

USING ABBREVIATED TORRANCE TEST for ADULTS (ATTA) TO MEASURE CREATIVITY TRAINING EFFECTIVENESS IN THE INDONESIAN CONTEXT

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Research has shown that creativity can be taught (Firestien & Lunken, 1993; Parnes & Noller, 1972; Rose & Lin, 1984; Scott, Leritz & Mumford, 2004, Horng et.al, 2005) and that creativity training can be effective (Parnes & Noller, 1972; Rose & Lin,1984). Davidovitch (2006) also indicated that a strong relation exists between creative thinking and effective teaching. Much research has been conducted in the field of creativity, but most of it in the Western context. The purpose of this study is to investigate whether creativity can also be taught in the Indonesian context. Creativity training was provided to teacher-students in various departments of several teacher preparation universities. The Abbreviated Torrance Test for Adults (ATTA) was administered to the participating teacher-students and teachers to test for their creative thinking abilities before and after creativity training. Results show a significant difference in participants' creative ability before and after training. This indicates that creativity training can be taught and be effective in the Indonesia context. A recommendation is made for creativity training to be integrated with teacher preparation curriculum in order to improve teacher-students' competencies, and for creativity training to be provided for in-service teachers.

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BACKGROUND

Creativity Definition

For the purpose of this research, creativity is defined as the skill to solve a problem effectively in a new and ethical way.

The importance of having a creative teacher who encourages students to think

The Indonesian education system is currently dealing with a very big challenge. This challenge was identified by the Indonesian Ministry of National Education and laid out in the strategic plan 2010 – 2014 as how to create a creative generation that possesses creative thinking skills and creative moodset (p.56). This challenges teachers to shift from a teacher-centered learning mindset to a student-centered learning mindset that would enable children to think actively, to construct their own knowledge and at the end reach their full potential and develop their creativity in any field. The implementation of student-centered learning encompasses an open source education and multiple understanding that allows students to gain personal meaning in their learning. One of the approach that is suitable for this kind of learning is an active learning approach. In active learning, the teacher's role shifts from being an instructor and knowledge giver to that of a facilitator who motivates students to learn (Millar, 2002). To fulfill this role, teachers need to be creative in their teaching as well as in their thinking (Wiratrisna, 2009) Therefore, it is important for teachers to grasp the essence of creativity and how they're going to teach it to their students.

Although the Ministry of National Education has identified creativity as a big challenge and has clearly stated in the strategic plan 2010 – 2014 that teachers should teach creatively and innovatively, the implementation appears to be weak. The teaching and learning in most public schools are still driven by examination and grades. Teachers are still using rote learning instead of active learning in their teaching. The situation is exacerbated by the government's educational goals that are normally translated to content laden curriculum by schools. In short, the concept of teaching creative thinking skills and moodset haven't been applied in the main stream in Indonesia's education, because it still teachers still tend to focus on the educational outcome or product (as in grade and graduation) instead of on the process of teaching and learning.

There are some reasons that may explain the weak implementation of the creativity concept in Indonesia's education, one is educators' misconception of creativity, specifically, that creativity needs talent. This misconception needs to be address so all teachers, especially future teachers, understand that everyone is born creative and have unique potentials (Davies, 2004). Teachers are creative, they do have the ability to think creatively, create a creative environment for their students and to teach creatively. Teachers should be aware of their own creative potential so they can be creative role models (Bandura, 1977) to their students. If teachers can teach their students creatively, it may lead to active learning where students construct their own knowledge and dare to express them self in a more free way (Horng, J., Hong, J, ChanLin, L., Chang, S & Chu, H, 2005.).

Therefore it is extremely important to equip in-service and pre-service teachers with the conceptual knowledge or basic theory of creativity. As they gain awareness of themselves as creative persons, they also need to be given practical know-how to develop their creativity, such as the tools and techniques in creative thinking available, methods that support creativity and how to set boundaries in a creative environment. These components of creativity can be formulated into a frame work for how teachers can deliberately teach creativity to their students.

Creativity can be taught

The need for critical thinking and creativity in higher education has been emphasized by UNESCO (1998). In its World Declaration on Higher Education for the twenty first century UNESCO called specifically for “innovative educational approaches”. Some higher level institutions have offered creativity courses as part of their curricula, 39 were listed by Xu, McDonnell & Nash (2005).

Creativity training should begin in teacher training universities

Research also shown that creativity is something that can be taught (Firestien & Lunken, 1993; Parnes & Noller, 1972; Rose & Lin, 1984; Scott, Leritz & Mumford, 2004, Horng et.al, 2005), and creativity training is effective (Parnes & Noller, 1972; Rose & Lin,1984). Horng et. al (2005) wrote that creative instruction should begin in teacher training in universities. This will equip pre-service teachers with the knowledge as well as strategies for creative instruction. They also suggested that schools and other education institutions should invite creative persons who have extensive experience in a creativity field to share their knowledge, tips and experience in teaching. By attending trainings and workshops of this kind, it was hoped that teachers will get to know how to think creatively and gain momentum to accommodate change in their educational approach. Davidovitch (2006) also indicated that a strong relation exists between creative thinking and effective teaching.

The Torrance Incubation Model and 18 Creative Thinking Skills

Torrance was known as the ‘creativity father’ and the most widely used and known of creativity test creator (Kaufman, 2006). Creative thinking involves different ways of thinking and perceiving. A set of 18 creativity skills have resulted from the work of Torrance and his student Safter in their development of teaching and learning model called the Torrance Incubation Model (Torrance and Safter,1990). The Torrance Incubation Model (TIM) is a method used as a reference in teaching creativity (Esquivel, 1995). The TIM consists of a set of 18 creativity skills (creative thinking skills). The creativity skills include, among others: the skills to analyze and take fresh perspectives on problems, produce and consider many alternatives, being flexible, being original, elaborating an idea.

Torrance Test of Creative Thinking (TTCT)

Torrance developed a creativity test called the Torrance Test of Creative Thinking (TTCT) that has since become the most widely known and used test to assess creative thinking ability (Sternberg, 2006; Treffinger, 1987; Goff, 2002). There are about 2,000 research articles reporting the use of the TTCT as their research tools. The TTCT has

been translated to 35 different language (Millar 2002), although it is not yet available in Bahasa Indonesia.

The TTCT was developed for the purpose of individual creativity assessment and development. It was designed to aid creativity instruction to maximize individual potential (Kaufman, 2006). The TTCT contains two different kinds of test, a verbal test and a figural test. It takes about one and a half hours to complete the test. In its entirety, the activities assess an individual's ability in the 18 creative thinking skills as contained in the TIM. The TTCT culminates in a creativity score or index that can be used as a gauge for one's creativity level.

Abbreviated Torrance Test for Adults (ATTA).

In order to shorten the test time, Torrance developed a shortened version of the TTCT which was named the Abbreviated Torrance Test for Adult (ATTA). Althuizen (2010) reported that ATTA has good validity, with a prediction validity coefficient $r = 0.59$. The ATTA, similar to the TTCT, culminates in a creativity score or index that can be used as a gauge for one's creativity level. It takes about 15 minutes to complete the ATTA. Three activities (one verbal and two figural) are taken from the TTCT that comprise the whole of the ATTA. In their entirety, the activities assess an individual's ability in the 18 creative thinking skills as contained in the TIM.

Torrance divides the 18 creative thinking skills into two kinds of measurement, norm-referenced measures and criterion-reference measure. *Norm-referenced measures* assess fluency, flexibility, originality and elaboration. *Criterion-referenced measures* assess emotion/expression, provocative questions, richness and colorfulness of imagery, future orientation, humor or conceptual incongruity, resistance to premature closure, unusual visualization or different perspective, movement and/or sound, abstractness of title, articulateness in telling story, combination of two or more figures, internal visual perspective, and fantasy. All the indicators are then tallied and converted into a final score that indicates a person's index and level of creativity.

There has been much research in creativity education in the USA, Europe, and a few countries in Asia, such as Singapore, Malaysia, South Korea and Taiwan but research in creativity education is lacking in the Indonesian context. This paper set out to investigate whether creativity training can be effective in the Indonesian context.

RESEARCH AIM

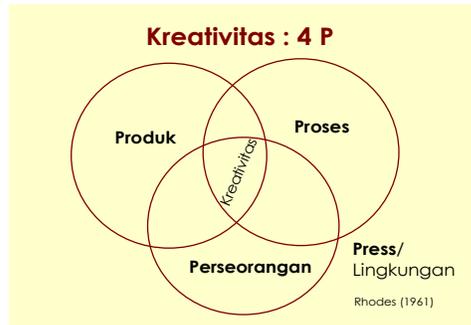
The aim of this research is to study the effectiveness of creativity training for educators in Indonesia.

RATIONALE

Creativity

According to Rhodes (1961), there's no unified definition of creativity and creativity consists of four components. The four components of creativity are: person, process,

product and press. Rhode's model of creativity is widely known as the ecological approach of creativity.



Picture 1. 1 The 4Ps Diagram (based on Rhodes, 1961)

Torrance (1999) defined creativity as creative thinking that involves several process as (1) to feel a difficulties, problems and gap in an information perceived or lost elements; (2) making assumption or hypothesis to fill in the gap; (3) testing the hypothesis, test and re-test and eventually (4) communicating the result.

This begged the question of whether creativity be learned and taught. These questions were entangled with the common misperceptions that creativity is a talent, inherited and only needed for the arts alongside the belief that creativity is a right brain activity. Creativity is not a talent is inherited but a skill that can be learn (Esquivel, 1995; Millar, 2002; Colvin, 2008) and taught (Firestien & Lunken, 1993; Parnes & Noller, 1972; Rose & Lin, 1984; Scott, Leritz & Mumford, 2004, Wiratrisna, 2009). It is needed in every area, not just in the arts (Davis, 2004).

This study aimed to investigate whether creativity can be taught effectively in the Indoneisan context.

RESEARCH METHODS

Credo, a not-for-profit organization established and based in Indonesia, provided training to in-service teachers from independent teachers organization and pre-service teachers from several teacher training universities in Indonesia. The creativity training is an affective and cognitive based training, the core modules which include: (1) block and barrier in creativity; (2) creative person, process (include creative problem solving), product and press; (3) TIM skills; (4) classroom management; (5). creative lesson planning (5) creative process and materials and techniques for early childhood education teachers (please refer to Appendix 1 for the creativity training details). The duration of the trainings varied from 21 to 49 hours delivered over 1 weeks to 20 weeks.

Participants.

The total number of participants for this research is 136, 119 were pre-service teachers from two teacher training universities and 17 in-service teachers that teach elementary to high school levels. 17% of of the participant were male, and 83% were female. The age of the participants range from 17 – 48 years old. The participants were trained in eight groups, from 2008 to 2009.

Procedure.

Participants took the ATTA before and after the creativity training. The instructions to the ATTA were translated to Bahasa Indonesia and read to the participants as required by the test. The tests were administered as per the ATTA manual (Goff, 2002).

The completed ATTAs were scored by a team of trainers in Credo. All the scorers had received training on how to score the ATTA. The completed ATTAs were randomly allocated to the scorers and were scored blindly scored. Some ATTAs were selected at random to be scored by a second scorer. If there were disagreements over the final creativity level, scorers met face to face to agree on a score.

Scores that were being analyzed include the norm-referenced scores that include the creativity index, fluency, flexibility, originality and elaboration. One Way Anova and/or T-Test for Paired Two Sample for Means was used to see whether there was difference in scores before and after training at the 95% level of confidence.

RESULT

One Way Anova. Table 1 shows the results for one way Anova for the creativity index for all the 8 groups of participants before and after training. The results show that there was no significant difference between groups before training which indicates that all groups come from the same population. The post training result of a coefficient of 0.05 also indicates that the groups after training were from the same population. Thus, the analysis for the creativity index, fluency, flexibility, originality and elaboration from the 8 groups can be taken as one population and be subjected to the T-Test for Paired Two Sample for Means.

<i>Measure</i>	Before Training	After Training
Creativity Index	,382	,575
Fluency	,898	,331
Flexibility	,949	,531
Originality	,051	,108
Elaboration	,516	,056

Table 1. coefficient for one way anova on creativity index between groups before and after training ($p \leq 0.05$)

T-Test for Paired Two Samples for Means. Table 2 shows the four scores for all participants, before and after training. The results indicate that there is a significant difference before and after training for creativity index, fluency, flexibility, originality and elaboration.

<i>Measure</i>	Before and After Training
Creativity Index	,000
Fluency	,000
Flexibility	,000
Originality	,000
Elaboration	,000

Table 2. coefficient for one way anova on creativity index, fluency, flexibility, originality and elaboration before and after training ($p \leq 0.05$)

Descriptive Statistics. Table 3 presents the comparison on the means for four scores: creativity index, fluency, flexibility, originality and elaboration with the standard (norms) as indicated by Goff (2002).

Measure	Before Training		After Training		Standard (Norms)	
	Mean	SD	Mean	SD	Mean	SD
Creativity Index	60,10	12,46	75,54	7,43	69, 43	10,98
Fluency	14,78	2,369	18,10	1,619	15,01	1,90
Flexibility	14,05	4,208	16,71	2,354	15,27	1,86
Originality	13,95	3,380	17,14	2,355	15,15	1,90
Elaboration	12,65	4,189	15,32	2,610	15,12	2,14

Table 3. means for creativity index, fluency, flexibility, originality and elaboration before and after training compare to standard from Goff (2002)

DISCUSSION

Creativity Index. Table 2 indicates that there is a significant difference before and after training. According to Table 3, we can see that there's an increase in the mean score after training. The mean before training was 60.10 and after training it became 75.54. Table 4 will help us interpret these figures.

Creativity Index	1-50	51-59	60-67	68-73	74-77	78-84	85+
Creativity Level	1	2	3	4	5	6	7
Verbal Assessment	Minimal	Low	Below Average	Average	Above Average	High	Substantial
% Adults in level	4%	12%	20%	26%	20%	12%	4%

Table 4. Conversion of Creativity Index to Scaled Score and Related Interpretive Information

From the conversion table (Table 4), a creativity index of 60 would give a creativity level of 3, in the "below average" range, and indicates that the mean of the subjects' creativity index ranks among the lowest 16% (12% in 2 and 4% in 1) among other adults.

The pre training below average level of creativity does not mean that the participants were not creative. Once again, this was the type of judgment that Torrance wanted to avoid from the use of his test. There is a possibility that the participants' creative ability were blocked perceptually, emotionally or from the environment. Additionally, the participants might not been aware of their blocks (Wiratrina, 2009).

After training, the creativity index of the participants increased. The mean was 75.54. This means that the average creativity index is at the creativity level of 5, in the "above average" range. This score ranks among the highest 36% (20% in 3, 12% in 2, 4% in 1) among other adults. Compared to mean in standard, the score is higher by 6.11 point. This indicates that the participants did have higher creative ability and were able to improve on their creative ability to that higher than average population after creativity training.

The Four Norm-references Measure

Fluency is the ability to produce ideas within a context. The participants' scaled score mean before training was 15 and increased to 18 after training. Flexibility is the ability to see something from different perspectives or utilization. The scaled score average score before training was 14 and after training, increased to 17. Originality is the ability to create a unique and noble idea. The mean scaled score before training was 14 and after training, the scaled score mean increased to 17. Elaboration is the ability to give information to make people understand idea without being excessive in the information provided. For this creative thinking ability, the scaled score mean before training was 13 and after training, it increased to 15.

Creative Ability	Total Score	Scaled Scores								
		11	12	13	14	15	16	17	18	19
		Corresponding Raw Scores								
Fluency		1-6	7	8-9	10	11-12	13-14	15-16	17	18+
Originality		1	2	3	4	5	6	7-8	9-10	11+
Elaboration		1-3	4-5	6-8	9-11	12-14	15-18	19-23	24-27	28+
Flexibility		-	1	-	2	3	-	4	5	6+
Creative Roles		Collaborator			Contributor			Accelerator		

Table 5. Converting Ability Raw Score to Normalized Standard Scores (Scaled Scores)

From the conversion table above for fluency, flexibility and originality before training said that the participants role as a contributor which mean the participants understood the value of their creative ability and recognize it in others. While after training, the participants role shifted became accelerator which mean they plugged into this creative ability, utilizing it as a way of life. For Elaboration, the role of the participant before was collaborator and shifted into contributor after training. A collaborator mean that the participants still needed a deeper understanding and help for this creative ability from others.

From the mean creativity index before and after training, there's a 15.54 point difference. And for the norm-reference measure, all shifted one step in their role. This result may indicated that training (with all the modules given) have a positive effect on participants' creative ability. It confirm that creativity is something that can be taught and creativity training is effective in Indonesian context.

Overall the modules given in the training seem to have positive impact to increase participants' creative ability. The modules given by experiential learning might have helped participants to grasp the theory as well as a strategy to develop their own creative ability. The end result is for them to teach this to their students by designing a creative lesson plan.

What's need to bear in mind is the data from ATTA before and after training is a short term effect. However, this creative ability need to be implemented in their daily lives in order to really becoming a creative teacher. It take a lot of exercise, persistence and a conducive environment to nourish this creative ability.

CONCLUSION

It has been said that creative instruction should begin in teacher training universities and that school should run a creativity training. This research showed that creativity training held by Credo for pre-service and in-service teachers is effective. It is proven by the increased some indicators measure in ATTA. Where for creativity index,. The creativity index went up 2 level, from below average to above average in adults population. While for the norm-reference measure: fluency, flexibility, originality and elaboration, the first three went from contributor to accelerator.

All of these data indicated as well to confirm that creativity can be taught and creativity training is effective for Indonesian context.

RECOMMENDATION

This research suggest to have creativity training in teacher training universities as their subject to develop the pre-service teacher creativity since the beginning. Even better if the universities integrated it in their curriculum to become a compulsory subject.

As for in-service teachers, as part their professional development, they should've attend creativity training to refresh and add ways to be more creative. It is recommended that schools, teacher organization should hold creativity training so teacher can improve their competence.

FURTHER RESEARCH

To see a long-term effect from this training, there should be further research to see whether the participants really apply their creative ability they've gained so far in their daily lives. Especially applied it to their teaching. Does this score in ATTA have correlation in their lesson plan design? Does the ATTA score have influence in their attitude? Does ATTA score have correlation towards their perception of creativity especially towards their students?

Further research could've be done to improve the modules given. Either contain or methods, can be revised and adjust to any kind of condition, rural or city, limited resources or highly equip environment.

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About author

I work as a trainer at a non-profit organization which promotes and teaches creative thinking and teaching to teachers and teacher students from all socio-economic backgrounds. I specialized in basic and secondary education. Education is my passion, either in teaching, learning or research. Through this I hope I can contribute to my country and improve it so Indonesian people can have the skill and ability to compete in this changing world

Appendix 1 Creativity Training

What unique from this creativity training is the time allocation that differ for each group. It can be given in an intensive course such as seven days in a row, or 2-3 times a week, or once a week, or once in every two weeks or even once a month. But all participants received the same modules. The core modules are: (1) block and barrier in creativity; (2) creative person, process (include creative problem solving), product and press; (3) TIM skills; (4) classroom management; (5). creative lesson planning Additional module is creative process for early childhood education and material and technique to make our own teaching tools from available resources.

Basically Credo experiential learning cycle to all their trainings, whatever it contain. The training also design using TIM template and include TIM skills. So in every activities designed, participant experience hands on activity, discuss about it, make conclusion from it and try to implement it in their daily lives, as person or as teachers.