

Creative Nature Education Program for Gifted and Talented Students

Caglar Cetinkaya

¹*Faculty of Education, Dumlupinar University, Kutahya, 43100, Turkey*
E-mail: caglarcetinkaya@yandex.com

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ABSTRACT The aim of the study was to improve gifted and talented students' creative abilities by nature education program in vicinity of Sakarya Province in the last week of August 2012. The study was carried out with the name of "Creative Nature Education for Gifted and Talented Students" and this study was supported by TUBITAK. 51 gifted and talented students from 7th to 8th grade participated in program. In this study, both qualitative and quantitative methods were used. In the quantitative part of the study; pre-test, post-test quasi experimental design without control group was used. Torrance Test of Creative Thinking (TTCT) was used for measure of gifted students' creative abilities. In qualitative study, open-ended verbal creative thinking form was used. All data was analyzed with statistical program for social science. Qualitative part of study shows that, the post-test score have been greater than the pre-test score and a significant difference has been found as a result. Various danger and damages, pragmatism, constructional change, different uses, scientific approaches, fun have been identified as the result of qualitative part of the study. It was seen at the end of study that creative nature education program improved and had a positive impact on gifted and talented students' creative abilities. It was suggested that the program should be used on different topics such as leadership and motivation etc.

INTRODUCTION

Gifted children have many characteristics that noticeably differ from their peers. One of the most important of those is creativity. Any work by human beings has creativity (Cetinkaya 2013a). Mayer (1999) has defined creativity, which is an improvable skill, as producing new and useable products. Again, in general sense, it could also be defined as making new combinations out of old ideas and creating new products (Boden 1998). Even though researchers give different definitions of creativity, the point that all agree on is that creativity is an improvable attribute. Creativity is not an inherently limited feature. Because of not being stable, creativity can be improved (Sternberg and Grigorenko 2002). Honig, too, (2001) considers it as an improvable attribute. Interests in art, open-ended questions, pondering upon unusual circumstances, being inspired by action are effective in the improvement of creativity.

In consistent with their learning pace and characteristics, the curriculum has been tailored to improve creativity in giftedness in individuals. Tailoring curriculum could be in different topics. Nature education, which is dealt with as extra-curricular educational activities, can be considered as one of them (Cetinkaya 2013b). Nature education involving different skill levels to improve students' skills of creativity is taken into consideration by different researches. Updating seven different types of intelligence that he addresses in his multiple intelligence theory, Gardner (1999) has added a new kind of intelligence. This new type of intelligence is naturalist intelligence. Naturalist intelligence is the skill of recognizing and categorizing living and non-living things. Naturalist intelligence is considered to be at a high level for those who work in the field of nature.

Nature education for the gifted which is considered in the context of extra-curricular activities was first seen in our country in the beginning of twenty- first century. In these efforts, especially supported by TUBITAK, it is planned to provide quality products. Nature education, which can contribute to gifted individuals' different skills and improvement of social features, can develop and improve their creative abilities (Cetinkaya 2013b). Assigning individuals responsibilities for problems in the nature, nature

Address for correspondence:

Dr. Caglar Cetinkaya
Asst. Prof.
Dumlupinar Universitesi
Egitim Fakultesi (43100)
Kutahya, Turkey
Telephone: +90 (274) 2652031
E-mail: caglarcetinkaya@yandex.com

education activities encourage them to formulate solutions and to actively involve in protecting the nature (Matthews and Riley 1995). In addition, the nature education increases individuals' familiarity of the nature, makes them more sensitive and contributes them to be ones who think creatively and more independently (Palmberg and Kuru 2000; Payne 2006)

MATERIAL AND METHODS

In this study, a mixed research method, in which both quantitative and qualitative research methods are used, was conducted (Bazeley 2002; Cresswell 2005; Somekh and Levin 2005). In this type of research model, which is called as mixed method by Patton (1990), qualitative data has been obtained from statistical analysis depending on quantitatively hypothesized data by using descriptive analysis. In quantitative part of the study, among the models, "one group pre-test-posttest quasi-experimental design with no group control" is used. This model is one of the models before the experiment. In the model, the measurements are taken both before and after the application. According to the model, in case of $P1.2 > P1.1$ the success is attributed to X (Karasar 1998).

Table1: Symbolic appearance of the model is as follows

Groups	Pre-test	Experimental application	Post-test
G : The Experimental Group	P1	X	P2

G: Shows the experimental group; P1, Shows the pre-test; X Shows the experimental application; P2 shows the post-test G, P1, x and P₂ refers to group worked on, pre-measurements taken from experimental group, experimental treatment and pre-measurements taken from experimental group respectively (Table 1).

In the qualitative analysis of the data, descriptive analysis was conducted. The data obtained were analyzed by descriptive analysis. Being a quantitative research method, descriptive analysis is an analysis which is carried out systematically, objectively and quantitatively to measure the variables in a text. Transforming into numeric figures is one of the important features of the descriptive analysis. In descriptive analysis,

the researcher develops categories primarily on the topic he is studying. These categories are determined as based on a theory. Then the researcher, in his examined data set, counts words, sentences or pictures belonging pre-prepared categories (Sandelowski 2000).

Research groups is comprised of seven grade students who passed to 8 grade and were diagnosed with giftedness from all over Turkey, mainly from Sakarya Province and its surrounding areas. 51 students participated in the seven-day lodging program. In choosing the participants, participants' age and gender were taken into consideration. Forty percent of the participants were female and the rest were male students.

Children's creativity ability was measured by "Torrance Test of Creative Thinking" figural A-B (TTCT) forms. TTCT, whose 50th year test of reliability was last done in 2010, is the world's most popular tool for measuring creativity skills (Runko et al. 2010). For qualitative studies, worksheets with open-ended questions were handed to the students.

The project lasted for a total of 8 days, and every day, 51 participants were given some training on different topics in nature education. TTCT was used for the measurement of students' creative skills. TTCT A form was used as pretest. The pretests were given to participants prior to the training. After the training, the post-tests, that is, TYDY B forms were carried out. Independent study activities were given and descriptive analysis was carried out for the levels of verbal creative ability. Students were asked to make comments on an unusual event or incident. In this way, on what themes they have creative ideas have been identified.

FINDINGS

Quantitative Part of Study

Hypothesis of effect of the program: TTCT post-test total score and all its sub-tests scores belonging to the group the program applied to improve the gifted children's creative abilities are greater than TTCT pre-test total score and all its sub-tests scores. Wilcoxon significance ranking test results were used for the significant differences of pre-test and post-test score differences of the Creative Nature Education Program as given in the Table 2.

Table 2: Descriptive Result of TTCT

<i>TTCT sub- dimensions</i>	<i>Group</i>	<i>N</i>	<i>X</i>	<i>Sd</i>	<i>Min</i>	<i>Max</i>
<i>Fluency</i>	Pre-test	51	23.03	5.78260	9.00	38.00
	Post-test	51	29.33	7.64897	12.00	44.00
<i>Originality</i>	Pre-test	51	14.58	4.06043	5.00	22.00
	Post-test	51	22.52	5.73534	9.00	38.00
<i>Detailing</i>	Pre-test	51	5.52	1.85853	3.00	10.00
	Post-test	51	6.78	2.70047	3.00	15.00
<i>Abstractness of Titles</i>	Pre-test	51	8.07	3.64880	1.00	17.00
	Post-test	51	9.50	3.75964	3.00	17.00
<i>Early Closure Resistance</i>	Pre-test	51	12.11	3.36836	4.00	19.00
	Post-test	51	15.82	2.53540	9.00	21.00
<i>Total Standard</i>	Pre-test	51	102.94	10.87826	72.00	127.00
	Post-test	51	120.76	12.16485	91.00	152.00

According to results, Fluency pre-test (=23,03, Sd=5,78260); Fluency post-test (=29,33, S=7,64897); Originality pre-test (=14,58, S=4,06043); Originality post-test (=22,52, S=5,73534); Detailing pre-test (=5,52, S=1,85853); Detailing post-test (=6,78, S=2,70047); Abstractness of Titles pre-test (=8,07, S=3,64880); Abstractness of Titles post-test (=9,50, S=3,75964); Early Closure Resistance pre-test (=12,11, S=3,36836); Early Closure Resistance post-test (=15,82, S=2,53540); Total Standard pre-test (=102,94, S=10,87826); Total Standard post-test (=120,76, S=12,16485).

TTCT post-test total score and all its sub-tests scores are greater than TTCT pre-test total score and all its sub-tests scores

According to Wilcoxon results, there are significant differences between pre-test and post-

test results of the Fluency $z=-5,309$ $p<.001$; Originality $z=-6,187$ $p<.001$; Detailing $z=-4,538$ $p<.01$; Abstractness of Titles $z=-3,226$ $p<.05$; Early Closure Resistance $z=-5,859$ $p<.001$; Total Standard $z=-6,122$ $p<.001$. Considering the results, it is easy to say that activities have a significant effect on participants about the subjects whose education was given (Table 3).

Qualitative Part of Study

Descriptive data is obtained via distributing "What if happens" free activity sheets to students. The worksheet comprises instruction which is indicated below:

"Now, a nearly impossible event will be presented to you, assume this is real. This activity

Table 3: TTCT pre-test and post-test Wilcoxon ranking tests results

<i>Sub-tests of TTCT</i>	<i>Ranks</i>	<i>N</i>	<i>Mean rank</i>	<i>Sum of ranks</i>	<i>Z</i>	<i>p</i>
<i>Fluency</i>	Negative ranks	2	23.75	47.50	-5.309	.001
	Positive ranks	43	22.97	987.50		
	Ties	6				
<i>Originality</i>	Negative ranks	1	3.50	3.50	-6.187	.001
	Positive ranks	50	26.45	1322.50		
	Ties	0				
<i>Detailing</i>	Negative ranks	2	7.50	15.00	-4.538	.001
	Positive ranks	28	16.07	450.00		
	Ties	21				
<i>Abstractness of Titles</i>	Negative ranks	8	21.56	172.50	-3.226	.001
	Positive ranks	32	20.23	647.50		
	Ties	11				
<i>Early Closure Resistance</i>	Negative ranks	1	5.50	5.50	-5.859	.001
	Positive ranks	45	23.90	1075.50		
	Ties	5				
<i>Total Standard</i>	Negative ranks	2	5.00	10.00	-6.122	.001
	Positive ranks	49	26.86	1316.00		
	Ties	0				

P<.001 (Significance)

allows you to use your imagination and think all other flattered outcomes if this event would come true. Assume that the given event is real. Then, think possible events which stem from the given event. So, what can be happened? Make guess as much as possible. Impossible situation: Assume there are strings bounding with clouds and preleasing. What might natural events occur? Sequence your ideas and guesses behind of the page”.

Table 4: Students' opinion on nature education

<i>Results</i>	<i>F</i>	<i>%</i>
Various dangers and damages	35	33.65
Pragmatism	24	23.07
Constructional change	17	16.34
Different uses,	12	11.53
Scientific approaches,	8	7.69
Fun	8	7.69
	N=51	2

Gifted individuals have different intellectual features from individuals indicating normal development. One of the outmost feature differentiating the gifteds from ordinary individuals is creative thinking skills. Therefore, the gifteds' perspectives and approaching styles toward any situation show difference in contrast to their peers. In this manner, perspectives of students toward a natural phenomenon are analyzed.

In the study, gifted individuals stated that they look at any situation from various perspectives such as various dangers and damages, pragmatism, constructional change, different uses, scientific approaches, and fun. They are categorized seperately. In below, perspectives of students related to these 6 domains are given in detail.

A Variety of Hazards and Losses

The students participating in the study expressed their thoughts on a variety of hazards and losses as follows:

- 1- Depending on the puddles on the ropes, more rainfall would be. This situation would cause unexpected results for living beings here. This case causes the mountain to lose its former features.
- Going to the top of the mountain would be much easier. So the people working on mountain sports would go bankrupt.

- 2- Depending on the emergence of the creatures eating ropes, toxic ropes may arise.
- When raining or snowing, ropes may fall down. Thick and heavy ropes may make meteor impact in this case.
- Depending on freezing of ropes in winter, the humans and animals passing over there may hurt by striking them. The ropes would break due to freezing and some widescale slits would occur on the ground.
- Climbing ropes, people would begin to take over the sky the same as in the earth.
- 3- Flying would be more difficult for birds. Ecological balance would be disrupted.
- 4- Car accident would be more frequent. Drivers would not be able to see the front. Because the ropes make the arrival of sunlights more difficult, life would be getting hard.
- Aircrafts such as planes, etc. would not be able to fly.
- Because rain water moves on the ropes and so water drops into the ground suddenly, water would not be absorbed by the soil and floods would be more frequent.
- Astronomical studies would be getting harder.
- 5- People would fall over the ropes and a constant chaos would occur.
- 6- After entering into marshes or dirty areas if the ropes entered into drinking waters, it would cause water pollution.
- 7- People would die while wanting to go above the clouds. Birds would die by striking the ropes.
- Many things would attach to the ropes and that would most likely cause problems.
- 8- Wrapping in the ropes, the vines would pull upwards and absorb the water in the clouds. This case would bring different drought problems.
- 9- Countries would fight for clouds.
- 10- If the ropes were conductive, the discharges in the clouds would be born out of these ropes. In this case, touching the ropes would be dangerous.
- 11- Because of the rain's flowing over the ropes, the balance of the nature would be disrupted.

- If rain fell constantly on the same place, erosion would occur at that place. The soil heated in the slope lands would result in landslides.
- 12- A tumultuous and problematic city would be.
- 14- If the ropes mingled continuously, it would be frequently aircraft accidents and so on.
- 15- People would constantly pull the ropes somewhere and this case would cause floods.
- 16- Bird deaths and traffic accidents would increase.
- 17- Accidents would increase because of ropes and birds would die by being attached to those ropes.
- 18- Because of the movements of clouds, some places would be arid and some places would be flood.
- Plant species would decrease and accordingly the global economy would be effected.
- Animal species would decrease.
- 19- The spinners would restrain movement areas of flying creatures. All living things in the world would have been disturbed them.
- This case would cause a visual pollution.
- 20- Depending on the ropes' break or fall, traffic problems may occur.
- 22- Cloud wars would burst out among countries.
- 25- When snowing or ropes' mingling each other, people would not be able to go out.
- Evaporation event would occur much more difficult.
- 26- Depending on the contamination of clouds, the contamination of biological contamination can be seen.
- 27- The ropes hanging down from the clouds would be attached to stones and, after a while, this case would cause pollution and so on.
- Animals would be attached to those ropes.
- Because of the plant's being attached to those ropes, their growing would be getting difficult.
- The ropes attached to the branches of trees would cause those trees break.
- 29- If ropes froze in winter, some problems would arise.
- 30- In the event of any lightning, the individuals touching those ropes may die.
- Deaths due to falling from ropes may increase.
- 31- This case may cause soil decay. While moving, clouds may cause movement of the soil and surface vibrations.
- Harmful substances in clouds may land on earth with the help of ropes.
- 35- Because of ropes, the lightning would strike directly where people were. This case would cause forest fires.
- 36- Birds would be attached to those ropes. The ropes would cause problems by mingling with each other.
- 37- People would often stay in sunless. Many natural disasters would occur.
- 38- Because many things would differ in life, a status of constant problem would arise.
- 42- People on the land would ascend to the sky and begin to eat birds.
- After a while, clouds would be dropped by people.
- 43- In case of ropes' being conductive, the lightning would strike directly on people.
- 44- The ropes iced over in winter may damage people.
- 45- Ropes may damage air traffic, living species and natural structures.
- 46- Everyone may pull a rope and so flooding crisis starts in the world.

Pragmatism

The students participating in the study expressed their thoughts on pragmatism as follows:

- 1- Ropes would absorb rainwater and the water absorbed by the ropes would continue to trickle down until half an hour after the end of rainfall.
- Thus recreation activities would increase and this place would get a touristic value. As a result, the number of tourists would increase.
- People would be saved instantly in case of possible disasters. These possible disasters would be able to avoided with the help of some vehicles connected to the ropes.
- Because of the ropes' corroding from being used, a new filed may occur.

- 2- If ropes had many sorts places such as the botanical garden would be able to be opened.
- If ropes were natural it would be able to provide benefit to the soil through ensuring those ropes to be decayed by the soil.
- 3- The latest bosphorus bridge may be built on these ropes.
- 5- Clouds may be connected to the desired locations with these ropes and thereby it may be provided to rain to those desired places.
- A new form of communication may be improved thanks to these ropes.
- Transportation may be facilitated through using the ropes.
- 6- These ropes may facilitate breeding through collecting pollen in flowers and providing their transportation to another flower.
- Because ropes scrape the soil, they may moisten the soil and thereby productivity in agriculture may increase.
- 8- Depending on not flying of aircrafts, less air pollution would achieve.
- 9- It would be possible to rain whenever we want.
- We would have a rather quickly means of transportation.
- 10- Observing the world better through the clouds, people would work more comfortably on the issues of pollution, etc.
- People ascending to clouds may clean the polluted clouds and restrain the formation of acid rain.
- 11- If the broken ropes were natural they would be a good source of raw materials for the natural balance.
- 13- Watering points may be created by controlling where the rain flows.
- 14- Geographical features of a place would be discovered better with the help of ropes.
- 20- Thus it may be possible to rain wherever we want. Spates may be prevented in the agricultural sector by directing clouds.
- A new accommodation may be created for some bird species.
- 21- Drinking water facilities may be created by connecting the deep and large boilers to the ropes.
- 22- Controlling the movement of the clouds with ropes, we may block the arrival of the sun.
- We may prevent lightning.
- 23- Being lowered down, ropes may be taken to arid areas and thereby drought may be reduced.
- 24- We would prevent volcanic eruptions.
- 25- People would take the help of ropes as a method of irrigation.
- 28- If people achieved conductivity in ropes power generation would be achieved from the events such as lightning, etc.
- 29- People would establish an elevator to clouds using these ropes.
- 30- We can use long ropes for preventing erosion.
- 32- Natural disasters would not breed bad results.
- 33- Lightning strike would be prevented.
- 34- Short-haul journey would to be done.
- 35- Power plants would be built with the help of ropes.
- Load change in clouds would be measured in a more comfortable way with the help of ropes.

Structural Change

The students participating in the study expressed their thoughts on structural change as follows:

- 1- It would cause mountains to lose their former features. Alternative routes would form for ascending and descending to mountains. Ascending and descending to mountains would be provided with ropes.
- People may think about what has happened and thereby the cultural level of city increases.
- 2- If ropes lengthened much natural rope forests would form.
- Clinging to ropes, vines would cover clouds and sky as its covering trees.
- 4- Dragging lands, these ropes may cause the emergence of a new form of erosion.
- 5- People will maybe fight for clouds hereafter.
- 6- When ropes touch the ground some changes to cause landslides, etc. may be observed.

- 7- Rain drops would come down off ropes and so they would not go everywhere. Depending on aridification of some regions in time, water resources would run short.
- 13- It can be started to produce some plants which grow in wetlands on clouds.
- 15- A change in species of flora and fauna would be observed.
- 17- Ascending to clouds, people would develop habitats.
- 18- Changes and equilibrium distribution difference in species of plant and animal would be observed.
- 21- New agricultural areas may be created.
- 22- Deserts can be converted to green areas.
- 23- Very high skyscrapers can be built and urbanization changes with the help of ropes.
- 26- The creatures using agricultural areas as a source of food may die. Because there is such a step in food chain, living creatures can adapt to live in accordance with this change.
- 32- Depending on lives on clouds, many changes would occur in life arrangement.
 - Transportation forms would start to change.
 - The natural balance would change depending on the conditions in which stayed.
- 34- Some people would provide to derive new sport branches.
- 39- Breeding out of the atmosphere, insects and other creatures may create new lives.
- 5- We would be able to pull clouds down, examine and touch them.
 - We would be able to place them in front of sun on hot days and use them as an umbrella for us.
- 9- Clouds would be able to go somewhere randomly in this way.
 - Meals would be able to decorated with small clouds.
- 10- People can build new settlements on clouds.
- 13- If we tied ropes to clouds we could make them move.
 - We would be able to observe over clouds better and so take a look at the sky closer.
 - We would be able to create a flying city.
- 16- It would be easier for prisoners to escape from jails.
- 21- Skydivers can jump over by climbing ropes.
- 25- We would not need to pray for rain.
- 43- People would experience to discover the top of clouds.
- 50- Factories would provide a new variety of energy production by ropes.

Scientific Approaches

The students participating in the study expressed their thoughts on scientific approaches as follows:

- 1- New scientific fields would occur depending on this case.
- 2- Rope science a new field of science would occur.
- 5- New scientific fields would occur to investigate how ropes are attached to clouds.
 - Gravity would be discovered earlier.
- 6- Observing the changes on ropes, people would create a science field such as metrology.
- 7- The necessary scientific and technological studies would be done for people's ascending to clouds.
- 25- A new art form such as "The Art of Cloud Ropes" would be created. Some paintings would be able to made by connecting ropes each other.
- 34- People would make new controlling inventions for natural events related to this case.

Different Uses

The students participating in the study expressed their thoughts on different uses as follows:

- 1- People would make investigations on clouds with the help of ropes. They would take the opportunity of research and investigation. Some branches of science examining ropes would occur in a short time.
- 2- Housewives would hang their laundries over these ropes.
- 4- The ones looking for solutions for this matter would make more expense for paper, etc. just like I am currently using the second paper.

- 42- Collecting samples from clouds, people would make scientific studies.

Fun

The students participating in the study expressed their thoughts on fun as follows:

- 4- Spiders in the forest would be so happy.
- Ropes would go into the volcano and this case would make funny images.
- 5- Children would fly clouds instead of balloons.
- 9- Games would change.
- The works would be easier for Tarzan.
- 13- We would play with ropes. We would possibly create the biggest swing in the world.
- We would find some funny activities by hanging over ropes.
- 16- Children would use them to escape from circumcision.
- 21- Giant puppets would be played.
- 25- The statement of “going up on clouds “ would be real.
- 46- People would play with these ropes.

CONCLUSION

According to the research, it is concluded that nature education programs for gifted people have positive contributions to their creative thinking skills. All post-test scores are greater than pretest scores. From qualitative data of the research, it is indicated that students' creativity has various sources such as pragmatism, constructional change, different uses, scientific approach, and fun.

RECOMMENDATIONS

In general aspect, it can be thought that experiencing the study with previous parallel studies can have effects on occurrence of positive outcomes. It is benefited from various theorems aiming at improving gifted individuals' creativity skills while the program is preparing. It can be said that since project team comprises experienced people, results are satisfactory. Choice of nature education instead of classic mathematic or science education provides students with more motivation. It can also be acceptable that funny activities carry great importance on occurrence of positive outcomes.

In this study, the program developed for improving creative abilities in should also be prepared for improving different student's features such as motivation, leadership and perfectionism. Even programs for preschool children should be arranged. Different teaching strategies and techniques may be used to obtain more effective consequences. Outcomes of the study should be tested in terms of different method. The study was performed with limited number of students attending from Sakarya province and its neighborhoods. This kind of programs which are carried out in certain cities should be provided for other cities.

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