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COULD WE UNDERSTAND ‘DESIGN’ THROUGH ITS DEFINITIONS AND APPROACHES? BASIC ATTITUDES OF THE 20TH CENTURY FROM HERBERT ALEXANDER SIMON TO WOLFGANG JONAS

**Tanımları ve Yaklaşımlarıyla 'Tasarımı' Kavrayabilir miyiz? Herbert
Alexander Simon'dan Wolfgang Jonas'a 20. yüzyılın Temel Tutumları**

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Abstract

The article speaks on whether we could discuss design by defining its guiding and distinctive aspects. The examination focuses on basic assumptions and inferences of the 20th century about how design can be described and follows a qualitative method. The qualitative way used is based on theoretical reading and discussion. In this article, the narrative starts from the problem-related attitude of social scientist Herbert Alexander Simon and extends to the information-based perspective of design theorist Wolfgang Jonas. The discussion would contribute to understanding some of the guiding differences and similarities between definitions and approaches to design. The study emphasized that defining and understanding the concepts of design and design processes is complex. They are the product of socio-cultural and artistic combinations, technological developments and mathematical ideas.

Keywords: *Design, design approaches, design process, design activity, Herbert Alexander Simon, Wolfgang Jonas*

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Öz

Makale, ayırt edici ve yol gösterici yönlerini tanımlayarak, tasarımın ne olduğu konusunda konuşup konuşamayacağımızdan bahsetmektedir. Çalışma, tasarımın nasıl tanımlanabileceğine dair yirminci yüzyılın başat varsayımlarına ve çıkarımlara odaklanmaktadır ve nitel bir yöntem izlemektedir. Kullanılan nitel yol, teorik okuma ve tartışmaya dayanmaktadır. Anlatı, sosyal bilimci Herbert Alexander Simon'ın tasarım problemi temelli bakış açısından başlamakta ve tasarım teorisyeni Wolfgang Jonas'ın bilgi temelli görüşüne kadar uzanmaktadır. Çalışma tartışması, tasarımla ilgili tanımlar ve yaklaşımlar arasındaki bazı yol gösterici farklılıkların ve benzerliklerin anlaşılmasına katkıda bulunacaktır. Çalışmanın vurguladığı üzere, tasarım ve tasarım süreçlerine ait kavramlarının tanımlanması ve anlaşılması karmaşıktır. Sosyo-kültürel ve sanatsal kaynaşmaların, teknolojik gelişmelerin ve matematiksel teorilerin ürünüdürler.

Anahtar Kelimeler: Tasarım, tasarım yaklaşımları, tasarım süreci, tasarım aktivitesi, Herbert Alexander Simon, Wolfgang Jonas

INTRODUCTION

We could say there is no exact definition and way of the design process, approach, or activity (Brawne, 2005; Kaplan, 1977; Alexander, 1977; Zeiler, 2019). Design processes have similarities with the problem-solving cycle and mental and decision-making processes. Design approaches are related to complex synthesis, assessment and evaluation steps. Design-specific attitudes and approaches need to be specially designed according to the design problem and environment. Efforts to plan and study the design components and routine steps would be valuable. The simulations and models would produce useful attributions before the process begins. Approaching design as a complex way of mediation will help us understand the role of the user and the designer.

Design definitions and approaches fit the mindset during the 20th century

Problem-related attitudes

We can define design as a '**problem-solving activity**' as an initial way related to a design problem. One of the first scholars, who interpreted the design process as a problem-solving activity, was American social scientist Herbert Alexander Simon. He defined problem-solving activity as the best appropriate activity amongst the massive possibility sets. Simon associated a successful problem-solving activity with the realisation of the chosen solution in a manageable way (Simon, 1979). According to Simon, problem-solving activity expresses solutions understandably in the most basic sense. Different solutions can emerge in different design-making approaches (Simon, 1976). American architectural historian Colin Rowe categorised the problem-solving activity into three sub-categories. They are 'trial and error type', 'generate and taste type' and 'means-end type' problem-solving activities. His idea associates the architectural design process with problem-solving activity and accepts the model-based analysis. For him, the final architectural product should be assessed quantitatively and qualitatively after making problem-solving (Rowe, 1983; Petit, 2015). Professor in Architecture Bryan Lawson associated design as a problem-solving ability with convergent and intuitional brain activities (Lawson, 1979). He says using different aspects of the design objects would be

beneficial to overcome the design-related problem-solving activities (Lawson, 1980; Lawson, 2016). Turkish academic Gülsün Sağlamer also defined the attributions of architectural design as a problem-solving activity. She says architectural design presents an ample, multivariate area to offer solutions to problems. However, solutions may lose their validity due to the time conditions and changing preferences related to the design problems/outputs (Sağlamer, 1982). American educational psychologist Richard E. Mayer associated the architectural design process with problem-solving activity and defined problems as givens, goals and obstacles. The givens express the beginning data of studying problem-solving. The goals represent the situations to achieve the solution of a problem (Mayer, 1998). With the aim to progress from givens to goals, the realisation of the thinking activity is required. The obstacles refer to the situation changes in givens or goals, which can sometimes stop the process.

One of the main concerns in the problem-solving attitude is defining the problem clearly. The other one is to integrate problem-solving steps to process compatibly and holistically. Considering some criteria or principles would be beneficial for solving the design problems. Indeed, the design activity needs to be directed to achieve one goal. Achieving the determined goal contains more than one articulated mental process. The mental process is accompanied by a cognitive process (Werner and Long, 2002). So, seeing the architectural design process as problem-solving is not enough to explain the design process. Before practising it, it is impossible to know an optimum solution for a design problem. Even if the design process is already solved, better solutions may be generated to the design possibilities (Bonnardel and Marmèche, 2005). Even if problem-solving steps are prescribed and known, it is impossible to clearly explain the relationship between problem and solution in the design process (Broadbent et al., 1990). So, the problems of the architectural design process are defined as ill-defined problems by some theorists.

Decision-related solutions

Studying design as a '**decision-making activity**' can be another way to understand it. British mechanical engineer Leonard Bruce Archer defined the design process as a goal-oriented decision-making activity. He explained the steps of taking decision activity as if they were listing possible design solutions (Archer, 1979). Creating alternatives and putting the final products can be possibly purposed in every alternative solution. Calculating the probability of realisation of every final product would be productive. Detecting the criteria for deciding and evaluating alternatives would create effective decision-making activities (Archer, 1965). Defining the design process by starting from decision-making is not enough to describe all the design processes. Using decision-making activities as a model can be helpful when the possible solutions are selected instead of listing all possibilities.

Discussing design as '**puzzle making**' is advantageous to discuss the difficulties of design's components. American architect John Archa expressed the architectural design process with the help of puzzle making instead of making a decision. He claimed the design issue could not be predicted before constructing it, so the architectural design process cannot be fully defined as a problem-solving activity (Archa, 1985; 1987). When the architectural design process begins, requirements are not particular. This situation creates a

contradiction with the nature of the problem-solving activity. In the problem-solving activity, problems are solved by considering the possible criteria and necessities. Thinking of design as a puzzle would be definitely beneficial if the design criteria are not strictly defined (Archea, 1971).

Cognition and mental processes-related ways

Overcoming the definition of design by its '**mental activity-based**' nature is highly productive. British design researcher Nigel Cross emphasised the uniqueness of human beings' design, not machines. His perspective shows that design needs exclusive ability and intelligence. Design is human brain activity and faces problems or necessary demands containing intensive mental activities. In the design process, situations are perceived, and solutions are generated according to the affordances. So, the design process needs to be defined as a problem-solving activity, including intensive mental activities. Differently from problem-solving activities, the design process needs mental capability due to the problems of design processes. Due to the ambiguity of design problems, designers may approach them as ill-defined problems. Unlike problem-solving activity in quantitative domains, problem-solving of design activity may not progress accumulative and linearly. The design solution strategy may change, and the strategies are temporal. The problem, design definition, obstacles and solutions may modify during the process. The design process follows the way toward deconstructing the logic. Individual creativity and intelligence can cope with the problem if the problem is defined appropriately. The personal power of creativity makes the design process more complicated and subjective, and constructing the relationship between solution and problem requires intensive mental activities (Cross, 2006; Cross, 2011). However, defining the design process as a mental activity may not assist profoundly in solving the problems since its claim is based on subjective creativity and ability (Brawne, 2005; Schüler, 2019).

Approaching design as a '**mental exploration**' may increase the chances of success or effectiveness to figure attributions. American design theorist Christopher Alexander defined design as a mental exploration activity to find the best physical components appropriate for the physical environment. For him, finding new solutions or alternatives related to the design process guide us to think of design as a mental investigation. Alexander defined design as a journey that can be applied to all human activities in terms of universality. He associates the design process with achieving personal or collective goals. In this attitude, exploration is not only associated with the final product. For this attitude, designers may explore the attributions of the object and problem at the same time. So, the design process may be created using abstract to concrete design languages (Alexander, 2002). Therefore, the design work can simultaneously be described with standardised scientific theories and creative activities to explore objects. The designer may simultaneously benefit from scientific research methods and artistic attitudes.

Information-based perspectives

Describing design as an '**information flow process**' is positive. British computer scientist Gavin Lowe's design process is united with the information flow process. Lowe integrated the design process model into information flow diagrams. He generated models by examining design as a flow structure (Lowe, 2002).

According to Lowe, perception of realities obtains information and transmission. Defining objects, processes, and systems need to categorise information like computer systems. Defining behaviours of elements may form objects, processes, and systems logically. They may create suitable models from the obtained information. In this way, the design process structure is created by using design methods and techniques following analogies with the information process (such as coding, decoding, selection, and ruling). The design process is related to the information selection or process management (coding, categorising, using transmission algorithms). Lowe's information flow-based design theory benefits from ideas related to cognitive and inferential thinking processes. His theory integrates thinking schemata to informational communications by mathematical models. According to him, most design theories intend to be deterministic and atomistic. Thus, the whole system controls the role of human beings without interfering (Lowe, 2004). This perspective causes not to accept the design process as only mental values. In information flow attitude, design mechanisms and combinations of solutions must benefit from artificial intelligence studies and communication theories.

We mention that it is highly helpful to see design as a **'new and specific discipline'** to understand and explore the design concept. The design process has an inner structure with unique criteria and procedures. It cannot be codified, formed, and researched comprehensively. To define design inclusively and completely with one-sided expressions is too tricky (Coyne, 1990; Protzen and Harris, 2010). Design theory Professor Wolfgang Jonas claimed that science or art could not solve the design process comprehensively. Jonas referred to the design could be explainable by creativity, intuition, or individuality, but the design activity is not art as it is not just individual expressions of artistic manners (Jonas, 1994). The design process cannot be explained by quantitative information, although it has functionalist purposes and objective criteria that technology may approach. Furthermore, science cannot describe the design. For that reason, we need to see design as a new and specific way to create a design concept. In this meaning, design is an intensive and complicated thinking activity, including integrating mental activities, explorations and specific expressions (Eastman, 1970; Beth et al., 1999). No matter what kind of reasons let us begin designing, the design concept has its own purposes and values. In which conditions design occurs, the attribution expected in the final product may not be imagined.

CONCLUSION

Thanks to the advances in arts, architecture, computer techniques, mechanisms and operation styles, the issues of creativity, design process and design thinking have been discussed in various ways. Cheapening computer technologies in the 1980s and widespread digital techniques increased design discussions and possible techniques to do design. Form generations, developing functional qualities, creating interactive environments, new optimizations and objectives for participatory methods paved the predictable ways of design thinking and design doing. Design philosophies have been formed by unique characteristics that neither science, computer techniques, nor art can explain, even if the design process integrates science and art. Design activity shapes a series of problem-solving activities with logical and definable information operating processes from a scientific perspective. By the way, under the perspective of art, design can be

described as a developing artistic product through intuition, triggering the creation of aesthetical forms and attributes. Nevertheless, models, stages, or implementations cannot sufficiently express the design process's complexity. Owing to the multivalent structure of the design problem, the solutions and conception of design form in a complicated world, and the designer's domination of design becomes difficult. At this point, constructive criticism and recommendations are worthy. Because the design act and design approaches need to be described by combining epistemological, scientific, aesthetical and artistic manners. We need to be aware of how the phenomenon is beyond complex.

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