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A COMPARISON STUDY FOR THINKING SKILLS OF HIGHER EDUCATION STUDENTS IN TERMS OF VISUAL ARTS EDUCATION

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Abstract

In related literature, mostly research findings indicated that the effect of art education upon creative thinking is positive. Also, prominent researchers pointed out that critical thinking can be gained by art education. That is, it can be expected that the effect of art education on critical thinking is also helpful. In contrast to that, some research findings upon the creative thinking reported that the effect of art education on creative thinking is ambiguous. However, it was not found any research finding in the literature reported that art education has also positive effect upon critical thinking. Hence, this study aimed to investigate the effect of visual arts education upon creative thinking and critical thinking disposition of Turkish university students. Thus, this study is first to compare the Visual Arts Education students with non-art students regarding critical thinking dispositions. As a regarding to this interaction, it was made a prediction such that Visual Arts Education would have a significant positive impact on art students compared to non-art students in terms of the creative thinking and critical thinking disposition skills. The causal comparative research design was implemented in this study with using of the Torrance Test of Creative Thinking and California Critical Thinking Disposition Inventory. For that, it was compared Visual Arts Education students (N= 33) with Elementary Teacher Education students (N= 32) to investigate whether the creative thinking and critical thinking disposition of Visual Arts Education students were significantly differ from Elementary Teacher Education ones as non-art students. According to results, it was not found significant effect indicating that Visual Arts Education students performed better than Elementary Teacher Education students upon creative thinking and critical thinking disposition. However, art students had high scores on creative thinking subscale of Fluency as significant. In contrast, Elementary Teacher Education students had significant scores on Titles as the other creative thinking subscale. This situation is also meaningful in terms of differences between education disciplines as much as Visual Arts Education students and Elementary Teacher Education students. According to this result, it is suggested that future study should be conducted the thinking styles of students in terms of the teaching

Keywords: *Visual arts education; Creative thinking; Critical thinking disposition*

SANAT EĞİTİMİ AÇISINDAN ÜNİVERSİTE ÖĞRENCİLERİNİN DÜŞÜNME BECERİLERİNİN KARŞILAŞTIRILMASI

Özet

İlgili alan yazında yapılan araştırmalar çoğunlukla, sanat eğitiminin yaratıcı düşünme üzerine etkisinin olumlu olduğu yönünde bulgular raporlamaktadır. Ayrıca, ilgili alanda önde gelen araştırmacılar eleştirel düşünmenin sanat eğitimi ile kazanılabileceğinin üzerinde önemle durmaktadır. Buna karşın bazı araştırma bulguları da sanat eğitiminin yaratıcı

düşünme üzerine etkisinin belirsiz olduğunu ortaya koymaktadır. Öte yandan, ilgili alan yazında sanat eğitiminin eleştirel düşünme üzerine olumlu etkilerini gösteren herhangi bir araştırma bulgusuna da rastlanılamamaktadır. Bundan dolayı, bu çalışmada yükseköğretim seviyesinde verilen görsel sanatlar eğitiminin, öğrencilerin yaratıcı düşünme ve eleştirel düşünme eğilimleri üzerine etkilerinin araştırılması amaçlanmıştır. Dolayısıyla bu çalışma, görsel sanatlar eğitimi alan üniversite öğrencileri ile görsel sanatlar eğitimi almayan üniversite öğrencilerinin eleştirel düşünme eğilimlerinin karşılaştırılması açısından ilktir. Bu çalışmada, görsel sanatlar öğrenimi gören öğrencilerin, görsel sanatlar öğrenimi görmeyen öğrencilere göre yaratıcı düşünme ve eleştirel düşünme eğilimlerinin anlamlı olarak yüksek olacağı varsayımından hareket edilmiştir. Bu çalışma tarama yönteminde bir karşılaştırma araştırmasıdır. Görsel sanatlar eğitimi alan öğrenciler (N= 33) ile sınıf öğretmenliği eğitimi alan öğrenciler (N= 32) yaratıcı düşünme ve eleştirel düşünme eğilimleri açısından karşılaştırılmıştır. Torrance Yaratıcı Düşünme Testi (TYDT) ve California eleştirel düşünme eğilim envanteri (CCTDI) veri toplama araçları olarak kullanılmıştır. Bu çalışmanın sonucuna göre, görsel sanatlar eğitimi alan öğrenciler ile sınıf öğretmenliği eğitimi alan öğrenciler arasında yaratıcı düşünme ve eleştirel düşünme eğilimleri açısından anlamlı bir fark bulunamamıştır. Bununla birlikte, istatistik analiz sonucunda, görsel sanatlar öğrenimi gören öğrencilerin yaratıcı düşünme Akıcılık alt boyutunda anlamlı olarak yüksek puanlara sahip olduğu gözlemlenmiştir. Buna karşın, sınıf öğretmenliği öğrenimi gören öğrenciler de yaratıcı düşünme diğer bir alt boyutu olan Başlıkların soyutluluğu'nda anlamlı olarak yüksek puanlar aldıkları bulunmuştur. Bu sonuç, sanat eğitimi alan öğrenciler ile sanat eğitimi almayan öğrenciler arasında yaratıcı düşünme açısından farklılıkları göstermesi bakımından kayda değerdir. Buna göre, gelecekte yapılacak çalışmalarda öğrencilerin düşünme becerilerinin aldıkları eğitime göre incelenmesi önerilir.

Anahtar kelimeler: *Görsel sanatlar eğitimi; Yaratıcı düşünme; Eleştirel düşünme eğilimi*

Introduction

The strong link between art and creativity since Renaissance is based some experiences beyond the beliefs. One of these experiences can be attraction of the art. The other experience may be natural language of the humanity as creativity of the art. Unless the art includes creativity, it could not be common communication tool for the humanity. To this point, it is possible to say that these experiences of the art, as attraction and the common communication of the humanity, based on the creativity. So, the strong link between art and creativity may be present. No doubt, there may be valid reasons of this situation. Perhaps, one of these reasons can be openness. The openness to experience is tied to the creativity profoundly (Runco, 2014). As more or less, art production process contains to be open to new experiences that lead to explore the new. In essence, to be open to new experiences for art and creativity is a common point to meet of artwork production or creative thinking. In this manner, art students must be capable of thinking in creative ways (Allen, 2010) and their artworks must contain the creativity as well because of the creativity plays an important role in arts (Runco, 2014) and art education (Gombrich, 1991; Kozbelt, 2004). Especially, drawing skills help students' creativity (Chan & Zhao, 2010) regarding visual arts education. As reported, art design should be applied for the development of the creativity in terms of educational goals (CIDA,

2015), because technical skill is necessary before one can create aesthetically (Howell, 1990). That is, the development of the creative skill is vital for the visual arts education students to produce artwork. This situation shows also itself in the art education curriculum as a prominent goal. Accordingly, it can be expected that creative thinking skills of visual arts education students might be developed more than other education disciplines' students.

Creativity is reflected in the generation of novel (Mumford, Reiter-Palmond & Redmond, 1994). For the creativity, perhaps, it is needed to be open to new experiences (Wang, 2012). Due to the production of novelty involves divergent thinking (Cropley, 2001), the definitions of the creativity is sometimes referred to divergent thinking (Roskos-Ewoldsen, Black & Mccown, 2008). The traditional education compared to art education generally targets on focusing convergent thinking; whereas art education stimulates divergent thinking. Divergent and convergent thinking were defined earlier. Closed-ended problems require convergent thinking, but non-routine problems support divergent thinking which can lead creative thinking (e.g. Runco, 2014). Hence, divergent thinking plays important positive role in creative achievement (Cropley, 2001) owing to encounter of non-routine problems in art education frequently. Thus, the art provides a creative domain (e.g. Runco, 2014), and creative thinking has an important role in art education (e.g. Kozbelt, 2004). Hence, art education has advantage for development of the creative thinking (Roege & Kim, 2013). According to Runco (2014), imagination, originality, usefulness, problem solving and innovation should also encourage creative thinking due to they are not separated from the creativity: Besides that, it is possible that creative thinking requires some of logic. Also, Isbell and Rainess (2003) stated that creative thinking is necessary for the new. Since many definitions of creativity are centered on core components novelty and appropriateness (Kaufman & Baer, 2012) or usefulness, creative thinking as first step can be included in cognitive operation before the creative activity.

Accordingly, it can be expected that students who follow the art education more develop their creative thinking skills than non-art students, but it can be said that the findings of the studies on this topic are ambiguous. According to Furnham, Batey, Boot, Patel, and Lozinskaya (2011), the creative thinking of art education students was significantly higher than non-art education students. On the contrary to that, some studies reported that there were not any difference between art students and non-art students' creative thinking (Charyton, Basham & Elliot, 2008; Charyton & Snelbecker, 2007).

On the other hand, Roege and Kim (e.g. 2013) underlined that art education improves life skills. That is true because of the creativity plays role in many everyday activities (e.g. Runco, 2014). It can be said that this situation originates from the nature of art which cannot be built on certain rules. Thus, it is possible to say that art education has such a domain which supports critical thinking besides the creative thinking. As a reason of this situation, it can be showed that the creative and critical

thinking skills nurture from similar ambiguity source. That is, students have opportunity to learn to critique in art education (Hetland, Winner, Veenema, & Sheridan, 2007). So, art education improves critical thinking of students (Freire, & Macedo, 1998; Knight, 2010). Critical thinking disposition are embedded into the basic elements of critical thinking (Ennis, 1996). Accordingly, it can be expected that students in art education may possess a significant critical thinking disposition.

Critical thinking is a process to make decision on what to do (Ennis, 1996). Similarly, critical thinking is assessment the all facts before making decisions to solve a problem; thus, critical thinkers have specific thinking approach on issues or problems (Facione, 2009). Additionally, Pithers (2000) stated that the critical thinking involves abilities as identifying and focusing problem with analyzing in the assumptions or sources of information with referring to prominent researchers. The thinking skills are critical thinking and problem solving that such as thinking skills are excessively difficult to learn except for new or novel situations (Peterson & Madsen, 2010). Siegler (1989) claimed that the solving process of new problems is the most effective method for acquisition of thinking skills. Accordingly, Runco (1994) stated that some critical are necessary for creative expression. The critical thinking is also one of the aspects of creative thinking as well (Glassner & Schwarz, 2007). To this point, it can be said that around the problem solving process about their relations is important point to interact mutually. Similarly, Rudd, Baker, Hoover, and Gregg (1999) stated that concerning with the interaction factor between critical thinking and creative thinking is the problem solving. Such as approach, it is impossible to draw a border line between critical and creative thinking (e.g. Glassner & Schwarz, 2007). The interaction between critical thinking and creative thinking may be in the problem solving process because of these thinking skills are fed by same uncertainty originating solving process.

It has been presented on many study findings in various educational disciplines in related literature upon creative thinking of students regarding to art education (Aral, 1999; Charyton et al., 2008; Furnham et al., 2011; Howel, 1990), but the research finding upon creative thinking and critical thinking in Visual Arts Education are rarely. So, this study was unique one to investigate the role of Visual Arts Education upon the creative thinking and critical thinking disposition of students. Accordingly, hypotheses of this study were as follow:

1- Visual Arts Education students will have significantly higher scores on creative thinking than Elementary Teacher Education students have ones.

2- Visual Arts Education students will have significantly higher scores on critical thinking disposition than Elementary Teacher Education students have ones.

To test these hypotheses, university students who were studying in the department of Visual Arts Education were compared to the students who were pursuing in the department of Teaching Elementary Education in terms of creative thinking and critical thinking disposition.

Method

The research method of this study is causal-comparative design which is one of the quantitative research design methods as descriptive type. The aim of implementation of the causal-comparative design in this study was to understand the effects of education course as independent variable upon creative thinking and critical thinking of students. The creative thinking (TTCT) and critical thinking disposition (CCTDI) were also used as dependent variable. Accordingly, two groups as independent variable in different study programs as visual arts education and teaching elementary education were compared.

Data Analysis

For the analysis of the data obtained from the study was used the Analysis of Covariance (ANCOVA) to reduce possibility of external validity (Karakaya, 2012; Sözbilir, 2014). The effects of the age (Mullineaux & Dilalla, 2009) and gender (Wang, 2012) were ambiguous on the creative performance. Therefore, the age and gender (possibility of external validity) were held as covariate in the ANCOVA analysis to reduce possibility of external validity to determine the roles of the education departments (Visual arts and Elementary Teacher Education) on the thinking skills of the students clearly. Because, the age and gender could be have very important effects on the creative thinking. For each group, the "Kolmogrov - Smirnow" and "Shapiro-Wilk" statistic techniques were used to determine whether the present data distributed normally. Both statistic techniques reported normal distribution (p> .05) for each group in terms of the dependent variables as the TTCT and CCTDI.

Also, the data was analyzed to determine whether all the assumptions of the ANCOVA were supported or not to use. For the TTCT and CCTDI, "Equality of regression trends" assumption was analyzed with *Univariate Analysis of Variance* and the "p" value was found as .47 and .86 (p> .05) respectively (in the Tests of Between-Subjects Effects). As well, the value of the "p" was found as .18, and .14 (p> .05) respectively for the TTCT and CCTDI in the presentations of the *Levene's Test of Equality of Error Variances.* According to these analysis results, it can be said that the assumptions of the ANCOVA were supported (Seçer, 2013) for the present data.

Participants

As a research group, participants (N= 65) were the students in the second year of pursuing the education departments of Visual Arts Education (N= 33) and Teaching Elementary Education (N= 32) in a state university of Turkey in 2013 spring. Visual arts education students had the art course intensively (65% of the total lesson time), whereas teaching elementary education students had the social science course of study intensively (79% of the total lesson time) until the end of fourth semester. The age range of the participants (M_{age} = 21) was between 19 and 27 years old. The majority age range of the participants was consisted of between 19 (69%) and 21 (28%) years old range. The majority of participants were female (40 girls and 25 boys).

Measures

Torrance Test of Creative Thinking (TTCT)

Torrance (1966, 6) defined creativity as *a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; identifying the difficulty; searching for solutions, making guesses, or formulating hypotheses about the deficiencies: testing and retesting these hypotheses and possibly modifying and retesting them; and finally communicating the results.* TTCT - Figural is used to measure the potential of creative thinking of individuals to high school students from kindergarten students. TTCT is a projective test in which gives test taker an unclear stimulating to reflect what he sees in it (Sungur, 1988). In these kinds of tests are formulated on one of the Gestalt Psychology's basics which is that incomplete figures (or pictures) cause of stress on the individual to complete (Korkmaz, 2002). TTCT was developed by Torrance in 1966. TTCT figural test include three activities within 30 minutes. The first task *Picture construction*, the others are *Incomplete figures* and *Repeated figures*. Knowledge about a person's creative thinking abilities does not seem appropriate to observe a variety of convergent, but it seems fit divergent thinking abilities. Therefore, TTCT activities includes nature of creative thinking process and assessment of these test activities in terms of Guilford's divergent thinking factors as fluency, originality and elaboration. For instance, the activity of the *picture construction* is required to think of picture in which the given shape is an integral part. Thus, the product is evaluated only for originality and elaboration. The other activity as the incomplete figures sets up in a person tension to complete it in the simplest way possible that is well-known from Gestalt psychology. Thus, the person usually has to control this tension and delay closure to produce an original response. In this manner, the activity of the 'repeated figures' is also similar to the activity of the 'incomplete figures' (e.g. Torrance, 1966).

The TTCT – Figural scoring procedure was revised in the 1984 third edition of the TTCT manual. In this study, that manual was used for the scoring of the TTCT-Figural forms which include to score in "Fluency", "Originality", "Elaboration", "Abstractness of Titles" (Titles), "Resistance to Premature Closure" (Closure) and "Creative Strengths" (Strengths) subscales (Kim, 2011). The Fluency produces and reflects the most available responses (Guilford & Hoepfner, 1971; Roskos-Ewoldsen, Black & Mccown, 2008). Fluency scores in the Torrance Test of Creative Thinking (TTCT) are determined by counting the number of different drawings produced without duplication; it requires a simple quantity of unique answers (e.g. Cropley, 2001; Torrance, 1965). The Originality is talent to produce genuine and visual ideas (e.g. Kim, 2011). The Elaboration assesses the ability to improve embellish and add details to an idea (Torrance, 1966; Lemon, 2011; Aslan & Puccio, 2006). The Titles is synthesis and organization thinking processes and for capturing the essence of the information. The Closure is the ability to be intellectually inquisitive and to be open minded (e.g. Kim, 2011). The Strengths involve emotional expression, articulate storytelling, movement and action, expressiveness of titles, synthesis of incomplete

figures, synthesis of lines or circles, unusual visualization, internal visualization, extending or breaking boundaries, richness of imagery, colorfulness of imagery and fantasy (e.g. Aslan & Puccio, 2006).

The Turkish version of the TTCT adapted into the Turkish language was performed reliability and validity studies by Aslan (2001). In the context of reliability and validity studies, the data was collected from participants (*N*= 922) including pre-school, elementary, high school and university students and individuals. The Cronbach Alpha coefficient was .70 in the reliability analysis. For the validity study, the Wechsler Adult Intelligence Scale (WAIS) was compared with the Turkish version of the TTCT. Also, the original TTCT in English language and The Turkish version of the TTCT were presented to participants who are fluent in Turkish and English languages in order to compare their scores in terms of linguistic equivalence. Accordingly, it was found high positive linear relationship between the English and Turkish TTCT' scores during the analysis of Pearson-Product Moment. It was observed that the reliability, validity studies and linguistic equivalence of Turkish version of TTCT were provided in the end of all these analyses. Also, TTCT figural test scores were analyzed in this study by the Cronbach's Alpha statistical technique as well. Accordingly, the value of the Cronbach's Alpha was found as .78 in related to the current research group. Thus, it can be said that Cronbach's Alpha reliability is provided for this study.

California Critical Thinking Disposition Inventory (CCTDI)

As a project of Delphi, the California Critical Thinking Disposition Inventory (CCTDI) was created by the American Philosophical Association (APA) in order to measure critical thinking disposition (Facione, Facione & Sanchez, 1994). The APA Delphi research project provided terminology for the survey instrument leading the structure with the listing of critical thinking skills including sub-skills, and dispositional features. There is a growing consensus that critical thinkers must include the nurturing of the disposition toward critical thinking. Habitually, some habits of ideal critical thinker are inquisitive, well-informed, trustful of reason, open-minded, prudent in making judgments. To this point, Motivational theory of Lewin (1935) provides the theoretical grounds for the assumption that the disposition to value and utilize critical thinking. Considerations of the disposition toward critical thinking have remained largely within the field of theoretical assumptions of scientific investigations. Accordingly, the conceptualization of the disposition toward critical thinking of the CCTDI was obtained from the APA Delphi Report. In this manner, CCTDI is the first such instrument (Facione, Sánchez, Facione, & Gainen, 1995).

Kökdemir (2003) applied the Turkish version of CCTDI on the 913 university students (M_{age}= 20.08) and translated into Turkish language by English language experts and psychologists. The analysis of correlation was examined in the item and total scores of Turkish version of CCTDI. Also, the correlation between item and total of the Turkish CCTDI were examined with principal component analysis as the

structure of factor. According to the results of analyses, it was found 19 items under .20 and the Turkish version of CCTDI was suggested to be represented by 51 items. Thus, the Turkish version of CCTDI was found to be reliable using internal consistency coefficient (alpha= .88) and principal component analysis. Accordingly CCTDI was adapted into the Turkish language as the sub-dispositions of "analyticity", "open mindednesss", "inquisitiveness", "self-confidence", "truth seeking" and "systematicity". The Truth seeking as subscale represents flexibility in considering alternatives and opinions. The Open-mindedness reflects the understanding of others' opinions. The Analyticity is to show how persistent the student is in the light of difficulties encountered. The other subscale of CCTDI is the Systematicity which illustrates how diligently the student went about seeking relevant information. The Self-confidence refers to the student's confidence is his/her own ability to reason. *Inquisitiveness* shows how concerned the student is to become and stay well-informed (Aizikovitsh-Udi & Amit, 2011). Participants were administered TTCT - Figural and CCTDI as data collection tool in the end of spring semester of 2013. Participated students were demanded to complete the TTCT within 30 minutes except instructions. CCTDI was completed by the participants less time than 30 minutes approximately.

Results

Table 1: *Analysis of Covariance for Creative Thinking Subscale Scores with Means and Adjusted Means by the Groups*

TTCT Subscales		Groups: Visual Arts[a]		Groups: Elementary Teaching[b]		*F*(1, 61)
Fluency						
Unadjusted	*M* (*SD*)	14.81	5.70	11.78	3.54	
Adjusted	*M* (*SE*)	14.84	.84	11.75	.85	5.56*
Originality						
Unadjusted	*M* (*SD*)	7.69	4.79	8.46	4.60	
Adjusted	*M* (*SE*)	7.64	.82	8.52	.83	.55
Elaboration						
Unadjusted	*M* (*SD*)	8.24	2.56	8.25	2.21	
Adjusted	*M* (*SE*)	8.24	.42	8.24	.43	.00
Closure						
Unadjusted	*M* (*SD*)	5.21	2.65	5.87	2.12	
Adjusted	*M* (*SE*)	5.25	.42	5.83	.43	.92
Titles						

Unadjusted	*M* (*SD*)	2.84	2.12	6.28	2.90	
Adjusted	*M* (*SE*)	2.81	.44	6.32	.44	31.10**
Strengths						
Unadjusted	*M* (*SD*)	2.36	1.45	2.62	1.26	
Adjusted	*M* (*SE*)	2.36	.23	2.62	.24	.54

*< .05, **< .01

[a] = 33, [b] = 32

To test the hypothesis of the study, it was put into practice Analysis of Covariance (ANCOVA) with comparing the Visual Arts Education students and Elementary Teacher Education students as gender and age covariate. According to ANCOVA, it was not detected significant difference [$F_{(1,61)}$ = .526, p> .05] between adjusted mean scores of creative thinking of Visual Arts Education students (M= 10.11) and Elementary Teacher Education students (M= 10.70). Also, it was not found significant difference [$F_{(1,61)}$ = .030, p> .05] between adjusted mean scores of critical thinking disposition of Visual Arts Education students (M= 217.72) and Elementary Teacher Education students (M= 216.84) in analysis of the Covariance.

However, ANCOVA calculated the six subscales of the TTCT and CCTDI on the Visual Arts students and Elementary Teacher Education students as covariate of gender and age. Two subscales of TTCT as creative thinking were significant: Visual Arts students scored (M= 14.84) higher on the Fluency [$F_{(1, 61)}$ = 6.561, p < .05, η^2 = .097] than Elementary Teacher Education students (M = 11.75). Whereas Elementary Teacher Education students scored (M = 6.32) higher on Titles [$F_{(1, 61)}$ = 31.10, p < .05, η^2 = .338] than Visual Arts students (M = 2.81). Excluding the Fluency and Titles, all of the subscales of TTCT showed insignificant differences (Table 1).

Additionally, ANCOVA revealed that there was no significant difference between Visual Arts students and Elementary Teacher Education students in terms of mean scores of CCTDI subscales (Table 2).

Table 2: *Analysis of Covariance for Critical Thinking Disposition Subscale Scores with Means and Adjusted Means by the Groups*

CCTDI		Groups				
Subscales		Visual Arts[a]		Elementary Teaching[b]		*F*(1, 61)
Analycity						
Unadjusted	*M* (*SD*)	49.00	4.81	48.40	5.52	
Adjusted	*M* (*SE*)	48.87	.89	48.53	.91	.07
Open Mindedness						
Unadjusted	*M* (*SD*)	49.57	8.86	51.50	8.08	

Adjusted	*M* (*SE*)	49.60	1.50	51.47	1.53	.75
Inquisitiveness						
Unadjusted	*M* (*SD*)	41.39	5.55	39.87	7.10	
Adjusted	*M* (*SE*)	41.15	1.08	40.11	1.09	.45
Self-Confidence						
Unadjusted	*M* (*SD*)	28.21	5.56	27.75	5.98	
Adjusted	*M* (*SE*)	28.17	1.02	27.79	1.03	.07
Truth- Seeking						
Unadjusted	*M* (*SD*)	25.30	4.36	23.96	5.34	
Adjusted	*M* (*SE*)	25.36	.85	23.90	.87	.75
Systematicty						
Unadjusted	*M* (*SD*)	24.81	4.27	25.03	5.28	
Adjusted	*M* (*SE*)	24.86	.84	24.98	.85	.01

[a] = 33, [b] = 32

Discussion

In this study, it was aimed to investigate the role of Visual Arts Education upon the creative thinking and critical thinking disposition of students through comparative approach. The first hypothesis of the study was on whether the significant difference between the Visual Arts Education students and Elementary Teacher Education students' creative thinking. So, it was compared the Visual Arts Education students with ones in Elementary Teacher Education regarding to creative thinking. According to the result, it was not found the significant difference between the students' overall creative thinking scores. This result is supported by some previous studies (e.g. Charyton & Snelbecker, 2007; Charyton et al., 2008; Hetland et al., 2007; Howell, 1990). However, present result is not supported by the findings of Furnham et al. (2011). That is, the present result is contradict with views of Furnham et al (2011) that the art can be developed by the visual arts education. The possible reason of the present result can be related to the education semesters. As known, the participating visual arts students in the second year of pursuing of the Visual Arts Education Department in the fourth semester. That is, regarding the general educational outputs of visual arts education as creative skills of the art students might not be completed in the fourth semester. Accordingly, it can be said that the art students would not be enough to acquire some skills as creative thinking unless they do not complete all learning process regarding the visual arts education. The other possible reason of this study may be a kind of problem solving style. Because, *problem solving* is main aspect of creative thinking (Scott, Leritz, & Mumford, 2004). Especially the non-routine problems include more creativity

regarding solving process than routine problems (Mumford, Mobley, Reiter-Palmon, Uhlman, & Doares, 1991). The non-routine problem requires the open goals (Runco, 1994), and the openness to experience is consisted of lack of the borders in the concepts and perceptions. Accordingly, it can be put forward that visual arts students cannot tend to solve non-routine problems when they cannot run into these problems in their learning environment. That is, the present result indicates that non-routine conflicts in learning activities are not given place enough in the Visual Arts Education. To this point, we should inquire whether the Visual Arts Education includes non-routine conflicts in learning activities.

On the other hand, in terms of insignificant differences between art students and non-art students' creative thinking, present result is consistent with the findings obtained by Florida (2014). According to Florida, the artists, educators, and scientists are belonged to the same creative class as super creative core. However, it was found a significant difference on the Fluency scores and the Titles scores between Visual Arts Education students and Elementary Teacher Education students according to the other result of the present study. That is, the Visual Arts students had significantly better scores on the Fluency, whereas the Elementary Teacher Education students had significantly higher scores on the Titles. So, it can be said that the present result is not supported by Furnham et al. (2011) who reported that there was no significant difference between art and science university students in terms of Divergent Thinking (DT) of *Fluency*.

The Fluency is defined as an ability of producing many ideas in cognitive process (e.g. Kim, 2011) as figural. On the other hand, visual thinking is the ability to see figural forms (Arnheim, 2007). Accordingly, figural Fluency can be defined as the speed and quantity of producing formal forms with using visual thinking. Hetland et al. (2007) reported that art students are often visual thinkers. As Prentice (2000) emphasized, it is necessary to think visually for the visual artists. So, it can be said that the present result is meaningful in regard to visual arts students who possess the ability of the speed of producing large quantity figural forms through the visual thinking. That is, under this result of the study, it can be put forward that the students in the department of Visual Arts Education think more visually than the students in the department of Elementary Teacher Education. Due to Fluency is necessary for divergent thinking of students (Dumas & Dunbar, 2014; Runco, 2003), it can be said that this result is consistent with the view that yield of the visual arts education focuses divergent thinking generally.

Other result was on the Titles scores in favor of Elementary Teacher Education students in this study. Accordingly, there was found significant difference in the Titles subscale between Visual Arts Education students and Elementary Teacher Education students. Cho, Nijenhuis, van Viannen, Kim, and Lee (2010) found a significant relationship between intelligence and Titles (TTCT) scores, but there was no significant relationship between intelligence and Fluency (TTCT) scores. Also, Kim (e.g. 2011) made analysis of creative thinking scores of the TTCT implemented

between 1984 and 1998 years and found that there was positive relationship between Titles scores and verbal intelligence scores. In another study (Kim, 2006), TTCT subscale scores were compared as the Fluency, Originality, Elaboration, Titles, Closure and the Strengths mutually, and it was found that TTCT-Figural is consisting of two factors as "innovative" (fluency, originality and closure) and "adaptive" (elaboration and titles).

In this study, students had the courses of education concerning intensive visual arts and education science curriculum as Visual Arts Education and Elementary Teacher Education respectively. According to the present result, it can be said that the Elementary Teacher Education students tend to be adaptive creative style, however, the Visual Arts Education students tend to be innovative creative style as well.

The Titles involve the abilities of abstract thinking, synthesis and organizational thinking process and for capturing the essence of the information (e.g. Kim, 2011). The Titles are based on verbal or logical activities more than visual. Accordingly, the present result is supported, in terms of visual and verbal areas of thinking process, by Palmiero, Nakatani, Raver, Belardinelli and Leeuwen (2010). Palmiero et al. found that there was effect of visual abilities on visual creativity positively. Also, they found that there was effect of verbal skills on the verbal creativity. Accordingly, it can be said that Elementary Teacher Education students can tend to think more verbal than Visual Arts Education students due to Elementary Teacher Education students took educational activities intensively verbal during their schooling period mostly. In contrast, The Visual Arts Education department may produce visual abilities related with educational activities as outcomes. So, Visual Arts Education students can tend to think more visual than Elementary Teacher Education students as well.

This result can give us some clues in terms of education disciplines. For instance, the structure of Visual Arts Education cannot be built on absolute certainties originating from the nature of boundless of the art. So, it can be expected that students in Visual Arts Education may be highly open to innovation due to learning climate. In contrast, students in Elementary Teacher Education may be possible to think more adaptively within distinctive rules owing to due to learning climate. This situation may reflect the students' thinking process as innovative and adaptive creative style. To this point, as Kaufmann (2003) stated, while the innovators prefer breaking the boundaries, adaptors tend to improve things within existing boundaries.

According to the report of Statistics Canada and OECD (2005), the factors of differences in course and training can affect the development of skills of individuals in definite domains, because the teaching is an important determining factor of the development of the skills. That is, present result shows us that the creative thinking style of students may be directed by education significantly. If students pursue an education characteristically, it is possible to say that students would possess a

distinct creative thinking style as innovative or adaptive according to this teaching. So, it is also possible to say that students tend thinking around of their characteristics of teaching.

The other hypothesis of this study was on whether the significant difference between the Visual Arts Education students and Elementary Teacher Education students' critical thinking disposition. For that, it was aimed to investigate the role of Visual Arts Education upon the critical thinking disposition of students. Accordingly, it was not found significant difference between the visual arts students and elementary teacher students when compared to their critical thinking disposition in present study. Additionally, it was also not found significant differences in the subscales of critical thinking disposition. This result is supported by Ben-Chaim, Ron and Zoller (2000). Ben-Chaim et al. found that there was significant difference neither on overall scores nor subscale scores of critical thinking disposition (CCTDI) between art education students and teaching education students. Accordingly, it can be said that the Visual Arts Education students and Elementary Teacher Education students could be similar as regard to critical thinking dispositions. The visual arts include ambiguous frequently regarding art product since the nature of the art has not been built on certain rules. This situation has been already present opportunities artists to explore and experience the *new* which nurtures the creativity. On the other hand, the skill of the critical thinking is revealed in the similar ambiguity conditions as well. Therefore, the hypothesis of the study was that the art education could develop the critical thinking. But this hypothesis was not supported by the present result. As a possible reason of this result, it can be shown that visual arts activities are not based on real life tasks. Because, the critical thinking is seen as an individual activity focusing on achieving for real-world problems' solution (Hammer & Green, 2011). Hence, the critical thinking is accepted as a skill of the possibility of solving of a problem (Higgins, 2008). The other possible reason related to present result can be learning paradigm which is to follow known rules determined by the art teacher. This paradigm reveals generally when the artwork is produced with a known technique. The critical thinking disposition has not been supported by such a way since this way has not include any ambiguous things in terms of the process. Hence, it can be said that the critical thinking can be developed by the way of ambiguous conditions.

According to the result of this study; excluding the *Fluency* skill of creative thinking, the Visual Arts Education may not be a significant effect on the development of creative thinking skill. Perhaps, it can be said that the role of the Visual Arts Education can be unclear on the development of critical thinking of the students pursuing of the Visual Arts Education in the middle of the formal education as the fourth semester. This result may be consistent of the second years of the Visual Arts Education pursued students since all of the education (four years) has not yet completed. So, it is suggested that future study should conduct to investigate the role of the Visual Arts Education on students' creative thinking and critical thinking

dispositions in various education levels besides higher education area. Also, it can be suggested that future study should conduct a follow-up study including a few semester to follow the development of creative thinking and critical thinking disposition of students in terms of investigating the role of the Visual Arts Education.

Implications and Limitations

The implication of present study was that the creative thinking style of students may be changeable according to education disciplines as an innovative or adaptive. Perhaps, this implication may indicate that the significant differences in creative style of students can be shaped by the education curriculum. Thus, this situation can provide many opportunities the education program makers to elaborate their curricula. The data used in the present study was obtained from the 65 university students. In terms of this small sample, the results of the study cannot be seen to be generalized unambiguously, but, despite this limitation, present study has one vital feature that confirms the findings of previous studies in the literature.

Conclusion

The university students' creative thinking subscales were significant difference in the *fluency* (in favor of Visual Arts Education) and the *titles* (in favor of Elementary Teacher Education). That is, present result is supported by Furnham et al. (2011) who found that Fluency can be significant predictor regarding the difference between art and non-art education because of the Fluency is correlated highly positively with Openness and Creativity. The Fluency is more relative with the innovative, but the Titles are related with the adaptive than innovative according to Kim (e.g. 2006). Therefore, it can be said that Visual Arts students thought more visually and innovatively than Elementary Teaching students. On the other hand, it can be said that Elementary Teaching students think more adaptive than Visual Arts students. This situation is consistent with Osborn's (1963) thoughts that our creative thinking has two ways as visualization and generating ideas. That is, creativity comes through some hierarchical dimensions as variety of disposition and developmental (Simonton, 2009). As Flavell (1979) stated, cognitive structure is related to specific stored knowledge as tasks and actions with outcomes of intellectual. Thus, it can be concluded that educational outcomes play also an important role in the cognitive structure besides the development of creative thinking styles of the individual. Hence, it can be suggested that education program makers consider the present result when their curriculums are planning in terms of the educational outputs. Also, this result suggests that future studies should be conducted to study the thinking styles of students in terms of the teaching.

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