comparative Fit Index (CFI) value arrived at 0.766 pointing out that the model suggested is good fit. Incremental Fit Index (IFI) value reached 0.772 showing that the model is good fit. Relative Fit Index (RFI) value gained 0.623 indicating that the model submitted is good fit. Goodness of Fit Index (GFI) value got to 0.885 displaying that the model is good fit. Adjusted Goodness of Fit Index (AGFI) value reached 0.821 indicating that the model proposed is good fit. SEM measurement presenting that model recommended in this research is a fit model.

Table I. Model Fit Summary

Fit measurement	Fit Value		
	<i>Cut-Off Limitation</i>	<i>Value</i>	<i>Decision</i>
NFI	0 < NFI < 1; NFI ≥ 0.90= good fit	0.714	Good Fit
CFI	0 < CFI < 1; CFI ≥ 0.90= good fit	0.766	Good Fit
IFI	0 < IFI < 1; IFI ≥ 0.90= good fit	0.772	Good Fit
RFI	0 < RFI < 1; RFI ≥ 0.90= good fit	0.623	Good Fit
GFI	0 < GFI < 1; GFI ≥ 0.90= good fit	0.885	Good Fit
AGFI	0 < AGFI < 1; AGFI ≥ 0.90= good fit	0.821	Good Fit

A measurement model test of the observed variables is shown in Table II. Table II presented that the significant positive associations between fluency, flexibility, elaboration, and originality with creative thinking skills was 0.573, 1.035, 0.890, and 0.759 respectively. The observed variables the students answering questions

with a number of replies, the students smoothly revealing their ideas, and the students quickly see the mistakes and weaknesses from the objects had significant association with fluency of 0.718, 0.694, and 0.476, respectively. The observed variables the students giving estimation variety of picture, story, or problem, the students thinking about various solutions of the problems given, and the students finding solution of the problems suitable in the certain condition with flexibility had significant coefficients of 0.375, 0.600, and 0.638, respectively. The observed variables the students finding the deeper solution with detail steps, the students developing other person ideas, and the students testing details to see the direction to be taken had statistically significant association with elaboration of 0.601, 0.673, and 0.374, respectively. The observed variable the students working to find the new solutions after listening the ideas, the students giving unique answers, and the students solving the problems with the new ways had significant association with originality of 0.580, 0.619, and 0.731, respectively. The structural model is shown in Figure 2.

Table II. Measurement model test (Regression Weights: Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
FLCY	<---	PRSLCR	0.485	0.118	4.103	***	
FLXB	<---	PRSLCR	1.101	0.182	6.059	***	
ELBR	<---	PRSLCR	0.565	0.140	4.043	***	
ORGN	<---	PRSLCR	1.000				
CTS3	<---	FLCY	1.000				
CTS2	<---	FLCY	1.379	0.263	5.243	***	
CTS1	<---	FLCY	1.257	0.240	5.244	***	
CTS6	<---	FLXB	1.000				
CTS5	<---	FLXB	0.977	0.146	6.714	***	
CTS4	<---	FLXB	0.479	0.106	4.520	***	
CTS9	<---	ELBR	1.000				
CTS8	<---	ELBR	2.098	0.480	4.368	***	
CTS7	<---	ELBR	1.714	0.403	4.249	***	
CTS12	<---	ORGN	1.000				
CTS11	<---	ORGN	0.683	0.100	6.812	***	
CTS10	<---	ORGN	0.780	0.120	6.515	***	

Source: AMOS Results 2019

Table II. Measurement model test (Standardized Regression Weights: (Group number 1 - Default model)

			Estimate
FLCY	<---	PRSLCR	0.573
FLXB	<---	PRSLCR	1.035
ELBR	<---	PRSLCR	0.890
ORGN	<---	PRSLCR	0.759
CTS3	<---	FLCY	0.476
CTS2	<---	FLCY	0.694
CTS1	<---	FLCY	0.718
CTS6	<---	FLXB	0.638
CTS5	<---	FLXB	0.600
CTS4	<---	FLXB	0.375
CTS9	<---	ELBR	0.374
CTS8	<---	ELBR	0.673
CTS7	<---	ELBR	0.601
CTS12	<---	ORGN	0.731

			Estimate
CTS11	<---	ORGN	0.619
CTS10	<---	ORGN	0.580

Source: AMOS Results 2019

Notes:

- FLCY = fluency
- FLXB = flexibility
- ELBR = elaboration
- ORGN = originality
- PRSLCR = creative thinking skills
- CTS1 = the students answering questions with a number of replies
- CTS2 = the students smoothly revealing their ideas
- CTS3 = the students quickly see the mistakes and weaknesses from the objects
- CTS4 = the students giving estimation variety of picture, story, or problem
- CTS5 = the students thinking about various solution of the problems given
- CTS6 = the students finding solution of the problems suitable with the certain condition
- CTS7 = the students finding the deeper solution with detail steps
- CTS8 = the students developing other person ideas
- CTS9 = the students testing details to see the direction to be taken
- CTS10 = the students working to find the new solutions after listening the ideas
- CTS11 = the students giving unique answers
- CTS12 = the students solving the problems with the new ways

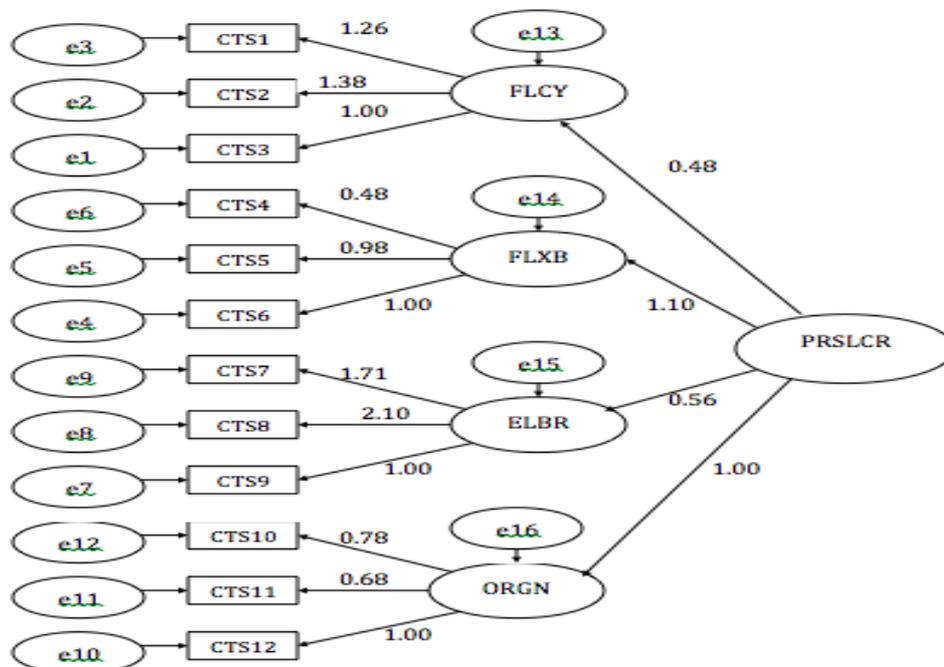


Figure 2. The structural model

Discussions

NFI value seen in Table 1 reached 0.714, which was more than 0 and less than 1 indicating that the model suggested was already good fit. Table 1 also presented that the CFI value arrived at 0.766, which was a value more than 0 and less than 1 and showing that the model was good fit. The IFI value attained 0.772, which

was more than 0 and less than 1 showing that the model recommended was already good fit. The RFI value achieved 0.623, which was more than 0 and less than 1 showing that the model offered was already good fit. The GFI was 0.885, which was more than 0 and less than 1 showing that the suggested model was already good fit. The AGFI was 0.821, which was more than 0 and less than 1 showing that the hypothesized model in this research was a good fit for the data.

Table II found that fluency, flexibility, elaboration, and originality were significantly positively correlated with creative thinking skills of 0.573, 1.035, 0.890, and 0.759, respectively. Similarly, Awamleh, Farah, & Zraigat (2012), found that dimensions of creative thinking skills were originality, flexibility, originality, and elaboration. In line with the study of Alkathiri, Alshreef, Alajmi, Alsowayan, & Alahmad (2018), creative thinking skills can construct originality and fluency.

The students answering questions with a number of replies, the students smoothly revealing their ideas, and the students quickly see the mistakes and weaknesses from the objects had significantly positive correlation with fluency of 0.718, 0.694, and 0.476, respectively. This finding is similar to the finding of the study of Awamleh, Farah, & Zraigat (2012), and Alkathiri, Alshreef, Alajmi, Alsowayan, & Alahmad (2018), fluency can be supported by solving the problems with many ways.

The students giving estimation variety of picture, story, or problem, the students thinking about various solutions of the problems given, and the students finding solution of the problems suitable in the certain condition had statistically significantly positive correlation with flexibility of 0.375, 0.600, and 0.638, respectively. Similarly, Awamleh, Farah, & Zraigat (2012) presented that dimension of flexibility can be improved by trying to find various solutions to the problems provided.

The students finding the deeper solution with detail steps, the students developing other person ideas, and the students testing details to see the direction to be taken had statistically significant correlation with elaboration of 0.601, 0.673, and 0.374, respectively. In line with the study of Awamleh, Farah, & Zraigat (2012), finding solution with more detail systematic steps promoted elaboration can estimate elaboration.

The students working to find the new solutions after listening the ideas, the students giving unique answers, and the students solving the problems with the new ways had significant association with originality of 0.580, 0.619, and 0.731, respectively. This finding is similar to that of the study of Awamleh, Farah, & Zraigat (2012), which claimed that providing new solution to the problems existed, can estimate originality.

4. Conclusion

An empirical model of creative thinking skills for elementary school students is provided by this study. Fluency, flexibility, elaboration, and originality can predict creative thinking skills. The students answering questions with a number of replies, the students smoothly revealing their ideas, and the students quickly see the mistakes and weaknesses from the objects can encourage fluency. The students giving estimation variety of picture, story, or problem, the students thinking about various solution of the problems given, and the students finding solution of the problems suitable in the certain condition can estimate flexibility. The students finding the deeper solution with detail steps, the students developing other person ideas, and the students testing details to see the direction to be taken can promote elaboration. The students working to find the new solutions after listening the ideas, the students giving unique answers, and the students solving the problems with the new ways can estimate originality.

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