

## Fundamental Demands in the Furniture Design and Application of Basic Design Principles

Hasan EFE<sup>1</sup>

<sup>1</sup>Gazi University, Faculty of Technology, Department of Wood Products Industrial Engineering, Ankara/Turkey

[hasanefe@gazi.edu.tr](mailto:hasanefe@gazi.edu.tr)

**Abstract-**The beginning of woodworking and metalworking led to major changes. The story of woodworking and furniture is inextricably linked with the story of our civilizations. In the last hundred years, as technology has advanced and social concerns have evolved into more democratic ideals, furniture makers and furniture designers have begun to acknowledge these cultural shifts within vocational and professional arenas.

People have used the furniture in their homes and always reflected the aspirations, fashions, and technology of the time during the history. Furniture design in disciplined work that combines technical information with prior experience, observation, and intuitive judgment, but systematic design will not guarantee good results.

Furniture designers have sought a better understanding and using basic design elements and principles. The elements and principles of basic design describe the ways that furniture designers use them in their design of art.

**Keywords :** furniture, design, basic, design principles

## Mobilya Tasarımında Dikkate Alınacak Temel Faktörler ve Temel Tasarım İlkelerinin Uygulanması

Hasan EFE

Gazi Üniversitesi, Teknoloji Fakültesi, Ağaç İşleri Endüstri Mühendisliği Bölümü,  
Ankara/Türkiye,

[hasanefe@gazi.edu.tr](mailto:hasanefe@gazi.edu.tr)

*Bu makale, 4. Uluslararası Mobilya ve Dekorasyon Kongresi'nde sunulmuş ve İleri Teknoloji Bilimleri Dergisi'nde yayınlanmak üzere seçilmiştir.*

**Özet** -Ağaç ve metalin işlenmeye başlaması büyük değişimlere yol açmıştır. Ağaçişleri ve mobilyanın hikayesi, insan medeniyetinin hikayesine sıkı sıkıya bağlıdır. Son yüzyıllarda tıpkı teknolojik gelişmeler gibi sosyal ve demokratik değerlerdeki gelişmelerde mobilya tasarımcıları ve üreticileri açısından, mesleki formasyon bilgileri kadar önem kazanmıştır.

İnsanlar tarih boyunca mobilyayı evlerinde kullanagelmişler, mekan ve mobilyalarına zamanın ruhunu, modasını ve teknolojisini yansıtmışlardır. Mobilya tasarım disiplininde teknik bilgi, tecrübe, gözlem ve sezgisel yargılar kombinasyonu yer almakla birlikte bu sistematik tasarım çalışması her zaman iyi bir tasarımın garantisi değildir.

Mobilya tasarımcılarının temel tasarım eleman ve ilkelerine hakim olmaları ve bu ilkeleri uygun şekilde tasarımlarının sanatsal boyutunda kullanmaları gerekir.

**Anahtar Kelimeler:** mobilya, tasarım, temel, tasarım ilkeleri

## 1.INTRODUCTION

The origins of man and global spread of homo sapiens can be interesting for us. Human beings first appeared in the World more than six million years ago. As they evolved and developed skills, they ranged further afield. Human development gathered pace, and with climatic change modern humans were able to migrate to new areas of the world.

Human societies became more sophisticated, with increasingly complex art and evidence of rituals. The beginning of woodworking and metalworking led to major changes. Early humans had been expressing themselves artistically from as early as 30.000 years ago. Cave paintings found in France are among the oldest surviving examples of art. Along these state the first major settlements in the central Turkey were Göbekli Tepe and Çatalhöyük. In 12000 BC Göbekli Tepe and in 9000 Çatalhöyük had begun to develop from a small settlement into a larger, more organized community ( Santon and Mc Kay, 2011),[1].

On the other hand, the story of woodworking and furniture is inextricably linked with the story of our civilizations. From Tutankhamun's Ceremonial Chair to Rococo armchairs, and from 15.Louis Centre Table to Postmodern Carlton Bookcase, the furniture people have used in their homes has always reflected the aspirations, fashions, and technology of the time [2].

Hayward, H., and others, (1975), have been prepared a source book about furniture. It's title is World Furniture, the writers have been studied from Ancient Furniture to Postmodern and Contemporary periods [3].

Aranson, J., (1975), has been prepared a source book, the Encyclopedia of Furniture, it's including all subjects about furniture such as styles and some important details [4].

Cerver, F.A., (2000), has been studied the story of the furniture and interior design. The writer has been approached the ' Trends' as the last subject in his source book, Interior Design Atlas [5].

Byars, M., (2004), in his source book, "The Design Encyclopedia", has been studied modern and postmodern furniture and other interior elements, view point of styles and details [6].

Hudson, J., (2006), has been studied the modern and postmodern furniture and interior elements in her source book the of title is '1000 New Designs and Where to Find Them'[7].

Atiya, F., (2010), has been investigated mainly Ancient Egyptian Furniture and articles in his book of The Egyptian Museum in Cairo. The book has been bought by the writer of this paper when his visiting The Cairo Museum in 2010 [8].

Miller, J., (2011), has been studied the story of the furniture in her book, title of “Furniture”, main lines of 11 subjects, from Ancient Furniture to Postmodern and Contemporary 1970 on ward [2].

Fiell, C. and P., (2012), have been studied more than 1000 Masterpieces of Modern Chair, include from Abildgaard’s Klismos Chair to Zaha Hadid’s Z Chair [9].

Gura, J. (2012), has been studied the story of the furniture, after 1970s in her book the title of Design After Modernism. It is including “Defining the Trends ”which are consist of 15 movements from Relaxing Modernism to Unaccustomed materials [10].

Postell, J., (2012), in the title of his book’s ‘ Furniture Design’, the writer has been carried out the systematic and useful knowledge. With a gladness, I have been used widely his valuable knowledge and experiences about furniture design in this conference paper. I would like to special thanks for his respectful studies here [11].

According to Postell, Architects, industrial designers, interior designers, furniture designers, enginneers, fabricators, craftspeople, theorists, sociologist, cultural anthropologist, historians, and business entrepreneurs actively contribute to furniture design in unique ways and hold distinct views about it.

Smardzewski, [2015], has been studied the principles of designing furniture as wooden structures. He has been discussed issues related to history of the furniture structure, classification and characteristics in terms of the most important features essential during designing, ergonomic approach to antropometric requirements and safety of use on his book [12].

Design furniture relies upon judgment and technical information linked to several professional and academic disciplines. The breadth and depth of knowledge necessary to design, select, fabricate, and arrange furniture in space is extensive.

Consider the influence that structural forces, material properties, the surrounding environment, ergonomics, and aesthetics have on furniture design. Reflect upon the historical, cultural, political, and societal conditions revealed by the way people sit, rest, work and play, or the human factors research upon which furniture designers rely.

On the other hand, like so many other industries, Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality(MR) are taking the world of design by storm nowadays. From architecture to interior home and furniture design, VR and related technologies are changing the way we create the places we work and live.

Generally, some references which are related with main subjects have been given respectively, without any comment at the end of the each subject in this study. Furthermore, if any participant wants to visit some useful internet sites or blogs, also he or she can find a few links at the end of the references.

This paper is prepared understanding and provides knowledge and inspiration for furniture and designing furniture.

Further more we have studied at the aesthetic factors (meaning of form) supporting of basic design for furniture design in this paper.

## 2. FURNITURE DESIGN

Designing furniture relies on intuition, judgment, design skills, engineering principles, and knowledge in a broad range of disciplines helpful with problem solving. Designing furniture requires inspiration, a concept or idea, and the commitment to give pleasure to those who use it (Postell 2012).

The inevitable shift from designing furniture to fabricating furniture generates an appreciation for both the obvious and subtle ways in which making can influence the design process. Through the process of making furniture, one will learn about hand, power, and digital tools, material properties and working methods, assembly processes, and the time required to finish a project. Making furniture does not necessarily quarantine an ability to design furniture, but it will result in an expanded knowledge of materials, tools, and joinery, which in turn generates a broader appreciation and respect for furniture design (Umezu, 1988), (Postell 2012).

Furniture design is deeply rooted in the human condition. It is a social science that belongs to the humanities, an applied art that draws upon many design disciplines, and is dependent upon a working knowledge of materials and fabrication techniques. It is a holistic and interdisciplinary field of study.

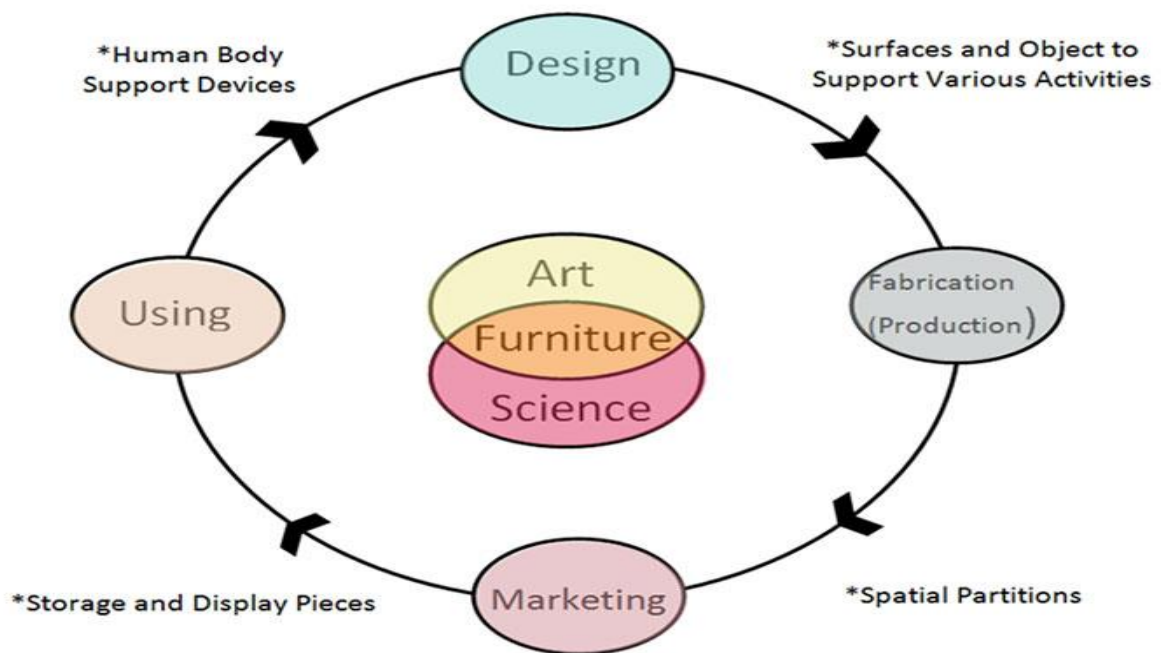
Before going into the furniture design, consider the terms furniture and design and reflect upon the fundamental and symbiotic relationships bound in the meaning and etymology of these two words.

## 3. FURNITURE

**Furniture** noun 1. the movable articles that are used to make a room or building suitable for living or working in, such as tables, chairs, or desks. 2. The small accessories or fittings that are required for a particular task or function: door furniture, (Postell, 2012), [11].

By many accounts, furniture includes a broad range of moveable objects organized in four main categories :

- \*Human body support devices
- \*Surfaces and objects to support various activities
- \*Storage and display pieces
- \*Spatial partitions

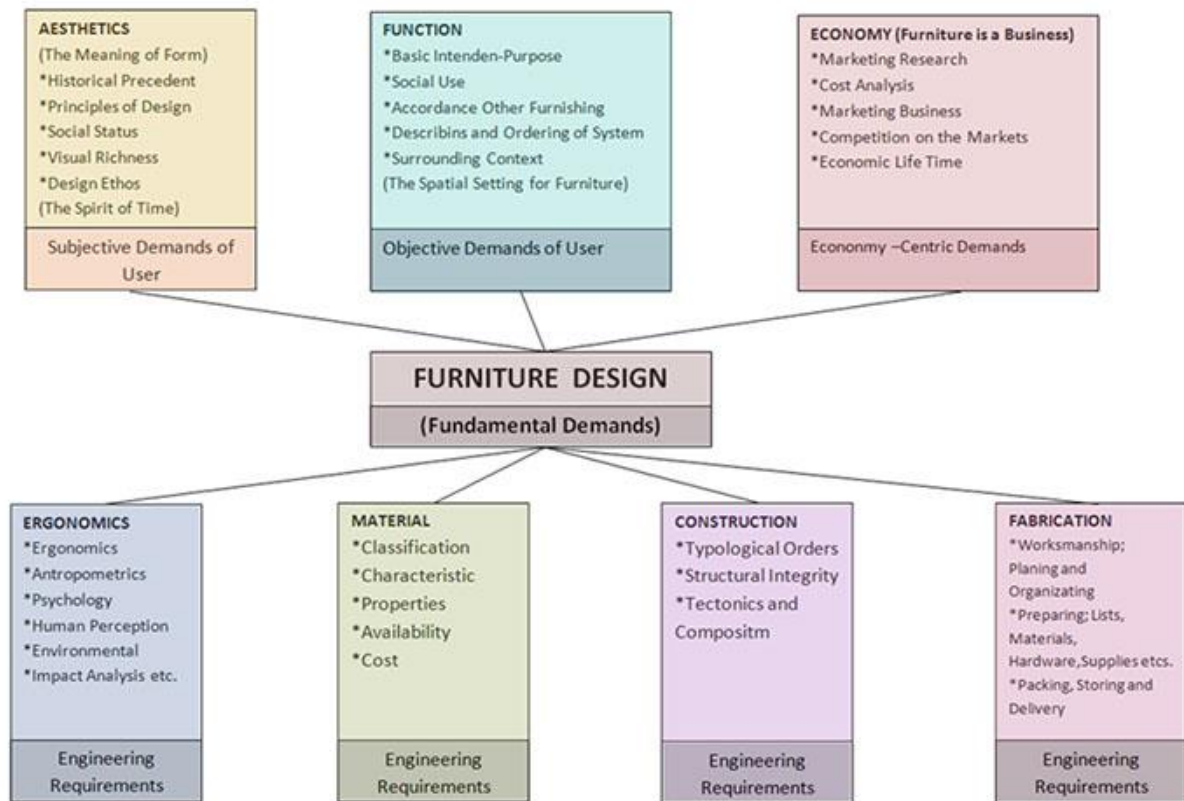


**Picture 1:** Basic Functions and Life Cycle of Furniture (EFE,2015) [13]

Furniture pieces are designed and fabricated to assist in the many ways people sit and rest, work and play, organize or display items, and partition space. This view suggests a broad utilitarian framework, in which function is perceived to be the primary intended purpose of furniture. Although function, utility, and social use are important aspects of the performance of furniture, rarely does function alone inspire great design.

Furniture design draws upon ideas of beauty, principles of design, theory, material properties, fabrication technologies, business economies, environmental design matters, and the surrounding spatial context in which it is placed, all of which are integral and intertwined with function, utility and social use. Considerations that influence what we think about and feel regarding furniture design include:

- \*Aesthetics (the meaning of form)
- \*Historical precedent (examples from the past)
- \*Principles of design (i.e., unity, harmony, hierarchy, spatial order)
- \*Function and social use (ergonomics, comfort, proxemics)
- \*Design processes (sketching, iterative overlays, model studies, digital modeling. Full scale working prototypes collage assemblies.
- \*Material (classification, characteristics, properties, availability, cost)
- \*Fabrication processes (hand, power digital)
- \*Environmental design matters (sustainability, renewable materials, off-gassing)
- \*Surrounding context (the spatial setting for furniture)
- \*Professional practice (economic, legal, and business decisions)



**Picture 2:** Considerations That Influence What We Think About and Feel Regarding Furniture Design (From Dr. Thesis, EFE, 1995, Revised 2015) [13]

Utilitarian considerations can channel the development and refinement of design ideas but rarely inspire them. Utility is grounded by specific categories of social use, associated with the broader classifications of building and zoning nomenclature. In this paper, categories of social use include [11].

- \*Healthy care
- \*Hospitality
- \*Institutional
- \*Office
- \*Recreational
- \*Religious
- \*Residential
- \*Retail
- \*Storage

Broad categories of social use are dependent on particular activities and affected by specific circumstances, which are nearly always influenced by place, occupancy, and time. As an example, day care furniture is a specific type of furniture cross linked with institutional and residential categories. A law firm is a specific type of office classification, as is an accounting firm or a telemarketing company. Furniture for a Catholic church, a Jewish synagogue, or Islamic mosque, falls under a liturgical classification.

The word furniture is derived from European verbs, nouns, and adjectives. The French verb Fournier means “to furnish” Furniture provides a place setting for work, rest, and play. It also

contributes to the ambiance and style of interior space. Furniture provides people with desired items and necessary equipment that complement and complete interior space.

The Latin adjective *mobile* means “movable”, which is an important characteristic of furniture. The French ‘*meubles*’, the Turkish ‘*mobilya*’, and the Polish ‘*namjstaj*’ all translate into the English word furniture. Freedom from the physical structure of a building provides designers with an opportunity to create spatial relationships between movable elements and built-in components. The creation of spatial relationships through the size, location, and orientation of furniture pieces places furniture design within the disciplines of architecture and interior design (Eckelman, 1978), (Kawakami, 1988), (Efe, 1997), (Postell 2012), [11], .....[17].

Spatial order and spatial organizations are including:

\*Grid : a regular tessellation that divides space into a series of contiguous cells, which can then be used for spatial indexing purposes. Grids can be generated from square or rectangular cells, triangular, circular, or hexagonal formations.

\*Linear : relating to, consisting of, or using lines in form or in spatial sequence.

\*Centralized : drawing spatial relationships into, around, or toward a central area or point.

\*Radial : elements radiating out from a central area or point. (spiraling or swirling) in a circular, lineal, or spiral path.

\*Cluster : a small group of elements gathered closely together.

Buying, selling, and marketing, furniture is a business. Sales are influenced, in part, by the display of furniture in a particular setting (i.e., store, showroom, ad, journal, book, exhibit, or web site). Price, quality, function, aesthetics, historical context, and branded appeal also influence sales. As a business, furniture is carefully marketed through specific venues with consideration towards the competition and broader market demand for similar products.

## 2.DESIGN

**Design;** \*noun, 1. a plan or drawing produced to show the look and function or workings of something before it is built or made. 2. The art or action producing such a plan or drawing. 3. Underlying purpose or planning the appearance of design in the universe. 4. A decorative pattern. \*verb, 1. Conceive and produce a design for. 2. plan or intend for a purpose, (Postell, 2012) [11].

One can think of design as structured play. It’s a process resulting from creative thinking, intuitive judgement, and hard work. As a process, design develops through a working method that is shaped by technical information, informed by theory, and dependent on communication skills. Design ideas develop within a conceptual and contextual framework and are dependent on the operations and abilities of the designer’s hand and head.

The design process utilizes both the right and left hemispheres of the brain. The left side of the brain processes information in a linear manner, working from part to whole relationships. It takes pieces of information and organizes them in a logical order, then it draws conclusions. The left-brain person would enjoy making schedules and planning the fabrication of furniture.

The right side of the brain, however, processes from whole to parts, holistically. It starts with the big picture, not with specific details. The right-brain person wants to see, feel, or touch furniture. Thus furniture designers who can activate both sides of the brain often enhance the design process, furthering the considerations of conceptual, structural, functional, tactile, aesthetic, spatial, economic, and cultural needs and desires, all at the same time (Kawakami, 1987), (Postell \*2012).

The word design is distinct from the word project. While design entails processes of inquiry and methods for exploring and synthesizing ideas a project is the coherent resolution of purpose and presence. At some point in time, design efforts will transform into projects. A project can be

revealed in a drawing model, working prototype, or fabricated work. It's not the medium that distinguishes a design from a project; rather, it is the presence of resolved and synthesized aspects, clarity of idea, function, purpose and, very often, the intent to make real.

The words design and designate are derived from the Latin verb designate. Designate translates "to mark out," taken from de, "of" and signare, "to mark" or the noun 'signum', a mark or sign. The Italian word for project is 'la progettazione', referring to the planning stage between design and fabrication, 'la progetto' translates into "the plan". The word design is sometimes used to mean "the plan" and can imply planning or intending for a purpose.

At the core of designing furniture is a body of knowledge and the skills necessary to integrate the tangible and intangible aspects that become furniture. Tangible aspects include :

- \*Materials (characteristics, workability, and finish qualities)
- \*Fabrication processes (tools, performance, quality, and limitations)
- \*Resources (time, money, and access to equipment and supplies)

Intangible aspects include :

- \*The program (intention, purpose, function)
- Theory and history (inquiry, rationale, precedent)
- \*Ergonomics and proxemics (designing for a set of activities, within the limits of the human body and the study of how people communicate in and through space) [19].
- \*Knowledge about the human body and the human condition
- \*The design process
- \*Marketing and branding strategies
- \*Professional practice

Design skills include the ability to graphically communicate and physically model ideas. Though technical instruction can be taught, design skills need to be exercised and will improve with experience. Furniture designers need to learn how to design, sketch, draw, draft, make study models, and use computer programs, while simultaneously developing a working knowledge about materials, fabrication techniques, and the human body, when they actively design furniture. In regard to the skills and knowledge necessary to design furniture, experience in both designing and making furniture's is perhaps the best teacher a student can have [11],[18].....[21].

## **2.FURNITURE DESIGN**

The primary intention of combining the terms furniture and design together is to articulate an emerging discipline in the combined synthesis of the two terms. The phrase furniture design establishes a framework for an emerging discipline that is comparable to interior design, industrial design, fashion design, or graphic design a discipline that is co-dependent with other allied design fields and, yet, one that has a core body of knowledge. It is an area of study that extends beyond the summation of furniture and design. It combines the arts and sciences, business and marketing strategies, and design and fabrication processes. It engages furniture as tangible objects, materials, and built form, as well as part of a larger history of design; informed by research, ideas, developed by design processes, theory, utility, comfort, use and aesthetics [11].

Furniture design needs to be practiced in order to be fully appreciated; however, some aspects can be studied, learned, and taught. Designers, educators, fabricators, industrial entrepreneurs, museum curators, and writers have developed an enormous body of knowledge about furniture design. This body of knowledge is available to the public through book, journals, museum and gallery exhibits, and web sites [22],[23].



A growing number of universities and colleges offer courses in furniture design many within art, industrial design, interior design, and architecture programs [24],[25].

There are scores of books, journals, report, professional organizations, academic institutions, web sites, furniture companies, showrooms, and galleries available to the designer today, and a wide range of professional practice venues, to support one’s study of the field of furniture design [26],[27],[28].

Within the broader study of the humanities, areas of research include;

- \*Human perception/psychology /behavior science
- \*Sociological/cultural inquiry
- \*Anthropometrics/ergonomics/proxemics
- \*Social use/notions of place-making and dwelling
- \*Business identify/branded environments

One can study economic, legal, and business matters in tandem with material and technical aspects of fabricating furniture. Research methods can channel and inform relationships between broad areas of inquiry and more focused studies in specific areas. They can also expand focused inquiry into broader, more complex understandings. [29],[30].

There are, essentially, two primary approaches to research methods:

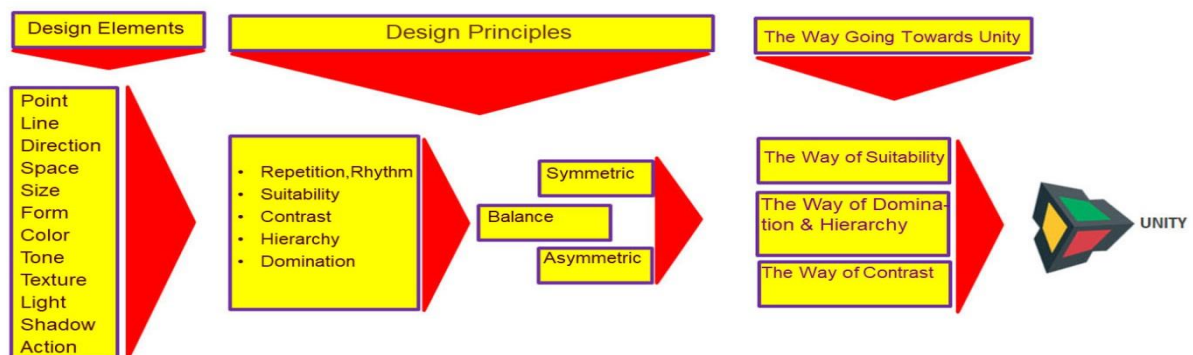
\*Empirical studies (learning by doing) i.e., designing, drawing, making, testing. Generally, an inductive approach working from concrete realities into general ideas.

\*Scientific methods (systematic and quantitative) i.e. gathering information, organizing data, and statistical analysis. Generally , deductive approach working from ideas and concepts down to concrete realities.

There is a third approach that is reflective in nature, involving the study of precedent, the writings of others, or investigating design processes (These approaches tend to be more scientific than empirical).

Themes and streams of research inquiry include: \*Theory (human factors, ergonomics, proxemics, comfort, social use) \*Design, (processes, methods, techniques) \*Material research \*Fabrication technologies \*Professional practice \*History;

The elements and principles of basic design describe the ways that furniture designers use them in their design of art. [31],.....[37].



**Picture 3:** Design Elements and Principles and the Schema of Their Using (EFE, 2015, After GÜNGÖR, 2005)

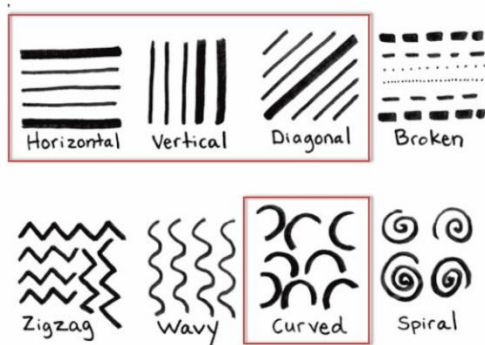
## Basic Design Elements

*Point:* Point is a coordinate without any dimensions, without any area. What we can draw is a dot. In fact dots are the building blocks of everything else.



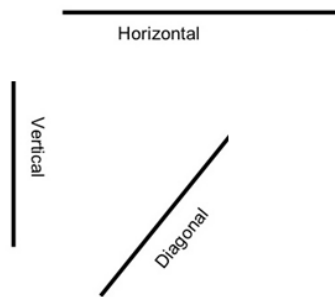
**Picture 4:** Points make a movement-action on the two walls, [ 38]

*Line:* Horizontal lines are calm and quite. Vertical lines suggest more of a potential for movement. Diagonal lines strongly suggest movement.



**Picture 5:** Line; most design begins with line, [39].

*Direction:* Direction intentionally guides viewer's eyes from one element to another. There are three common directions used in design that mentioned in “Line” subtitle.



**Picture 6:** Different directions make different meanings, [40].

*Space:* The distance or area around or between elements of an artwork.



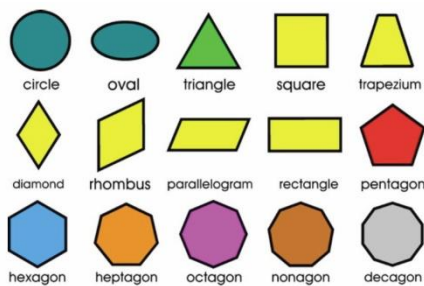
**Picture 7:** The distance has been located between elements or area of an art work, [41].

*Size, Scale and Proportion:* Scale and proportion are dependent upon physical and spatial relationships, although important distinctions need to be made between these terms. Scale is based upon the size of one thing relative to another, such as the size of a sectional sofa in relation to the size of a room. Proportion is the geometric correlations between parts and between parts and the whole. (Zelanski,1984), (Kawakami, 1988), (Beyazıt, 2000), (Gürer, 2004), (Güngör, 2005), (Postell\* 2012).



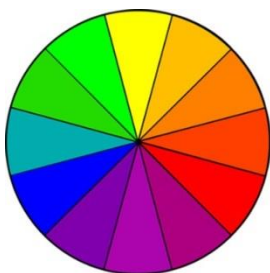
**Picture 8:** Size is an important elements in furniture design, also has been used scale and proportion, [42].

*Form:* Shape is an area that is contained within implied line, or is seen and identified because of color or value changes. Form describes volume and mass, or the three dimensional aspects of objects that take up space. (Shape is two-dimensional)



**Picture 9:** Generally form is a notation of three dimentional structure, [10].

*Color:* Obvious elements of design, for both the user and the designer. It can stand alone, as a background, or be applied to other elements, like lines, shapes, textures or typography. Primary and secondary colors. Ligtness and darkness. Intensity and purity.



**Picture 10:** Color maybe the most important and powerful design element, [43].

*Tone:* Tone is a quality of color. It has to do with whether a color is perceived as warm or cold, bright or dull, light or dark, and pure or "dirty."

*Texture:* Texture is visible and tactile quality of any surface. Textures can be smooth, rough, shiny or matte.



**Picture 11:** Texture has been given an energy to a furniture design with color, [10].

*Light & Shadow:* Light is essential to any interior space as it is the means by which we can see our surrounding environment. Value variation from lightness to darkness gives a sense of space and depth to an object emphasizing its three dimensionality.



**Picture 12:** Furniture decoration as a visual arts so it is necessary to light and the light has been caused the shadow, [44].

*Action (Movement):* Motion or movement in a visual image occurs when objects seem to be moving in a visual image. Movement in a visual image comes from the kinds of shapes, forms, lines, and curves that are used.



**Picture 13:** Because of twisted line, [9].

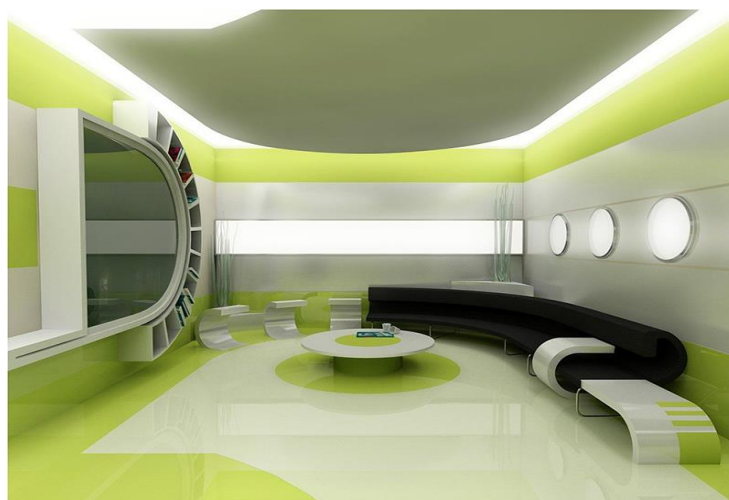
### Basic Design Principles

Design principles provide criteria that describe formal intentions. The intended purpose of a chair or table can begin with a range of needs or desires and develop through any number of processes. Along the way, furniture designers are confronted by design principles, which require the eye and the hand to work together in a complex system of thought and action.

**Repetition, Rhythm and Pattern;** The word rhythm derives from the Greek term *rhythmos*, meaning “to flow” Rhythm is the foundation of music dance poetry, and design. Rhythm is the structure and order of elements in space or time. In other words rhythm is the repetition of visual movement of the elements-colors, shapes, lines, values, forms, spaces, and textures.

Rhythm is also the order of temporal daily experiences such as waking and sleeping, including monthly and seasonal patterns, and life-cycle events such as birth and death.

Pattern is the arrangement of elements that determine a whole and are made from points, lines, and shapes. Rhythm and pattern are codependent and inherent aspects in design. They reveal the underlying structure of form through physical spatial, or temporal compositional order.



**Picture 14:** Repetation, Rhythm and Pattern, [45].

**Suitability;** lines, sizes, forms and colors etc. has been suitable each other in the furniture design. In this case, it could be called “suitability” as a design principle.



**Picture 15:** Consist of color contrast make a kind of harmony, we called it as suitability. [46].

**Contrast;** Contrast or juxtaposition is the simultaneous experience of the relationships between contrasting elements or characteristics. Examples include a curvilinear form juxtaposed with an orthogonal shape and a light, reflective surface juxtaposed with a dark matte finish.



**Picture 16:** An example of color contrast, [47].

**Hierarchy;** hierarchy, and emphasis point to priority, and relative value in design. Hierarchy and emphasis are achieved through the manipulation of location, color, size, texture, and shape. Form, color and material can emphasize primary, secondary, and tertiary levels of importance and meaning.

Formal hierarchy can reinforce social status, such as the person sitting at the short end of a long rectangular conference table. In this sense, social, cultural, and political meaning, parallel formal characteristic of hierarchy.



**Picture 17:** Examples of hierarchy, [48].

**Domination and emphasis;** Emphasis is drawn from dominant and subordinate relationships. For example, one can emphasize the vertical elements of a shelving system by using distinct materials and details to draw the eye. Shape differences and contrast levels can help designers distinguish dominant and subordinate relationships in their work.



**Picture 18:** Red color is dominant element in this composition, [49].

**Balance: Structural and Visual, Symmetry and Asymmetry;** Visual balance is the spatial weighing of a composition around an axis. Structural balance involves the physical equilibrium of freestanding elements such as chairs and tables. Furniture must be able to withstand lateral, shear, live, and moment forces. Visual balance and structural balance are related but distinct concepts.



\* **Structural Balance;** Structural balance considers the forces in furniture to be in equilibrium. When forces are not in equilibrium, cantilevers can fail, shelves can sag, and furniture can tip over. Furniture must be able to withstand lateral forces (forces applied from the side), shear forces (internal forces working in parallel but opposite directions), and moment forces (rotational force applied to joints). Structural forces inspire design ideas and are an important consideration in the conception of form.

In cases where furniture is precariously tall and narrow or where the center of gravity lies beyond the tipping point, it may become necessary to attach furniture to a floor, wall, or ceiling in order to maintain structural stability.

There are dimensional limits to the horizontal span of shelving before deflection occurs and imbalance appears. Shelving system, bred frames, music stands, grandfather clocks, cabinet, doors, and speaking podiums all depend upon basic engineering principles to maintain structural balance and function safely.

\* **Visual Balance;** The spatial weighing of visual balance expresses either symmetrical or asymmetrical composition.

\* **Symmetry;** is a form of balance where a component (or several components) is mirrored along an axis. Symmetry can be expressed bilaterally (around a common axis) or radially (around a common point).

\* **Asymmetrical balance** is dynamic and appears in equilibrium along an axis through its form, though it cannot be mirrored.



**Picture 19:** Example of visual symmetric balance, [50].

**Unity;** Unity means the harmony of the whole composition. The parts of a composition made to work together as a total visual theme. Unity occurs when all the parts of a design or composition are related by one idea. A unified design has consistency of style.



**Picture 20:** An example of unity with a postmodern composition, [10].

## REFERENCES

- [1] Santon, K., & McKay, L. (Eds.). (2011). Atlas of World history. Parragon Pub.
- [2] Miller, J., (2011): Furniture; World Styles From Classical to Contemporary, Dorling Kindersley Ltd., 80 Strand, London, U.K.
- [3] Hayward, H., others, (1975): World Furniture, The Hamlyn Publishing Group Ltd. London
- [4] Aronson, J., (1975): The Encyclopedia of Furniture, Crown Publishers, Inc. New York
- [5] Cerver, F. A., (2000): Interior Design Atlas, Könemann, Verlagsgesellschaft mbH, Bonner Strasse 126, D-50968, Cologne, Germany, P : 958-999
- [6] Byars, M., (2004): The Design Encyclopedia, Laurence King Publishing, Ltd., 71 Great Russell Street, London, U.K. P :10-829
- [7] Hudson, J., (2006): 1000 New Design and where to find them, A 21 st Century Sourcebook, Laurence King Publishing Ltd., 71 Great Russell Street, London, U.K. P : 12-139.
- [8] Atiya , F., (2010): The Egyptian Museum in Cairo, Farid Atiya Press, P.O. Box 75, 6th of October City, Giza, Cairo, Egypt, P : 503-532
- [9] Fiell, C. and P., (2012): Chairs, 1000 Masterpieces of Modern Design, 1800 to the Present Day, Goodman Fiell, Carlton Publishing Group, 20 Mortimer Street, London, 2012, P: 1-768
- [10] Gura, J. (2012): Design After Modernism, Furniture and Interiors 1970-2010, W.W. Norton Company Inc. 500 Fifth Avenue, New York, N.Y. 10110, USA, P. 152-191.
- [11] Postell, J. (2012). Furniture design. John Wiley & Sons.
- [12] Smardzewski, J., (2015), Furniture Design, Poznan University of Life Sciences, Poznan, Poland, Springer
- [13] Efe, H., (1994): Mechanical Behavior of Tradational and Alternative Joints on Construction Design of Modern Furniture Frames, (PhD.Thesis, Adv.; Dr.Örs), Karadeniz Technical University, Trabzon, Turkey
- [14] Umezu, J., (1988), Lesson Notes of WSP, Fac.of Art and Eng. Tokyo Politechnic, Uni. Japan
- [15] Eckelman, C., (1978): Strength Design Of Furniture, TimTech. Inc., 303 North, 350 West Road, West Lafayette. Indiana, USA, P: 1-3, 232
- [16] Kawakami, S., (1988): H., EFE, Lesson Notes of Fur. Design, Tokyo Politechnic Uni. , Japan
- [17] Efe, H., (1997): Analyses of Furniture among the Function, Form, Aesthetics and Technic, Subject of Science and Technic, The Journal of Türk İnşa, 177, P;19-21, Ankara, Turkey
- [18] Kawakami, S., others, (1987), International Federation of Interior Architects/ Interior Designers- Members & Others, Rikuyo-sha Publishing, Inc., Tokyo, Japan
- [19] Panero, J., and Zelnik, M., (1979): Human Dimension & Space, Watson – Guptill Publications, New York, NY
- [20] Beyazıt, N., (2000), Tasarlama Kuramları ve Metodları, Birsen Yayıncılık, S:1-308, İstanbul
- [21] Efe, H., Arslan, A.R., (2008): Kullanıcıların Mobilya Satın Alma Davranışlarında Tercih Kriterleri, 14. Ulusal Ergonomi Kongresi, 30 Ekim-01 Kasım 2008 Karadeniz Teknik Üniversitesi, Trabzon, S:346-354, Turkey
- [22] Erdil, Y.Z., Diler, H., Kasal, A., Efe, H.,(2013): "The Strength Performance of Different Types of Household Chairs According to Engineering Design Concepts", 67th International Convention of the Forest Products Society, Austin, Texas, USA, 9 – 11 June, 2013
- [23] Spannagel F., (1954), Der Möbel Bau, Otto Maier Verlag, Ravensburg, Germany
- [24] Efe, H., İmirzi, H.Ö., Dizel, T., (2004): Oturma Mobilyası Tasarımında Ergonomik Kriterler, 10. Ulusal (Uluslararası Katılımlı) Ergonomi Kongresi, Uludağ Üniversitesi, Ekim 2004, Bursa, Turkey
- [25] Grandjean, E.,(1971): Fitting the Task to the Man, Taylor and Francis Ltd., London
- [26] Güngör, İ., H., (2005): Temel Tasar (Basic Design), Yem Yayınevi, 2005, P: 1-258, Turkey
- [27] Zelanski, P.(1984): Design Principles and Problems, Rinehart and Winston, New York
- [28] Gürer, L.,(2004): Temel Tasarım (Basic Desgn), Birsen Yayınevi, 2004, P. 1-332, Turkey
- [29] EFE, H., [2015], Furniture Design Concept and Trends , The XXVII. International Conference Research for Furniture Industry, 17th-18th September 2015, Gazi University, Ankara, Turkey

- [30] EFE, H., [2016], Furniture: A Short Story,, II. International Furniture Congress, October 13th-15th 2016, Muğla Sıtkı Koçman University, Ankara, Turkey.
- [31] Seylan, A., (2005), Temel Tasarım, Dağdelen Basın Yayın Ltd. Samsun.
- [32] Martineau, J., (2013), Designa: Technical Secrets of The Traditional Visual Arts, Bloomsbury Pub., New York.
- [33] Nozedar, A., [2010], Signs & Symbols Sourcebook, Metro Books, New York.
- [34] Kopacz, J., (2003), Color in Three-Dimensional Design, Mc Graw-Hill Books, New York.
- [35] Kobayashi, S., (1987), A Book of Colors, Kodansha International, Tokyo and New York.
- [36] Whelan, M. B., (1994), Color Harmony, Rockport Publisher Inc., Massachusetts, USA.
- [37] Allen, J., (1986), Designer Guide to Color, Chronicle Books, San Francisco, USA.
- [38] <https://www.thinkchromatic.com/portfolio/>
- [39] <http://www.bandbsnestinteriors.com/mg/405082/1gy50a-enticing-roomsketcher-interior/405080/>
- [40] <http://advancedesign.com/yeni-tasarim-konseptleri/page/4/>
- [41] <https://homedesignator.com/2017/09/11/2books-design-chiang-house/>
- [42] <https://www.papertostone.com/designs/for/interior-design-bengali-style?page=47>
- [43] <https://br.pinterest.com/source/yourlery.com/>
- [44] <http://geeketto.com/home-interior-led-lights/new-home-interior-led-lights-decoration-ideas-collection-fancy-and-design-tips/>
- [45] [http://www.brexinteriors.co.uk/resources/IMG\\_1954.JPG](http://www.brexinteriors.co.uk/resources/IMG_1954.JPG)
- [46] [http://www.zastavki.com/pictures/originals/2014/\\_Green\\_tones\\_in\\_the\\_design\\_of\\_the\\_living\\_room\\_091275\\_.jpg](http://www.zastavki.com/pictures/originals/2014/_Green_tones_in_the_design_of_the_living_room_091275_.jpg)
- [47] <http://www.dorettaescutti.com/wp-content/uploads/2016/02/red-walls-green-armchair-in-living-room.jpg>
- [48] <http://wegoracing.com/wp-content/uploads/2016/11/1000-images-about-paint-colors-on-pinterest-key-west-tropical-intended-for-87-outstanding-living-room-wall-color.jpg>
- [49] [http://idolza.com/a/f/a/april-transnational-architecture-group-alan-vaughan-richards-interior-design-room-apartment-condo-house-wallpaper-background-residential-drafting-and\\_draw-floor-plans-online\\_indo.jpg](http://idolza.com/a/f/a/april-transnational-architecture-group-alan-vaughan-richards-interior-design-room-apartment-condo-house-wallpaper-background-residential-drafting-and_draw-floor-plans-online_indo.jpg)
- [50] <http://big5.yifanfurniture.com/html-cn/image/1-GopfVnmAwdRe-1-1.jpg>