

Full Length Research Paper

Improved creative thinkers in a class: A model of activity based tasks for improving university students' creative thinking abilities

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The main objective of this study was improving university students' from different faculties creativity thinking through a creativity education process. The education process took twelve weeks' time. As pretest, Torrance test of creative thinking (TTCT) figural form was used. Participants were 24 university students from different faculties who attended the course of "*Fostering of Creativity and Creative Thinking*" in spring semester. In the beginning of the lessons, TTCT Figural Form A was completed by all the students. After completion of the sessions, TTCT Figural Form B was asked to be completed as the last test. Also, all the participants were requested to made verbal comments about the effects of the lessons on their creative thoughts. The results of this research indicated that creativity based educational activities have a positive impact on creative thinking of the students, and they mentioned that they gained how to think divergently in their daily life. The results of the TTCT indicated that students' perform better especially in originality and closure factors.

Key words: Creative thinking, creativity activities, creativity improvement.

INTRODUCTION

In recent years, thinking skills and creativity has been seen as one of the important abilities in many areas, and also has gained increasing attention in education. In many areas, some important skills such as self management, decision making and thinking skills, especially creative thinking began to flourish for being successful in daily life and also in vocational life. In this rapid change, new educational methods and practices should be used in every educational setting and also in university graduate programs. As Runco's (2003) statement about everyone that has creative potential, it

can be said that this potential can be improved more, through appropriate educational activities in educational settings. So, in creativity training process teachers should bear in mind to encourage this capacity. Creative thinking, as a component of thinking skills, can be defined as a cognitive process of solving problems, generating useful ideas and producing plans that are not present before (Hargrove, 2013).

Creative thinking and problem solving can be built into instruction in many ways and creative abilities have been seen vital for students' future success (Gregory et al.,

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2013). Fostering creative thinking could be beneficial to learners, and this will help them to cope successfully with the new situations and to find new ways to solve their problems, in other words creative thinking gives students a life skill (Newton, 2012). For that reason teachers must explicitly foster and teach creativity in educational settings.

Creativity, in general, is one of the terms of thinking skills, and can be defined as an universal capability of thinking divergently (Siraj-Blatchford, 2007) and the ability to imagine and produce new and useful things, and/or combine different ideas to form original ideas (Newton, 2013; Kyung-Hwa, 2005), besides imagining of different things which could be other than they are (Carruthers, 2002). Compton (2007), identifies six components as essential for creativity; enquiry, evaluation, ideation, imagination, innovation and problem solving. These components should be implied to be considered for fostering creative thinking process.

Before getting started, to improve creative thinking and develop programs for creativity education at first the study needs to look deeply at the process of creativity. Studies suggest that training affect creativity (Fleith et al., 2002). In this training process; environment, materials, fun and game based activities, teacher's attitudes and students' involvement are important components (Newton, 2013; Gregory et al., 2013; Robson and Rowe, 2012; Kyung-Hwa, 2005). Creative thinking ability involves fluency, flexibility, originality and elaboration. Therefore, the training activities should consist all of these. On the other hand, environmental organization has to be comfortable, gives permission to work both alone and in groups and could be able to provoke and/or encourage student's ideas. Also students could have a chance to explore and combine different materials. In creativity as indicated by Csikszentmihalyi (1988) there is a dynamic interaction between social institutions, cultural domain and individuals (Riga and Chronopoulou, 2014). So it can be stated that the social and pedagogical environment as well as physical environment play an important role on fostering one's creative potential.

Teachers' positive attitudes and moods are crucial in promoting creative thought. As positive moods confirm a safe and playful situation, it could reduce concerns about being judged which can suppress creativity (Newton, 2013). Feeling happy and free and feeling to be safe in taking risks broadens thinking. For that reason, the climate of the classroom and teachers attitudes should be comforting and not judging. Teachers can provide an environment in which they can encourage, nurture, support and value creativity. They should set a secure environment to take risks and by this way students' divergent thinking, usage of their imagination, solving of problems and exploration of alternative ways could be encouraged.

Based on the related literature, variety of strategies could be proposed for fostering creativity. Some of them

were selected to be used in the current study. These were; self-expression, improvisation, communication and cooperation. Some practices based on playfulness, such as, alternative views on various situations, alternative using of objects and imagining stories or poems were also suggested by Riga and Chronopoulou (2014).

Importance of the study

As Hargrove (2013) stated;

"Being creative is more than simply coming up with a big idea. It involves a set of behaviors; the way we see, feel, think and do every day. But when we see, feel, think and do things as we've always seen, felt, thought and done them before, our ideas will undoubtedly be the same. Having awareness and understanding of our thought processes in a way that informs, engages and inspires is vital for our continued personal and professional development in today's competitive world."

Different kinds of methods and activities are needed for improving creative thinking. For the educators, it's important to use activities for improving creative potential. Therefore, increasingly numbers of individuals can be more creative and can be able to solve many problems divergently. Also higher education is important for the whole wellbeing of the community; the professionally educated creative individuals could build a new and strong workforce and society. For that reason it can be stressed that in higher education, the curriculum should include learning to foster divergent thinking abilities and creative productivity. The aim of this study is to suggest some creativity improving activities as a sample for university students for their little c (daily experiences) and through these activities to improve their creative thinking and also to give a vision about their potential becoming creative in their professional lives. On the other hand, another objective is to assess the effectiveness of these activities and to give some ideas for education professionals about what kind of activities they can use on their practices.

The main objective of the study is improving university students', from different faculties, creativity thinking through a creativity education process. The sub-objectives of the study were, examining the effects of the creative thinking activities according to fluency, originality, elaboration, closure and titles. The education process took twelve weeks' time. Participants were 32 university students from different faculties who attended the course of *"Fostering of Creativity and Creative Thinking"* in spring semester.

METHODOLOGY

Participants

In order to examine the research question, a quasi-experimental

Table 1. Distribution of the volunteered students' faculties.

Faculties of the attendants	Frequency
Faculty of Law	3
Faculty of Communication	2
Faculty of Economic and Administrative Sciences	4
Faculty of Engineering	4
Faculty of Architecture	1
Faculty of Arts and Sciences	4
School of Health	2
School of Social Work	4

design was adapted. Intervention took place at a standard classroom in Faculty of Education with the participation of students from different faculties. The faculties of the attendants' could be seen in Table 1. The research group consisted of 32 participants. Eight participants were excluded from the analyses because they could not be able to attend some of the sessions. Therefore, the following analyses are based on 24 university students (16 female and 10 male, mean age, 22.3 years) who signed up for the study voluntarily.

Procedure

The education process lasted for ten weeks. In every session, an objective about creativity thinking was selected and a short warming up activity about fluent and divergent thinking was also planned. The warming up activities were planned as like communication process. Students were grouped as couples and asked to talk with each other and tell about the things they had done earlier that day. The educational process and all the activities were planned and created out of eminent literature by the author. In the sessions, students' abilities about creative writing, creative movement, creative crafts producing and creative problem solving were targeted to be improved. The planned activities are as follows:

In the first week after warming up, students were asked to create a new alphabet with symbols and/or letters for composing a secret message.

In the second session, students were asked to work in pairs and then each group were given a post-card. One of the partners' duties was to tell the details of the picture and the other one was asked to listen to his/her partner and then tried to draw the picture without seeing it.

The third session's objective was solving a problem. The students were grouped as five persons per group and then each group was given three small figure toys symbolizing a wild thing like a dragon or an alligator, a domestic pet like a cat or bird and a peaceful thing like an angel or a fairy. The students' duty was to solve the problem between these figures.

In the fourth session, the students' were asked to think about alternative uses of a glass bead and their task were to find divergent solutions and planning an advertisement for selling their beads to other groups. In another session they were given toilet rolls and some clothes pins for producing a new toy. In the sixth session their mission was trying to create a new job with three different colored bottle caps by symbolizing them and then structure the qualities of person who will attend for this new job. In the seventh session, students' duty was to write a poem about three awkward things which were not supposed to be together like a water melon, a tuna fish and an armchair. The eighth session was about creative movement. All the students were given some

newspapers to create a tail for them and then told to do some actions for communication with each other by using their tails and in another session students tasks were planning to improve a children's playground. In the last session a problem solving task was planned and students were asked to think about the friendship between an octopus and an elephant and to create a story about this friendship.

In all the sessions', playfulness is the main point of the activities. Because as Bateson and Nettle (2014) stated, playfulness is associated with creativity. Their survey about creativity and playfulness indicated that, people who regard themselves as playful also believed that they can come up with new and creative ideas. Students were also asked to make reflective comments in the last session as written assessment of the whole course. As the participants were from different faculties and classes, therefore they were not familiar to each other, connectivity activities were also important for the success of the activities. As also recommended by Hackbert (2010) in every session, there was always a short warming up activity as a way of preparing the participants for the creative thinking process.

Measure

Torrance Test of Creative Thinking (TTCT) Figural Form A and B was used at the beginning and at the end of the intervention. For maintaining a holistic interpretation also semi-structured interviews with the attendant students were made at the end of the intervention process.

TTCT – Figural test was used because it is the most widely used test of creativity, the most referenced of all creativity tests and has been translated into more than 35 languages (Millar, 2002). TTCT was designed as two forms as A and B forms in order to test in pre and post-tests. The tester had to use one form at the beginning and the other at the end of his/her intervention. Two forms were parallel and basically very similar, but also a little bit different in figures in order to prevent duplication.

In the testing procedure, there are three basic tasks to complete by drawing. Ten minutes are required to complete each activity. In Activity I, the subject constructs a picture using a pear or jellybean shape provided on the page as a stimulus. The stimulus must be an integral part of the picture construction. Activity II requires the subject to use 10 incomplete figures to make an object or picture. The last activity, Activity III, is composed of three pages of lines or circles that the subject is to use as a part of his/her picture.

As a second measure, semi-structured interviews were made at the end of the interventions, for collecting the views and reflective comments of the attendant students. The interviews consisted of open questions to evaluate the views of the students' comments about the effects of the lessons on their creative thinking. These

Table 2. Mean scores and standard deviation for the national percentages of TTCT pre and post-tests'.

Variable	N	Mean	Sd	T	P
Pretest	26	41.4615	24.092	8.564	0.037*
Posttest	26	72.4615	18.494	19.703	

*Correlation is significant at the 0.01 level.

comments are used to assess the individual learning progress. The replies were assessed according to:

- i) Freedom of expression;
- ii) Challenging the commonly accepted;
- iii) Self-confidence and
- iv) Fun and fantasy.

Data analysis

Collected data were analyzed using SPSS 18.0. The scores calculated from the result of the test were shown via tables.

FINDINGS

In Table 2, the participants' mean scores and national percentages of the TTCT results are shown. The national percentages of the creativity thinking according to TTCT Figural form results are improved. Students indicated that the program is especially useful for their creative thinking improvement.

TTCT Figural Form scores were determined for originality, fluency, abstractness of titles, elaboration and resistance to Closure. A mean score and t test were calculated. Pearson correlations were employed to compare associations among pre and post-tests with Torrance's creativity tests. The post-test scores indicated that students who participated in the creativity fostering program were able to maintain a significant level of creative thinking especially in originality and closure factors (Table 3). Some of the students' semi structured interview replies about the effect of course were stated as:

Student A: "The sessions were very fun and I am really amazed to find out myself as a productive person." (Self-confidence and Fun and fantasy).

Student B: "What I learned about myself was that I could think divergently and could produce creatively." (Freedom of expression and Challenging the commonly accepted).

Student C: "This lesson was a creativity journey for me, and I experienced how to look at the problems in more different ways with different students from different faculties whom I met first in this class." (Freedom of expression; Challenging the commonly accepted and Self-confidence).

Student D: "I had a chance to review my new thinking style in fun ways. This lesson and the activities made me to explore my fantasy world and creativity." (Challenging the commonly accepted; Self-confidence and Fun and fantasy)

Student E: "I'm really happy to remember that I have imagination. From now on I'm sure that I can be able to think out of the box." (Challenging the commonly accepted and Self-confidence).

Student F: "Now I feel more comfortable to begin to write and improve my poems and I feel an encouragement to publish them and I'm also thinking to attend creative writing classes to go further for polishing my creativity." (Freedom of expression and Self-confidence).

DISCUSSION

The participants' mean scores and national percentages of the TTCT results as shown in Table 2 showed improvement in national percentages of the creativity thinking according to TTCT Figural form results as well as an indication by students that the program was especially useful for their creative thinking improvement. In numerous research, the positive effect of training process on students' creative thinking could be seen (Riga and Chronopoulou, 2014; Rodriguez and Castilla, 2013; Cho et al., 2014; Hu et al., 2013; Hargrove, 2013; Kousoulas, 2010; Hackbert, 2010; Garaigordobil, 2006; Wu et al., 2005; Fleith et al., 2002).

As Davies et al. (2013) mentioned, positive, supportive, collaborative and game based learning environments foster students' creativity. In this study, the researcher aimed to establish a pedagogical environment and a supportive, positive relationship between herself and the participants. The post-test scores indicated that students who participated in the creativity improving program were able to maintain a significant level of creative thinking especially in originality and closure factors.

The findings of the students' opinions about the course indicated that the creative thinking process meet the objectives of the course. Students' interview results on the educational process reveal that they were motivated, stimulated and inspired to use their fantasy by fun activities to think divergently. The course objective was to understand the importance of divergent thinking and

Table 3. Results of TTCT pre and post-tests' scores.

Variable		N	Mean	Sd	t	P
Fluency	Pretest	26	29.3846	31.20266	4.639	0.222
	Posttest		39.1154	31.98791	6.076	
Originality	Pretest	26	43.2692	35.37633	0.093	0.001*
	Posttest		58.1923	26.55864	10.980	
Elaboration	Pretest	26	92.1923	18.31943	25.382	0.0
	Posttest		99.0000	0.00000		
Closure	Pretest	26	21.8077	25.15555	4.218	0.024*
	Posttest		38.1923	19.48542	9.733	
Titles	Pretest	26	22.9615	26.80221	4.178	0.206
	Posttest		53.7692	29.69755	9.060	

*Correlations are significant at the 0.01 level.

practices involved in being creative, inventive and innovative. The majority of the students in the class (approximately 92%) defined the course as either improving or very engaging. It appeared that the educational process was able to reach an effective teaching in creativity as average or above.

The results found from current study are consistent with previous studies made with higher education students (Rietzschel and Nijstad, 2014; Rodriguez and Castilla, 2013; Hargrove, 2013; Wu et al., 2005). The creativity improvement activities, combined with a supportive and encouraging classroom climate, seemed to contribute to the success of the program. As many researchers believe (Cho et al., 2014; Davies et al., 2013; Fleith et al., 2002), a comprehensive view of creativity takes into consideration the mutual interaction between the individual and the environment in the creative process. The pedagogical and physical environment has a power in the development of creativity.

In this research, in the creativity fostering program, a positive classroom atmosphere was aimed to facilitate, as emerging from previous studies (Davies et al., 2013; Garaigordobil, 2006) that have stressed the importance of classroom atmosphere for creative potential. The results indicated in this research suggested the relevant role of social and affective factors in the development of creativity. Specifically, the results underline the positive effect of cooperative games and of communications for the development of creativity. Also, as Amabile and Hennessey (1992) stressed that intrinsic motivation can increase creativity. Thus, in this research, the positive motivational approach used on the participants to achieve the tasks they were given and solve problems in different ways, and think creatively may have helped them to perform better on posttests.

The results of this research indicated that creativity based educational activities have a positive impact on creative and divergent thinking, as measured by TTCT, supporting other research findings which indicated it is possible to improve people's creative thinking (Riga and Chronopoulou, 2014; Rodriguez and Castilla, 2013; Cho et al., 2014; Hu et al., 2013; Hargrove, 2013; Kousoulas, 2010; Hackbert, 2010; Garaigordobil, 2006; Wu et al., 2005; Fleith et al., 2002). The findings indicate that the activities selected for the implemented program seems to have influenced the student's creative thinking. In the educational process, students' ability to build an understanding of their own divergent thinking was aimed. The main starting point was that, any student can learn the skills needed to be creative; students' take all the steps in activity sessions and try to solve problems divergently.

Creativity must be integrated into the educational system, from preschool to university. Unfortunately, for children and youngsters, the classroom opportunities and programs for developing this ability are not enough. The students need learning situations that allow them to develop their creative potential in different areas. This research supports the hypothesis that participation in creative fostering activities appears to have positive effects on enjoyment of the students as well as improvement of creativity.

The easy part of this research was the voluntarily involved participants. In many research, personal traits and willingness were found to be correlated with creativity (Collard and Looney, 2014). Although there has been a great amount of research in human creativity and many policies for creativity education and thinking skills, more research need to be done for understanding and fostering creativity within educational settings. Based on the

mentioned theoretical framework, the objective was settled for exploring the entities or instances of student creativity that emerged during the learning process in classroom settings.

Implications for the researchers could be designing a creative thinking program for a long period of time, by organizing specially designed environments/classrooms and by using different kinds of assessment materials. Also, further studies should examine possible correlations between student's performance from different geographical areas or backgrounds in creative thinking tasks.

Limitations

This research was limited with the participants attending the course of "*Fostering of Creativity and Creative Thinking*" in the spring semester of 2013 to 2014 periods. It's also limited with the activities and tasks planned for fostering creative thinking in the students for only ten weeks.

Conflict of Interests

The author has not declared any conflict of interest.

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