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COLLABORATION AND SCOPE AREAS OF CHANGING CO-DESIGN APPROACHES IN THE FORMATION OF DESIGN CRITERIA

Esin Fakıbaba Dedeoğlu[a]
e.dedeoglu@etu.edu.tr
(ORC-ID: 0000-0001-6831-7168)

Meryem Yalçın
myalcin@etu.edu.tr
(ORC-ID: 0000-0003-1836-4243)

TOBB University of Economics & Technology, Department of Interior Architecture, Ankara, Turkey

Abstract

Nowadays, new trends see design education not as a discipline shaped by a perfectionist form approach; but as a collaborative holistic, sharing, and exploratory approach. The aim of this study is to develop a perspective on Furniture development and formation in today's world within the innovative, collaborative holistic, ever-evolving process design approaches that have been developing and diversifying since the 90s (Burnett, 2009; Rylander, 2009; Sanders and Stappers, 2008). It is not possible for a single design discipline to answer the scale or complexity of the design problems we face today and seek to provide solutions. Considering that experimental, virtual and real mixed areas will be designed in the future; it is not possible to ignore the fact that areas that work in collaboration with integrated disciplines in the field of design and work with an understanding of common gain will spread. Co-Design expertise/disciplines are involved in the design and production of furniture; many design disciplines such as *Communication design, interface design, brand design, graphic design, digital design, system design, transformation design, organizational design and space design* require simultaneous/joint/integrated work because of the effort to create the holistic values of design. By proposing a roadmap for the development of design-based professions, these forms of expansion create new areas of design activity where designers facilitate creative collaborations. The research method in the study in which qualitative research method is used can be defined as "explanatory case study". In line with the purpose of the study, one of the qualitative data collection tools, "document analysis" technique was used.

Keywords: Co-design, innovative furniture, multiple design collaboration, design criteria

1. Introduction

According to the functionalist understanding, "Furniture-Item" is a means of action. It is used to perform a service and/or job. It is an action that determines, conducts, and directs things. Every item is for an action (Bilgin, 1991). According to Asatekin; "It is a phenomenon of product design that human beings begin to consciously shape objects that they use for a certain purpose and to meet a certain need, and that they develop this form with possible feedback by observing the usage process over time" (Asatekin, 1997).

Accordingly, the designer is in an effort to present an integrated design process by evaluating the values that the user wants to have, show and/or exhibit on the furniture within the framework of both the user and his/her own design understanding and vision. In the furniture design process, the designer must consider certain stages and criteria. Koberg and Bagnall summarized the design process that starts with the determination of a problem and need in seven steps. The process that begins with the determination of needs is detailed with analysis, and the main issues and goals are clarified. Ideas are developed to diversify the options and the most suitable one is chosen among these designs. The next step is to take action to make the abstract idea concrete. Finally, the concrete product is evaluated in every aspect. There are some criteria that the designer should consider while designing the product to be produced. These are handled in two aspects, human-based and technical criteria. While human-based criteria address the ergonomic, psychological, aesthetic, and functional dimensions of the design, both the material and the production phase are evaluated with its technical dimension.

[a] *Corresponding Author*

In the period that started with modernism, while the disconnection of disciplinary information was experienced in the design processes, the efforts to re-establish these ties in the last 15 years have gained importance and new collaborative relationships that define these ties with different frameworks have been presented.

These new collaborative approaches are described as "Integrated Design". Sanders and Stappers (2008) defines Integrated Design as "Collective Creativity" applied throughout the entire design process. With this "Collective Creativity", the importance of collaboration between different disciplines for the richness of processes and products is increasing day by day. Since a linear and hierarchical path is followed in the traditional design process, different disciplines are included in the process independently when their time comes. For this reason, in order to make the processes stronger and based on the idea that integrated strategies should be carried out not only in the design process, but also in the production and use process, while the integrated design process is followed from the very beginning in the designer-manufacturer and user chain in the furniture sector, it is aimed to integrate information, to provide discipline based integration and visual integration by considering all multi-disciplinary data components that can be involved in the process.

2. Furniture Design Process and Its Criteria

2.1. Furniture Design Process

Koberg and Bagnall (1974) stated that the furniture design process takes place in certain stages as seen in Figure 1.

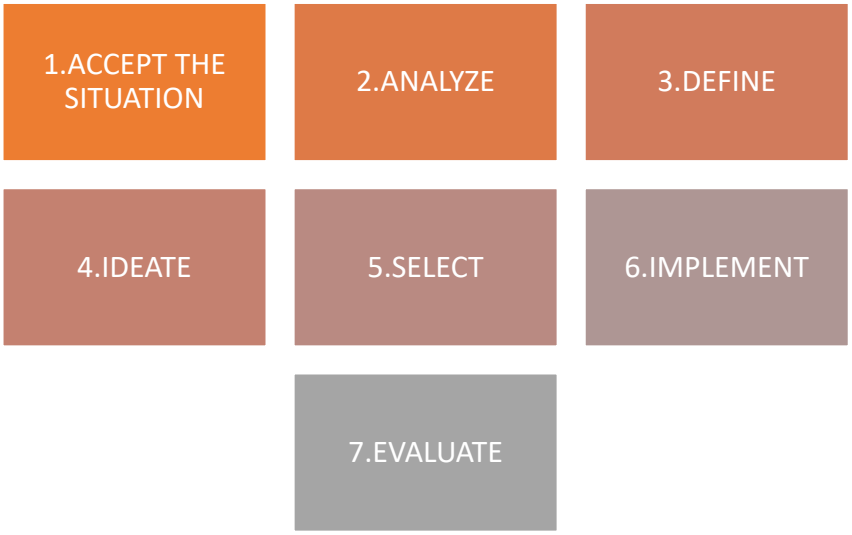

Figure 1: Furniture design process (Koberg and Bagnall, 1974)

2.1.1 At the situation determination stage, the solution of an existing or newly formed problem or need is handled. Why this problem or need has arisen and thoughts about the ways to solve it are examined. This process involves revealing the thoughts and experiences of the designer or the design team, and the search for solutions by considering the opinions and evaluations of the user group regarding the solution.

2.1.2 In the analysis stage, if there is another furniture designed for the same problem or need, the deficiencies related to it, the opinions and suggestions of the relevant experts are examined. Researches are made on the selection of the materials to be used, how they will be used, the methods of the construction of the furniture, and the technological developments that can be utilized during construction.

2.1.3 With the identification stage, everything that is examined, determined, and predicted during the preparation and research stages is handled. In the light of these data, technical issues such as the functions for the purpose of the furniture to be designed, the technology to be produced, the materials to be used, and how these materials will be used are enlightened and a final decision is made. In other words, the results of all processes that the furniture will undergo in the process from the emergence of the need to the production are evaluated at this stage.

2.1.4 In the intellectualization- ideate stage, the designer makes different designs using his/her own skills and creativity in the light of all the data collected and decided in the previous stages. All these designs

are designed to be made with the material, construction, function, and production method determined in the other stages.

2.1.5 Screening- Selection stage can be defined as choosing the most suitable design according to certain criteria among different designs with the same technical features. If necessary, some changes can be made on the choice made for improvement. Since more than one design is chosen, sometimes a product can be created by combining designs.

2.1.6 With the implementation stage, the design that was mentioned, solved, researched, and decided in the previous stages is put into practice. Design, which is an abstract idea, becomes concrete.

2.1.7 At the end of the design process completed with the last stage, whether the desired result has been achieved regarding the product, the point reached, and the observed effects are evaluated.

2.2. Furniture Design Criteria

On the other hand, there are some criteria that a designer should consider while designing a furniture (Figure 2). The first goal to start off in furniture design is to meet certain physical needs of the designed product. "Every furniture is in a one-to-one relationship with the human body, in forms suitable for use. Therefore, human measurements, body shapes for the purpose of use, psycho-social and socio-cultural structure of the user, as well as aesthetic understanding are variable factors that closely affect furniture design." (Altınok, 1987).

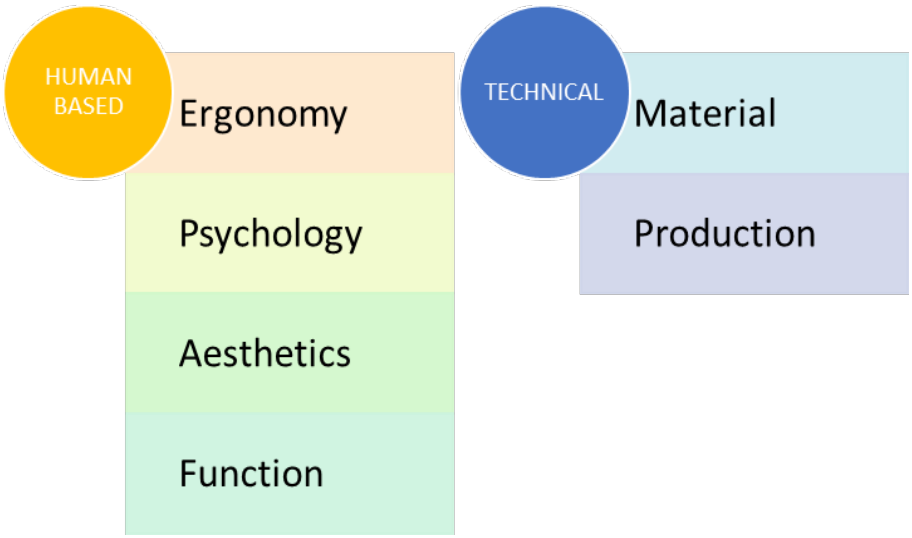

Figure 2: Furniture design criteria (Meru, 1986).

2.2.1 Functionality: In shaping the furniture, for what requirement it was produced, is the first question to be answered. Furniture can be designed in a variety of ways according to the intended use. It is the main requirement and constant function expected of a furniture. Each design should be suitable for what needs to be met and what action is considered as a priority, but it is possible to produce multi-functional furniture by considering its main purpose.

2.2.2 Ergonomics: "Ergonomics is the science of personal work. By researching the characteristics and abilities of the human organism, it provides the necessary conditions for the adaptation of the work to the human and the human to the work. By enabling people to realize their talents and to use them effectively, it prevents people from being worn out due to excessive strain while working and increases work efficiency thanks to this harmony" (Milliyet Economy Encyclopedia, 1994). The necessity to arrange the conditions in the human-vehicle relationship more favorably for the user by handling the problems arousing from people's working and using tools in terms of their features has created ergonomics. The designer must be limited in certain measures while designing the furniture. At this point, human measures come into play. "Anthropometry is defined as the measurements of the human body resulting from the anatomical (skeleton, muscular system) structure within the scope of action science" (İzgi, 1999). A designer should improve the harmony between the furniture he/she designs and the user and analyze it well.

2.2.3 Psychology: A person establishes a connection with his/her environment and the things around him/her through senses. Especially the visual relation is the most prominent among these senses. For this reason, the designer should take these senses into account to ensure that the furniture he/she

designs and produces is perceived by its users. "Like every formation, the qualities of being understood through seeing can also be based on certain foundations. In many studies on this subject, the nature and logical qualities of understanding, the types and causes of errors have been examined. Based on these, it is possible to interpret how the furniture fits its functional structure with the emotions it arouses in the user" (Arnheim, 1966). While creating a product, designer must meet the psychological needs of people. Some of these requirements are as follows; **Security requirement:** When buying a piece of furniture, the user must first and foremost feel that the furniture is safe and reliable for him/her. Therefore, although the designer thinks that he/she creates a durable and reliable product, it should be ensured that the furniture evokes the same feeling in user. **Comfort requirement:** Another requirement that the user should feel while buying the product is comfort. The shape, form and material of the furniture should give the user a sense of comfort. **Peace requirement:** The color, texture, form, and material used are related to the peace of the furniture. Sometimes a furniture may not be preferred just because of its color, although all other design factors are considered properly. Colors have a significant impact on human psychology. In some cases, although the color is soothing, the complexity, density and irregularity of the material used can have a negative effect on the person. **Prestige requirement:** This requirement is the desire of the person to want the product he/she bought to be different and to be liked by others. While producing a furniture, designer should pay attention that it is developed and different from previous examples.

2.2.4 Aesthetics: When people buy a product, they want their needs to be met, as well as the product being visually appealing to their taste. In this respect, aesthetic factors directly interact with human psychology.

2.2.5 Material Factor: Material is a criterion that should be considered in detail during and after the design process. The material to be used should be suitable for the physical properties of the furniture designed. The design of the furniture and the material is a process that should be considered simultaneously. Each material has different strength, flexibility, texture, and workmanship. The ability of the furniture, each designed to meet a certain need, to fulfill its function and at the same time to comply with the environment and conditions of use is closely related to the material used.

2.2.6 Production Method: All designers should benefit from all the innovations brought by technology as much as possible. The materials, manpower, energy, etc. used in production are an important part of the production line. Decisions made during the design process are important at this point. Problems that may occur due to design decisions can endanger all these production inputs. For this reason, the designer's appropriate furniture design is important in terms of both consumer satisfaction and the expansion of the manufacturer market.

In order to better understand and interpret integrated design processes, it becomes important to define the environments where the processes take place and the relationship patterns established on different information areas. It is necessary to explain the concepts of 'inter-disciplinary', 'multi-disciplinary', 'trans-disciplinary', and 'cross-disciplinary' at this point, and to analyze the relationships formed within the integrated design processes. It is also gaining importance for understanding and developing the collaborative environments that occur in these processes (Figure 3).

Figure 3: Design for Future requires 'inter-disciplinary', 'multi-disciplinary', 'trans-disciplinary', and 'cross-disciplinary' understandings (Web- 1)

Inter-disciplinary: The term inter-disciplinary is defined as revealing new disciplinary knowledge by combining multiple disciplines. With the use of more than one disciplinary knowledge in inter-

disciplinary studies, new emerging disciplines and thus the existence of a disciplinary knowledge in different aspects are mentioned (Klein, 2005). In such work environments, different disciplinary knowledge and methods are integrated into the work environment and a real synthesis approach is used to solve problems or generate new disciplinary knowledge (Stember, 1991).

Multi-disciplinary: The term multi-disciplinary refers to areas where more than one academic discipline or professional knowledge is used. A multi-disciplinary project describes a group from different disciplines with equal rights and a common goal. In this group, partners who have different disciplinary knowledge try to reflect their disciplinary knowledge to the project. It is characteristic of the multi-disciplinary structure that different disciplinary knowledge is integrated into the work in the context of the common goal.

The common goal in multi-disciplinary work environments is divided into certain sub-parts and distribution is made according to the disciplinary knowledge of the participants. It is possible to talk about distributed information and distributed control in such environments. In other words, each participant deals with it by undertaking his/her duty. There is also a decentralized situation here (İpek, 2014).

Trans-disciplinary: Trans-disciplinary working environments can be defined as areas where subjects are studied where disciplines are not sufficient and where holistic research processes are not required. In these working environments, the aim is to go beyond the disciplinary perspectives by combining the intellectual frameworks of different disciplines (İpek, 2014).

Cross-disciplinary: In cross-disciplinary work environments, the process takes place by explaining one disciplinary knowledge from the perspective of another discipline. Although explaining one discipline from the perspective of another discipline is far from holistic approaches, it contains an analogical approach. In such processes, two disciplinary areas are communicating and therefore cross-disciplinary processes have moved away from holistic approaches (İpek, 2014).

3. Changing Design Approaches

One of the main points where the integrated design process differs from the traditional design process is the order in which data information is included in the design process. In the integrated design process, data are collected at the beginning of the process, and are controlled in an integrated way simultaneously throughout the process. In the traditional design process, the data are included in the process when their time comes.

The traditional design approach is a process that is based on linear and causal systems, with each discipline that follows and controls each other in a hierarchical order, separated from each other with clear boundaries, and plays a role in design included in the design process independently of other disciplines and in order (Turan and Bayazıt, 2010) (Figure 4).

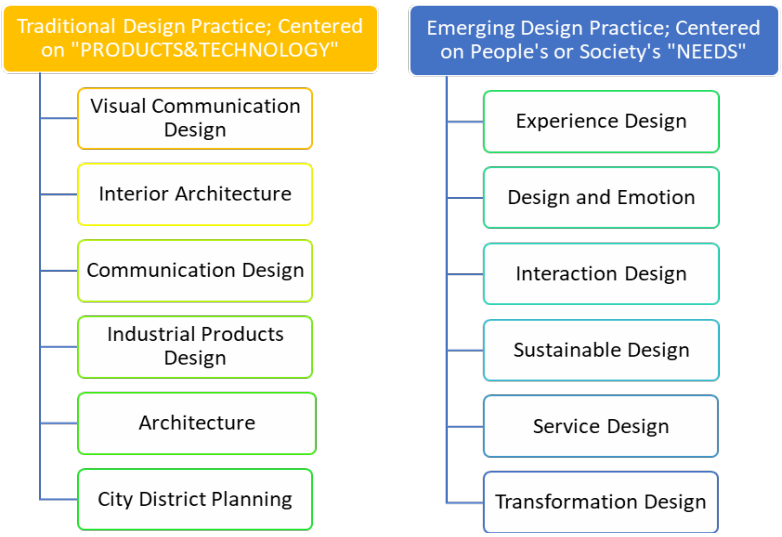

Figure 4: Traditional design versus emerging design practice (Sanders and Stappers, 2008).

A multi-disciplinary approach requires the presence of different types of information adapted to meet common ground for clarifying design decisions. Adapting different types of information from different disciplines to meet a common ground while supporting the decision-making process will prevent project

development from being slowed down at the early design stage. At the same time, the multi-disciplinary approach must have the ability to overcome the challenge of transferring and coordinating knowledge across disciplines. The adaptation of 'input information' from different disciplines requires the use of a multi-disciplinary approach that can address the complexity of the process, being multidimensional, and uncertainty. The expected process in this approach is shared decisions, compromises, preference rankings and an open decision-making process as a role for all disciplines. (Fregonara et al., 2016) (Figure 5).

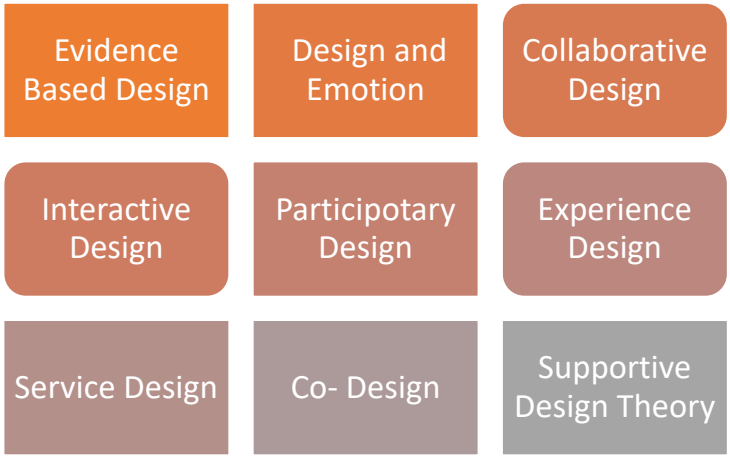

Figure 5: Multi- disciplinary design approach

3.1. Collaborative Design

Collaborative design is often defined as an approach that aims to design with users rather than design for users. Muller (2002) discussed various participatory design methods and practices and expressed a number of benefits as follows; developing mutual learning and understanding, combining and integrating the ideas of different people, improving communication and collaboration between different people and ensuring the creation of new common ideas form the basis of the collaborative design approach (Schuler and Namioka, 1993) (Figure 6).

Figure 6: Collaborative design approach - design with users (Kymalainen, 2013).

It is aimed to involve the target user in the design process and thus increase the success of the service. Collaborative design is the process in which actors from different disciplines share their knowledge about both the design process and the design content. They do that in order to create shared understanding on both aspects, to be able to integrate and explore their knowledge and to achieve the larger common objective: the new product to be designed. Actors share design knowledge through design communication,

which means communication about the design content (Chui, 2002; Valkenburg, 2000). From literature on success and failure in product design projects, we can learn that collaboration is an important factor for success (Cooper, 1999; McDonough III, 2000). Effective collaboration also influences the quality of the product designed (Valkenburg, 2000).

3.2. Evidence Based Design

The evidence-based practice, which started with Archie Cochrane's evidence-based research methods in the 1960s, was followed by studies revealing the relationship between staff productivity and hospital organization in the United States and England in the following years (Malone et al., 2007)

In the 1990s, studies on orientation (Carpman and Grant, 1993) were conducted, and in the 2000s (Baird et al., 1996), how the "Post-Use Evaluation" (POE) system can be used to improve the design and building quality was revealed. (Zimring et al., 2008). Today, evidence-based design, which has been prominently highlighted by the American Institute of Architects, is supported by the organization "The Center for Health Design".

With evidence-based design, the understanding of architects' relying and adhering to evidence within their own fields such as engineering science, statics, geometry, physics, and construction law has been replaced by an inter-disciplinary understanding. The usual answers to the complex problems that arise in design and implementation have been replaced by new responses that the designer puts forward with the user (Hamilton and Watkins, 2009) (Figure 7).

Figure 7: Evidence based design approach - designing furniture with users (Web- 2).

In evidence-based design, the collaboration of the designer with the user is seen as the main condition. The important thing here, as perceived by many architects; the user is not considered as a barrier to design decisions and project control, but rather as a key to solving many crucial points.

3.3. Experience Design

In order to define the experience design, the concept of "experience" must first be understood. In terms of furniture design, experience is the mental and cognitive consequences arising from user and product interaction. It is not correct to define interaction as an experience alone. Knowledge gained as a result of interaction, perceptions and emotions formed constitute the whole of the experience (Martin and Guerin, 2006). According to Forlizzi and Ford (2000), the concept of experience expresses the continuous flow in the human mind. People accept experience by talking to themselves or by expressing themselves. The experience in question refers to a situation where the user is constantly and completely experiences it subconsciously.

The effect of furniture design features on the psychological state of the individual has been revealed, and the method of experience design is used according to the type of structure. According to Hamilton, in the simplest terms, experience design is a holistic process that guides design decisions by combining research data and user experiences (Hamilton 2003) (Figure 8).

Figure 8: Experience design approach - focus on furniture design (Web- 3).

Furniture design works as a whole in order to convey the desired perception and message to the user. The prominent approach in furniture designs is on the requirement that the product meet the psychological needs of the users. For this reason, designers need experiential user data. The concept of experience design can be explained using experiential data. The concepts of user, design, interaction, and context are mentioned in experience design (Andarood, 2014). Furniture can be defined as a form of non-verbal communication using materials, colors, textures, and forms.

3.4. Service Design

Service design is a very new field that designs ideas through consumer experiences, using both tangible and intangible environments. This area provides many benefits for the end consumer experience, especially in industries such as retail, banking, transportation, and healthcare. The service design process as an application often results in the design of systems and processes that aim to provide a holistic service to the consumer. Service design is an inter-disciplinary approach that brings together various methods and tools from different disciplines. This inter-disciplinary application combines design, management, and developmental engineering skills. It also improves factors such as ease of use, satisfaction, and efficiency, without ignoring the environment, communication and products used (Stickdorn and Schneider, 2011).

Service design is a method used for both consumers and service providers to improve service quality. It brings together various disciplines such as service design, ethnography, system design, interaction design, product design, industrial design, graphic design, service marketing, innovation management and social psychology (İlisulu, 2015).

Service design refer to the process of planning and organizing people, infrastructure, communication and material components of a service, with the goal of improving the service's quality, the interactions between a provider and its customers, and the customers' experiences (Mager, 2008) (Figure 9).

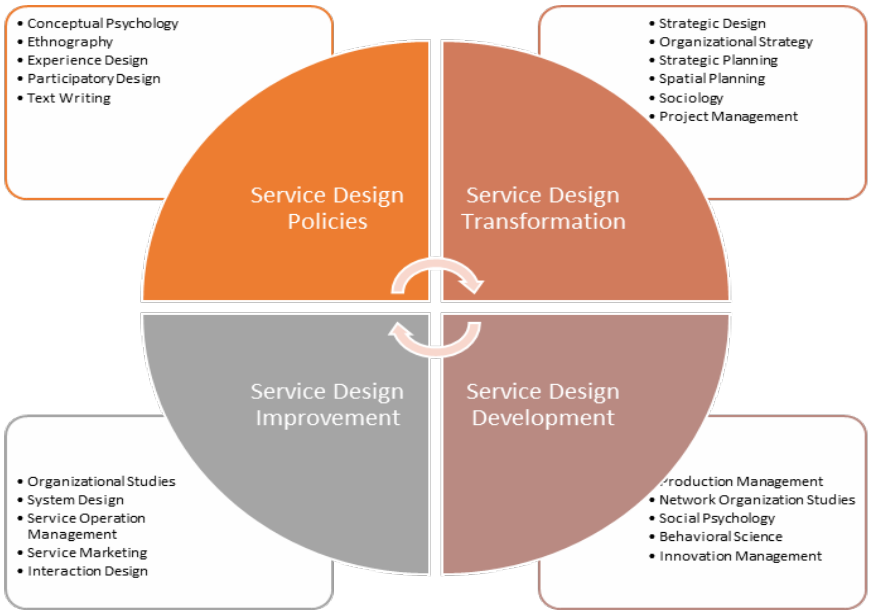

Figure 9: Service design - human oriented aproach (Mager, 2008)

Service design is a completely consumer-oriented design and management of the entire "process" through visualization of elements such as infrastructure, communication, technology and materials, with the aim of maximizing consumer satisfaction, creating awareness by adding value to the brand or service (İlisulu, 2015). It can be said that this discipline constitutes its own principles in its development process as a result of handling service design from all aspects. Although it overlaps with other design areas as a design concept, it shows that the service design methodology is a concept that is open to innovation thanks to its own design criteria. The fact that service design elements are rich and developable supports the inter-disciplinary integrity of this design concept (Moritz, 2005).

3.5. Supportive Design Theory

When Ulrich's supportive design theory is examined, it is seen that the physical environment designed, the furniture and accessories used especially in healthcare spaces have a physical content that reduces the stress caused by being sick, accelerates the healing process and provides psychological support. Humans cannot be considered separate from space throughout life. In this process, it is inevitable for individuals to be affected by the social and physical environment of the space. The reflection of the emerging effects on the life process of people increases the importance of the space perception in users (Ulrich, 1991). Another factor affecting the design of healthcare spaces is the transformations in space/design-patient/healthcare personnel approaches. In healthcare spaces where the concepts of patient-oriented approach, healing environments and therapeutic architecture are at the forefront, the necessity of designing environments that support the users in a psychosocial way emerges. For this purpose, using the space experience data of the users in order to determine the patient/healthcare personnel needs in the most accurate way has become an important requirement in the design processes. Environmental graphic design elements, which are an important part of the physical environment of the hospital space, should be handled with a team of various design groups, considering the user needs and requirements in the light of these data (Ulrich, 2003).

4. Conclusion

"Design" with all its aspects should be handled with a holistic perspective. This fact should be adopted by all design disciplines, not just furniture. In this sense, many design disciplines require simultaneous/joint/integrated work. Well-performed integrated product design processes may result in higher speed to the market, higher quality products that fit the market needs and the possibility of developing products with different functionalities (McDonough III, 1993; Cooper and Kleinschmidt, 1994; Langerak, et al., 2005). This approach is also important for the success of the final product. The margin of error of the product, of which every detail has been studied with relevant disciplines from the very beginning, will be reduced to almost zero. Integrated design understanding focuses on needs, while

traditional design adopts an understanding that focuses only on the product itself. Instead of focusing on project typology, Co-Design focuses on design for experience, design for interaction, design for culture, and sustainability (Sanders and Stappers, 2008).

We are in an age where spaces are perceived as real by deceiving the senses. Considering that virtual and mixed spaces, furniture, and equipment will be designed in the future, "collective creativity" will be highly needed. Due to their different disciplines, all actors in the multi-disciplinary design team have a different view of the new product to be developed and they each address their own interests during negotiation (Bucciarelli, 1996). Thus, the product is handled in every aspect and the margin of error is minimized.

The furniture industry transforms and develops with the interaction of all design disciplines. Research areas are expanding, so spaces, accessories and furniture are designed with Holistic/Participatory/Collaborative approaches. However, in order to keep up with changing conditions and to realize the right designs, the fact that the factors affecting the productivity of the furniture sector such as Branding, Standardization, Technology, Capital, Technical Information, Trained Personnel, Design and Designers deficiency should be improved in order to increase efficiency in the furniture sector.

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