



The Study on the Impact of Teachers' Creativity Training on Improvement of Creativity in Students and Their Insights on Teacher Training Curriculum

Alireza Assareh, Ali Asghar Ghahremani, HeidarAli Abaspour, Ahmad Lotfi Mohammad Abadi

Shahid Rajaei Center, Teacher Training University, Tehran, Iran

* Corresponding author's Email: Alireza_asaareh@yahoo.com

ABSTRACT: The current study examines the impact of teachers' creativity training on growing creativity in students and their insights on teacher training curriculum. This research has been carried out by semi- experimental method and it is aimed at interpretation of necessity for paying attention to training of creativity in curricula of teachers' training centers. For this purpose, two groups ($n_1=n_2=90$) of students from first graders in primary schools in Tehran City Area no 7 were chosen by means of randomized cluster sampling technique in academic year 2010-11. The given data were gathered by means of Form- B of Torrance Tests of Creative Thinking (TTCT) at two stages of pre-test and post-test. The results derived from revision of data and or by application of covariance analysis indicated that there is a significant difference among tested and control groups ($p= 0.05$). In other words, the growth rate of creativity in students who were taught by well- trained teachers in creativity field was higher than those children that were taught by the teachers who had not been trained in this educational field.

Keywords: Creativity, Torrance (figural) Tests of Creative Thinking (TTCT), Teachers' Training

ORIGINAL ARTICLE

INTRODUCTION

According to Toffler's view, human's civilization has witnessed three waves so far. The first wave is related to Farming Age and the second wave was raised by Industrial Revolution in 17th century. But we enter into Age of Trans- Industry since the second half of twentieth century that is one of the most creative reconstructions of all these periods. Humans possessed a limited and short thinking ability during first wave because they depended on the land but since second wave and through expansion of mobility and communications, mental horizons were spread widely. Technological achievements required another civilization which could be denoted as Third Wave. Raw materials of civilization in third wave are information, imagination and creativity that are the characteristics and natural outcomes of this wave. Creativity is the foremost developer from second wave to third wave. The first wave nations may become third wave nations without passing through second waves and or completely ignore their own cultural issues. If they succeed to compose high- techs with civilization of first wave by the aid of their people's creativity then they may achieve economic, cultural, and social development; therefore, creativity serves as a serious condition for survival and viability particularly in these communities (Hosseini, 2008).

Subject Interpretation:

Torrance's studies (1968) have shown that children are at peak point in terms of creativity up to age of 10

but when they are under school conditions and they are expected to give certain and cliché answers to the questions and be evaluated, then their creativity will gradually be reduced. Parrot- like learning, lack of attention to individuals' differences, hard discipline, curriculum, and inflexible schedule time tables for classroom activity, teachers' unfamiliarity with characteristics of creative students, teacher- oriented methods, overemphasis on score as the criterion of utility, lack of acceptance of new ideas, teacher's serious personality, exertion of pressure for coordination with others, silence culture against teacher's comment, emphasis on convergent thinking versus divergent thinking, lack of mobilization of sources, facilities and reliance on surface level of cognitive area may be considered as the paramount barriers against training of creativity in schools. Within a general classification, they can be categorized into three groups including **governing climate of school, educational contents and materials and teacher** among of them, role of teacher are noticeable in training of creativity out of several aspects.

I) Way of teacher's attitude: Type of teachers' attitude toward creativity and creative students is one of the basic factors. In a study, Torrance (1965) asked more than 1000 teachers to announce characteristics of better and more interesting students. Some cases which were more valuable for teachers included observance of others, independent thinking, constant will, persistence, wittiness, curiosity, intimacy,

politeness (courtesy), on- time working and knowledge (Hosseini et al., 2000).

II) Exemplar role of teacher: Studies has indicated that creative persons succeed more in training of creativity than non- creative ones. Creative teachers both act as example of creativity and improve process of creativity. This class may give freedom of activity to students in order to discover and invent. They welcome unexpected questions and even seem unreasonable and strange and eventually they try to identify and employ what causes developing creativity both in students and themselves (ibid.).

III) Emotional relations among teacher and student: Creation of appropriate climate to grow creativity, requires the presence of an intimate and secure climate in classroom. The studies have shown that intimate relations along with interest and respect may play an effective role in student's creativity (ibid.).

IV) Educational relations among teacher and students: Researchers often maintain that traditional educational techniques not only do not contribute to creativity in children but also it serves as an essential and serious barrier against them. Thus, if teachers create appropriate and safe climate in classrooms as possible despite of training limitations and employ active and exploratory techniques in classrooms then they have assisted their students to exploit from their creative potential (ibid.).

Certainly, playing these roles appropriately will be difficult regardless of teachers' familiarity with subject of creativity. Therefore, it necessitates codifying some curricula to train creativity for teachers. But this point that whether such trainings might affect growing creativity in students or not, is a question that seems to be answered by design and execution of a semi-experimental research. Accordingly, and with respect to literature of subject matter, the assumption taken by researchers for giving answer to this important question that has been designed, is in that the rate of improving creativity of children who are taught by well- trained teachers in the field of creativity growth will be higher than children that were taught by teachers without such trainings.

Research History:

Hosseini (2003) codified a curriculum for training of creativity to teachers. During this program they were taught for 70 hours and they executed educational techniques of creativity in their classrooms. The result of this study was in that training program improved creativity growth model and creative teaching skills in terms of variables of originality, flexibility, fluidity, and elaboration in teachers.

In an investigation which called "A comparison among the creativity growth in children who taught by

well- trained teachers and not trained teachers for creativity in first graders of primary schools in Khorasan Province at academic year 2009-10", Afshar Kohan (2009) came to this result that rate of creativity growth in children who were taught by well-trained teachers was higher than children that were not taught for this purpose.

In another study under title of "The impact of training creativity on cognitive elements of creative thinking among university students", Pirkhaefi (2009) concluded that training of creativity might improve fluidity, flexibility, and mental initiative in students.

Saeedi (2002), in study of the relationship among teacher's creativity and creativity of primary school students in Tehran City Area 11, came to this result that students with creative teacher are more creative than students who lacked such a teacher and there is a significant difference among these two groups in variables of fluidity, flexibility, originality, and elaboration.

Torrance (1968) explored into teacher's impact, regardless of educational achievement and exclusively with respect to benefitting of students from creativity. The findings from the conducted studies suggest that creative teachers train more creative students.

The studies done by Pardo (2002) showed that trained teachers may essential affect on creativity performance, educational achievement and cognitive growth of students. This impact includes both groups of talented and non- talented students. With respect to this outcome, he suggested that to hold constant and regular training course for teachers especially in Developing Countries.

In another survey under title of "Creativity in education among high school students in Croatia that was intended to: 1) encouraging students to divergent thinking via adoption of creativity techniques in classroom; and 2) increasing students' satisfaction with possibility for participation in planned activities", which was carried out by Ibrakovid et al. (2009), research findings showed that use of creativity techniques is not sufficient and at the same time some other factors such as period of teaching, teaching methods, students previous experiences in creative activities as well as teacher's creative attitude might affect students' creativity training.

In a study done by Reddy Sarsani (2009) which was conducted for exploring the relationship among creativity and cognitive variables, motive, and interests of students and their imaginations and experiences within classrooms on 373 students of Indian schools, the students were divided into three groups with high, average, and low creativity levels based on scores of composite creative thinking. The findings from this survey reflected that very creative students, in

comparison with other groups of students, had taken more favorable attitude toward subject of teacher's encouragement within classroom.

In other investigation under title of "The comparison among two Van hill's and traditional teaching methods in improving creativity level among students" done by Eredgan et al. (2009) on 55 children at age 6 in Ankara (Turkey) by means of TTCT, the results indicated that there is a significant difference in variables of fluidity and originality among tested and control groups.

MATERIALS AND METHODS

This study is of semi-empirical type and it is carried out as pre- test and post- test with control group and without random selection.

Tested Group T_1 X T_2

Control Group $T_1 - T_2$

Total number of testees was divided into two 90 participant groups based on gender. A pre-test was conducted by using **Form- B** of Torrance Figural Test (TTCT) at first week on October 2010. Prior to this test, teachers from tested group were trained in creativity for 24hours. At the last week on the middle of December 2010, the same test was administered as post-test on the former samples in the above- said schools. Statistical population of this study comprised of all students who studied in Grade I of primary schools in Tehran City Area no 7 at academic year 2010-11. Sample space consists of 180 participants that were selected by multi- stage cluster sampling technique. As a result, 12 schools (6 girl schools and 6 boy schools) were selected and at the next step one classroom of any school with 15 students were chosen randomly.

Research Tool:

In this study, Form- B of Torrance Figural Test was adopted as tool for gathering data. This tool has been constructed based on Torrance's theory and definition of creativity. He considers creativity as a composition of four major components including originality, flexibility, fluidity, and elaboration (Karami, 1999).

Test Validity and Reliability:

Content Validity: To ensure from content validity of tests, a homogeneous and planned effort was made based on stimulant tests, test assignments, instructions and procedures doe scoring according to the best studies and theories which have been so far available. In this task, he was highly benefitted from the studies concerning to life and personality of genius and creative persons and nature of those practices which were deemed creative and theories regarding human's mind and also in making decision about selection of test tasks (Amabeli, 2007; translated by

Ghasemzadeh, 2007). In this survey, some comments and attitudes from the experts in the field of educational planning and psychology were used to validate research tool.

Reliability: In his study, Torrance has reported correlation coefficient as 86% to 99% among scores of well- trained raters and raters without such trainings. In another survey by focusing on accurately reading of scoring manual, mean value of reliability was reported as 88%-96% for figural tests (ibid). Reliability value of test in this study was obtained as 93% for Cronbach's Alpha coefficient.

Method of Data Analysis:

In order to compare effectiveness of teachers' creativity training on growth of students' creativity, one- way covariance analysis was done. The goal and cornerstone of covariance is in that to contribute to the researcher to make decision whether the observed differences among means are due to chance or because of systematic differences among the tested communities.

Covariance analysis does this task by omission of predictable personal differences from dependent variable and thereby it provides a more accurate approximation from trial error in comparison with intergroup design and a strong statistical test to examine null hypothesis (Shivelson, 1988, translated by Kiamanesh, 2005).

RESULTS

Research Major Hypothesis: The growth rate in creativity of students who were taught by well- trained teacher for improvement of creativity is higher than in children who were taught by teachers without such trainings.

To examine this hypothesis and comparison of effectiveness of teachers' creativity on improvement of students' creativity, one way covariance analysis was done (Table-1). Independent variable was training creativity and the dependent variable was the resultant score from Form-B of Torrance figural creativity test. Pre-test scores were used as covariate (random accessorial variable) for this purpose. The primary exams were administered to guarantee non-violation from assumptions in covariance analysis including normality, linearity, and homogeneity of variances, homogeneity of regression ranges and reliable measurement of covariate. After adjustment of pre-test scores, there was a significant difference among both groups in post- test score ($F_{1,177} = 58.07$; $P = 0.001$; $\eta^2 = 0.247$). The relationship among scores of pre-test and post- test ($\eta^2 = 0.247$) was at average level.

Minor Hypotheses

To examine minor hypotheses and comparison of the effectiveness of teachers' creativity on improvement of students' creativity, one way covariance analysis was administered. Training of creativity was the independent variable while dependent variable included the score derived from Form- B of Torrance figural test in components of originality, fluidity, flexibility and elaboration. Pre-test scores were used as covariates in this test. The primary studies were done to ensure non- violation from the assumptions in covariance analysis. After adjustment of pre-test scores, there was a significant difference in post- test scores in four above- said variables (Tables 1).

With respect to results of below tables, ($F_{1, 177} = 56.07$; $P = 0.001$; $\eta^2 = 0.242$) the given hypothesis was confirmed. Thus, the rate of improvement children's creativity (in originality variable), who were taught by well- trained teachers was higher than students who taught by teacher without such trainings and the relationship between pre- test and post- test scores in originality variable ($\eta^2 = 0.242$) was at average level. With respect to results of below tables, ($F_{1, 177} = 45.25$; $P = 0.001$; $\eta^2 = 0.204$) the given hypothesis was verified. Therefore, the rate of improvement in

children's creativity (in flexibility variable), who were taught by well- trained teachers was higher than students who were taught by teacher without such trainings and the relationship between pre- test and post- test scores in flexibility variable ($\eta^2 = 0.204$) was at average level.

Given the results of below tables ($F_{1, 177} = 51.07$; $P = 0.001$; $\eta^2 = 0.224$) the above hypothesis was confirmed. Thus, the rate of improvement in children's creativity (in fluidity variable), who were taught by well- trained teachers, was higher than students who were taught by teacher without such trainings and the relationship between pre- test and post- test scores in fluidity variable ($\eta^2 = 0.224$) was at average level.

With respect to below tables ($F_{1, 177} = 29.25$; $P = 0.001$; $\eta^2 = 0.141$) the above hypothesis was verified. Therefore, the rate of improvement in children's creativity (in elaboration variable), who were taught by well- trained teachers was higher than students who were taught by teacher without such trainings and the relationship between pre- test and post- test scores in elaboration variable ($\eta^2 = 0.141$) was at average level.

Table 1. Results of one way covariance analysis on creativity training effect

Source of variance	SS	DF	MS	F	Sig.	Effect Value
Creativity (pre-test	10081.62	1	10081.62	8.65	0.004 *	0.047
Group	67718.62	1	67718.62	58.07	0.001 *	0.247
Error	206403.29	177	1166.12			

P < 0.05 *

Table 2. Descriptive statistics of creativity based on separate groups

Source of variances	Mean	SD	N
Students taught by well- trained teachers	143.81	43.53	90
Students taught by non- trained teachers	104.85	23.16	90

Table 3. Descriptive parameters of creativity

Source of variances	Mean	SD	N
Creativity (pre-test)	83.89	26.45	180
Creativity (post-post)	124.33	39.89	180

Table 4. Results of one way covariance analysis on creativity training effect in variable of originality

Source of variance	SS	DF	MS	F	Sig.	Effect Value
Creativity (pre-test	1055.90	1	1055.90	8.44	0.004 *	0.046
Group	7078.31	1	7078.31	56.60	0.001 *	0.242
Error	2213.58	177	125.04			

P < 0.05 *

Table 5. Descriptive statistics of originality variable based on separate groups

Source of variances	Mean	SD	N
Students taught by well- trained teachers	11.02	15.59	90
Students taught by non- trained teachers	1.84	8.94	90

Table 6. Descriptive parameters of originality variable

Source of variances	Mean	SD	N
Creativity (pre-test)	6.43	9.47	180
Creativity (post-post)	15.18	12.39	180

Table 7. Results of one way covariance analysis on creativity training effect in variable of flexibility

Source of variance	SS	DF	MS	F	Sig.	Effect Value
Creativity (pre-test	284.17	1	284.17	17.04	0.001 *	0.088
Group	754.33	1	754.33	45.25	0.001 *	0.204
Error	2950.32	177	16.66			

P < 0.05 *

Table 8. Descriptive statistics of flexibility variable based on separate groups

Source of variances	Mean	SD	N
Students taught by well- trained teachers	4.38	5.78	90
Students taught by non- trained teachers	0.17	3.41	90

Table 9. Descriptive parameters of flexibility variable

Source of variances	Mean	SD	N
Flexibility (pre-test)	13.05	3.59	180
Flexibility (post-post)	15.31	4.71	180

Table 10. Results of one way covariance analysis on creativity training effect in variable of fluidity

Source of variance	SS	DF	MS	F	Sig.	Effect Value
Creativity (pre-test	175.79	1	175.79	8.96	0.003 *	0.048
Group	1001.70	1	1001.70	51.07	0.001 *	0.224
Error	3471.32	177	19.61			

P < 0.05 *

Table 11. Descriptive statistics of fluidity variable based on separate groups

Source of variances	Mean	SD	N
Students taught by well- trained teachers	5.33	6.32	90
Students taught by non- trained teachers	0.34	2.86	90

Table 12. Descriptive parameters of fluidity variable

Source of variances	Mean	SD	N
Flexibility (pre-test)	12.82	3.14	180
Flexibility (post-post)	15.70	5.08	180

Table 13. Results of one way covariance analysis on creativity training effect in variable of elaboration

Source of variance	SS	DF	MS	F	Sig.	Effect Value
Creativity (pre-test	6691.39		6691.39	14.328	0.001 *	0.075
Group	13659.45		13659.45	29.249	0.001 *	0.141
Error	82660.69		467.00			

P < 0.05 *

Table 14. Descriptive statistics of elaboration variable based on separate groups

Source of variances	Mean	SD	N
Students taught by well- trained teachers	38	27.73	90
Students taught by non- trained teachers	23.63	23.74	90

Table 15. Descriptive parameters of elaboration variable

Source of variances	Mean	SD	N
Elaboration (pre-test)	35.57	21.10	180
Elaboration (post-post)	66.34	29.07	180

DISCUSSION

In this study, the impact of training creativity by teachers in improvement of students' creativity was explored and semi- experimental technique and pre-test post-test design was administered with control group for this purpose. The present study includes a major hypothesis with four minor hypotheses for which to review them covariance analysis was adopted. According to resultant findings from covariance analysis (Tables 4, 7, 10 and 13), there was a significant difference among both control and sample groups in terms of all creativity statistical variables. Namely, training creativity for teachers may positively affect on students' creativity. Similarly, results of this study are complied with research findings from studies done by Dill Bruenger (2009), Walling (2010) , Elias et al. (2010) , Eredgan et al. (2009), Ibrakovid et al. (2009), Pardo (2002), Torrance (1986) Saeedi (2002), Moradinejad (2007), and Afshar Kohan (2009).

The moment/ effect value (η^2) of each of four variables is at high level according to Cohn's view but a more accurate investigation showed that the moment of originality is greater than other variables ($\eta^2=0.242$). Originality means unusual and out-of- mind ideas. The more someone recedes from the field of daily issues in his/ her ideas, the further he/ she possesses authenticity and novelty in the presented ideas. Training of creativity may isolate students from cliché thinking and create strange and out- of- mind ideas in them, thereby novel and new ideas may germinate and grow in students' mind. Similarly, results of this study are in line with research findings from Torrance (1968), Afshar Kohan (2009), and Saeedi (2002).

The moment of fluidity variable ($\eta^2=0.224$) was obtained. Fluidity refers to number and quantity of responses and it is natural that the wider vocabulary and learning the child has and especially the more stimulants that the child may see are tangible for him/ her and could be tested, the higher achievement he/ she will have in this part of activities. And thus it is expected from teachers to employ educational classroom activities simultaneously with play, viability and mobility as well as purposing riddle and incomplete stories to develop child's knowledge field with respect to characteristics of children at this level and by which they contribute to share him/ her in learning activities in order to internalize deep and stable learning in child. Findings of this hypothesis correspond to research results derived from Torrance (1986), Eredgan et al. (2009), and Afshar Kohan (2009).

The moment of flexibility variable was derived ($\eta^2=0.204$). Subject of flexibility denotes number of fields of individual's thinking; namely, if, for example, we ask

the child about applications of an object, the more creative child will imply its application at wider areas. Results of this hypothesis are complied with research findings from Pardo (2002), Afshar Kohan (2009), and Saeedi (2002).

The lowest moment was obtained in variable of elaboration ($\eta^2=0.141$). Elaboration variable is based on individual's paying attention to the usual details that are assumed obvious. The more attention is paid to the details, the higher accuracy and care will be taken to the given point and increasing attention level may lead to receive environmental news and data.

Finally, demonstration of all major and minor hypotheses indicated that the rate of improving creativity of first grader children who taught by well-trained teachers was higher than children that were taught by teachers without such trainings in terms of creativity growth at 95% level of confidence and the existing difference among tested and sample groups is significant. The results of this hypothesis correspond to research findings from Torrance (1968), Afshar Kohan (2009), Hosseini (2003), and Saeedi (2002).

Accordingly, paying attention to teachers' training center seems very crucial subject. Namely, those centers are intended in which training of creativity is also considered along with paying attention to convey of knowledge and training of teaching methods and psychology as well. The creative teacher may train creative students and as the greatest future capital for this country, the creative students may approach the country further to advancement peaks. At the end, it is suggested to take subject of creativity training in curricula of teachers' training centers into consideration.

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