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Deconstruction as a Technique for Divergent Thinking in Pedagogy of the Academic Design Process

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Abstract

Academic pedagogy of the architectural design process is one of the most contested concerns in architecture. Divergent thinking has resulted from the intricacy of architectural problems, as well as the requirement for creativity in finding solutions. One of the most well-known theories in the field of linguistics is Jacques Derrida's deconstruction theory, which looks to be comparable to divergent thinking. The purpose of this article is to demonstrate how deconstruction may be used to develop different thinking and, as a result, increase the creativity and problem-solving abilities of architecture students. The two design processes and their outcomes were compared in this study, which was undertaken experimentally during an academic architecture pedagogy semester with the participation of senior architecture students. According to the findings, 80 percent of students in group A, who used the deconstruction technique, had all of the divergent thinking criteria in their design process and outputs; however, these criteria were not totally obvious in group B work that used the regular process. Based on the qualitative and quantitative findings of this study, it can be concluded that deconstruction in the design process serves as a tool (technique) to foster divergent thinking and creativity in students, hence boosting their ability to generate responsive solutions.

Keywords

Deconstruction, Derrida, Design Process, Divergent Thinking, Academic Architecture Pedagogy.

Introduction

Derrida is one of the most important, divisive, and difficult intellectuals of the twentieth century. Deconstruction is Derrida's work, but it was started by previous thinkers such as Heidegger, Husserl, and Nietzsche. He appears to have disclosed his deconstruction theory for the first time in the book *of grammatology* by contesting the origins (Derrida, 1976). According to Derrida, deconstruction is performed in two steps: reversal and searching for the roots (Derrida, 1976). This research was conducted in an academic design studio and its purpose is to study deconstruction as a tool for divergent thinking and examines the impact of roots and reverse trends on the architectural design process and its outputs. In this study, the emphasis is on using hand-making tools such as diagrams, sketches, schemas, and maquettes instead of computer software, as in many studies the importance and advantages of these tools have been mentioned (Lawson, 1994; Liu, 1996; Athavankar & Mukherjie, 2003; Bechky, 2003; Goldschmidt, 2004; 2007; Goldschmidt & Smolkov, 2006).

Literature Review

The pedagogy of academic architecture is based on design studios. The design studio is, in reality, the most significant experience of architectural departments. Students learn some of the most important knowledge and design abilities, as well as develop their creativity, in this educational setting (Casakin & Kreitler, 2008; Schön, 2008). They practice combining academic and practical parts of the architectural profession by experimenting issues that simulate real-life practice (Crowther, 2013). An ambiguous problem is offered to the student at the start of each design process, and the student must provide an efficient solution to this problem using the design process output (Cross, 1982; Chand & Runco, 1993; Aspelund, 2006). The media define the outputs of the design process. Media are used at every level of the process, sometimes as meaning-making tools and sometimes as physical instruments, and this is a technique to increase the designers' and students' abilities (Khakzand & Babaei, 2018). The complexity of the design problem as well as the process itself forces architecture students to try out many approaches and media in order to find appropriate solutions (Sorguç et al., 2009; McLuhan, 1964). Divergent thinking and convergent thinking are two ways of getting the answer to the problem. If there is only one answer to the problem, convergent thinking will be useful, but the nature of the architectural problems is such that they can have countless correct and creative answers (Runco, 2001). Therefore, divergent thinking is necessary to answer design problems. Divergent thinking can be achieved many ways. Derrida's deconstruction theory is introduced and explored in this study as a technique for achieving divergent thinking and promoting students' creative talents.

Derrida's Theory and Design Process

Deconstruction can be used to better comprehend the relationship between text and meaning, institution and nature, dichotomies, and the hierarchies that language creates. It is a type of literary and philosophical analysis that is based on the writings of post-structuralist philosopher Jacques Derrida. His work suggests that meaning does not remain static but rather evolves and alters over time and space (Turner, 2016). *The difference between one discourse and another lies merely in the manner in which one inhabits the interior of a conceptuality doomed to decay, or already submitted to decay*, argues Derrida. *We must strive to re-establish the unity of tool and idea, whether inside that conceptuality or even without it, before the originality of the one and the other is revealed, and without allowing this profound union to give rise to confusion* (Derrida, 1998). A sentence is made up of words that have meaning alone. Each word has an equivalent and alternative in different languages that convey the same meaning, and therefore a sentence can be made in different linguistic structures with multiple forms and still adhere to the desired concept. But if we change the position of words in a sentence, not only does its original meaning disappear, but it may become completely meaningless. In architecture, the components in different contexts can be expressed in different languages but retain their meaning.

Deconstruction in this study approach does not mean changing the position of words and architectural elements but finding alternative words that in new structures still adhere to their original meaning. In other words, there is an equivalence, analogy, or at least a metaphorical relationship between words and architectural elements. According to Derrida (1988), Deconstruction comprises two stages. The reversal occurs in the first stage, and the search for the root hierarchy begins in the second. The linguistic structure of Derrida is extremely similar to the architectural context and geography through which the text, which is the architecture, may be understood, according to the conceptual interpretation of this theory that is studied in this study. Each language has its own grammar that determines the position of words relative to each other. Also, each architectural context determines the type of composition of architectural elements and how they are placed. The harmony of the building with the surrounding environment is just as vital as the harmony of the text with the language's order.

The design process is a one-of-a-kind solution to site problems and Architecture context that is presented owing to the unique qualities of each site, and because different challenges need different responses, each design process will be unique (Harvey, 2013). Rather than a straight line, Lynch (2012) shows this process as a loop between intuition and reality, or the mind and the hand (Toth, 1988; Lynch, 2012). According to Derrida's theory in linguistics, in the design process it can also be stated that everything can play a role as a medium, and some other studies have shown that the search for ideas is often relatively free and intuitive (Goldschmidt & Sever, 2011; Davies & Talbot, 1987).

1. *Reversal*

The reversal happens by the use of classical argumentation concerning presuppositions. The reversal here is similar to the familiar repetitions or design feedback cycles with the difference that in addition to Reverse motion in a design process and examining the possibilities and feedback, at the same time in each stage — selecting ideas, shaping them, and creating architectural forms— inverse concepts are also addressed. Subversion of hierarchical structures, according to this viewpoint, occurs on a regular basis (Araya, 2008). Regular structures in the design process limit the creative use of media (Casakin & Wodehouse, 2021), but a reverse and cyclical approach that allow for return, reflection, and re-examination allows for various answers and creativity. Reversal in a design process can happen at any point, according to deconstruction. This reverse approach allows the student to examine the solution, correct any flaws and with the help of inverse concepts, find the roots of the main concept and clarify its purpose and the efficiency of elements. Furthermore, because the issue of the context is also brought up in the design process, coordination with the context and geography can only be accomplished through a cycle procedure (Figure 1).

2. *Roots*

Each design challenge refers to one or more concepts, either directly or indirectly. In Derrida's view of linguistics, these concepts can be equated to the same roots. The search for roots can alter the structure of traditional forms (Derrida, 1988). As stated before, architecture is a kind of language. In this study, students searched for roots in a variety of ways. They searched for metaphors, meanings, shapes, junk art, etc. to generate their ideas.

In design, metaphors are viewed as heuristics that help to organize design thinking and deal with ill-defined design problems (Khakzand & Azimi, 2015). A metaphor, it is claimed, is one of the most basic tools that a designer may use to form a structure, build connections, and remold the experiences that humans rely on so heavily. These are the same things that a design student should do throughout the concept phase. Metaphors can play an important part in the creative process by changing known thoughts into new ones (Lakoff, 1987). According to Gonçalves et al. (2014), metaphor is a powerful tool that can inspire designers in a variety of ways. Metaphor is appropriate and useful in the early stages of the design process, and it is especially important for defining a situation. To put it another way, creating parallels between different concepts and situations aids the designer in comprehending the design problem from various angles (Gonçalves et al., 2014).

Furthermore, metaphor is not the only way to explain how shapes arise; it is merely a tool to help people grasp how an object is formed (Khakzand & Babaei, 2018). Junk art was defined in some encyclopedias as three-dimensional art which is made from discarded materials such as metal, mortar, glass, wood, etc. (Merriam-Webster, 2016). Creating a junk model is a strong, efficient, and enjoyable procedure that greatly assists in comprehending the components of problems and ideas. Also, readily available objects were quickly transformed into improvised materials, which were then included in the emerging and appearing form. There are no specific guidelines to follow when creating such a model, except that you should utilize your imagination, and finally layouts should be recognized in their proper context (Bramston, 2008).

Divergent Thinking

Divergent thinking is the ability to generate a large number of new ideas in a variety of formats, which encourages creativity (Runco & Sumners, 2015). Divergent (proliferating) thinking, productive thinking, imaginative thinking, or creativity are all terms used by educators and psychologists to describe this skill (Kim et al., 2011). Divergent thinking, in turn, leads to more flexible information seeking and a greater openness to unexpected discoveries (Heinstrom, 2010). Divergent thinking is cognition that leads in various directions. Some of these are conventional, and some are original. Because some of the resulting ideas are original, divergent thinking represents the potential for creative thinking and problem-solving. Originality is not synonymous with creative thinking, but originality is undoubtedly the most commonly recognized facet of creativity (Runco & Pritzker, 2020). Divergent thinking, as one component of creative thinking, is still a popular notion among creativity researchers, and it is the basis for many of the most popular creativity-training exercises (Baer, 2016).

In the literature, four criteria of diverse thinking are usually mentioned:

- Fluency: The total number of reactions to a particular stimulus is known as fluency, *the total number of ideas given on any divergent thinking exercise* (Runco, 1999).
- Originality: The uniqueness of responses to a given stimulus is known as originality, *the unusualness of an examinee's or respondent's ideas* (ibid).
- Flexibility: the number of various types of responses to a given stimulus, or more broadly, *a change in the meaning, use, or interpretation of something* (Guilford, 1968).
- Elaboration: the extension or broadening of ideas in one's responses to a given stimulus, *the richness of detail in the ideas one produces* (Baer, 2016). In this study, attention is paid to the context similar to the Elaboration criterion, which means the expansion of ideas in a person's responses to certain stimuli.

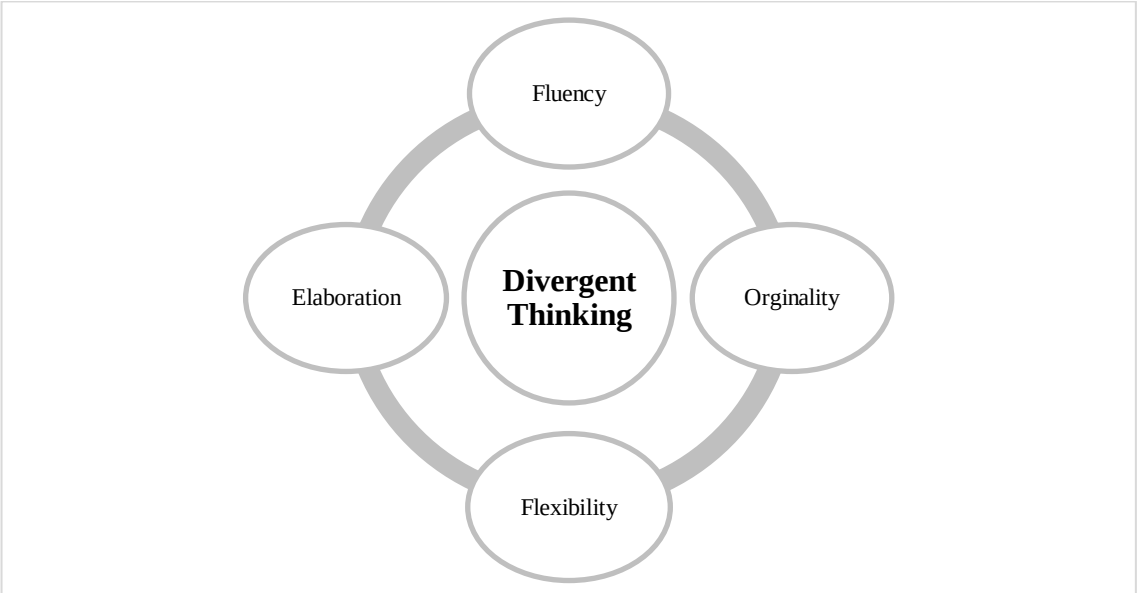


Figure 1: *Criteria of divergent thinking.*

Methodology

The architectural design studio contains an important procedure that tries to mold students' architectural sensibilities while developing their communicative and problem-solving skills (Tokman & Yamacli, 2007). In this study, In order to test the association and effect of deconstruction on the design process, the experimental method was used in which the design process and design results of two groups of students were compared with each other. Thirty senior architecture students participated in the study and were randomly divided into two groups of 15 people. Both groups received the same teaching experience in previous semesters and had the same supervisors during the process;

- The first group consisted of 15 students who designed with deconstruction (Group A).
- The second group consisted of 15 students who designed with a formal structure process (Group B).

This study is taken from an eight-week semester in a design studio, to which 5 hours of a day per week were allocated. At the beginning of the semester, all students were given a single topic called *The Center for Architects* and a geographical context. They were asked to pay attention to the coordination of the design with the context in addition to answering the design problem (Table 1). Due to the importance of the design process and the results obtained in this study, participants were asked to record all the steps and details of obtaining ideas, shape composition, and creating forms. The authors were also present at all stages of the students' activity and recorded the distinctive points of each process. Then the design processes and their outputs were compared with divergent thinking criteria (Figure 4).

Table 1: *Symbols and abbreviations used in this research.*

Week	Group A		Group B
	Adaptation of the concept of deconstruction from Derrida's theory for the design process		A linear design process model
1-2	*Metaphor*	**Meaning** **Instructors:** Defining the design problem, context, and describing the design process as well as the role of deconstruction (reversal and roots). **Students:** Study the problem, relevant and irrelevant meaning, context and geography. Students worked in groups to find the subject's roots. This step was repeated by the students several times.	**Instructors:** Defining the design issue. In addition, context and geography were introduced. **Students:** Study the problem and physical plan.
3-4	*Idea*	**Instructors:** The student was asked to find the roots of these meaning in any way they could, like junk art. **Students:** Looking for ideas in the words, meanings, metaphors, junk art and everything around them. The students attempted to come up with ideas that mostly were in harmony with the meanings and roots discovered in the previous step. At this point, they also took advantage of the reversal of the trend.	**Students:** Generating composition of volume based on common shapes related to the problem.
5-6	*Concept*	**Instructors:** The students were asked to create compositions that have the most similarity to the ideas with the help of lines and planes. **Students:** creating concept (shaping ideas) with the help of lines, planes, etc. Students created concepts in harmony with the context, meanings and ideas. They created several combinations at this stage	**Students:** Designing the plan and creating composition of volume to achieve the most appropriate composition.
7-8	*Form*	**Instructors:** The students were asked to convert created lines, planes and composition of volume into architectural forms. **Students:** Looking for architectural forms and finally achieving the form. Students attempted to transform the composition produced in the concept stage into an architectural form using architectural elements that are in dynamic interaction with the context while remaining true to the original idea and hidden meanings.	**Students:** Landscape design. At this stage, after designing the volume and architectural plans, the student designs the surrounding landscape. Most of the student's activity at this stage is to incorporate architecture into the context and not to interact with it.

During the pre-design exercise, Group A students uncovered the roots by evaluating the design problem and context through brainstorming and exploring meanings — in the first week of the project—. They then group similar concepts, and each student chooses a set of phrases before searching for only one word that encompasses all fundamental principles (search for roots). In order to clarify the relevant notion, students additionally extracted the inverted concepts linked to it. The students then went on a search for compositions, shapes, and anything else that reminded them of the subject they had picked. In reality, they use metaphors and strive to locate words in the universe of shapes. Focusing on reverse concepts and the reverse process at this time is quite beneficial. In the third stage, students were asked to transform these metaphorical ideas into three-dimensional compositions using points, lines, and planes, and to come up with as many diverse compositions as possible. Finally, the students must locate the architectural equations of the components in the fourth stage and construct the final forms in the final step.

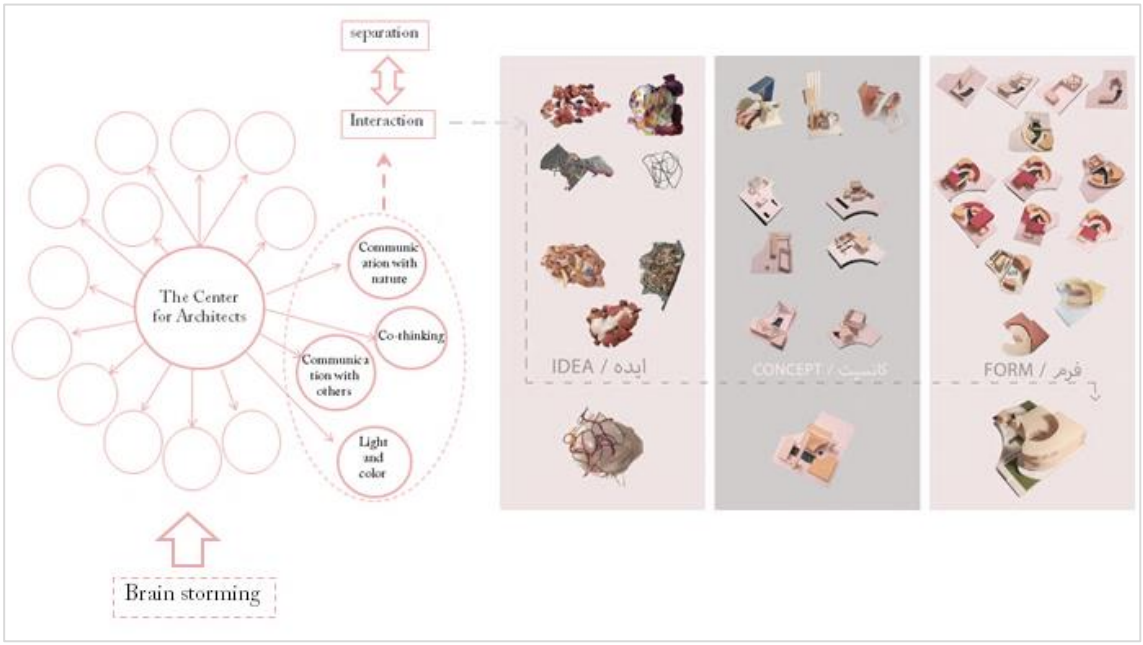


Figure 2: *An example of a Group A design process.*

Finding

All student projects were collected by the authors and then analyzed. The dominant design process in the two groups based on student designs and authors' analysis is presented in Figure 1, and Table 2 presents the sources of ideas and the minimum and maximum number of compositions obtained in each step.

Table 2: *Compare idea sources and the number of outputs of each step.*

	Idea Generation	Concept Getting	Form
Group A	Junk, Shape, Meaning, Metaphor, …	N: 2-5	N: 2-4
Group B	Shape	1	1

In the process of Group A, the position of the roots and the reverse process are presented. In this process, to find the design answer, students first searched for the roots of the problem and its implications. They used metaphors, meanings, shapes, etc.

They also used the reverse process of repetition in returning from form to concept and from concept to the idea. The multiplicity of concept stage formulations as well as the variety and responsive forms are a testament to the creativity of Process A. As can be seen, the students in Process B used a linear process with a forward trend according to the teaching method in the previous semesters. They sometimes looked at the shape compounds of the previous stage in the form-creating stage but did not look for roots or explore other possible options.

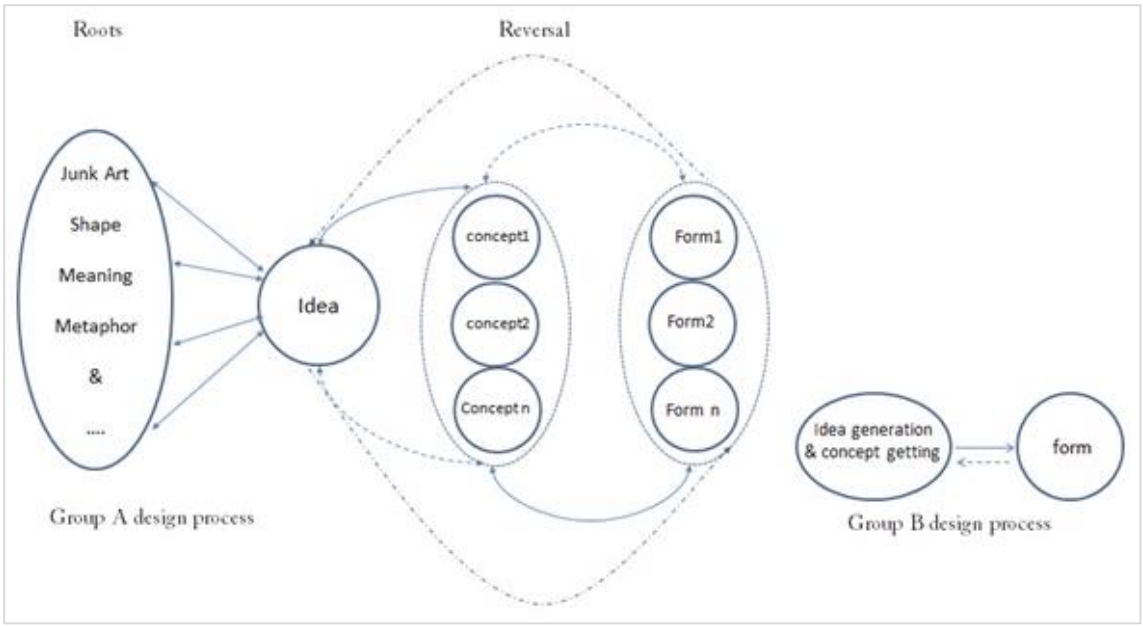
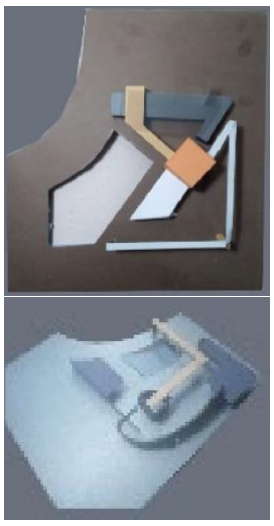
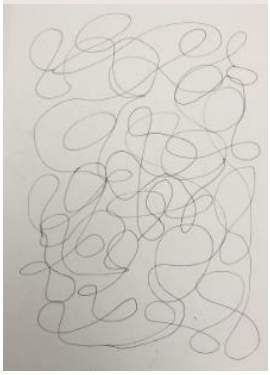
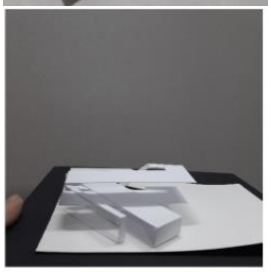
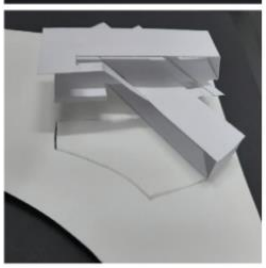


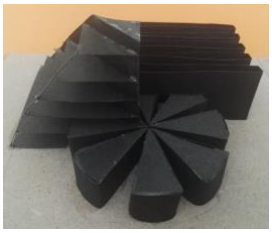
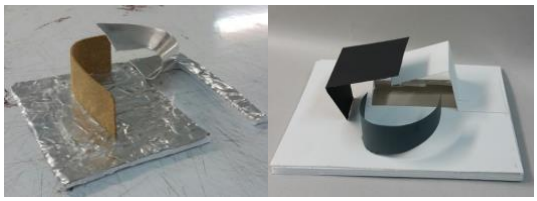
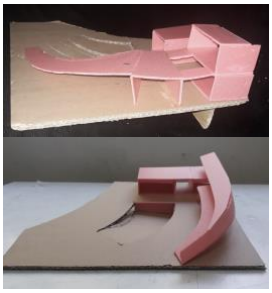
Figure 3: *Comparison of Group A and B design processes.*

In Table 3, due to the large number of projects and page limitations, only three projects in each group were randomly selected.

Table 3: *Comparison of results and design process with divergent thinking criteria: Fluency (F1), Originality (O), Flexibility (F2), and Elaboration (E).*

Group A; *Students were familiar with the deconstruction in the design process. Metaphorical ideas, Multiple concepts and The final form has complex volumetric compositions*						
Idea	**Concept**	**Form**	**Criteria**			
			F_1	**O**	**F_2**	**E**
			*	*	*	*

 	   	  	*	*	*	*
 	   	  	*	*	*	*

Group B; *Most students got ideas from shapes and could not communicate with the context and Geography. Forms are mostly One volume.*					
Idea generation & concept getting	**Form**	**Criteria**			
		F_1	**O**	**F_2**	**E**
					
					
					*
		*			

The design process of students and its outputs were examined in terms of compliance with divergent thinking criteria. The results of this study are presented in the following diagram (Figure 4). In this analogy, for each of the criteria for determining divergent thinking, an equivalent was defined by the professors in the design process. The multiplicity of ideas is equivalent to Fluency, deep attention to the problem and extraction of its basic concepts is equivalent to Originality, the ability to change compositions and cyclic movements during the process is equivalent to Flexibility and attention to the context and coordination of the final form with the project context is equivalent to Evolution.

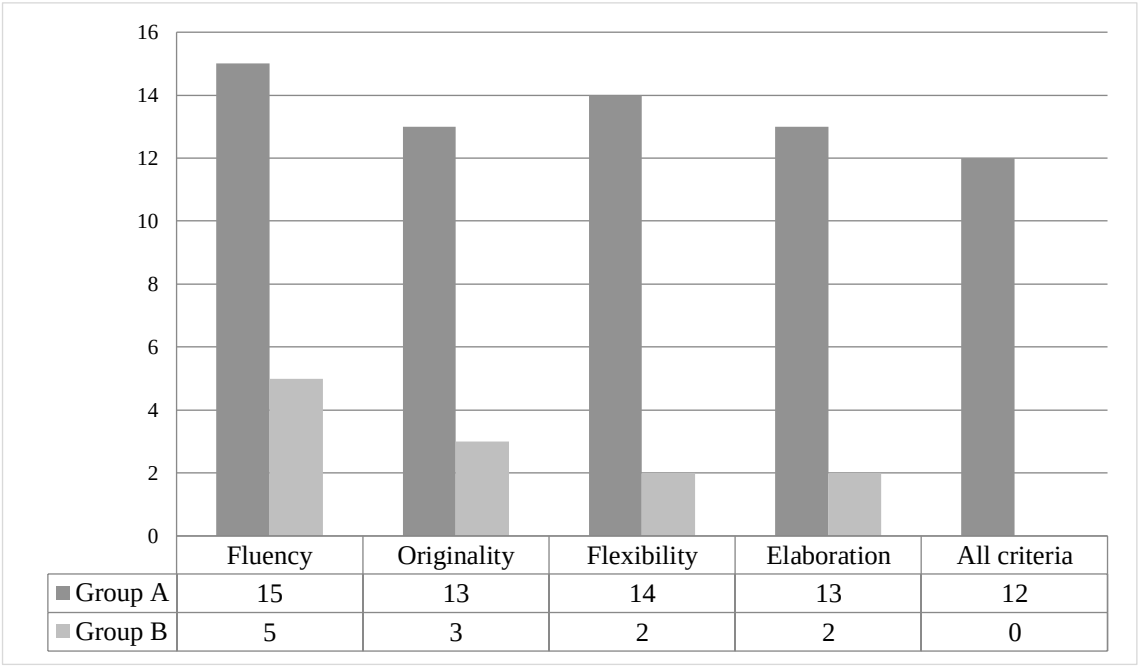


Figure 4: *Comparison of design processes and their outputs with divergent thinking criteria.*

Discussion and Conclusion

The design process of the two groups, the activities they performed at each stage, and their outputs show that Group A is highly consistent with the divergent thinking criteria. As Lee stated, there is a clear link between divergent thinking and ideation (Lee & Ostwald, 2022). In this study as well, Group A students got ideas from a variety of unusual examples. Some of them got ideas from the objects around them and others from junk art, forms, metaphors, and other sources. The diverse number of ideas in Group A reflects the fluency that is the first measure of divergent thinking (Baer, 2016; Lee & Ostwald, 2022). While Group B students, due to the wrong system of academic education in the previous semesters, looked for a similar shape or concept for the problem then moved straight to the first alternative (closest option) that this is a sign of their convergent thinking (Killgore, 2010). At the early stage of the process, Group B extracted the physical program according to the subject matter and created volumetric compositions that were appropriate to the use and demands of the problem. As a result, they refused to come up with multiple ideas.

As seen in the design process diagrams (Figure 3), students in Group A benefited from a dynamic process with a continuous reverse trend and a cycle process. This made the process and compositions flexible and enabled students to change the compositions at any time during the design process (Baer, 2016; Drago & Heilman, 2012). Whereas students in Group B went to the next step as soon as they got the answer and refused to go back and test alternative options (Figure 3). According to the findings of the two design processes, 80 percent of Group A students who designed using deconstruction were able to present all criteria of divergent thinking and they were able to simultaneously achieve the appropriate composition of the form to answer the design problem and the context coordination (Figure 4). They were able to understand the design problem more deeply due to the technique of returning to the roots, and also due to the reverse capability had more freedom of action and as a result, acted creatively during the process and in achieving the form. Group B students who had gone through the linear design process in previous semesters participated in this semester with the same assumption. Therefore, design process in Group B has a regular framework and structure that students have subconsciously felt obligated to follow. As a result, they avoided proposing novel ideas or solutions. Also, not only did they fail to behave creatively, but they also failed to consider the context.

The Group A design process confirms that as stated in the study of Casakin and Wodehouse, going through the process in an unusual way encourages students to break away from conventional thinking and common forms. This is how they achieve divergent thinking (Casakin & Wodehouse, 2021; Runco, 2001; Lee & Ostwald, 2022).

On the other hand, in contrary to what was stated in a study of a public opinion poll in Mackinnon, creative abilities to respond to design problems are not inherent, and this study showed that, as Derrida said and it has also been mentioned in Vangundy studies, it can be achieved (Torrance, 1974; Derrida, 1976; VanGundy, 2008). In fact, people who devote more attention to carefully defining problems are often more creative than other persons (Runco, 2001). This study revealed that the search for roots, which in this study occurred through creative associations, metaphors, meanings, and empirical openness in order to receive open-minded inspiration at the early stage of the design process (Mumford et al., 2018), and reversing trends are significantly in line with divergent thinking criteria. For this reason, it can lead to creative solutions and improve students' problem-solving ability.

Unfortunately, the deficiencies of the educational and academic systems, as well as instructors' inabilities have resulted in a suppression of students' creativity. As previously stated, it is possible to cultivate creativity through education, and instructors must provide effective methods and approaches to foster students' creativity. This study presented deconstruction as a technique for achieving divergent thinking and promoting creativity in the pedagogy of the academic design process. The authors suggest that in future studies other approaches that can be beneficial in realizing divergent thinking are to be studied.

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