

Effectiveness of Entrepreneurship-Project Based Learning Model to Improve Creativity Using Holistic Perspective (The Four P's)

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Abstract

Creativity is important for a developing country as catalyst for prosperity but the strategy for creativity development and measurement is an imperative problem for many universities in Indonesia. The research concerned here had the objective of testing the effectiveness of a model of entrepreneurship project-based learning (Entp-PBL) designed to improve creativity in the class of entrepreneurship using Rhodes' holistic perspective on creativity (four P's model). The research used the pretest-posttest control group design involving eighty-three randomly-selected university students forming and randomly distributed into the experimental and control groups. Inferential statistical analysis was used to observe the significance in the difference of the final mean score for creativity. The research results indicate that, on the whole, the Entp-PBL model improves creativity more effectively compared to a conventional model and it shows varying degrees of significance for the various creativity-forming dimensions. Pedagogic implications of the findings related to each dimension have been discussed and followed with recommendations for strategies in improving each creativity dimension.

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1 Introduction

Indonesia as a nation becoming a member of the Asean Economic Community is in need of many creative entrepreneurs. Asia society partnership for global learning (2012) recommends giving importance to creativity training. Creativity is a machine of cultural evolution (Runco, 2004). Creativity and entrepreneurship are closely related. Education in entrepreneurship plays a part in changing the attitude of the younger generation (Nelson & Johnson, 1997). Universities have become the hope for the birth of creative entrepreneurs but the majority of graduates (83.18%) still become job seekers because of their low levels of creativity (Didi Purwadi, Berita Pendidikan 2011).

Entrepreneurship as an academic subject is still relatively new for the majority of universities with a learning system oriented to students' quick graduation with a high IP (*indeks prestasi* 'grade point average') and their quick employment. It is realized that creativity is important in entrepreneurship but the pedagogical model for its development still becomes the most imperative challenge in education. Pujiriyanto (2013) finds in university learning the occurrence of domination by theory with a composition of 57% for theory and 43% for practice. Creativity is responded to with quite a reactive attitude but it is packaged and taught theoretically. This phenomenon is not only happen in Indonesia. According to Kakouris et. al., (2016) the European Commission mapped the ongoing provision of entrepreneurial courses through a survey in more than 600 higher education institutes across Europe. The survey found found that entrepreneurial courses were primary based on traditional lectures supplemented by case studies and practitioners visits in class.

Creativity is not fit to be taught mostly theoretically with the theory and the practice separated from each other; instead, they should be in the cyclical unity of the wheel of learning (Boyyet & Jimmie, 1998) with the teaching providing considerable opportunity for practice (Carter & Collison, 1999). Creativity teaching requires techniques that differ from merely presenting declarative materials (Clary et al., 2011; Haring-Smith, 2006). Entrepreneurship learning needs to focus on the learning process rather than the learning material (Lane, et. al., 2011). Creativity is indeed a dilemma as material which is difficult to teach (Lautenschläger & Haase, 2011). Creativity is complex in nature and there is no consensus about it yet in the field of psychology. A single definition does not sufficiently cover the concept of creativity (Hasirci & Demirkan, 2003) but creativity could be learned and implanted (Tsai, 2014).

An innovative approach is needed in creativity development. The strategy of project-based learning (PBL) has been admitted by many to be potential and

fitting for creativity development. Ravitz et al. (2011) mention that PBL significantly develops twenty-first century skills. Wurdinger & Qureshi (2015) state that PBL effectively improves creativity.

The still minimum amount of information about the best practice in PBL application causes reluctance to apply it and tendency to keep using a conventional model. PBL is still often interpreted very openly according to the radical constructivist, not yet designed systematically with comprehensive creativity measurement. All this time creativity testing starts from different definitions, constructs, and theories. There is a contradiction concerning the effect of creativity-oriented learning, namely, being specific or general in nature (Cropley & Cropley, 2008). The testing has been dominated by the Torrance Test of Creative Thinking, which has the weakness of having a scoring system that is claimed to be objective while basically it is subjective by depending on the test scorer's consideration. Rhodes (1961) puts holistic perspective on creativity called the four p's (or 4 P's) with p representing the four dimensions of creativity, namely, person, process, press, and product, acknowledged as essential components (Runco, 2004; Hasirci & Demirkan, 2003, 2007). The 4 P's model is one of the ways to organize research on creativity (Kaufman & Sternberg, 2007); it is able to unite various views on creativity and is useful that way (Hasirci & Demirkan, 2003). Batey & Furnham (2006) considers that the 4 P's model is beneficial and it makes synthesis easier. Freiberg Hoffmann et. al., (2014) states that creativity measurement requires a multi-dimensional approach and the four-dimensional approach is such an approach.

According to exposition, there are three main problems, namely, 1) creativity is not yet developed through the right learning strategy, 2) the measurement of creativity requires a comprehensive approach, and 3) the potential of the project-based learning for creativity development needs to be proven empirically. The research concerned here had the objective of testing the effectiveness of the Entp-PBL model to improve creativity using holistic perspective (the four P's).

2 Method

The pretest-posttest control group experimental design was applied. The experimental group applied the Entp-PBL model while the control group used the conventional (expository) model that had been applied all the time. An equality test using pretest data ascertained that the two groups had equal initial creativity. The pretest scores for the dimensions of the product, namely, the four p's, were obtained by evaluating the creative idea and the sketch of the product to be made.

Participants

The research population consisted of 166 students of a study program who attended a class of entrepreneurship in the academic year of 2013/2014 at UNY (*Universitas Negeri Yogyakarta* 'State University of Yogyakarta'). The sample was taken randomly by using as basis a formula by Yamane (1967) finally indicating that a sample taken from a population of 166 individuals with a 90% degree of trustworthiness was at the minimum 38% of the population. The researcher randomly took 50% of the population as sample and the eighty-three students making the sample were randomly distributed into the experimental and control groups. The experimental group had a membership of forty-one students consisting of twenty-two males and nineteen females with ages averaging 21.02 years ($SD=0.72$) and the control group had a membership of forty-two students consisting of sixteen males and twenty-five females with ages averaging 20.93 years ($SD=0.78$).

Procedure

The Entp-PBL model refers to the model of Gregory and Chapman (2007) with the working procedure as follows: (1) exploration, (2) implementation, (3) realization, (4) presentation, and (5) reflection. The students completed a project through the phases of generating, planning, and producing. The learning scenario of the experimental group consisted of 1) making work groups of three to four individuals, 2) signing learning contracts and studying students' guide book, 3) exploring the environment for creative ideas, 4) choosing an idea to be used as project topic and constructing a project design, 5) developing the idea, 6) realizing/actualizing the idea into a sketch/prototype as creative product, 7) presenting the product in front of a team of judges, and 8) making a reflection together. At the end of the learning time, a posttest was administered to both groups. The project took eight weeks to accomplish, conforming to class schedule with the two groups placed in different locations.

Research Instruments

A creativity evaluation instrument was developed from relevant theories. The dimension of creative person (P1) was with the following indicators: (1) curiosity/extroversion (X1), (2) responsiveness/agreeableness (X2), (3) openness to new experience (X3), (4) risk-taking courage (X4), (5) sensitivity to problems (X5), and (6) self-confidence (X6) (Batey & Furnham, 2006; Guilford, 1950; Lowenfeld, 1962; Torrance, 1966). Through a validity test on the P1 scaled items in the evaluation instrument by using Pearson's Product Moment coefficient of correlation, twenty-five out of sixty items were found valid with $r_{obtained} > r_{table}$, (which was 0.361), $\alpha=0.05$, $N=30$, and Cronbach's Alpha coefficient of reliability of $0.73 > r_{table}$ (which was 0.71). When the Alpha coefficient is greater than 0.70, the item concerned is acceptable (Hatcher, 2013). The twenty-five statement items with a scale of 1 to 4 were found to be representative of all the indicators with

answer scores of 1=inappropriate, 2=moderately appropriate, 3=appropriate, and 4=very appropriate.

The dimension of creativity-encouraging environment/press (P2) was with the following indicators: (1) involvement and participation in the family (X7), (2) openness of parents' attitude (X8), (3) freedom in exploring (X9), (4) participation and cooperation (X10), (5) openness of the lecturer's (university teacher's) attitude (X11), and (6) freedom in taking initiatives (X12). This dimension as variable was derived from the view of (Karakaya & Demirkan, 2015; Amabile, 1995; Sawyer, 2015; Amabile & Grysiewicz, 1989). Through a validity test on the P2 scaled items by using Pearson's Product Moment coefficient of correlation, twenty-eight out of sixty items were found valid with $r_{\text{obtained}} > r_{\text{table}}$ (which was 0.361), $\alpha=0.05$, $N=30$, and Cronbach's Alpha coefficient of reliability of $0.84 > r_{\text{table}}$ (which was 0.71). The twenty-eight statement items with a scale of 1 to 4 were found to be representative of all the indicators. The criteria for answer scores are as previously above: 1=inappropriate, 2=moderately appropriate, 3=appropriate, and 4=very appropriate.

The dimension of the creative process (P3) refers to creative thinking ability (also known as divergent thinking) covering the aspects of (a) fluency (X13), (b) flexibility (X14), (c) originality (X15), and (d) elaboration (X16) (Guilford, 1967). All four are cognitive aspects related to the creative thinking process (Freiberg Houffman et. al., 2014). Creativity is a mental process for the formation of something new, different, and original based on preexisting elements (Hurlock 1992; Mednick, 1962). The verbal creativity test used in this case adopted Utami Munandar's standardized test, reconfirmed to be already sufficiently valid and reliable with the respective values of 0.4037 and 0.897. It was administered within a controlled time length, covering testing about word beginnings, composing words, forming three sentences, usual characteristics, unusual uses, and what results.

The dimension of creative product (P4) contains three elements, namely, novelty, effectiveness, and ethicality (Hurlock 1992; Mednick, 1962). A creative product is concerned with a product quality determined by an observer (Amabile, 1982: 1983a). A creative product should be observable and present a new construction (Roger, 1954). The creative product evaluation used an evaluation rubric covering the following elements: (1) newness/novelty (X17), (2) originality/uniqueness (X18), (3) problem solving (X19), and (4) elaboration and synthesis (X20). The creative product evaluation rubric was developed with theoretical constructs (as conceptual criteria) as basis and the evaluation used consensual criteria involving two experts. The evaluation rubric covered the four aspects with a scale range of 0-25 so that the minimum score was 0 and the maximum score was 100.

The indicators of each valid and reliable creativity dimension were tested to see whether the theories forming each indicator were fitting and consistent ones and were conceptions of appropriate unidimensionality. The tryout subjects were 128 students outside the research population. The fit between the data and the

result of measurement was tested by using Confirmatory Factor Analysis (CFA) with the program of LISREL 8.5. The data analysis requirements were fulfilled with the Q plot of standardized residual (with normal quartiles) of each creativity dimension (of the first order) and creativity construct (of the second order) being found normal. The criteria for Goodness of Fit Indices (GFI) used were absolute in nature; they were 1). Chi-Square Statistics, 2). Significance Probability, 3). Root Mean Square Error of Approximation (RMSEA); and 4). Goodness of Fit Index (GFI). The value of t_{obtained} for every dimension > 1.96 . The CFA results presented in Table 1 indicate a good fit with the construct model.

Table 1: Goodness of Fit of The Creativity Construct Evaluation Model

Goodness of fit index	Dimension				Creativity	Cut-of value
	Person (P1)	Press (P2)	Process (P3)	Product (P4)		
Chi Square (χ^2)	7.17	11.96	1.17	2.98	132.62	The smaller is better
Sig. probability	0.62	0.10	0.56	0.225	0.961	≥ 0.05 is good
RMSEA	0.000	0.075	0.000	0.062	0.000	≤ 0.08 is Goodfit
GFI	0.982	0.970	0.995	0.988	0.905	≥ 0.90 is Goodfit
CR	0.877	0.871	0.956	0.963	0.853	≥ 0.7 is reliable
AVE	0.751	0.733	0.936	0.904	0.599	≥ 0.5 is reliable

Note: RMSEA=root-mean-square error of approximation; GFI=goodness of fit index; CR=composite reliability; AVE=average variance extracted

The loading factor (for convergent validity) of at least 0.50 and ideally 0.7 in value is sufficiently powerful to account for the latent constructs (Hair et. al., 2006; Imam & Fuad, 2008). The creativity construct model and its loading factor value could be seen in Figure 1.

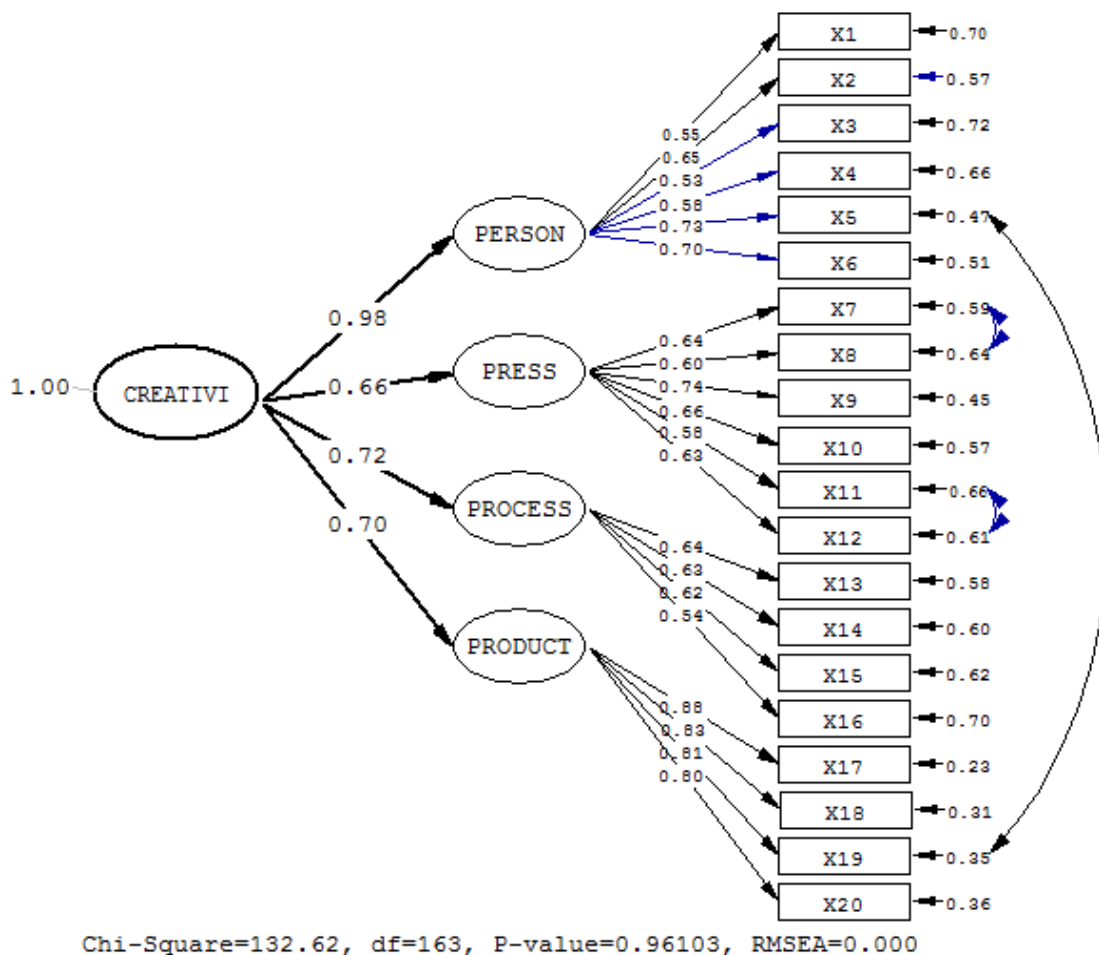


Figure 1: Creativity construct evaluation model

Data analysis

The data analysis was descriptive and it was to describe the mean, SD, and gain score obtained for each dimension. The inferential statistics method of the independent t-test was used to test the difference in posttest mean score of the groups with the program of SPSS 22. The interpretation of the results of the test on difference in mean score for each dimension paid attention to the loading factor of the creativity construct model formed.

3 Result

The requirements for analysis of normality were fulfilled with one-sample Kolmogorov-Smirnov test and the test of homogeneity was done with Levene's Test of Equality Variances. The data were found to have normal distribution and to be homogenous with $p > 0.05$ for each dimension. Before treatment, an equality test was applied to ascertain that the two groups had equal initial creativity and the results are presented in Table 1.

Table 1: Results of T-Test on Pretest Scores of The Experimental and Control Groups

Dimension	df (N-2)	Mean of pretest		SD of pretest		0.05. Level	$t_{obtained}$	t_{table}
		Experime nt group	Control group	Exp. Group	Control Group			
P1	81	85.31	86.70	7.55370	5.31255	0.335	-0.970	1.989
P2	81	93.51	99.69	8.86273	6.83449	0.105	-1.641	1.989
P3	81	77.34	70.05	18.04662	20.11667	0.086	1.737	1.989
P4	81	41.10	42.14	8.25471	9.69931	0.599	-.528	1.989

Results of the independent t-test in Table 1 show that $t_{obtained}$ of each creativity dimension is located in the area of values between -1.989 and +1.989, which means that there was no initial difference in creativity between the experimental group and the control group. Pretest and posttest results of the two groups give the difference in the gain score obtained as presented in Table 2.

Table 2: Comparison in Gain Score Between The Experimental and Control Groups

Dimension	Experiment group			Control group		
	Pre Test	Post Test	Gain Score	Pre Test	Post Test	Gain score
P1	85.32	87.73	2.42	86.70	85.65	- 1.05
P2	93.51	98.95	5.44	99.69	96.68	- 3.01
P3	77.34	156.71	79.37	70.05	125.43	55.38
P4	41.10	57.32	16.22	42.14	47.62	5.48

The independent t-test significantly indicated difference in creativity score between the experimental group and the control group concerning the P3 and P4 dimensions as presented in Table 3.

Table 3: Results of the Independent Sample T-Test on the Two Groups

Dimension	df (N-2)	Mean posttest		Standard of deviation		0.05. level	$t_{obtained}$	t_{table}
		Experiment	Control	Experiment	Control			
P1	81	87.73	85.65	6.67063	7.83199	0.195	1.307	1.989
P2	81	98.95	96.68	7.16659	5.69075	0.055	1.948	1.989
P3	81	156.71	125.43	34.62748	25.75887	0.00	4.677	1.989
P4	81	57.32	47.62	10.43417	10.60592	0.00	4.198	1.989

4 Discussion

The discussion here places each dimension in its own position. It is important to distinguish the discussion into those of respectively creative product, creative process, creative person, and creative press/place (Kaufman, 2009).

In relation with the P1 dimension, it was found that $t_{obtained}=1.307$, which was within the area of acceptance between -1.989 and 1.989, and $p=0.195>0.05$, with $df=81$. It means that there is no significant difference in P1 dimension score between the experimental group and the control group. The creative person is influenced by personality, intelligence, knowledge, thinking style, and motivation (also called the big five) (Sternberg & Lubart, 1995). Individual factors strongly correlating with creativity are, among others, emotional intelligence, divergent thinking, openness to new experience, creative personality, and intrinsic motivation (Da Costa et. al., 2015). A basic personality with interest in, attraction to, or curiosity in matters outside oneself (or extroversion) and with openness to new experience plays a part in the formation of a creative person (Sun & Jin, 2009). Openness in attitude is one of the three superfactors able to determine the characteristics of a creative personality, the superfactors being extroversion (E), neuroticism (N), and psychoticism (P) (Eysenck, 1993). According to the model construct, the indicator *openness to experience* (X3) has the smallest value of loading factor, namely, 0.53. According to Martindale (2007), potential for creativity and primordialism in thinking are closely related to openness in attitude.

In the context of the research, primordialism as background is assumed to influence openness in attitude towards new experience.

In relation with the P2 dimension, it was found that $t_{\text{obtained}}=1.948$, which was within the area of acceptance between -1.989 and 1.989 , and $p=0.055>0.05$, with $df=81$. It means that there is no significant difference in score for the P2 dimension between the experimental group and the control group. A strategy that could form a creative environment is to provide active, constructivist, and collaborative learning and opportunities for improvisation (Sawyer, 2015). The system model theory explains that creativity is formed by the role of, among others, the people involved during the attainment of success (Csikszentmihalyi, 1999). A model figure, collaboration, a feeling of psychological security, the culture in the campus, and the university teacher's way in interacting are influential contextual factors (Jiafang, 2014). The most effective strategy for creativity teaching is to change the way the learning is conducted (Sawyer, 2015). According to the model construct, the manifest indicator freedom in exploring (X9) has the greatest value of loading factor, namely, 0.74 . The Ent-PBL model is better than a conventional model in giving freedom in exploring, obtaining a gain score of 5.44 while the situation with the conventional model is, conversely, distorted with the attainment of a gain score of -0.31 . The formation of a creativity-encouraging environment is a process of multi-level transformation. Amabile (1995) mentions that key people in the circles of the family and society have a share in giving influence. In view of the primordial background, the formation of a creative environment not only receives influence from the learning model and the campus culture but also needs to reach a transformation in the circles of the family and society.

In relation with the P3 dimension, it was found that $t_{\text{obtained}}=4.677$, which was outside the area of acceptance between -1.989 and 1.989 , and $p=0.005<0.05$, with $df=81$, so that there is a significant difference in score for the P3 dimension between the experimental group and the control group. The Entp-PBL model is effective in stimulating students to find and generate many ideas and simultaneously to also compare, evaluate, develop, and actualize them and, therefore, also effective in stimulating the dual thinking process. Sowden et.al., (2015) states that thinking creatively involves two thinking processes (or is a dual-mode process), namely, the process of generating ideas (a generative process) and the process of improving, evaluating, and selecting ideas (an evaluative process). One who generates many ideas becomes significantly creative (Da Costa et. al., 2015). The creative process refers to the divergent and convergent thinking abilities (Guilford, 1967; Hennesey & Amabile, 2010). The creative process is initiated with a divergent thinking process and it has four stages, namely, (1) problem identification, (2) idea generation, (3) idea evaluation and selection, and (4) implementation plan construction (Karimi et. al., 2016). Creative thinking is the ability to generate many ideas and is simultaneously a mental challenge. At the time of generating many ideas, an associative thinking process occurs. Original ideas are products of a system that generates ideas and a control system evaluating

various ideas (Maysseless et.al., 2015). The model shows that the manifest indicator fluency (X13) was the most explanatory with the greatest loading factor of 0.83. The indicator fluency refers to the ability to generate many ideas. It is supported and strengthened by Runco et. al., (2011), who regards fluency originality as key to creativity (to true creativity, that is) because the more the ideas, there is a chance for one to become increasingly more creative. Compared to a conventional model, the Entp-PBL model more effectively facilitates university students in generating many ideas and simultaneously also evaluating and comparing them and making a decision concerning which idea is the best as project theme.

In relation with the P4 dimension, it was found that $t_{\text{obtained}}=4.198$, which was outside the area of acceptance between -1.989 and 1.989, and $p=0.000<0.05$, with $df=81$. There is significant difference in score for creativity in the P4 dimension between the experimental group and the control group. According to Hasirci and Demirkan (2003), the process and the product occurring in a creative environment correlate highly with each other while Kaufman (2009) states that a product is the final result of a creative process influenced by the environment. The Entp-PBL model, besides facilitating the dual thinking process, is also able to form a creative environment and thus encourage the generation of creative products. What about the personality factor? Individual factors contributed 2% to the variance in actual creativity with $r=14$, which was under the average in social psychology with $r=21$ (Da Costa et. al., 2015). However, it is realized that the evaluation of a creative product is very much influenced by an agreement among experts with varying degrees of experience as well as varying methods of evaluation (Kaufman, et. al., 2008; Horn & Salvendy, 2006a). Lu Chia & Luh (2012) find that the use of Consensual Assessment Tool (CAT) in evaluation by non-experts is in fact higher in interreliability. In the future, the involvement of non-experts (or mere users) is worth considering to improve the credibility of the evaluation.

5 Conclusion

The Entp-PBL model is able to improve the scores for all creativity dimensions and differ significantly in the P3 and P4 dimensions compared to the conventional model. The Entp-PBL model is able to facilitate the dual thinking process encouraging the generation of creative ideas. The creative process encourages the actualization of creative products that are environmentally influenced. The Entp-PBL model positively develops the P1 and P2 dimensions while the conventional model distorts them instead. The development of the P1 and P2 dimensions through the Entp-PBL model appears to require a relatively long process in targets having a background of primordialism. Creativity is influenced by various factors and it is complex in nature. The research has given

the understanding that the Entp-PBL model, by providing freedom in exploring, in a structured and systematic way and in clear directions, with a holistic perspective approach, could give information that is beneficial to creativity development strategies.

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