Management Science Letters 11 (2021) 1765–1770

Contents lists available at GrowingScience

Management Science Letters

homepage: www.GrowingScience.com/msl

The effect of creative thinking in improving decision making

Ahmad Hariri[a*], Supari Muslim[a], Ekohariadi[a] and Eppy Yundra[a]

[a]*Universitas Negeri Surabaya, Lidah Wetan, Lidah Wetan, Kec. Lakarsantri, Surabaya, 60213, Indonesia*

C H R O N I C L E

Article history:
Received: December 12, 2020
Received in revised format: December 29 2020
Accepted: February 4, 2021
Available online: February 4, 2021

Keywords:
Creative Thinking
Decision Making
Improving

A B S T R A C T

Vocational education is no longer just an education that prepares its graduates to work or become mediocre workers. Creative thinking skills are the basis of science that is very important for students. This research uses a quantitative approach and the population of this study included 106 Cadets of The School of Aviators in Indonesia. Sampling techniques taken were saturated sampling techniques and the samples were taken as many as 106 cadets. Data analysis techniques used were Structural Equation Model (SEM) with AMOS help (Analysis of Moment Structures) program. The results of this study show that critical thinking has a significant effect on decision making.

1. Introduction

Vocational education is no longer just an education that prepares graduates to work or become mediocre workers. The United States has oriented vocational education and vocational education as an education that is the level and type of career. If vocational education is the type and career level, vocational education will become the community's target, such as doctor education, military education, police education, and some ministry education in Indonesia. This is important for the continuity and guarantee of a person's life. Creative *thinking skills* are the basis of science that is very important for students. Optimization of high-level thinking skills is crucial because it is a life skill that needs to be developed. It is necessary to overcome complex problems and develop the era, especially in this 21st century (Fatmawati et al., 2019). Aboob et al. (2020) *creative Thinking* is one level of complex Thinking because creativity means that an individual can achieve something familiar from something unfamiliar and turn the familiar into something alien. *Creative Thinking allows one to apply imagination to generate ideas, questions, hypotheses, and testing various alternatives, and evaluate* them to become the final product (Kampylis & Berki, 2014). *Creative Thinking* is considered necessary because (IBE UNESCO 2013), we live in a world that needs a creative way of thinking to solve rapidly and complex problems. To minimize the possibility of humans being hit by problems that they cannot solve, people must understand and be skilled in making decisions to solve problems. One way to develop skills in making such decisions is to think creatively (Rohayuningsih & Handoyo, 2015).

2. The foundation of theory

2.1. Creative Thinking

Creative Thinking can be defined as a whole set of cognitive activities used by individuals by an object, specific problems, and conditions, or types of efforts towards particular events and problems based on individual capacity (Birgili, 2015). *Creative Thinking* is the ability to come up with surprising and valuable new ideas in many ways. *Creative Thinking* has to do with novelty, the ability to create things, apply new forms, generate a lot of imaginative skills, or create something existing and something new {Formatting Citation}. *Creative Thinking is* one form of self-disclosure uniquely. The *creative* process is described as consisting of several phases (Težak, 2015):

* Corresponding author.

E-mail address: ahmadhariri.pnb@gmail.com (A. Hariri)

doi: 10.5267/j.msl.2021.2.006

a. Problem or task identification
b. Preparation (collect and reactivate relevant information and resources)
c. generate responses (search for and generate potential responses)
d. Validation of responses and communication (testing and responding to criteria)

2.2. Decision Making

The company takes many important decisions to achieve goals, even with operational limitations and a work environment. The restrictions include resources, time, labor, energy, raw materials, and money. The company's most frequent goal is to maximize profits wherever possible, where the goal of other organizations that are part of a company is to minimize costs (Sager & Taylor 2006). According to Terry and Rue (2013), factors that must be considered in making decisions as follows:

a. Tangible and intangible things, emotional and rational, need to be taken into account in decision making.
b. Every decision must be used as material to achieve the goal. Every decision should not be focused on personal expectations but a thirst for importance.
c. It is rarely the right choice, so make an alternative.
d. Decision making is a mental act of this action should be converted into a physical action
e. Effective decision making takes a long time.
f. Practical decision making is needed to get better results.
g. Every decision should be institutionalized so that it is known that it is right.
h. Each need is the initial action of the next set of links.

2.3. Research Model

Fig. 1 presents the structure of the proposed method.

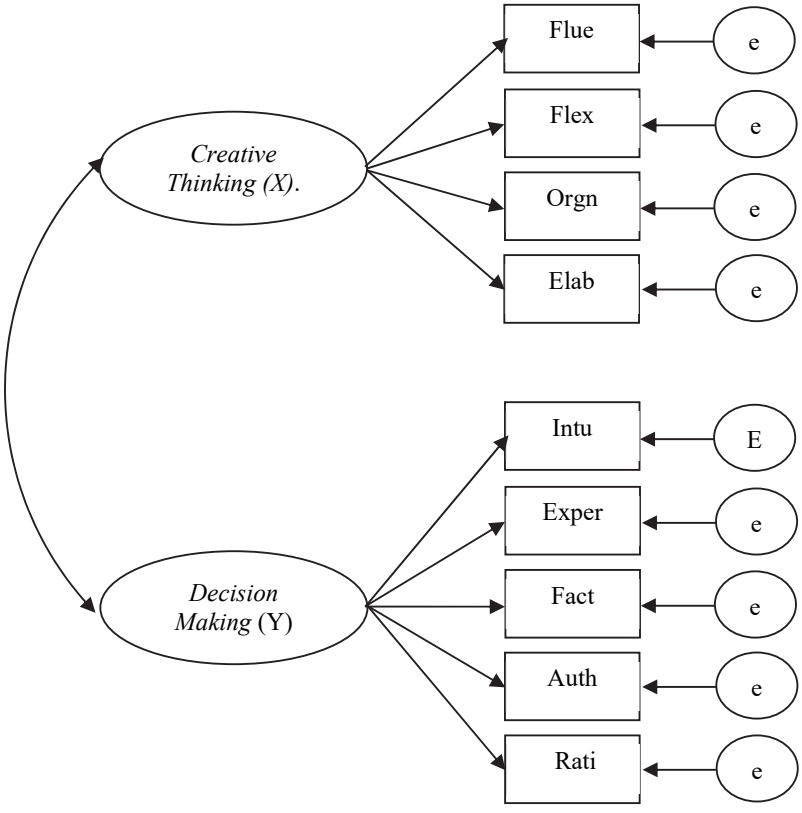

Fig. 1. Research Model

2.4. Hypothesis

Creative Thinking *has* a significant effect on Decision *Making*

3. Method

3.1. Research Design

This research type is concluded to be causal research. According to Sekaran and Bougie (2016), causal research is a type of research that design to elaborate on one factor or more is some problem. This causal research will explain that the X variable

is the cause of the Y variable (Sekaran & Bougie, 2016). This study used a quantitative approach because the symptoms were converted into numbers analyzed using the statistic. According to Creswell (2016), quantitative research requires researchers to explain how variables affect other variables.

3.2. Population and Sample

Population refers to an entire group of people, events, or exciting things that researchers want (Sekaran & Bougie 2016). The population in this study was 106 Cadets of The School of Aviators in Indonesia. Sekaran and Bougie (2016) define a sample as a subset of the population, and it comprises members selected from the population. Therefore, by studying a sample, the researcher should draw conclusions that are generalizable to the population of interest. In this study, sampling techniques taken are total sampling techniques that are a type of purposive sampling technique that involves examining the entire that have a particular set of characteristics (Sekaran & Bougie 2016). Thus, the samples used in this study were 106 Cadets of the School of Aviators Ministry in Indonesia.

3.3. Variable Operational Definitions

An operational definition is a concept or something that can be measured and seen in the dimension of behavior, aspect, or nature indicated by the concept. The operational definitions of variables in this study are:

3.3.1. Exogenous Variables

According, exogenous variables are often referred to as stimulus variables, predictors, and antecedents. Exogenous variables are often also called free variables, i.e., variables that affect or cause changes or the appearance of bound variables. The exogenous variable in this study was Creative *Thinking* (X). *Creative Thinking* in this study was measured through several indicators referring to Munandar (2004), namely:

a. Fluency b. Flexibility c. *Originality* d. Elaboration

3.3.2. Endogenous Variables

Bound variables are variables that affect or become a result due to the existence of free variables. The endogenous variable in this study *was Decision Making* (Y). *Decision Making* in this study was measured through several indicators referring to (Terry 2000), namely:

a. Intuition b. Experience c. Fact d. Authority e. Rational

3.4. Data Analysis Techniques

Data analysis is an achievement for research aimed at answering research questions in order to uncover certain phenomena. Data analysis is the process of simplification of data into a form that is easier to read and implement. The analytical technique chosen to analyze the data and test the hypothesis in this study is the structural equation *model* (SEM) with the AMOS's help (Analysis *of Moment Structures)* program. The structural equation model combines two different statistical methods, namely factor *analysis* developed in psychology and psychometry and simultaneous equation modeling (simultaneous equation *modeling)*, which developed in econometrics. SEM is a statistical method used to measure the validity and reliability of causality relationships among the study variables. (Ferdinand 2002) The advantages of SEM application in management research are its ability to confirm the dimensions of a concept or factor that is very commonly used in management and its ability to measure the influence of relationships – relationships that theoretically exist.

4. Results

4.1. SEM Assumption Test Results

Data is considered a normal distribution, both univariate and *multivariate,* when *the Critical Ratio value at skewness* is between -2.58 until 2.58, with a significance level of 0.01 (1%). The results of the analysis appear in Table 1.

Table 1
Test Normality (*Assessment of Normality)*

Variable	Min	Max	skew	C.r.	kurtosis	C.r.
y15	3.000	9.000	.090	.467	-.287	-.741
y11	3.000	9.000	-.178	-.920	-.054	-.139
y12	3.000	10.000	.273	1.412	.074	.192
y13	3.000	10.000	.265	1.366	.481	1.243
y14	3.000	10.000	.163	.843	.304	.786
X11	2.000	10.000	.024	.124	-.476	-1.228
X12	2.000	10.000	-.089	-.461	-.354	-.914
X13	2.000	10.000	-.212	-1.093	-.476	-1.228
x14	2.000	10.000	.028	.146	-.385	-.994
Multivariate					-1.180	-.530

The test results showed that the c.r. Multivariate values in table 1 were mostly between -2.58 to 2.58, meaning the assumption of normality had been met, and the data was feasible for use in subsequent estimates or analyses.

4.2. SEM Measurement Test Results

4.2.1. Creative Thinking Factor Analysis Results

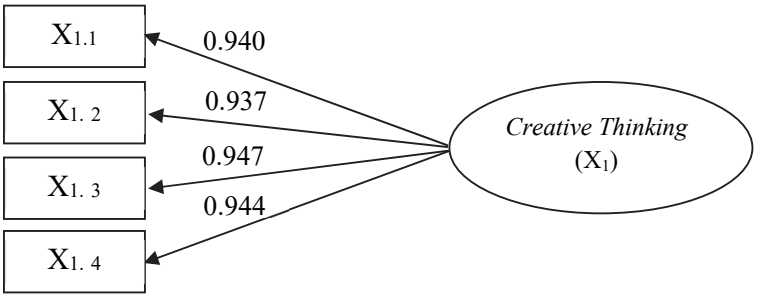

Fig. 2. Analysis of Creative Thinking Confirmatory *Factors*

From Fig. 2, it can be seen that the model for Culture can be seen through the coefficient *value of the loading factor* of each indicator presented in Table 2 as follows:

Table 2
Coefficient Value *loading factor* For Creative *Thinking*

Variable	Indicators	*loading factor*	Cut Off	*Q*	Description
Creative Thinking	Fluency($X_{1.1}$)	0.940	0.5	0.000	Valid
	Flexibility($X_{1.2}$)	0.937	0.5	0.000	Valid
	Originality($X_{1.3}$)	0.947	0.5	0.000	Valid
	Elaboration($X_{1.4}$)	0.944	0.5	0.000	Valid

Based on the data in Table 2, it can be explained that Creative Thinking *construction* can be declared valid based on *the qualified loading factor* value of *loading factor* > 0.50. The data in Table 2 shows that there are four *Indicators of Creative Thinking* that can be declared valid in reflecting the construction of Creative *Thinking* because it has qualified the loading *factor* value > 0.50.

4.2.2. Results of Confirmation Decision Making Factor Analysis

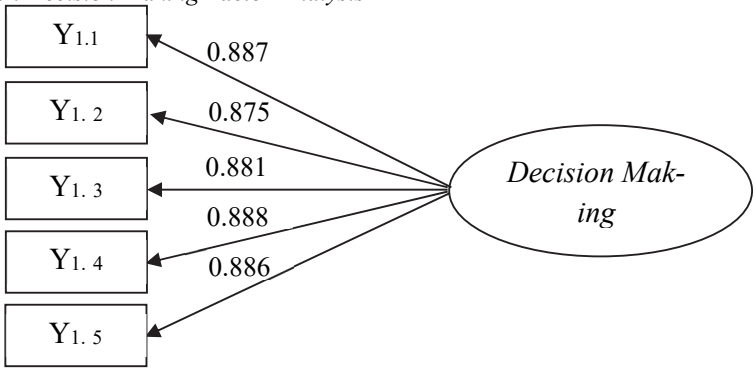

Fig. 3. Analysis of Decision Making Confirmatory *Factors*

From Fig. 3, the model for Decision Making *can* be seen through the coefficient *of loading factor* of each indicator presented in Table 3 as follows:

Table 3
Coefficient Value *of Loading Factor* for Construct *Decision Making*

Variable	Indicators	*loading factor*	Cut Off	*Q*	Description
Decision Making	Intuition ($Y_{1.1}$)	0.887	0.5	0.000	Valid
	Experience ($Y_{1.2}$)	0.875	0.5	0.000	Valid
	Fact ($Y_{1.3}$)	0.881	0.5	0.000	Valid
	Authority ($Y_{1.4}$)	0.888	0.5	0.000	Valid
	Rational ($Y_{1.5}$)	0.886	0.5	0.000	Valid

Based on the data in Table 3, it can be explained that the student trust construct can be declared valid based on the qualified loading *factor* value of *loading factor* > 0.50. The data in Table 3 shows three indicators of student confidence that can be declared valid in reflecting student confidence because it has qualified the loading *factor* value > 0.50.

4.3. The goodness of Fit Criteria Evaluation Results

After sem assumptions are fulfilled, then further structural feasibility testing will be carried out and for this will be used several feasibility index models that look at the results in table 4 below:

Table 4
Evaluation of *Goodness of Fit Indices Criteria*

№.	*The goodness of Fit Index*	Results	*Cut off Value*	Description
1.	RMSEA	0.026	< 0.08	Fit
2.	Chi-Square	28. 833	Look at Prob.	Fit
3.	Prob	0.319	= > 0.05	Fit
4.	CMIN/DF	1.109	=<0.2	Fit
5.	Gfi	0.964	> 0.90	Fit
7.	TLI	0.998	> 0.95	Fit
8.	Cfi	0.998	> 0.94	Fit

Table 4 shows that the test results of the goodness of fit in the structural equation model show useful data because it has met all the required criteria.

4.4. Hypothetical Test Results

The research hypothesis test was conducted based on the results of causality relationship analysis between research constructs, as presented in table 5 below:

Table 5
Research Hypothesis Test Results

	Estimate	**S.E.**	**Q**	**Label**
Creative Thinking → Decision Making	0.520	0.044	0.000	Significant

Based on the data in table 5, it can be explained the results of hypothesis testing as follows:

1. The coefficient *of standardized regression weight* between *Creative Thinking* and *Decision Making* is 0.520 with a *probability of* 0.000 or $p < 0.05$. This suggests that Creative Thinking variables *significantly affect decision-making variables,* which means the first hypothesis in this study is acceptable.

5. Discussion

Based on the analysis results, *creative Thinking* has a significant effect on the *variable decision making*. This can be seen from the probability value of 0.000 or $p < 0.05$, which means creative Thinking *can* impact decision *making.* The direction of influence between creative *thinking* variables *on decision making* is positive, which means creative *Thinking* can increase *decision making.* In other words, the better the cadets' creative thinking ability, the more able to improve good decision-making ability. These results show that the hypothesis "Creative *Thinking has* a significant effect on *Decision Making*" can be declared acceptable and proven genuine. Decision making is defined as an informed choice between an alternative available in a particular situation, a trade-off process of alternative solutions to a particular problem, and choosing the best solution (Hawari, 1994; Yusnaeni et al., 2017). The success achieved by any organization depends mostly on the effectiveness and efficiency of the decisions taken and their relevance to targets identified at various administrative levels (Alsayrafi, 2003). Effective decision making can be achieved if one has creative Thinking. Creativity is defined as an expression of human truth that allows man to wonder about the reality of the cosmic phenomena surrounding him and helps him discover and develop methods, tools, and ideas that allow him to uncover or analyze them or reach them. Rules and laws governing their existence, design and develop methods, tools, and ideas that allow it to deal with this phenomenon and benefit from it in the development of its life (Ahmad et al. 2019). Creativity is everywhere, in the way we see, observe, and solve practical problems to create something for their aesthetics. In recent years, teaching foreign languages began to see the potential for creativity for foreign language classrooms and the need for it due to the increasing value in world work (Mumford & Simonton, 1997). The results of this study are in line with the results of (Ahmad et al., 2019) research, which found that there is a positive influence of the availability of fluency in Creative Thinking on the effectiveness of the decision-making process in insurance companies operating in Yemen, and the Thinking demonstrates the ability to produce the most significant number of alternatives, ideas, problems. Alternatively, use responses to certain stimuli, and the speed of their creation, the point of which is the process of remembering and recalling information, experiences, or concepts that have been studied. Therefore, someone who has this ability will have his creative decisions because of the alternatives and alternatives available and proposed. This will be far

from stagnation and monotheism, which will consider the subject in many ways, produce effective solutions, generate innovative ideas, and positively affect the decision-making process's effectiveness.

6. Conclusion

Based on the hypothetical test results *obtained, a p-value* of 0.000, critical Thinking *has* a significant effect on *decision making.* This shows that the better critical Thinking that *cadets* have, the more decision making will *be made.* Thus, it can be concluded that the hypothesis "Creative *Thinking* has a significant effect on *Decision Making*" can be declared acceptable and proven to be true.

References

Aboob, A. P. D. H. A., Mohsin, B. N., & Aqeel, L. D. A. (2020). Percentage of creative thinking contribution to meditators versus impulse in decision-making accuracy for first-class referees in volleyball. *Health, 23*(4), S504. doi: 10.36295/ASRO.2020.23420.

Ahmad, F.A., Mao, S., Alaawani, M., & Barman, A. (2019). Creative thinking and its influence on the decision making process. *SSRN Electronic Journal* (January). doi: 10.2139/ssrn.3435532.

Alsayrafi, M. (2003). *Interpersonal and Human Management*. Amman, Jordan: Qandeed Publishers.

Birgili, B. (2015). Creative and critical thinking skills in problem-based learning environments. *Journal of Gifted Education and Creativity, 2*(2), 71-80.

Fatmawati, A., S. Zubaidah, S. Mahanal, & Sutopo. (2019). Critical thinking, creative thinking, and learning achievement: How they are related. *Journal of Physics: Conference Series, 1417*(1). doi: 10.1088/1742-6596/1417/1/012070.

Ferdinand, A. (2002). Structural equation modeling dalam penelitian manajemen. *Semarang: Badan Penerbit Universitas Diponegoro*.

Hawari, S. (1994). *Explaining the Elements Outlined in the Administration, Library*. Cairo, Egypt.: Ain Shams.

IBE UNESCO. (2013). *Review of the International Bureau for Education (IBE)*. (March):1–44.

Kampylis, P., & Berki, E. (2014). Nurturing creative thinking. *International Academy of Education, 6*.

Mumford, M. D., & Simonton, D. K. (1997). Creativity in the workplace: People, problems, and structures. *The Journal of Creative Behavior, 31*(1), 1-6.

Munandar, U. (2004). *Pengembangan Kreativitas Anak Berbakat*. Jakarta: Rineka Cipta.

Rohayuningsih, H., & Handoyo, E. (2015). Berpikir Kreatif dalam Pengambilan Keputusan. In *Forum Ilmu Sosial*, *42*(1), 106–13. doi: 10.15294/fis.v42i1.9248.

Sager, M. J., & Taylor, M. P. (2006). Under the microscope: the structure of the foreign exchange market. *International Journal of Finance & Economics, 11*(1), 81-95.

Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. John Wiley & Sons.

Terry, G. R. (2000). *PRINSIP-PRINSIP MANAJEMEN*. 1st ed. Jakarta: Bumi Aksara.

Terry, G. R., & Rue, L.W. (2013). *Principles of Management*. 5th ed. Jakarta: P.T. Bumi Aksara.

Težak, K. (2015). Creative thinking and decision-making processes in EFL creative writing. ELOPE: English Language *Overseas Perspectives and Enquiries, 12*(2), 161-174.

Yusnaeni, Y., Corebima, A.D., Susilo, H., & Zubaidah, S. (2017). Creative thinking of low academic student undergoing search solve create and share learning integrated with metacognitive strategy. *International Journal of Instruction, 10*(2), 245–62. DOI: 10.12973/iji.2017.10216a.