

ASSESSING STUDENTS' CREATIVITY IN DESIGN EDUCATION AT DIFFERENT UNIVERSITIES IN TURKEY THROUGH THEIR ADMISSION EXAMINATION TYPES

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Abstract: Creativity is a wanted and desirable human skill. When examined through the viewpoint of a fundamental exertion, much of the time, educators are asked or urged to encourage creative thinking in the classroom. However, do the educators' definition and criteria of creativity match up with students' creations? In this article, the question whether students who take the national entrance examination or who take the aptitude tests to study at university are more creative in the sense of Guilford's (1950, 1967a) concepts of divergent thinking, curiosity, fluency, flexibility, elaboration and originality was elaborated. In order to achieve that aim, selections of works of the same professor's students when he was teaching at several different universities between 2018-2020 in Turkey have been chosen and clustered as re-evaluated according to the adoptions of Guilford's concepts of creativity. In the end, it was found out that students who take the national entrance examination are more divergent in their thinking while being less curious, fluent, flexible, elaborate and original than their peers who take the aptitude tests.

Keywords: Creativity, Design education, J. P. Guilford, Area efficiency test (AYT), Aptitude test (ÖYS).

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TÜRKİYE'DE ÜNİVERSİTEYE GİRİŞ SINAVI TÜRLERİNE GÖRE FARKLI ÜNİVERSİTELERDEKİ ÖĞRENCİLERİN YARATICILIKLARININ DEĞERLENDİRİLMESİ

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Özet: Yaratıcılık, en gerekli ve değerli insan yeteneklerinden biridir. Temel bir bakış açısıyla incelendiğinde, çoğu zaman eğitimcilerin, sınıftaki öğrencileri yaratıcı düşünmeye teşvik etmeleri beklenir ya da istenir. Fakat bu amacın gerçekleştirilmesi için öncelikle başka bir faktörün incelenmesi gerekmektedir. Eğitimcilerin yaratıcılık tanımı ve kriterleri ile öğrencilerin yaratımları örtüşmekte midir? Bu makalede, Guilford'un (1950, 1967a) ıraksak düşünme, merak, akıcılık, esneklik, detaylandırma ve özgünlük kavramları bağlamında, AYT (Alan Yeterlilik Testi) ya da ÖYS (Özel Yetenek Sınavı) ile Güzel Sanatlar ya da Sanat ve Tasarım Fakülte'lerinin Grafik Tasarım, Görsel İletişim Tasarımı ve İletişim Tasarımı Bölümlerinin birine giren öğrencilerden hangilerinin ilerideki eğitim dönemleri içerisinde daha yaratıcı oldukları irdelenmiştir. Bu doğrultuda, aynı profesörün 2018-2020 yılları arasında Türkiye'de birçok farklı üniversitede ders verdiği öğrencilerinin çalışmalarından seçimler yapılmış ve Guilford'un yaratıcılık kavramlarına göre yeniden değerlendirilerek kümelenmiştir. Sonuç olarak, AYT ile giren öğrencilerin yetenek sınavı ile giren akranlarına göre daha az meraklı, akıcı, esnek, ayrıntılı ve özgün oldukları tespit edilmiştir.

Anahtar Kelimeler: Yaratıcılık, Tasarım eğitimi, J. P. Guilford, Alan yeterlilik testi (AYT), Özel yetenek sınavı (ÖYS).

1. INTRODUCTION

Creativity is a wanted and desirable human skill. In the prism of a systematic initiative, educators are needed or required to promote the innovative thinking of students in their classrooms. However, do educators' concept and requirements of innovation fit with the creations of students? Both students and educators often feel ill-prepared for these teaching goals (Mullet et al., 2016).

Creativity is a complicated, miscellaneous psychological construct (Kokotsaki, 2012). In an orderly examination of the literature on educators' origination of creativity Mullet et al. (2016, p.27) reasoned that educators' origination of creativity is usually 'naïve or incomplete'. Educators for the most part compare creativity with labels such as 'imagination' or 'freedom of expression' (Bolden et al., 2010, p. 153 cited in Hung and Sitthiworachart, 2020). This particular origination of creativity can bring about educators utilizing a limited focus to perceive creativity in student performance. This may clarify why most educators like to intently compare creativity with art-related disciplines (Bolden et al., 2010; Diakidoy and Kanari, 1999; Mullet et al., 2016 cited in Hung and Sitthiworachart 2020). It is frequently accepted that educators seem to disregard other potential fields of creativity, for example, problem-solving and critical thinking. Regarding interfacing social qualities to creativity, properties like curiosity, divergent thinking and non-compliance have been associated with creativity. In any case, most educators want to compare high impression, good scores and manner with creativity (Gralweski and Karkowski, 2013) and consider actual creative activities as negative activities (Scott, 1999).

Design is firmly identified with creativity by including the construction of new information just as critical thinking (Dorst, 2003). Specialists have connected design practices to creativity.

Barlex (2007) recommends that what designers do alludes to the principal substance of their creativity. He recognizes five factors on design and technology education as the government entity, the curricula maker, the teacher, the student and the researcher, uses innovations in school design and technology education observations from England, and describes a variety of activities involving one or more factors, noting the effect each has on the creativity of school design and technology. It is appropriate for creativity to be a natural and important piece of design (Rutland and Barlex, 2008; Howard et al., 2008). In this perspective, design educators regularly need their students to make inventive works and innovative products. Students are typically energetic about their own work thinking that it is something new and unique.

The purpose of this study is to designate whether students who enter with national entrance examination or who enter with aptitude tests are more creative in the sense of Guilford's (1950, 1967a) concepts, which are mentioned below shortly. In most countries students' selection for higher education is determined by some kind of measurement. In Sweden and Israel, in addition to final grades from upper secondary school a certain kind of examination, different formation of SAT is used. In addition, sometimes interviews are carried out or other supplementary devices are used. Especially the SweSAT (Swedish Scholastic Test) is very similar to the well-known US SAT (Aberg-Bengtsson, 2005). Thus, issues brought forth and discussed in this study might be of an international and broader horizon than admission to Turkish Universities only. In order to determine this purpose, selections of works of the same professor when he was teaching at several different universities between 2018-2020 in Istanbul, Turkey have been chosen and clustered as re-evaluated according to the adoptions of Guilford's concepts of creativity.

2. LITERATURE REVIEW

Numerous definitions have been given in the literature as far as students' creativity is concerned. Of these definitions, Guilford seems, by all accounts, to be the one most often alluded to. Literature on creativity demonstrates that creativity is the ability to construct novel, unforeseen but still invaluable imaginings (compositions, techniques or logical hypotheses) or items (Boden, 2004), creative, excellent product-resolution goals/cases (Kaufman and Sternberg, 2007), thoughts, manners or commodities that transform a current space or product into another one (Cszikszenthmihalyi, 1996) and an observable, innovative and helpful production (Plucker, Beghetto and Dow, 2004).

Starko calls attention to three fundamental components in the development of creativity in the classroom: (1) showing strategies for the construction of novel thoughts, (2) producing inventive people in the disciplines, (3) and establishing creativity-friendly study rooms. Furthermore, he embeds that different reasoning procedures, the usage of illustrations or analogies, the portrayal of imaginative connections and helpful projects might be a portion of different approaches to assemble creativity in classrooms.

With regards to assessing creativity, the best method in the literature, seems to be the divergent thinking tests of Kaufman (Kaufman et al., 2008). Guilford (1976a, p.138) portrays divergent thinking as "a concept defined in accordance with a set of factors of intellectual ability that pertain primarily to information retrieval and with their tests, which call for a number of varied responses to each test item".

Guilford's (1950, 1967a) early system with respect to divergent thinking tests and SOI (Structure of Intellect Model), in which he recommended divergent thinking, presented the concepts of fluency, flexibility, originality

and elaboration in their relation to the creativity. Fluency alludes to the quantity of ideas, advancements and reactions, which can be utilized as the regeneration of knowledge. Flexibility suggests the quantity of various kinds of ideas, advancements or reactions and adds to the categorization of knowledge (Kaufman et al., 2008). Elaboration delivers new results and chain-like thinking (Guilford, 1967a).

3. METHODOLOGY

In this case study, as the evaluation criteria when evaluating students' work to determine the level of creation Guilford's (1957) assessments of divergent thinking and his creativity concepts plus curiosity have been adapted as follows:

1. *Divergent thinking* was correlated with the successful combination of colors according to Itten's Color Wheel. The students who had the correct relations between colors were determined as having done divergent thinking.
2. *Fluency* was seen as general aesthetic formation and integrity or just the congruity of characters in animation projects.
3. *Flexibility* referred to just timing and the totality of characters in animation projects and forming target audience in the magazine cover design project.
4. *Elaboration* indicated usability in web design projects, typographic design and readability in other projects.
5. *Originality* referred to technical details in all the projects, the choice of cover photo in magazine cover project.
6. *Curiosity* was used as referring to the choice and formation of the themes of each single project chosen by student. We also included curiosity defined as the yearning for knowledge to ask the appropriate questions that will guide new ideas that are unrelated to students' immediate environment (Guilford 1957, p. 111-2).

3.1. Preliminary Explanations on the Details of Creativity Concepts

Divergent thinking will be explained in further detail in the next section.

Aesthetic formation and integrity in Fluency: What we mean by aesthetic formation is the general form and style of lines (whether horizontal, vertical, curvy or diagonal), usage of color and type that could be accessible by direct sensation as described by Pentak ve Lauer (2015, p. 28-34 and 132-4). The same definition applied to the congruity of characters in animation projects. If 65% of such an integrity or congruity was accessible, we accepted the work as 'successful' and assigned it as '1' and any percentage below were 65 was considered as 'lacking' and assigned '0'.

Timing of characters and totality of the moving sequences and forming target audience in Flexibility: What we mean by the timing of the sequences is the synchronization of characters' speech and body movements as well as their synchronization with the background and general setting of the animation as explained by Weixel and Morse (1980). If 65% of such a synchronization was accessible, we accepted the work as 'successful' and assigned it as '1' and any percentage below were 65 was considered as 'lacking' and assigned '0'.

Usability and Typographic Design in Elaboration: What we mean by usability is the presentation of information in a clear and concise way lacking ambiguity and the placement of important items in appropriate areas as well as ensuring that the content works on various devices and browsers. In other terms, usability is providing satisfaction by minimizing the time it takes to the user to learn new functionality and page navigation system, allowing the user to accomplish a task efficiently without major roadblocks, fixing errors and re-adapting to the website or application

system and functionality with minimum effort as described by Allanwood and Beare (2019, p. 1-14).

Typographic design is the technique of arranging type to make written language eligible, readable and appealing when displayed by selecting typefaces, points sizes, line lengths, line-spacing, letter-spacing etc. as well as the contrast of background-foreground on which the text stands (Harkins, 2015). If 65% of such usability or typographic design was accessible, we accepted the work as 'successful' and assigned it as '1' and any percentage below were 65 was considered as 'lacking' and assigned '0'.

Technical Details in All of the Projects and Choice of Cover Photo in Magazine Cover Project in Originality: What we mean by technical details are the overall details in typography, layout, lines, color as well as the choice of the photograph on the magazine cover, which defines the main theme (men, women, fashion, sports, auto etc.) as well as sets the general style of the magazine as explained by Moser and Moser (2011). If 65% of such a choice in the cover photograph as well as the technical details was accessible, we accepted the work as 'successful' and assigned it as '1' and any percentage below were 65 was considered as 'lacking' and assigned '0'.

Choice and Formation of the Themes of Each Single Project in Curiosity: What we mean by the choice of the theme of each single project is a question of determining whether the project was selected from the immediate environment of the student or not and the answer was achieved from an interrogation with the student (Yiğit, 2018, p. 117-140). If 65% of such a choice was from the immediate environment of the student, we accepted the work as 'successful' and assigned it as '1' and if the theme was not selected from the immediate environment of the student then it was considered as 'lacking' and assigned '0'.

3.2. Further Explanations on The Details of Creativity Concepts

Divergent Thinking:



Image 1. Johannes Itten's color wheel in paint colors, Example of triad and tetrad (Published by Itten, 1987).

For the purposes of the current study, we chose Itten's Color Wheel to determine the students' divergent thinking because it is what is taught in the Basic Design course students take in the first year of their education. They know that in the Itten model the saturated hues can easily be placed around the sphere but the comparisons between the hue values across each other are more obscure because pure hues come in different value levels. Through these kinds of comparisons, the students learn to situate their own perceptions to the structure of perceptions within the Itten's system.

In this study, divergent thinking, which requires finding the significant relationships between colors of different alternatives rather than convergent thinking, which involves, different than a conventional problem, finding only the single correct answer. Thus, what was considered to be 'a significant relationship' between colors as examples of divergent thinking occurred when a relationship between analogous, complementary or black/white and other colors were established. Since the number of possibilities of such color combinations is a lot, it also requires creativity of divergent thinking instead of a single possible answer as could be described in convergent thinking.

The contrast is between black and red. Since black is color that is out of the equations of color

relations, it can be contrasted with any color. Since the relationship between the colors were significant, it has been considered as an example of divergent thinking (Image 2).



Image 2. An example of student work from an interface design project.

In this example, a gradient has been used between magenta and blue. Since the relationship is between two analogous colors, the work was considered to be a way of divergent thinking (Image 3).

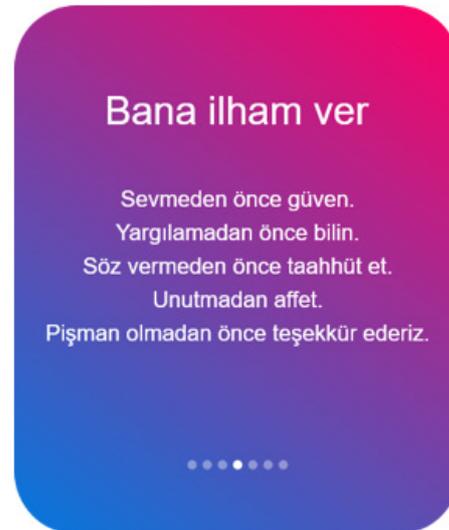


Image 3. An example of student work from an interface design project.



Image 4. An example of student work from an interface design project.

The relationship is between orange and blue, thus between a primary and tertiary color. Since there is no significant relationship, the work is considered not to oblige to divergent thinking (Image 4).



Image 5. An example of student work from an interface design project.

The relationship between blue and orange as between a primary and secondary color was not significant and thus considered not to be an example of divergent thinking (Image 5).

Although it was a moving image of an animation project, only a snapshot of it can be provided. The general aesthetic formation was well in this animation. The colors were in harmony, the sizes of the objects are in proportion and the general story was logical. And the story was a discussion of two fishes about a hotel to stay. The calculation of characters' movements was on time, one was speaking when the other was listening and



Image 6. A frame from an example of student work from an animation project.



Image 7. Another frame from an example of the same student work from the same animation project.



Image 8. Another frame from an example of the same student work from the same animation project.



Image 9. Another frame from an example of the same student work from the same animation project.

vice versa and the background diegetic sound was proper. Thus, the congruity of characters was acceptable for this project and therefore it contained *fluency* (Image 6, 7, 8, 9).

Although it was a moving image of an animation project, only a snapshot of it can be provided. The



Image 10. A frame from an example of student work from an animation project.



Image 11. A frame from an example of the same student's work from the same animation project.



Image 12. A frame from an example of the same student's work from the same animation project.



Image 13. A frame from an example of the same student's work from the same animation project.

general aesthetic formation was not well in this animation. The colors were in harmony but the sizes of the objects were not in proportion and the general story lack logicity. The story was that of a man entering into a fast-food restaurant. The calculation of characters' movement was in disjunction, and the non-diegetic background sound was not properly placed. Thus, the congruity of characters was not acceptable for this project and therefore it lacked *fluency* (Image 7, 8, 9, 10).

Flexibility and Originality:

The timing of the movements of both objects and the characters was proper and in the appropriate place in this animation. One character was moving in the correct spot with correct number of keyframes while other characters were doing the same. Also, the background objects floating in the water were also pinned correctly. Correct number and placement of key framing was done. Thus, it was considered to be a *flexible* project (Image 6, 7, 8, 9).

The timing of the movements of both objects and the characters was not out of joint and inappropriate in this animation. Almost all of the characters were moving in the wrong spots with wrong number of keyframes. Wrong number and placement of key framing was done and the project was not completed. After the main character seen above enters to a fast-food restaurant. An image of the brand occurs on the screen with wrong timing. Thus, it was not considered to be a *flexible* project (Image 11,12, 13, 14).

The magazine cover was imagined to belong to science and art magazine. The cover was original and represented the appropriate design for the audience of such a magazine with well-endowed technical details. Thus, the design was considered to be flexible and original (Image 10).



Image 14. An example of student work from a magazine cover design project.

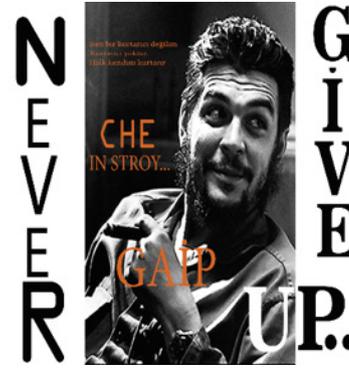


Image 15. An example of student work from a magazine cover design project.

It was not transmitted nor properly explained what genre the magazine cover was imagined to belong to. The cover represented almost nothing except a political message, which was even properly transmitted. The cover photo was not original at all. There was not a direct target audience for the magazine since the genre was not determined. Thus, the design was not considered to be flexible nor original (Image 11).

Elaboration:

The page was not in the correct resolution measurement. The page was slided to sideways and did not have a good usability. The readability of typography was regular and did not have



Image 16. An example of student work from a web design project.

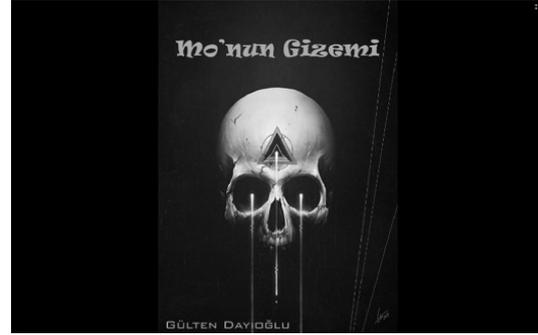


Image 18. An example of student work from a book cover design project.

any styling. Thus, it was considered not to be elaborate (Image 12).

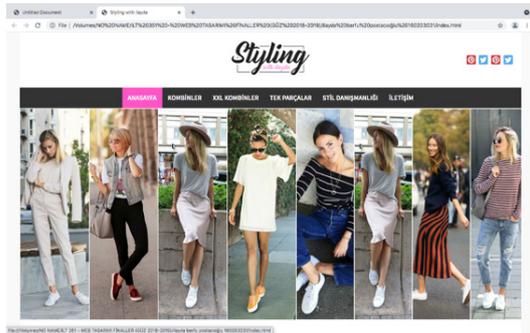


Image 17. An example of student work from a web design project.

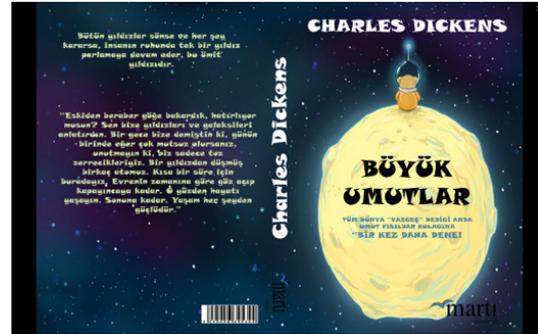


Image 19. An example of student work from a book cover design project.

The page was in the correct resolution measurement. The page was to be controlled to be placed upwards and downwards appropriately and had a good usability. The readability of typography had styling. Thus, it was considered to be elaborate (Image 13).

Curiosity:

The design was that of a book cover of a Turkish author. The student has informed the evaluator that it was a book he has read. The project belonged to the immediate environment of the student. Thus, the project was considered not to have curiosity (Image 14).

The design was that of a book cover of a British author. The student has informed the evaluator that it was a book he has read. The project did not belong to the immediate environment of the

student. Thus, the project was considered to have curiosity (Image 15).

In order to demonstrate the correlation between students' works and the professors' expectations, this study will seek to determine the level of creativity between students who have entered their departments by aptitude tests or national entrance examination (TYT). All the assignments were selected from works (midterm and final projects) of undergraduate students at several universities in Istanbul, Turkey between years of 2018-2020, all taught by the same professor. Of all the assignments being evaluated by one professor is done on purpose in order to better designate and underline the independent variable. Since all other variables (students and their works etc.) are from different grades, classes and projects thus all of them being evaluated by one professor was statistically significant.

Table 1. Distribution of gender and six concepts of creativity in students who entered their departments by national entrance examination.

Courses	Number of each gender and number of students who succeeded in each of the six concepts of creativity according to the parameters above							
	Male	Female	Divergent thinking	Curiosity	Fluency	Flexibility	Elaboration	Originality
Multimedia 1 (n=11)	6	5	5	6	7	8	7	7
Multimedia 2 (n=26)	10	16	6	19	20	7	7	20
Multimedia 3 (n=28)	10	18	16	20	20	4	4	4
Web Design 1 (n=22)	9	11	16	21	20	3	17	21
Web design 2 (n=13)	8	5	7	6	13	5	13	13
Completion Project (n=8)	3	5	7	8	4	2	8	8
Introduction to visual communication design (n=8)	11	9	13	14	15	20	17	15
Total (n=128)	57 (44.5%)	71 (55.5%)	70 (54.7%)	94 (73.4%)	99 (77.3%)	49 (26.7%)	73 (57%)	88 (68.8%)

Table 2. Distribution of gender and six concepts of creativity in students who entered their departments by aptitude test.

Courses	Number of each gender and number of students who succeeded in each of the six concepts of creativity according to the parameters above							
	Male	Female	Divergent thinking	Curiosity	Fluency	Flexibility	Elaboration	Originality
Interface Design 1 (n=146)	77	69	62	139	138	136	119	139
Interface Design 2 (n=158)	73	85	58	158	158	158	158	158
Total (n=304)	150 (49.3%)	154 (50.7%)	120 (39.5%)	297 (97.7%)	296 (97.4%)	294 (96.7%)	277 (91.1%)	297 (97.7%)

Assignment works of students (n=432) from the courses of Multimedia I, II, III, Web Design I and II, Visual Communication Design and Completion Project at the Department of Communication Design at University A, and Interface Design I and II courses at Graphic Arts (in both Turkish-English Language Instruction) at University B and Introduction to Visual Communication Design at Visual Communication Design Department at University C were selected and assessed according to the evaluation criteria described above (Table 1, 2).

Variations of color combinations, technical details, integrity, typography and readability, usability, knowledge of the software used and general aesthetic establishment and formation were the parameters of the criteria used in the study. Variations of color combination were determined according to Johannes Itten's Color Wheel. In order to determine the level of divergent thinking, each student's work has been examined and the ones having a significant color combination in accordance with Johannes Itten's Color Wheel was determined as having 'divergent thinking'. Content will establish the level of

Table 3. Comparison of six concepts of creativity between students entered their departments by aptitude tests or national entrance examinations.

	National Entrance Examination (n=128)	Aptitude Test (n=304)	P
Gender			
Male	44.5%	49.3%	0.419
Female	55.5%	50.7%	
Divergent Thinking	54.7%	39.5%	0.005
Curiosity	73.4%	97.7%	<0.001
Fluency	77.3%	97.4%	<0.001
Flexibility	26.7%	96.7%	<0.001
Elaboration	57%	91.1%	<0.001
Originality	68.8%	97.7%	<0.001

Table 4. Comparison of concepts of creativity between the genders.

	Male (n=207)	Female (n=225)	P
Divergent Thinking	43%	44.9%	0.762
Curiosity	88.4%	92.4%	0.205
Fluency	88.4%	94.2%	0.047
Flexibility	80.6%	76.4%	0.357
Elaboration	81.6%	80.4%	0.846
Originality	88.4%	89.8%	0.762

curiosity, integrity will establish the level of elaboration, readability will establish fluency and usability will establish the level of flexibility and knowledge of the software and general aesthetic establishment and formation will indicate the level of originality. For all the parameters other than divergent thinking, (technical details, integrity, typography and readability, usability, knowledge of the software used and general aesthetic establishment) the ones over 70% were found to be significant.

4. RESULTS

As a result, 432 students were enrolled in the study with a male to female ratio of 207/225 (0.92). 30% (n=128) of them have entered their department with national entrance examination (TYT) and 70% (n=304) of them were have entered their department with aptitude tests done by the specific departmental committee. 4.6% (n=20) of the students were in the 1st class, 8.4 (n=37) of them were in the 2nd class, 83.8%

(n=367) of them were in the 3rd class, and 1.8% (n=8) of them were in the 4th class.

In the whole group, 43.4% (n=190) were divergent, 89.3% (n=391) were curious, 90.2% (n=395) were fluent, 73.7% (n=323) were flexible, 79.9% (n=350) were elaborate, 87.9% (n=385) were original.

When the students were compared considering their entrance to their departments by aptitude tests or national entrance examinations, gender was similar between the groups, while divergent thinking was significantly higher in the students entered with national entrance examinations (p=0.005) and curiosity, fluency, flexibility, elaboration and originality were significantly higher in those who entered by aptitude tests (p<0.001 for each, Table 3).

When the concepts of creativity were compared between the genders, all but fluency were similar between the groups (p>0.05). Female students were more fluent than males (p=0.047) (Table 4).

5. DISCUSSION OF RESULTS

Based on the findings of the current study, the lowest difference between the values of percentages of students was obtained with the concept of divergent thinking followed by the concepts of flexibility, elaboration, originality, curiosity and fluency. It could be interpreted that students who enter with national entrance examination are more divergent in their thinking while being less curious, fluent, flexible, elaborate and original than their peers who enter with aptitude tests. One reason could be that students who enter with the national entrance examination go through a long period (1-2 years) of preparation and become more disciplined in their manners. Thus, when they are introduced to Johannes Itten's Color Wheel in the first grade, they comprehend the correct color relations and combinations and get acquainted with them much better than students who enter with aptitude tests.

Despite the fact that the most minimal difference exists in divergent thinking, since creativity has five more concepts including curiosity, fluency, flexibility, elaboration and originality, it is significant for students to exhibit a low contrast in each of the four concepts to have the option to be perceived as creative people (Guilford, 1967a, 1967b; Kaufman et al., 2008; Leikin et al., 2009; Torrance, 1974; Altan and Tan, 2020). The results of the study are compatible with that of Syukri et al (2017) in which flexibility has the most notable difference among all other concepts of creativity and of Mayasari et al. (2016) in which the scores of fluency and curiosity were similar to each other and flexibility, elaboration and originality.

Another comparison could be held with SweSAT, Aberg-Bengtsson's (2005) study, in which it is stated that a comparison between USA and Swedish SAT is drawn. Such a study has parallels with my study in that both studies have the need to include additional information about

the students who take the test. This information could be other academic achievements or the track of study in upper secondary education. However, Aberg-Bengtsson (2005) proves one of my suggestions in the discussion section. One could argue that students who come from fine-arts tracks in their high school studies are more successful in their college studies. This was further enhanced when the 'quantitative' part of SAT II was introduced in USA-SAT. Based on Aberg-Bengtsson's, it could be interpreted that students who enter with aptitude tests are more divergent in their thinking when their upper secondary education is in the same (fine arts) track.

Another important finding was that among the genders, females were found out to be more fluent than the males. Since fluency referred to readability, that is, typographical design in the projects, it could be claimed that females have better perception in typographical skills. Typographical design requires more exquisiteness than any other component of the design process. Thus, it could be said that since female students in general are more scrupulous than male students, their typographical skills are more punctilious than their male peers.

If one could draw some parallels between this study and other internationally done aptitude tests, as noted above, studies from Israel and Sweden are to be explored since these are the countries that require aptitude tests for admission to fine arts undergraduate programs. Zeidner's (1987) examines the main effects of gender and cultural group affiliation on the aptitude test performance.

Zeidner's (1987) study agrees with my study for the fact that in that study, sex differences were found to be more influential among Jewish students and more marked among males than among females. In my study, female students were found out to be more fluent in typographical

skills in design so one could argue in agreement with Zeidner (1987) that sex differences are significantly important in determining aptitude in the entrance to the undergraduate admissions as well as during the undergraduate studies.

One important limitation to this study was that this study was done with the students of one professor who has worked at several private universities in Istanbul, Turkey between 2018-2020. Further studies replicating the methodology of the current study should take into consideration the expansion of several classes of students with several different professors both at state universities and private universities. For example, one project could be given to one class of a professor at a state university wherein students were taken with aptitude tests and the same project could be given to two classes, one of which was that of one professor at a private university wherein students were taken via aptitude tests and the other one being the class of another professor at the same private university wherein students were taken via national entrance examination and the concepts of creativity could be evaluated with those different three classes. When done with such a methodology, the results might be more than interesting to see.

To overcome the limitations of this study, more studies to enhance the quality of the aptitude tests could be done. There are high schools in Turkey who are specialized in fine arts education. Further studies, which track the performances of the students coming from these high schools, need to be done. In addition, creativity level of students coming from different socio-economic families and regions may also be traced in order to understand the correlation between inclination of students and the family and the environment in which they prosper. However, students selected for the study were rather limited due to them being students of a single professor.

CONCLUSION

In order to compare the conclusions of this study with other studies, one can take a look at several works focusing on the differences and predictions between SAT (both in Israel and Swedish contexts – added the USA contexts here as well) and other admission systems based on GPA or other abilities of students who apply to the fine arts departments.

Further in their study, Atkinson and Geiser (2009) find two truths. First is that the pool of qualified candidates who succeeded in college is larger the number of students who can be accommodated at certain number of institutions in USA. Second is that admission criteria different than scores in the tests are more significant in selecting whom to admit from among the larger pool. However, in their study, Atkinson and Geiser (2009) note that no single admission criteria satisfy all of the principles. They note that two decades ago, Crouse and Trusheim (1988) have argued that a new generation of achievement tests should provide incentives for educational improvement and encourage greater diversity in admission tests. In other words, it has been suggested by Atkinson and Geiser (2009) that ACT tests, which are the tests used in USA today have insufficient criteria for admission to colleges and provide a weak prediction for later success in the academic life.

In order to continue with the compared international contexts above, another parallel can be drawn from Beller's (2008) study. The present context in Israel is based on the agreement that an admission score composed of an equally weighted composite of matriculation grades (*Bagrut*) and the psychometric test score (PET) is applied by Israeli universities.

Beller (2001) states that the overall benefit of PET over secondary school accomplishments would be diminished if not expunged out in conditions

where secondary school accomplishments are all the more viably directed. Beller (2001) recommends that the selection apparatuses ought to be selected based on psychometric contemplations while decisions with respect to admissions strategy ought to mirror the upsides of the general public and alternative high-validity selection strategies and upgrades in the framework ought to be persistently looked for. Albeit such endeavors being completed by psychometric specialists in the selection and admission processes at the colleges, they need to keep utilizing the current framework while consistently attempting to further develop it.

As Cliffordson(2008) had found in her study that the inconstancy in the expectation of achievement in scholastic tests is more prominent for SweSAT than the grades. The outcomes illustrate the SweSAT to be functioning better as an indicator for Hum-Soc programs than Tech-Nat programs. The SweSAT contains two quantitative sub-fields (numerical reasoning and problem solving with information in diagrams, tables, and maps) and three verbal sub-fields (English and Swedish reading comprehension, and vocabulary).

To further the study of Atkinson (2004), Cliffordson (2008) additionally supports utilization of GPA in inclination to aptitude tests. Nonetheless, in Atkinson's (2004) contention about the reason of achievement tests being liked over grades is that evaluating paradigms shift across instructors and schools. Cliffordson (2008) demonstrates that educators and schools have been noticed for the new criterion-referenced grading system and that these grades have the best prescient legitimacy of all the selection devices. Almost certainly, the arrangement of national tests utilized in the Swedish educational system adds to keeping up equivalence between evaluating paradigms of various schools.

As it could be concluded from all three studies

that SAT (which could be compared with the Core Proficiency Test - TYT) is not a well-endowed predicator of the success achieved in the later years of undergraduate study. As my study concludes, it could be said that students who enter with national entrance examination are more divergent in their thinking while being less curious, fluent, flexible, elaborate and original than their peers who enter with aptitude tests. It could be asserted that aptitude tests although are poorer in the way they are done, they offer a better criterion for predicting later success in academic life.

For recommendation, further studies similar to the current study could be done including a larger sample of students as well as universities and professors. Future research on these types of evaluation could lead with several probable inclinations. This study was conducted with several different student groups who have several different projects and a specific class level (university undergraduates). It would be appropriate to converge the research to a specific group of students with specific projects to investigate the generality of the present findings and to identify a comparative level at which the creativity concepts are specifically used. Also, the students in this study were task-oriented (for realizing a specific project at a specific time and in a specific plan) but not open-ended (that is, not customized for self-exploration and self-solubility). Tasks that are more peculiar to the type of self-reflection (exploration or solubility) may predict better results. An additional option would be to minimize the feedback of the instructor by making it more suitable for students' self-reflection, rather than remaining specific to the instructor-oriented projects.

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- *Image 6, 7, 8, 9*. A work by Berkant Uçar - A Communication Design Student
- *Image 10, 11, 12, 13*. A work by Esra Yalınkılıç - A Communication Design Student
- *Image 14*. A work by Buket Ergül - A Communication Design Student
- *Image 15*. A work by Ömer Faruk Meçu - A Communication Design Student
- *Image 16*. A work by Busenur Özkan - A Communication Design Student
- *Image 17*. A work by İlayda Berfu Postacıoğlu - A Communication Design Student

- *Image 18. A work by Berkay Can İshakođlu - A Communication Design Student*
- *Image 19. A work by Veysel Can Őeker - A Communication Design Student*

