

**RE-THINKING CREATIVITY IN
ARCHITECTURAL DESIGN EDUCATION**

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Ph.D. Dissertation

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January 2020

FINAL APPROVAL FOR THESIS

This thesis titled “RE-THINKING CREATIVITY IN ARCHITECTURAL DESIGN EDUCATION” has been prepared and submitted by Fatma KOLSAL in partial fulfillment of the requirements in “Eskişehir Technical University Directive on Graduate Education and Examination” for the degree of Doctor of Philosophy (Ph.D.) in Department of Architecture has been examined and approved on 17.01.2020.

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ABSTRACT

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The stages of architecture and architectural education depend on the phases of human being's changing interpretation in the creative processes. The concept which is called “creativity” today and which has been discussed in the past through various definitions such as inspiration, imagination, production, or mimesis is determined by our ways of perceiving the world and ourselves. On the one hand, the sequence of events that contextually affect each other, and on the other hand important thresholds that emerge in some periods, produce world views that explain how architecture is represented.

In this context, the stages and thresholds undergone until the 21st century, have an important place in the conceptual foundation of the thesis. Regarding the contextual parameters, the variable, volatile, ambiguous and complex structure of contemporary perspectives is underlined. Another highlight is the potential of the tools of the age. These findings provide an important reason for reconsidering architectural design studios that have embraced certain traditions from Bauhaus to the present. The critical value of both design and creativity in the 21st-century brings together the concepts of creativity and design in this reworking of the studio.

This thesis associates the concept of the transformative concept of architectural design education and creativity through a historical analyses. It carries this association to the design studio ground from past to present on the axis of creativity. Thus, an architectural education process in which creativity is decisive is put forward in the conceptual framework obtained. It is discussed how the accumulation of architectural education determined from this point can be handled on the base of the architectural design studio of the century. In order to achieve a specific goal, inferences are made about how creativity, defined as the application of knowledge and skills in new ways, can be coincided with the architectural design studio's contemporary theoretical, practical, technological and pedagogical approaches and historical development.

Keywords: Creativity, Architectural design education, Design studio

ÖZET

MİMARİ TASARIM EĞİTİMİNDE YARATICILIĞI YENİDEN DÜŞÜNMEK Fatma KOLSAL

Mimarlık Anabilim Dalı

Eskişehir Teknik Üniversitesi, Lisansüstü Eğitim Enstitüsü, Ocak 2020

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Mimarlığın ve mimarlık eğitiminin geçirdiği aşamalar, aslında insanoğlunun yaratım süreçlerinde değişen yorumun geçirdiği aşamalara bağlıdır. Günümüzde “yaratıcılık” olarak adlandırdığımız ve geçmişte ilham, hayal gücü, imgelem, üretim, mimesis gibi pek çok çeşitli tanımlamalar üzerinden tartışılan kavram, dünyayı ve kendimizi algılama biçimlerimizle belirlenir. Bir yandan, bağlamsal olarak birbirini etkileyen olaylar dizgesi, bir yandan da bazı dönemlerde beliren önemli eşikler, mimari olarak neyin nasıl ortaya konduğunu açıklayan dünya görüşlerini üretirler.

Bu kapsamda, 21. Yüzyıla ulaşana kadar geçirilen aşama ve eşikler, tezin kavramsal kurgusunda önemli bir yer tutarken, çağdaş bakış açılarının değişken, uçucu, muğlak ve karmaşık yapısının da altı çizilmektedir. Vurgulanan bir diğer konuya, çağın araçlarının taşıdığı potansiyellerdir. Bu tespitler, Bauhaus’tan günümüze belirli geleneklerini tutucu bir şekilde sahiplenilen mimari tasarım stüdyolarını yeniden ele almak için önemli bir gerekçe oluşturmaktadır. Gerek tasarımın, gerekse yaratıcılığın 21. Yüzyılda kritik değerde olmaları, stüdyonun bu yeniden ele alınışında, yaratıcılık ve tasarım kavramlarını bir araya getirmektedir.

Bu tez, zamana bağlı değişen mimari tasarım eğitimi ve yaratıcılık kavramını tarihsel bir inceleme sonrasında günümüzle ilişkilendirmektedir. Bu ilişkiyi stüdyo odağına taşımakta; geçmişten günümüze, mimar, mimarlık ve mimarlık eğitimini, yaratıcılık olgusu ekseninde inceleme altına almaktadır. Böylece elde edilen kavramsal çerçevede, yaratıcılığın belirleyici olduğu bir mimarlık eğitimi süreci ortaya konmaktadır. Buradan yola çıkarak tespit edilen mimarlık eğitimi birikiminin, yüzyılın mimari tasarım stüdyosu zemininde nasıl ele alınabileceği tartışılmaktadır. Belirli bir hedefi gerçekleştirmek için bilginin ve becerilerin yeni şekillerde uygulanması olarak tanımlanan yaratıcılığın, mimari tasarım stüdyosu kapsamında çağa ait teorik, pratik, teknolojik ve pedagojik yaklaşımlar ve tarihsel gelişimi ile nasıl çakıştırılabileceğine dair çıkarımlar yapılmaktadır.

Anahtar Sözcükler: Yaratıcılık, Mimari tasarım eğitimi, Tasarım stüdyosu

STATEMENT OF COMPLIANCE WITH ETHICAL PRINCIPLES AND RULES

I hereby truthfully declare that this thesis is an original work prepared by me; that I have behaved in accordance with the scientific ethical principles and rules throughout the stages of preparation, data collection, analysis and presentation of my work; that I have cited the sources of all the data and information that could be obtained within the scope of this study, and included these sources in the references section; and that this study has been scanned for plagiarism with “scientific plagiarism detection program” used by Eskisehir Technical University, and that “it does not have any plagiarism” whatsoever. I also declare that, if a case contrary to my declaration is detected in my work at any time, I hereby express my consent to all the ethical and legal consequences that are involved.

Fatma KOLSAL

ACKNOWLEDGEMENTS

During this research, where I tried to understand the prolonged relationship in between architecture and creativity, first of all, I would like to thank my supervisor Prof. Dr. Nuray Özaslan for her valuable, critical, and out-of-tradition contributions to the direction of the thesis with her creative suggestions; for her support that broaden my scholar horizons, and for opening of her unique book archive to me.

Likewise, I would like to thank my esteemed teacher, Assoc. Prof. Dr. Emine Dilay Güney for her continuous support, vital ideas in this long-term process, and for her energy and suggestions, which immensely enriched my research. Her positive attitude and sincere criticism is an important factor in my progress.

I would like to express my special thanks to Assist. Prof. Dr. Feryal Aysin Koçak Turhanoğlu, who helped me to discover the sociological and societal connections in my work from a non-disciplinary perspective. The “Postmodernism and Space” course, which I took during the beginning of my Ph.D., was one of the cornerstones of my academic experience, has noteworthy reflections on this thesis as well.

Although I cannot specify their names, I would like to thank all my colleagues and friends who helped me manage and surpass this demanding process well.

Last but not least, I would like to thank my dear husband Evren and my dear son Oğuz for whom I always felt their support and presence by myself during this busy and challenging period.

Fatma KOLSAL

January 2020

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LIST OF SYMBOLS AND ABBREVIATIONS

IT	: Information Technologies
OECD	: Organization for Economic Co-operation and Development
UNESCO	: United Nations Educational, Scientific and Cultural Organization
CCR	: Center for Curriculum Redesign
CIAM	: Congres Internationaux d'Architecture Moderne
MARS	: Modern Architectural Research Group
EAAE	: European Association for Architectural Education
PSI	: Personalized System of Instruction
AA	: Architectural Association
MoMa	: Museum of Modern Arts
MIT	: Massachusetts Institute of Technology

1. INTRODUCTION

In the twenty-first century, there are considerable changes at many levels. A highly complex and rapidly changing world is confronted which affects our lives. The interaction between technological developments and society has led to significant changes in the ways of living and experiencing life.

Recently, Information Technologies (IT) Revolution in the world has emerged as a result of developments in information and communication technologies. With it, the structure of the society and the relationships among people have also changed and transformed.

However, it can be stated that the construction of the information society is a complex social process that cannot be explained solely by technological factors. Information society emerges as a result of the interaction between information technologies and society which feedback each other.

There are several outcomes of this multi-dimensional interaction. The change is fast and strong. The complexity of the interconnected nature of the world continues to grow. The complexity makes causal relationships not clear, leading to unknowns and uncertainties. Therefore, there is a scene of a globally networked world defined as a world of volatility, uncertainty, complexity, and ambiguity (Charles Fadel & Groff, 2019).

Under this ambiguous atmosphere, to reach, interpret, construct and adapt the acceptable information is a challenging issue. There are educative, societal, individual, economic, and many other reflections of this ambiguity directly/ indirectly affecting our lives. Education is one of the most controversial parts of the recent developments. On one hand, the reflections of this complexity to the educative fields are seen as a critical dimension of the problem; on the other hand, the lack of a holistic philosophy to reconstruct and transform the ongoing methods in the stream of education is seen urgent, but time-consuming. Moreover, the necessity for an instructor and a space for education is a heated discussion.

Architecture and Architectural Education in the Context of 21st Century

On the educative cultural ground of the 21st century, there is an interactive structure based on technology and knowledge. Although the transfer of this interaction

to the field of education is inevitable, the reflections of the rapid change processes on education are seen slower. To grasp the contextual necessities, the competencies and capabilities required for the 21st-century can be considered as a common starting point. There are some examples of varied organizations such as the Organization for Economic Co-operation and Development (OECD), Center for Curriculum Redesign (CCR), and United Nations Educational, Scientific and Cultural Organization (UNESCO) to draw a framework for how the 21st-century individual should be educated. There is Delor's Report (1996) as an initiative, where lifelong learning has firstly been associated with a global educational paradigm. For these discussions, it is assumed that we are currently preparing students for jobs and technologies that don't yet exist to solve problems that we don't even know are problems yet (C. Fadel, 2008).

The individual should equip him/herself with some capabilities. There are some featured skills for this century, such as learning skills (creativity, critical thinking, collaboration, communication), literacy skills (information literacy, media literacy, technology literacy) and life skills (flexibility, leadership, initiative, productivity, social skills) (Ananiadou & Claro, 2009; Bialik & Fadel, 2015; Centre for Educational Research and Innovation & Organisation for Economic Co-operation and Development., 2010; C. Fadel, 2008).

In this environment, architectural education has its share as well. In particular, architects who pioneered the 20th-century debates, seem to have lost their avant-gardist position. At the beginning of the 20th-century, within a modernist point of view, Bruno Taut, for instance, one of the important architects of the era, believed that only the artists and architects can lead men back to a spiritual unity emphasizing the designers' high and magnificent powers (Gelernter, 1995, p.231). However, architects lost out their leading role over time. It can be stated that architecture is stuck between traditional and contemporary in many areas from the education of architects to the status of discipline and practices in the field. The academy and the practice seem growing distant. With the developments brought about by time, it can be determined that this situation has contextual reasons. On the one hand, with the power of starting from the first principles -with the spirit and influence of the Bauhaus period- the contemporary educational practices that are held in the illusion that this previous paradigmatic shift can be adapted to the changes of the day as well; on the other hand, the architectural knowledge, tools, and pedagogy that is not changed within its conserved and self-confident structure,

reinforced this situation. Another argument is that the architecture, the architect and the education of an architect is a circular formation and the contextual developments have a different amount of impacts on each which causes discord among them. As a result of this growing apart, they have been handled as divergent notions.

In the twentieth century, there was a rational way of thinking that seeks to understand the mechanisms of reality, and this affected the modes of production as well as the design and the architecture. Hence, the function was important. Through abstraction, architects tried to establish a physical world that influenced everyday life due to a formal and independent context. Science was based on understanding the laws of nature and interpreting them through technology. On the other hand, changing technology and science in the 21st-century saw the use of rational knowledge as well as intuition and imagination. Information technologies have begun to allow the production of new mechanisms instead of the mimesis of existing mechanisms and to visualize them. In this case, information-based creativity instead of problem-solving creativity came to the agenda. Research for/ by design, design thinking and its processes as a knowledge generator became important for the search of the “new”. A shift - from problem-solving to re-defining problems and a shift from transferring knowledge to producing it- have happened. This shift resulting from redefining the problems rather than solving them draws attention to contemporary social and environmental questions that determine the future where ethical values seem to affect the quality of the concept of creativity.

This is not only the motivation source of the designers but also the newly developing fields of science. Creating a difference in all design areas has been considered as the most important skill. Creativity, innovation, collaboration, critical thinking, communication and learning to learn have turned to be the fundamental competencies of the 21st century. With an awareness of the potential of design in generating knowledge, design education is started to be reviewed according to these competencies. The cultural milieu of the age together with its social, economic and technological conditions is turned to be the resource for the creative designs and the ‘new’(Kolsal & Özaslan, 2019). Thinking and producing the ‘new’ became the main motivation of the global world. However, the definition of the ‘new’ itself also subjected to new confrontations. The ‘new’ of the modernity challenged to the past, tradition, regional culture and holy knowledge by the enormous support of the science.

It was the mean to create the modern world that shaped by the universal values. Today, the world faces to social, humanitarian and environmental problems which threatens the future of life. The contemporary definition of the 'new' should recognize the present context and include the ethical and social considerations to prevent causing destructive problems. As creativity is revealing the "new" for a determined goal using knowledge and skills, it is an enormous capacity to shape the life through its characteristics.

Creativity and/ with/ in Architecture

Historically, "creativity" and research on creativity has emerged during the 1920s. Pope(2005, p.19) states that the notion of creativity was firstly introduced in the dictionaries in the 1930s. It can be accepted as a product of the mid-twentieth century and of the modern world which was a great challenge to the traditional and historical qualities in its essence. It is a specifically modern response to problems associated with rapid social and technological change. Yet, it was always there in history, called by different names such as memes, inspiration, imagination, etc. The new thing was only the handling of creativity within the modernist peak as a favorable issue and as a scientific field.

It is understood that creativity is a mental activity that is difficult to explain under a single definition (Amabile, 1996; Bohm, 1998; Csikszentmihalyi, 1997; Kaufman & Baer, 2005; Runco, 2014; Thomas & Chan, 2013; Vartanian, Bristol, & Kaufman, 2013; Zimmerman, 2009). However, at the beginning of those researches, creativity was mostly associated with artistic productions or with creative personalities in history (Csikszentmihalyi, 1997). This reductive perception is related to the fact that the state of creation and creativity become more prominent in artistic actions and in genius person. Another misconception was about the teaching of creativity, which was once accepted as a stable gift to specific personalities that cannot be improved or developed for other individuals (Runco, 2014). Yet creativity is an inherent and determinant element involved in any kinds of human activity and is now considered and handled for every individual in the contemporary view.

One of the views about creativity in the first half of the 20th-century was about its coming to light due to its contribution to scientific progress through the World Wars. According to Pope(2005), creativity in the 20th-century has a 'spirit of times' status.

Generally speaking, there was a military aspect of struggle, with its race to develop new weapons and new strategies with an atmosphere of cold-war politics and enlarging capitalism. As J. P. Guilford states, a founder of modern creativity research, the coming of the age of space is a force contributing to the upsurge in interest in creativity. He pointed out the change of the time in mid the 1930s and implied the adjustments in the political and personal-relations areas call increasingly for imaginative solutions.

Here the increasing mobility of the people and relations could be emphasized regarding the effects on demanding more creative world views. This implies the abandonment of the reductive perspective of creativity only to art and science in the 21st century. Similarly, what is abundantly confirmed is that the theory and the practice of creativity can only be fully grasped by reaching beyond distinctions between arts, science, and technology (Pope, 2005, p.22).

This is valid for architectural design education as well. Today, everybody may tend to agree upon the necessity of including art, science, and technology in a design curriculum. But, there will be divergent perspectives upon their relative importance, and upon their respective function. There will arise separation regarding the intensity of these three aspects in a curriculum. This was tried in history as well (Figure 1.1). Bauhaus, for instance, founded by Walter Gropius in 1919, tried to combine art and technology for an idea of a new world. When Moholy-Nagy established a new Bauhaus school in Chicago in 1937, he desired to combine art and science for an idea of a new man. Not surprisingly, Maldonado and Horst Rittel worked out another combination- a combination of science and technology to introduce a new culture in 1958 at Hochschule für Gestaltung in Ulm (Findelli, 2001).

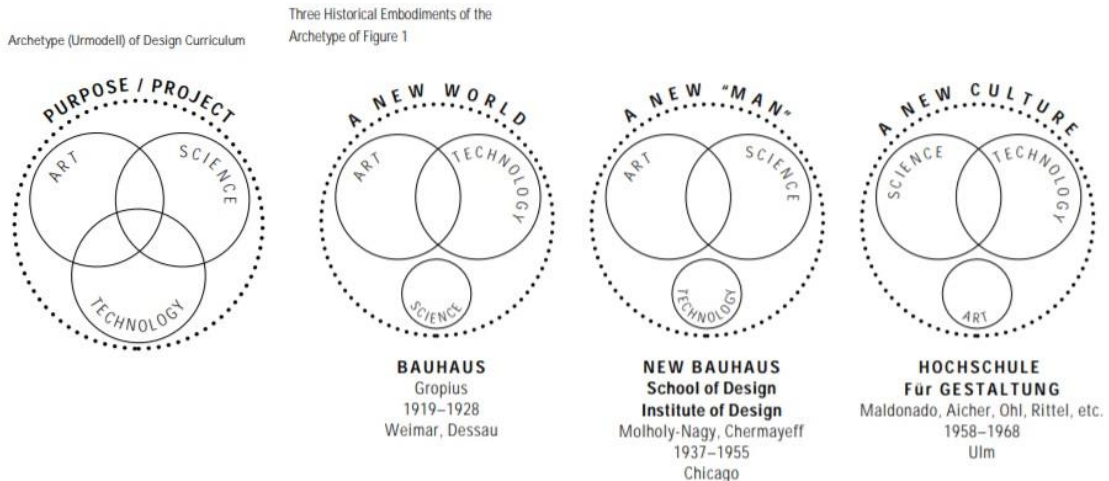


Figure 1.1. *Different attitudes in architectural education (Findelli, 2001).*

Those experimentations in the history of architectural education show us there is not a certain answer for the curriculum design. The dominance of art, science, and technology may differ according to the spirit of the time. This can be seen as a reflection of fragmented world views and heterogeneous comprehension of the architectural discipline and the complex structure of its education today. For the practices in education, it seems difficult to find a common basis in an environment of diversity and interaction. In architectural design studios, there is a need for more general but inclusive starting points that can be agreed upon, rather than developing an overall approach. These points can be described by their general characteristics. The framework of the studio can be determined by the relationship it has with the concept of creativity. The creativity, which is an inseparable part of the era, is the main motivation for innovation and the search of the new. There are many definitions of creativity. Among all other definitions, one of them is capturing the variable creative design issues:

‘...the application of knowledge and skills in new ways to achieve a valued goal...’(Pope, 2005, p.27).

This definition may be the most adaptable one for the ‘in limbo’ situation of architectural design education. It is in limbo because it could neither create a bridge in between the practice and theory nor use the full potential of the contemporary circumstances. Here it is critical to emphasize the importance of defining what the “new” is and what the “valuable” is as much as what the “goal” is. Scrutinizing the process of architectural design education with its contents, it is possible to comment on

the trajectories of the design studio and the future concepts related to creative linkage. Those concepts can be counted as knowledge/research-based design, new tools, new pedagogies and re-positioning of the studio in a social, societal, environmental and ethical manner.

Here, some questions arise. Should we read the era through the skills of 21st-century human to be competent in the time we are living in? Are we created out of those skills: learning, literacy, life skills? Could they draw a frame for architectural education or have they already been the concerns of the architectural field? Aren't those characteristics a part of the architectural educative, social and academic environment long since? Or is there confusion about all of them? What is the role and quality of creativity in architectural education in the age that social and environmental responsibilities points out the ethical values?

Contextual Creativity

Being one of the learning skills of the 21st century, creativity has a privileged place among others, since it has an umbrella role for the rest. Creativity catalyzes all other skills. This is valid in the history as well. Breaking points in human history have developed as a result of creative actions which often had led to creative processes. Although there are many examples of this kind of rupture in history, a few of them can be particularly emphasized here.

The invention of the steam engine in 1784 (Briggs & Burke, 2009), for instance, can be regarded as a striking example when its radical influences on the faith of societies are considered. Without ignoring the context and the pattern of events that paved the way for the invention of the steam engine, the invention itself appears as the key descriptor of a refraction and a threshold in the history. It may be argued that the transformation from an agricultural society towards an industrial one was probably inevitable, however, the introduction of the steam engine accelerated this transformation and turned it to be a clear cut or a shift. Similarly, the discovery of electricity can be given as an example in terms of its impact on human history.

In addition to these exemplifying well-known scientific discoveries, an artistic example could be complementary. The power of artistic creativity to transform societies

is another side of the creative thresholds. For instance, Van Gogh's transfer of wheat fields from his point of view, avoiding the sole concern of representing the “wheat fields”, and his desire “just to paint, not to represent” set a good example as one of the breaking points in the world view of the individual. Here, the change at an individual scale caused a change at a societal scale afterward (Image 1.1).



Image 1.1. Vincent Van Gogh's wheat fields, an example for individual creativity, evoking a shift in artistic perspectives, in object-subject relation, and in the way of perception (<http-1>).

Another interesting example of this nature is the emergence of “photography” as it involves both artistic and scientific discoveries (Burke, 2001). This invention, which questions the uniqueness of art and demolishes the representation system on which the art of painting is built, has opened new doors that are not known in the creative lands while it seems like a convenience in some cases and a problem in other cases in terms of the reproduction, reproduction of images and the new meanings produced by the replicas, copies, and multitudes. What is more, the wars, despite all the negative meanings they contain, have laid the groundwork for many discoveries. The rivalry in cryptographic security during World War II constitutes the first step in the discovery of the computer, can be counted as an example of this kind.

Creativity through art and innovation by science seem quite influential on the history's turning points. This characteristic of civilization can be observed in various disciplines including architecture. The thesis is handled this transformation process as thresholds to position and map arguments clearly. Producing meaning and interpretations of the events can be constructed by establishing such relationships.

Making these relationships visible, which enables us to understand developments and make forward projections, is thought to be a difficult but critical point in researches.

Considering the examples given above and numerous other examples of the argument, creativity may appear on different scales. It may appear as an individual invention with social reflections; as a scientific invention; as a personal discovery without any reflection; or as an artistic approach that influences world views; it may result in an artistic or a scientific development that triggers other artistic and scientific events. In this perspective, it may be predicted that creativity may change contextually (Figure 1.2).

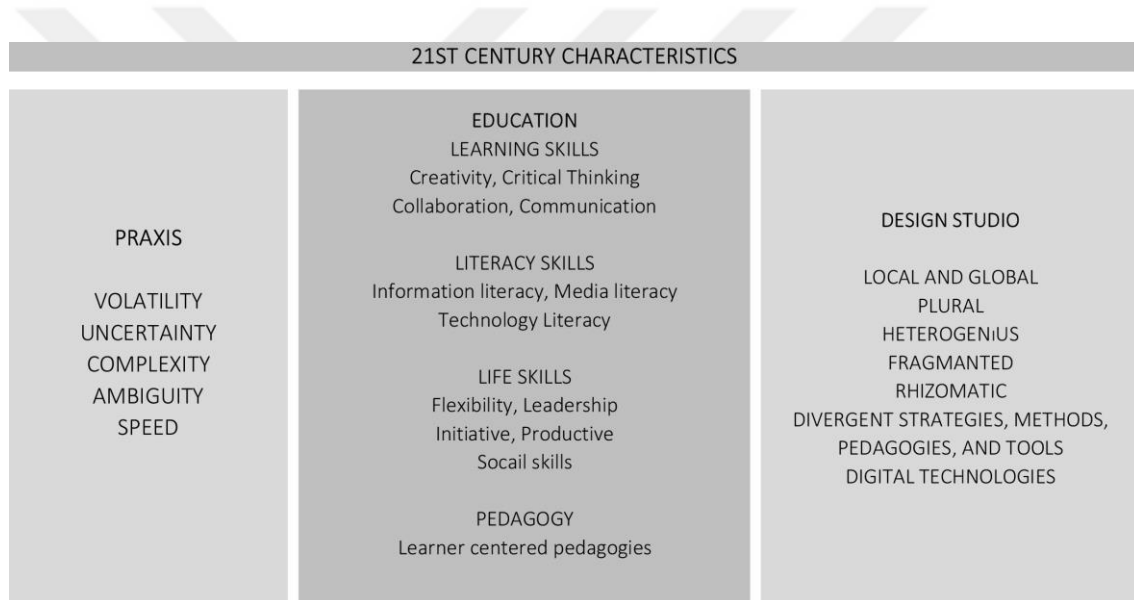


Figure 1.2. *The 21st-century framework and characteristics of some related fields in a creative threshold*

So, within the context of the 21st century, creativity should be studied regarding the contextual parameters. The atmosphere created by the developments and accumulated processes in every field forming the character of the current temporal situation constitutes a different ground other than before. Speed and ambiguity define the continuously changing parameters of the new. This complexity generates the reasons for looking at history to attain a pattern. A pattern, which may lead to a holistic reading of the distracted structure of the contemporary conditions.

1.1. The Definition of the Problem

Architecture could be assumed as an accumulation and a reflection of one of the most creative processes of mankind. It could be accepted as the embodiment of artistic, technical and anthological presence of human experience attained us hitherto employing design thinking and the designed and built edifices. The notion of design associates with both the theoretical and the physical. Former implies meaning-making, creating insights and organizing information mentally depending on a thought to reach truth and the latter refers to the encapsulation of that theoretical knowledge in the body of a product-e.g. a building or a drawing.

Architecture is one of the creative fields of human being. Although the naming, scope, and definitions of creativity have undergone a transformation in history, it can be said that it is one of the most impressive notions which affects the manifestations of architecture.

To relate architecture to creativity in advance may not be difficult, yet the challenge of this relation is often about the lack of a single definition of both creativity and architecture. Furthermore, the existing definitions are variable, multidimensional, and layered. In this study, firstly, these two concepts whose definitions are transformed and expanded depending on time is tried to be understood. In particular, depending on the changing definitions of creativity in the historical process, how architecture, architect, architectural education and consequently architectural design are transformed in the axis of creativity is discussed. At this point firstly, there will be a search for *ground* to understand the contents of creativity, to reveal the creative thresholds in the history and to discover past relationships of architecture and creativity, to provide foresight to make novel connections about the role of creativity within the architectural design studio today.

In the 21st century, there is a mutual link between economy and science. The way to earn more is to produce and consume the 'new' through science, and art. Today, the production of the 'new' is the most important motivation of development in the fields of economy, science and art. Creativity is the most important factor in the production of the 'new'. The creation of 'new' today and in the future is in a position that determines the context of civilization. Therefore creativity is one of the most critical skills of the age. Creativity's relationship with architecture is also obvious. So,

predictions and readings on the relationship between architecture and creativity are necessary for the 21st century. The effects of this relation in architectural education and design studio and the methodologies should be discussed gradually.

Therefore, the question of the thesis can be stated as:

What is/will be the notion of creativity in architectural design education in the future?
(Figure 1.1.1).

To answer this versatile question, other sub-questions are needed to be answered:

- How was the relationship of creativity and architecture in history? (Chapter: 2.2)
- What is the new conception of creativity in the 21st Century? (Chapter 3.3)
- How are the past and current concerns in architectural design education? (Chapter 3.1 and 3.2)
- What are the parameters of architectural design education in the 21st century? (Chapter 4.1.)

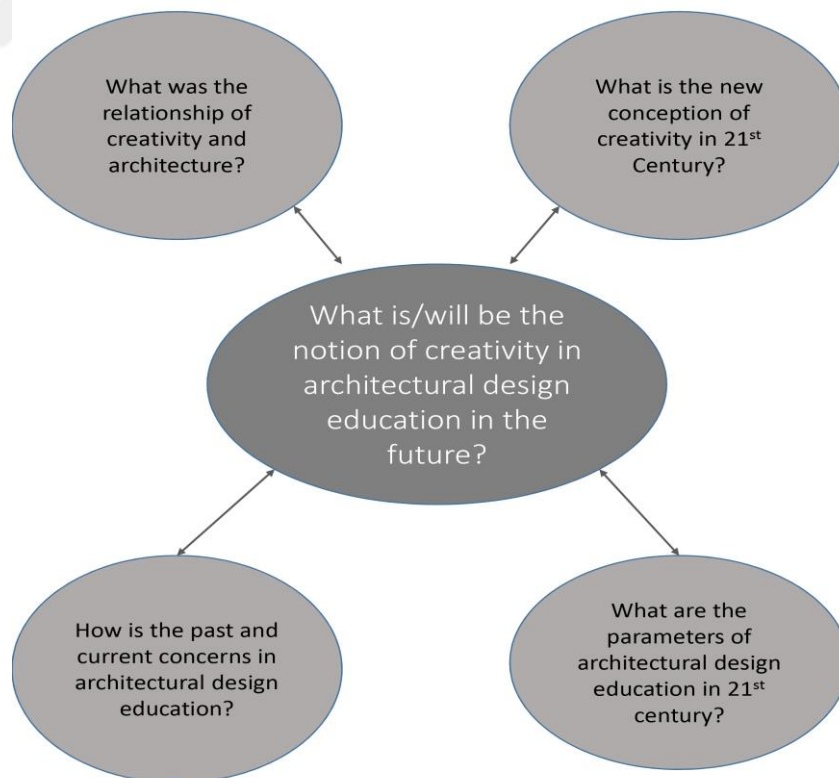


Figure 1.1. *The main and subsequent questions of the research*

The technology, the cultural and economic systems, forms of living and the way of thinking have all been changed in due course from ancient times to the 21st century. Within this context, having a central concern for the creativity and architectural design, the changing climate of the era with its new arguments is tried to be analyzed and grasped in this dissertation for a future projection in architectural design education searching for new directions and gateways.

“Changing notions of creativity, research and definition of architectural problems require a re-examination of current approaches” (Elsheshtawy, 2007). Therefore understanding circumstances in the past and at present seems important.

The increasing demand to change and adaptation for the fast and unstable character of the time renders it difficult to find a referential point. Although the need for a change regarding the studio has been discussed for decades, the studio remained as unresponsive to this transforming environment.

Similarly, the distinctions multiplied in the field of architecture between the profession, education and the identity of the architect is one side of the problem all of which have critical places regarding their direct/indirect societal reasons/causes/reflections. The other side is about the intrinsic conventionality in teaching/learning architectural design which domains the core of architectural education (Figure 1.2).

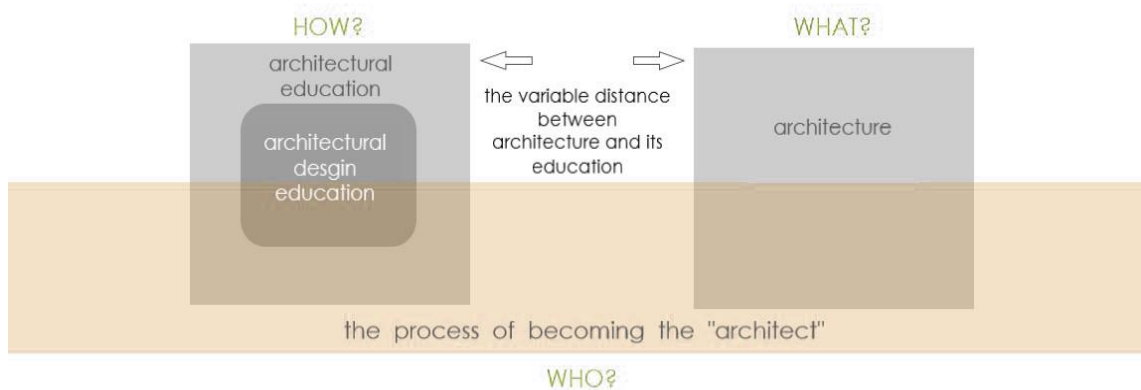


Figure 1.2. The scheme of the mutable tension and relation in between “the architect”, “the architectural education” and “the architecture”

At this point, what architecture is, who the architect is, how education should be, are important for this study to locate artistic, scientific and technological counterparts of the field. Even though the aim and scope of this dissertation is not focusing on this correlation among the practice and education, this issue constitutes the periphery of the research. In other words, these intertwined constituents that determine what architecture is in different periods and at different scales are inevitably included in the subject while discussing architectural design education today.

1.2. Aim and Scope

This research aims to determine the transformations in the notion of creativity, changing perceptions of “creativity” and reveal its effects on architecture in the history to justify its role on architectural design education today. This thesis has not a view from inside about a determined tactical application of creativity to a curricula or an exercise within the studio; on the contrary it has an inclusive view taking creativity as a leading condition of the spirit of time. Therefore, this study aims to relate the effects of the 21st century’s context on the notion of creativity which defines the methods of running the architectural design studio. Thus the architectural design education which is shaped by its context is supposed to be construed regarding the contemporary consequences. By this way, it is believed that some inferences about a more responsive architectural design education could be done through re-thinking the role of creativity for the 21st century.

The scholar conveniences of architectural education has been derived from the European models of educative trials which have all shaped and remarkably influenced architectural education within a global scale. Although this common grounded understanding of the architectural education is adopted, transformed and interpreted by local and temporal parameters, it is not wrong to state that most of the worldwide architectural schooling have been founded on the basis of Western European origins. Thus, the scope of this research is determined by this historical origination concerning the institutionalization of the modern architectural education. The introduction of the notion of the studio is a key concept in this becoming, which has still been accepted as central to the architectural design education.

In addition to these statements, the current complex condition of the notion of the studio is worth to mention to better define the scope of this research. The studio is a hard-to-define concept regarding its structure and components with the variable parameters which effects the identity of it.

Here, Deleuze and Guattari's(1988) conceptualization of "rhizome" in *Thousand Plateaus* may present a useful analogy. The rhizome is a type of plant stem in botany and it is perceived as a tool to compare the static woody body. Woody body explains the model of thought dominated by the image of dogmatic thought. This model is monocentric, the points are essentially linear and vertical, and thus hierarchical. Rhizomatics, instead, is a way of thinking and research related to it. The rhizome is multicentric and horizontal, in planar form with many intersecting lines, not a single line. It consists of dimensions, or rather, moving directions, not units.

The analogy of Deleuze and Guattari was firstly used by Martin Pearce and Maggie Toy (1995) in their book called "Educating Architects", where they inferred that the resistance of architectural education for a single identity being inherently diverse in its components, which are in a flux with a certain growth, mutation and transformation is the because of this rhizomatic structure and the reason for the anxiety/paranoia of architectural education today.

After a decade, similarly, the image and the idea of the Rhizome is utilized by the winner of the "Writings on Architectural Education" competition, Frank Weiner, organized by European Association for Architectural Education (EAAE) in 2003. The analogy of Deleuze and Guattari is emphasized once again in the writing for conceptualizing five horizons in architectural education in an age of distraction (Weiner, 2005). The heterogeneity of the architectural education with a connection, multiplicity and complexity is visualized by that image (Image 1.2).

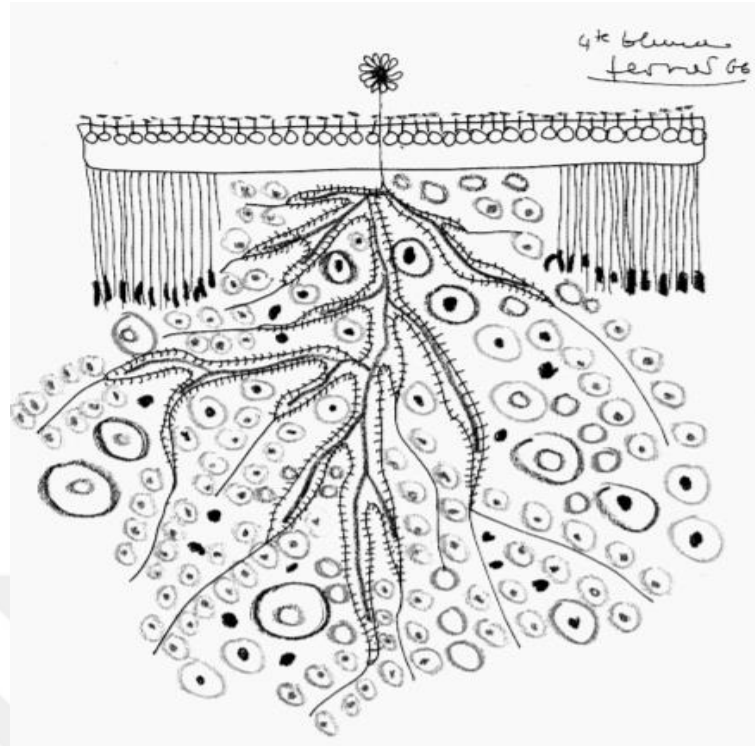


Image 1.2. *The Rhizome image to represent the architectural education used by Weiner on the cover page of his writing, 1st prize of the competition of EAAE (2003-2005) (Weiner, 2005).*

Because of this pertinent rhizome analogy, which is thought to describe the current situation of the studio as well, this thesis conceptually examines the “studio” in the center of architectural education without concentrating on “a studio” of a particular place or a particular culture, but on “the studio” as a notion.

Just like Deleuze and Guattari's example of “Rhizome”, and as Deleuze (1995, p.161) stated, “It's not beginnings and endings that counts, but middles where you have to get work, that's where everything unfolds”, the “studio” of any kind could be assumed as an extract of the notion.

1.3. Method

The methodological approach of the thesis is to discuss the changing nature of the key concepts such as creativity, architectural education and architectural design studio throughout the related literature. The study discusses the previous debates on creativity and its effects on architectural design education by an examination of the

literature with an interrelating approach. The study aims to clarify the contemporary qualities of the notion of creativity and its possible impact to run an architectural design studio for better architecture and in turn better-built environment. The main objective of this study is to develop an understanding of the design studio tutorship which aims to improve students' creative abilities. The thesis discusses the related literature on a conceptual and theoretical basis focusing on the research questions. It examines the contemporary contributions to the research subject by the applications in the design studio.

This examination is realized by means of both explanatory and discursive research methods. Explanatory research, which is one of the qualitative research methods, focuses on the cause and effects of a problem and try to answer “why?” questions. It is not a linear kind of research, which means the course and the structure of the study are open to transformations during the process of the research (Merriam & Grenier, 2019). Discursive research consists of construction of the meanings of phenomena, knowledge, and reality, and the networks linking them (Oswick, 2012). Therefore, for a general and holistic understanding within the framework of the thesis, explanatory research is utilized in order to reveal causes and effects, whereas discursive research methods are engaged so as to interpret meanings and construct connections.

For the categorization of information, a technique called “critical mapping” is introduced in this dissertation. This categorization technique is developed in order to visualize and organize the overall information regarding the problem/subject under interrogation. It gives the opportunity of visioning the causes and effects of a concept altogether at the same time. It is basically a table and may include timelines, intersections, interpretations, quotations, and images for a particular subject. The critical mapping can be utilized as a tool to correlate the events and to discover the hidden dependencies or linkages among them. Moreover, a total reading of the maps may reveal some repeating or idiosyncratic patterns for the subjects under examination. Another potential of critical mapping is the opportunity it gives to isolate and combine issues for divergent interpretations (see table 2.1).

There is a technique called “cognitive mapping” in literature. Cognitive maps are defined as the maps of meaning, related to the cognition of a particular culture which makes relations understandable for its members (Dutton, 1991, p.51). It may

seem difficult to relate this definition with the methodological maps utilized in this study, however, there is a similarity between the “cognitive mapping” and the “critical mapping”. Both of them are to make clear connections and to understand the complex relationships within a defined system. For former it is culture, for latter, it is the universe of this research.

1.4. The Structure of the Thesis

When making research about architecture and architectural education/design/studio/, it is a necessity to explain the multi-layered designations such as “architect”, “architecture”, “architectural education”, and “architectural design education”. Because the content of them may differ contextually. The aim of this thesis is not particularly to explain the differences between these notions, however, it is somehow useful to draw a general framework in order to provide the welfare of the research and to avoid further confusion keeping in mind the future perspective.

It is especially difficult to study on the historical process of the architectural education, since the words “architect”, “architecture”, “architectural education” and “design” may have several meanings in the past disparate from the contemporary connotations. There are some instant reasons for this disparity in the meanings;

- The architecture is both an artistic and applied endeavor. When we say “architecture” it may refer to a building, a structure, an idea or a representation. Or may it have theoretical meanings?
- The education of the architect was intrinsic to the production of architecture in history. They were nested, formerly in a guild system, then by apprenticeship. In time, the education and the profession were separately handled.
- The institutionalization of modern architectural education was in the late 17th Century, where “ateliers” have become “studios” in the process of time.
- The definition and the responsibilities of the architect were crystal clear in history, but in due course, they have been enlarged and blurred.
- The “design” is a modern concept, so as “the architectural design education”, which focuses on the improvement of the students’ creative abilities.

Introducing these facts about the architecture with its evolution through the historical, professional and educational transformations, the usage of the terms within historical explanations may be predetermined and become meaningful for the reader. For instance, as a choice of expression, a historical interrogation of the relationship of “creativity with architecture” during the renaissance, includes some visual interpretations through exemplifying buildings as well as the readings of related studies (see Chapter 2-section 2.2.5.). Here, both the physical building and the idea of architectural design is referred by using the notion of the “architecture”, even though there was no such a term “design” in the time of renaissance. Another example is the education of the architect during ancient times, where, in fact, there are no corresponding meanings of the “architect” and “education” as we understand today.

It is critical to clarify what the “architectural education” and “architectural design education” do refer in the thesis. Architectural education is the whole process of education to become an architect in the narrowest sense. In this limited definition, the “architecture”, the “education” and the “architect” are all variables according to the context. Hence, although not institutionalized in the past, what meant by “architectural education” in general, is the one’s way through which an experience is gained to produce architecture of a particular period. However, when “architectural design education” is in question, it refers to modern times, especially the times after the notion of “studio” emerged as discussed in Chapter 3.

One of the major outcomes of this study was to foresee future perspectives in architectural education which should be reconsidered with the new understanding of related notions emerging from the contemporary context.

After these general explanations, it may be helpful to briefly mention the contents of the chapters in order to introduce the structure of the thesis where the overall configuration can be seen in Table 1.1.

Table 1.1. *The structure of the thesis*

<p>QUESTION OF THE RESEARCH</p> <p>What is/will be the notion of creativity in architectural design education in the future?</p>	
<p style="text-align: center;">UNDERSTANDING THE ARCHITECTURAL THRESHOLDS</p> <ul style="list-style-type: none"> • Revealing the Thresholds : significant events in the history and their overall/particular effects are researched; they are positioned on a timeline; they are juxtaposed in order to discover the thresholds of interrelated timelines • The Relationship in between Creativity and Architecture: This relationship is tried to be understood by interrogating the philosophical roots of creations in the actions of humanbeing. <p>Poiesis, Praxis, Techne is the key concepts in order to evaluate the architectural sense of doings and makings.</p> <ul style="list-style-type: none"> • Mapping the Relationship: visualizing the relationship 	<p>Sub-questions:</p> <p>What was the relationship of creativity and/in/with architecture in the history?</p>
<p style="text-align: center;">CREATIVITY AND ARCHITECTURAL DESIGN EDUCATION</p> <ul style="list-style-type: none"> • A Brief History of the Education of the Architect: From "Guilds" to the "Studio" • Describing the Current Architectural Design Studio • Relating the Concepts of Creativity with Architectural Design Studio 	<p>Sub-questions:</p> <p>How is the past and current concerns in architectural design education?</p> <p>What is the new conception of creativity in 21st Century?</p>
<p style="text-align: center;">THE NOTION OF CREATIVITY FOR A NEW PARADIGM IN ARCHITECTURAL DESIGN STUDIO</p> <p><u>The Contemporary parameters of Architectural Design Studio</u></p> <ul style="list-style-type: none"> • Design Thinking • Design Tools and Digital Architecture • Research by Design • Production of knowledge in Studio • Technology, Image, and Representation • Re-defining the Design Pedagogies • Re-defining body-space relationship • Ethical, Social and Environmental Issues 	<p>Sub-questions:</p> <p>What are the new parameters of architectural design education in the 21st century?</p>
<p>DISCUSSION – CONCLUSION</p> <p>Inferenses and future projections about the creativity-architectural design education relation Evaluating the potentials and contextual consequences regarding the evolving role of creativity on architecture.</p>	

Chapter 1, is an introductory chapter where the question of the research and its formation process is defined. How the aim, the scope, and the method have come out focusing on the research question, is explained in this chapter. Not only the problem, purpose, and methodology are stated in Chapter 1, but also an overall discussion about the characteristics of the 21st-century is done, which is central to the formation of the question.

Following Chapter 2 and Chapter 3 concentrate on specific issues of creativity and architecture. They include the historical processes of creativity and architecture through an effort to intersect their flow with a clarifying concern of the notions themselves and interrelations among them. Chapter 2, presents the chronological developments starting from the nature of human creativity to the source of architectural creativity; where in Chapter 3, there is a discussion of the contemporary perception of the notion of creativity and its current handling by the society and by the individual with an emphasis on architectural design education, that is to say on the studio.

As a complementary of previous chapters, Chapter 4 is a search for the notion of creativity for a new paradigm in the architectural design studio. Thus, it presents a framework for the contemporary parameters of the studio and bridges those with the arguments of creativity from an interpretative perspective regarding the previous theoretical basement.

Finally, Chapter 5 is the discussing and conclusive chapter of the thesis, where the inferences, interpretations and the foresight about the question of the research are done. It is accepted that there may not be clear, explicit and wide-open judgments at the end regarding the variant nature of the subject matter. Yet, it is believed that the overall discussion may lead a critical contribution and may introduce a different point of view with respect to the creativity related issues, firstly for architectural comprehension and then for the studio.

2. THRESHOLDS IN THE HISTORY INFLUENCED ARCHITECTURAL EDUCATION

Historical flow leads to complex cause and effect relationships. Events that trigger each other or cause each other can sometimes be seen with clarity, but there may also be some invisible determinants. Although it is not possible to simultaneously look at all events in history, to evaluate some parts of them integrally becomes important in this study. Regarding the scope of the thesis, it can be stated that changes in science, art, technology, and philosophy mostly have a direct reflection on architecture. In addition, if the events that have indirect effects on it and on its education are examined too, it is supposed that healthier inferences can be made. In this respect, wars, disasters, inventions or developments that have global impacts are also important in terms of the intended integrity. Thus, the developments in historical flow shaped by creative thresholds turn out to be readable, visible, and construable. For this reason, the subjects that will be tried to be understood through the idea of thresholds are determined under the headings of art, science, philosophy, technology, global events, architecture, and architectural education.

2.1. Revealing the Thresholds

Philosophical shifts have always had an impact on how we experience the world. Similarly, the shifts on the world views have always affected the directions of the scientific, philosophical, and global developments. This reciprocal and sometimes paradoxical condition of the flow of the events creates complex relationships with vice versa remarks on the architectural scene.

It is impossible to discover when the first transformation had started, yet it is probable to make a statement after analyzing the chronological happenings on the effort of understanding the relations better and to see connections clearly. Hence, it is believed that the critical mapping of timelines through the history of philosophy, science, communication technologies, art, architecture, and global events could be utilized and juxtaposed (Table 2.1).

Table 2.1. Thresholds In The History Influenced Architectural Education (interpreted, synthesized, and visualized from various resources (Briggs & Burke, 2009; Broadbent, 1995; Burke, 2001; Kostof, 1986; Tafuri, 1976; Weiner, 2005).

	AGRICULTURAL SOCIETY										INDUSTRIAL SOCIETY															
	Western Roman Empire					Eastern Roman Empire					Baroque					Enlightenment					Romantic Rebellion					
	Greek Civilization		Roman Empire			MEDIEVAL AGE			Humanism and Secularism			Mannerism			Humanism and Secularism			Positivism			UNIVERSAL PRINCIPLES			POSTMODERNISM		
	6th Century BC	5th Century BC	4th Century BC	3rd Century BC	2nd Century BC	1st Century BC	1st Century	2nd Century	3rd Century	4th Century	5th Century	6th-13th Century	14th Century	15th Century	16th century	17th Century	18th Century	19th Century	20th century	21st Century						
	00:30	20:40	40:60	60:80	80:00	00:30	20:40	40:60	60:80	80:00	00:30	20:40	40:60	60:80	80:00	00:30	20:40	40:60	60:80	80:00						
Philosophy	Thales (630-545 BC) Socrates (470-399 BC) a shift from nature to mind. Plato (427-347 BC)-Idealism Aristotle (384-322 BC) - empiricism and materialism										Descartes (1637)-Rationalism Johne Locke (1632-1704) George Berkeley (1685-1753) La Mettrie (1709-1751) David Hume (1711-1776) Jean-Jacques Rousseau (1712-1778) Immanuel Kant (1724-1804)															
Science	Invention of alphabet (2000 BC) Invention of writing (500 BC) Woodblock printing in Japan (764) First known printed book (868)										Copernicus- Sun centered universe (1543) Galileo's telescope (1619) Gazette begins publication in Paris (1631) Gazette d'Amsterdam (1662) Flying post founded in England (1695) Newton Principles (1687) Boston newsletter founded (1704) First Press established in St. Petersburg (1711) First Press established in Istanbul (1726) Encyclopedia (1751-65) First edition of Encyclopedia Britannica (1771) The Times founded by John Walter (1788) James Watt, Steam Engine (1775) Alessandro Volta first electric battery (1800) Isolation of Selenium (1816) Amperes laws of electrodynamics (1820) Niépce produces permanent photographic image on a plate (1827), First typewriter (1829) First railways in Britain, France, Canada (1830s), Electric Telegraph (1837) Morse's first telegraph with Morse code (1843) ETH Zurich (1955) Cooper Union (1859) Bell's telephone (1876) Edison's motion picture camera (1889) Lumiere's cinema show in London (1896) London-England in automobile rally (1896) Langley's flying machine (1896) Magnetic recording of sound (1899) Ecole de Beaux-Arts (1863) Paris Exhibition (1900) Mercedes-Simplex automobile (1901) Wireless telegraphy (1903) Pteriot driven First motorhouse in London (1904) First Hollywood studio (1911), First Eiffel Tower wireless signals (1913) Einstein's theory of general relativity (1915) The Big bang theory (1927) Radar (1935) Einstein's theory of special relativity (1905) Theodor Adorno (1903-1969) Ludwig Wittgenstein (1889-1951) William James (1842-1910) Jean Paul Sartre (1905-1980) Edmund Husserl (1859-1938) John Dewey H. Bergson (1859-1941) Jean Piaget Heidegger Hannah Arendt Lyotard Jacques Derrida Gilles Deleuze Claude Lévi-Strauss (1908-2009)															
Communication and Information Technologies	Invention of alphabet (2000 BC) Invention of writing (500 BC) Woodblock printing in Japan (764) First known printed book (868)										Paper-making machine (1798) Iron press (1800) First iron steam ship (1820) Niepce produces permanent photographic image on a plate (1827), First typewriter (1829) First railways in Britain, France, Canada (1830s), Electric Telegraph (1837) Morse's first telegraph with Morse code (1843) ETH Zurich (1955) Cooper Union (1859) Bell's telephone (1876) Edison's motion picture camera (1889) Lumiere's cinema show in London (1896) London-England in automobile rally (1896) Langley's flying machine (1896) Magnetic recording of sound (1899) Ecole de Beaux-Arts (1863) Paris Exhibition (1900) Mercedes-Simplex automobile (1901) Wireless telegraphy (1903) Pteriot driven First motorhouse in London (1904) First Hollywood studio (1911), First Eiffel Tower wireless signals (1913) Einstein's theory of general relativity (1915) The Big bang theory (1927) Radar (1935) First IBM computers (1952) Demonstration of Online system (1968) Breaking of genetic code (1961) Fiber optics (1975), first portable computers (1976), Cellular telephone (1977) Commercialization of internet (1979) Huble Space telescope launched (1990) Dolly was cloned (1996), Kasparov was beaten by "Deep Blue" (1997) Yahoo (1994), Google (1998) "Smart Technologies" Wikipedia founded (2001), Facebook (2004), Twitter (2006), Whatsapp (2009) Pinterest (2010), Instagram (2012) Hadron Collider at CERN (2007) Synthetic DNA (2010)															
Architectural Education	apprenticeship system- imitation-trad- error system imitation of the existent- geometry - Orders and Styles emerged										Vitruius made a proposal for basing education on abstract principles found Academia Platonica (1470) Guilds Invention of the printing Press (1440) First Press established in Rome (1467) First Press established in Paris (1468) First Press established in Westminster (1476) Columbus lands in America (1492) First Printed map to include info about America (1506) First Press established in Moscow (1564) First news sheet in Germany (1609) Gazette begins publication in Paris (1631) Gazette d'Amsterdam (1662) Flying post founded in England (1695) Newton Principles (1687) Boston newsletter founded (1704) First Press established in St. Petersburg (1711) First Press established in Istanbul (1726) Encyclopedia (1751-65) First edition of Encyclopedia Britannica (1771) The Times founded by John Walter (1788) James Watt, Steam Engine (1775) Alessandro Volta first electric battery (1800) Isolation of Selenium (1816) Amperes laws of electrodynamics (1820) Niépce produces permanent photographic image on a plate (1827), First typewriter (1829) First railways in Britain, France, Canada (1830s), Electric Telegraph (1837) Morse's first telegraph with Morse code (1843) ETH Zurich (1955) Cooper Union (1859) Bell's telephone (1876) Edison's motion picture camera (1889) Lumiere's cinema show in London (1896) London-England in automobile rally (1896) Langley's flying machine (1896) Magnetic recording of sound (1899) Ecole de Beaux-Arts (1863) Paris Exhibition (1900) Mercedes-Simplex automobile (1901) Wireless telegraphy (1903) Pteriot driven First motorhouse in London (1904) First Hollywood studio (1911), First Eiffel Tower wireless signals (1913) Einstein's theory of general relativity (1915) The Big bang theory (1927) Radar (1935) First IBM computers (1952) Demonstration of Online system (1968) Breaking of genetic code (1961) Fiber optics (1975), first portable computers (1976), Cellular telephone (1977) Commercialization of internet (1979) Huble Space telescope launched (1990) Dolly was cloned (1996), Kasparov was beaten by "Deep Blue" (1997) Yahoo (1994), Google (1998) "Smart Technologies" Wikipedia founded (2001), Facebook (2004), Twitter (2006), Whatsapp (2009) Pinterest (2010), Instagram (2012) Hadron Collider at CERN (2007) Synthetic DNA (2010)															
Art and Art Education	Figures and reliefs with natural subjects art should copy nature geometry, symmetry and proportion helps the artists to create the ideal/ perfect the mathematical harmony, proportion to reach divine order The beginning of the history of "art" Leonardo da Vinci (1452-1519) Michelangelo (1475-1564) Albrecht Durer (1471-1528) Rembrandt (1607-1669) Velasquez (1599-1660) Institutionalizing of art education: the Establishment of the First Academy of Fine Arts, Academia dell'arte del Disegno (1563) Establishment of the French Academy (1635) Establishment of the Royal Academy of Painting and Sculpture in Paris (1648) Academy (1692), Foundation of the Berlin Academy of Germany (1696) Geneva Drawing School (1751)										Beginnings of the STUDIO culture A century of architectural eclecticism. Architects like Schinkel discussed how to invent their own styles. Gropius thought he solved the object-subject problem in combining the art and technology. ABSTRACTION CUBISM DADAISM ABSTRACT EXPRESSIONISM RADICAL MODERN / POSTMODERN ART CONTEMPORARY ART															
Global Events	In ancient times, art is a phenomenon which is considered on the basis of philosophy. In the Roman period, there was a tendency to explain the ideal of art in the works of that period. Studies on the iconographic worlds of Saints, Martyrs, and Religious elders Preoccupation with the secular rather than the divine. Sense of experience is the source of the knowledge. A search to establish the objective and universal rules of art and architecture, without reference to personal insights or skills The Revolutionary foundations of the modern world. Industrial Revolution Independence (1776) Constitution of USA (1787) French Revolution (1789) Opening of Suez Canal (1869) Fall of Napoleon III (1870)										The Enlightenment undermined the Empiricist concepts and attempted to extend Empirical tradition into new areas. Existing of free will was discussed. The shift to abstraction in art. It is discovered that the painting was structurally made up of rhythm, balance and contrasts Most of the 20th century philosophers tried to limit the damage of relativism by finding strong foundations for objective knowledge. Loss of Titanic (1912) World War I (1914-1918) Great Depression (1929) World War II (1939-1945) Contract signed for Electrical Numerical Integrator and Computer (1943) Vietnam War (1954-1975) (1961), Neil Armstrong lands on Moon (1969) Commercialization of Internet (1979), Voyager I: first signals from Saturn (1980) Caucasus in Bucharest (1989), Fall of Berlin wall 1989 Dissolution of the Soviet Union (1991), Gulf War (1991) Attack to World Trade Center (2001) Afghan War (2001) War in Iraq (2003) Tsunami in Asia (2005) Floods in Burma (2008)															

With this mapping, the thresholds in the historical process are understood, as well as the relationship of these thresholds with the fields affecting architectural education. It turns out that the transformations in the educational stages of architecture had developed depending on the events or different point of views. Here, the effects of not only artistic and technological developments but also philosophical and global events are taken into consideration according to their impacts on architectural developments. Thus, the dynamics shaping the world views and the parameters defining the perception of creativity could be examined in depth. On one hand this mapping provides us with the holistic picture of the correlated events, on the other hand the events about a field correlates themselves with the others forming a pattern upon which architectural context occurs. For example, the philosophical timeline may be handled independently in order to concentrate on the changing world views drawing a new paradigm for the source of creation (Table 2.2). This timeline may well be intersected with the timeline of the architectural education where the philosophically discussed ideas seem to configure the educative points of views. This linkage is obvious when the Descartes had argued Cartesian method during Renaissance, the perspective came into the agenda as a representational tool for architecture.

Another potentiality of the mapping knowledge about different domains is its incomplete and infinite character. The knowledge intertwines and when it is rendered visible on the map, it leads a ground for reasonable connections. It is incomplete because the knowledge mapped on it, is infinite and continuous. This renders the mapping generative and productive regarding the data inserted on it and the ones which will be inserted in the future.

According to the point of view, the mapping can be utilized horizontally or vertically keeping its connection to its context in the map. This provides an intrinsic coordinate system representing a multidimensional network which is ready to be interpreted.

Table 2.2. The detail for philosophical context out of the holistic mapping

THE EMERGENCE OF THE INDIVIDUAL		16th-18th Century 16th Century	17th-18th Century 17th Century	19th-20th Century 19th Century	20th-21st Century 20th Century	21st Century
<p>Despite the medieval idea that objectifies the object, personifies the subject, and evolves the object from the inner world of the subject, ascribing it to a solid position in the outside world, the Renaissance has an adaptation with the surrounding world. The perspective is about this. It is the strict Cartesian space perception of the observer, who is turning into the eyes of the perspective world. This stiffness dominates the senses and reproduces the world.</p>			Humanism and Secularism			
				Renaissance		
<p>There is an independent "I" concept. The subject is fixed and is defined objectively. Descartes secures the knowledge of the outside world through God. Descartes' cogito thought has been criticized in many ways. Because such a thought was based on an idea that denies the senses by claiming that it firstly and clearly understood the essential essence of the "I" and that it was given to him by God. As a result, "I" is not independent, but on the contrary, it carries all intensities and ideals. In Kartzyen thought, the subject is positioned within the activity of the "thinking subject".</p>	Descartes (1637)- Rationalism		Marxism			
<p>JOHNE LOCKE (1632 -)</p> <p>GEORGE BERKELEY ()</p> <p>LA METTRIE (1709 -)</p>						
<p>Since the mind is built only from sensory impressions, its first and only source is sensation; however, the impressions of thought are the effect of the mind on the mind, the principles "the impressions of thought characterize the mind as the subject" Deleuze develops a thought of subjectivity and individualization that the thought of a subject is not prioritized. According to Hume, there is no clear and distinct information about "self" without experience.</p>	DAVID HUME (1711 - 1776)					
<p>Jean-Jacques Rousseau</p>						
<p>Panofsky, sees the Renaissance as a Kantian step into the worldview. Kant places knowing on a logical basis, inspiration and art on an irrational basis. According to him, there is a general and compulsory knowledge separate from the knowledge of the senses. According to Kant, all of the possible experiences have no meaning on their own. These become meaningful under categories. Categories are a priori forms that are as precise as a scientific concept. Time and space are again a priori, but they are views of the mind, apart from categories. Instead of the pair of looks / essences, Kant replaces the pair of "emerging / appearing" conditions in this case, the previous subject understanding has changed completely. The subject in Kant no longer has an essential essence, but is a founder. It distinguishes between the "logical I" in the "think" and the type of "thinking" or the metaphysical essence of thought, and reveals the idea of an anti-Cartesian. For Kant, space, time and causality are the constructions of mind.</p>	IMMANUEL KANT (1724 - 1804)					
<p>HEGEL (1770 - 1831) Idealism</p> <p>Arthur Schopenhauer</p> <p>Charles Darwin</p> <p>Emile Durkheim</p> <p>Friedrich Engels</p> <p>Ferdinand de Saussure</p> <p>KARL MARX (1818 - 1883)</p> <p>Aguste Comte (Positivism)</p> <p>David Hume Empirical tradition</p>						
<p>1994</p> <p>Theodor Adorno (1903-1969)</p> <p>Ludwig Wittgenstein (1889-1951)</p> <p>WILLIAM JAMES (1842 - 1910)</p> <p>JEAN PAUL SARTRE (1905 - 1980)</p>						
<p>Phenomenology is an attempt to discover how things seem to us in our conscious experience. This thought puts the subjective "appearance" of things against their objective beings. It explores how something looks to consciousness. Husserl's phenomenological orientation finds a new point in Descartes' thought. He even states that his transcendental phenomenology could be called a new "twentieth century Cartesian thought." Husserl aims to make the world an experience we live in, not an object of knowledge. Man and the world are not separate but in relation. Descartes separates thought and being from each other, so the mind is an "object" like other objects in the world, but it is a special and unique object, and for Husserl, the mind can never be achieved within this world. It is not an object.</p>	EDMUND HUSSERL (1859-1938)					
<p>Certain knowledge of the world can be gained in intuitions.</p>	John Dewey					
	H. BERGSON (1859 - 1941)					
<p>Jean Piaget</p> <p>Heidegger</p> <p>Hannah Arendt</p> <p>Lytoard</p> <p>Jacques Derrida</p>						
<p>The subject carries it in the thread, not objectively. According to the philosophy of the event, there is a temporal and spatial dynamic formation of the individual within the unity and integrity of the event. Subject-formation is a dynamic structure that reveals the existence of multiplicities and uniqueness. In an incident, there are "spatial and temporal" situations that the "subject" faces, as well as "ideal" situations occurring outside it. Deleuze: Descartes emphasizes sensation and sensation in the face of the cogito thought that takes the mind to the center.</p>	Gilles Deleuze					
<p>Claude Lévi-Strauss (1908-2000)</p>						

2.2. The Relationship in Between Creativity and Architecture

When the relationship in between creativity and architecture is intended to be examined, looking at the intersection field of the creations and architectural processes of man could be a useful way. “Man has on earth a poetic, that is, a productive, status” (Agamben, 1999, p.68). This poetic status is discussed for dwelling of the man by Heidegger(1971), where the notion of creating and building is combined and attached architecturally. He implies the differentiated degrees of creation and physicality of dwelling with its theoretical bringing. Thus, the productive man, at the same time, creates products/ buildings behind their material limits, surpassing their practical and technical presence. So, to specify the distinctions of this notions, is critical.

In order to grasp the productive human and its creative potential, it is better to make a definition for creativity. Creativity can be viewed as a process and/or a product, and is generally thought of as the production of useful solutions to problems, or novel and effective ideas (Amabile, 1996). From an architectural point of view, creativity is an original cognitive ability and problem solving process (Potur & Barkul, 2006). Seeing creativity as a process rather than a product is an outcome of the 21st century. It is not a single event, and genuine. Creative processes involve critical thinking as well as imaginative insights and fresh ideas (Azzam, 2009).

Those are some of the contemporary explanations defining a few characteristics of the creativity. However, even though it is called creativity in modern times, the concept of creativity had been examined by great thinkers such as Plato and Aristotle in the history as well.

2.2.1. Poiesis-praxis-phronēsis-techné

The first discussions on creation has its roots in Antique times. The base of the philosophical arguments of the creation is related to the arguments on thinking, doing and making of the human being. Plato and Aristotle are key figures on which the current epistemology on this subject is grounded. Aristotle suggested three kinds of human activities: *theoria*, *poiesis* and *praxis*. According to him the activities related to *theoria* aim to reach a truth; where *poiesis* kind of activities aim an end goal of production. In *praxis*, however, the activities themselves are good for their sake and have a goal of action, without any central concern for a product. There is another concept Aristotle introduced, called “*phronēsis*” which represents the knowledge of doing, where

“*techné*” is just related to the processes of making (Tuckwell, 2017; Yüncü, 2008b). In oxford review encyclopedia of terms *phronēsis* defined as:

“...‘practical wisdom’ that has been derived from learning and evidence of practical things. Phronesis leads to breakthrough thinking and creativity and enables the individual to discern and make good judgements about what is the right thing to do in a situation” (http-2).

Here it becomes vital to explicitly define the concepts of *poiesis*, *phronēsis*, *praxis*, and *techné* before correlating their intrinsic relationship with architecture (Table 2.3).

Table 2.3. *The doing vs. making concepts*

Doing (Creating) related concept	Making related concept
Poiesis	Praxis
Phronesis	Techné

Access to the knowledge of the world is possible with virtue of *phronēsis*. It is only possible to reveal the artwork or to think about an artwork with *phronēsis*. According to Aristotle, art, which is an activity related to *poiesis*, is not only *praxis* and is not only a making process, but a creating process (Kart, 2015). *Phronēsis* is strictly connected to *poiesis*. The concept of *Poiesis* refers to the experience of producing and bringing into existence; it is based on the fact that something passes from non-existence to existence, from the state of confidentiality to the full illumination of the work. The main nature of *Poiesis* is not that it is a practical and voluntary process, but a mode of truth that is understood as revealing the hidden.

When *techné* is considered through these definitions, it appears as a sort of identical relation resolving a degradation of ideas into the body or an elevation of sensation into ideas (Tuckwell, 2017, p.54). It is useful to compare it with *phronēsis*. *Technē* is related to the processes of making, whereas *Poiesis* is of doing and *Phronēsis* is the knowledge of doing. *Technē* is comprehended as skills necessary for creation of an object. On the other hand, *phronēsis*, is bridging the accurate relationships between

actions. *Phronēsis* is related to doing actions and the purpose in itself is doing well. (Yüncü, 2008b).

So, when the architectural creation is considered through the notions of making and doing, it is seen that architecture is a medium of human activity embracing *Poiesis*, *phronēsis*, *praxis* and *Technē*. That is, architecture is a discipline of both doing and making. Yet the balance in between doing and making has always differed. In order to exemplify, *Technē* and *praxis* were dominant over *poiesis* and *phronēsis* in medieval age, whereas *phronēsis* became more important during mannerism. Similarly, *Technē* was prior to *poiesis* in Ecole de Beaux Art, while *phronēsis* is emphasized in Bauhaus period to foster creativity. Therefore, those notions have their corresponding products or pedagogies in the architectural history.

2.2.2. Mimesis in architecture

“Mimesis” is an ancient identification which is conceptualized by Platon for the first time. According to Platon, the art is a mimetic action for that the artist/ poet imitates the real. The real is formed by the Divine, by a reflection from the world of ideals, then this reflected object is imitated by the artist in order to create replicas or multitudes of the real.

For Aristotle, art is not moving away from the truth by distortion of it, nor a second order imitation, on the contrary art is related to truth. In his mimetic theory, art is the power of the approximation of the nature, where Aristo introduces a different point of view other than Plato. For Aristo, in producing art or *poiesis*, *Techné* turns to be a kind of intelligence accompanying to action and the work (Kart, 2015).

Broader meanings rather than the traditional notions of art as an imitation of nature can be understood from the term “mimesis” in architecture as well. Firstly, Benjamin and lately Adorno affected from Benjamin’s ideas, connected the mimetic theory to the theory of language (Heynen, 2000, p.184). According to them, all communicative systems, such as symbols, language, architecture or an art work, include a mimetic basement. Sign and image, like for Egyptian hieroglyphs, are unified and merged through the abstraction of the reference. Yet, a divorce between sign and image had happened, similarly between the individual and the experience. Adorno believes that a work of art exists by the mimetic stimuli derived from a rational input. For him,

by means of mimesis, art constructs a bridge with social reality. That is to say, art communicates.

It is clear that architecture can be approached as a mimetic discipline. Since mimesis can be described as a true replica or imitation, or a depiction or reproduction of a particular reality, it is difficult to recognize its existence in architecture. Forms are built in architecture and structures are designed on the basis of correspondence, similarity and difference. The reference points of these similarities and differences are quite varied in character: program demands, physical context, typological approaches, a specific formal formation, a historical connection. All these elements owe themselves to their translation in design by entering a mimetic process (Heynen, 2000, p.193).

2.2.3. Doing and making in architectural sense

According to Heidegger (1971), “Poetically man dwells”. This poetic dwelling has very much to do with the Aristotle’s notions of poiesis. Poetry is identified with a process of creation and it is also aligned with mimesis.

As Brown and Milat states in the introduction of their book called “*Poiesis*” (2017, p.8):

“...Heidegger theorizes poiesis as a kind of “bringing forth”. For Heidegger poetry is “a kind of building,” insofar as it opens a relation between language and thinking that lets us “dwell.” But while Heidegger thinks of poetry as a kind of building, he does not emphasize the physicality of poetic making as a practice of construction or fabrication, working with the concrete materials of language. On the contrary, for Heidegger this material element of poetic practice is inessential to its vocation as the speaking of being”

In above sections, the difference in between poiesis and phronēsis with *praxis* and *Technē* is presented by revealing their concerns with the actions of doing, creating and making. Doing and making in architectural sense, is somehow similar to exemplified artistic and poetic productions of the ancient times. It embraces mimetic and poetic versions of the actions, as well as practical and technical sides. However, as Heidegger discusses, a building is more than what it is constructed from. It is an identifier of larger relationships behind the dull presence of itself.

Thus, architecture becomes a mixture of what is practically and technically made and how it is and with which knowledge it is done and created. It is a product of both doing and making with a theoretical background.

Despite the fact that the notions of making and doing differs, the relationship of *Technē* and *phronēsis* becomes important in architecture. The definition of this relationship is the key point in the history, which at the same time, defines the source of creation according to the context for architectural comprehension. *Technē* stands for objective knowledge where *Phronesis* is the knowledge of doing distilled from a subjective filter. It is the tension in between those notions which determines how we create.

Along the history, the source of architectural creation has changed and this change has influenced the education of the architect. In the history, where creativity was accepted only as a divine transfer-divine knowledge transferred to a building or artwork- the knowledge based production of architecture is sustained by technical mimetic skills. However, when the individual and his potential of mind, abilities and imagination were understood, a sole technical handling was not enough to reflect and represent the creation of space. Moreover, the practical wisdom to decide the good or bad and the personal poiesis contributed to the progress of both architecture and its educative fields. Therefore, to see the shifts in the history as the evolving and discovered characteristics of creativity is important in order to understand the transformations in architectural thinking and design.

2.2.4. Architectural design and thinking

As far as inferred, architecture is a product of both the actions of doing and making with a theoretical background. So, there is a theoretical dimension in architectural doings and makings. It has an indirect form contrarily to the direct form of practical knowledge.

There is a gradual condition of architectural progress in the history, moving through the architectural doing-making, architectural thinking and design. As mentioned before, the balance among poiesis, phronēsis, praxis and *Technē* defines the degree of the mimesis whether it is a first or second order representation; that is to say whether it is icon or phantasma. Icon is semblance, where the phantasma is illusion (Benardete,

1986, p.120). In sophist, Plato mentions two kinds of image making. The first is reproduction of the original by precisely copying it, the second one is intentionally distorting the copy so as to be perceived as the original (Rosen, 1983)

According to Tuckwell (2017; p.6), if a craftsman creates an object, it is the first order representation, it is an icon, from the ideal to the material. From this icon, through mimesis a second copy of the material, image or simulacrum occurs, that is phantasma. Here it is important to remind the definitions of Jean Baudrillard who argues that a simulacrum is not a copy of the real, but becomes truth in its own right (Baudrillard, 1994).

According to Deleuze (1994), the conditions for the essence of the representation derives from this distinction of the copy-simulacrum or model-copy. This is based on the creation of a pre-philosophical image of thought, and refers to the transfer of an idea to the original domain where the thought emerged. Simulacra as "those systems in which different relates to different by means of difference itself. What is essential is that we find in these systems no prior identity, no internal resemblance".

When these statements are transferred to the architectural thinking, it is seen that *Technē* and *phronēsis* comes together. In order to exemplify: technical skill is necessary to create drawings and practical wisdom is needed to reflect upon what is drawn. This is an intellectual quality. This reflection constitutes architectural thinking (Yüncü, 2008b).

Likewise the difference in between craftsmen and artist, the builder and designer differentiates accordingly to their content of creation. The craftsmen produces the first order imitation of a thing from the ideal one and creates the replicas of them. The artist multiplies and interpret this first order imitation through second order action of *phronēsis*. Similarly, the builder builds the archetype from where the designer creates variable buildings by architectural thinking. First order implies technical and practical, whereas second order implies *poiesis* and *phronēsis*. The architectural designer, utilizes the mimetic knowledge accumulated hitherto in order to create a meaning through a mental and physical combination.

As pointed out before, there is a gradual condition of architectural progress in the history. This gradualness depends not only on the amount of the imitation or interpretation of the first representations of the supposed essence of the things, but also

on the intellectual skill which recaptures, interrogates and interprets mimetic connections.

Architectural design, in this sense, is a poetically constructive process. By its nature, it contains creativity (Kolsal & Özaslan, 2019, p.5). It is argued that creativity can be defined as the revelation of new information through the processing of the data. Design is a field of relating data sets, creating meaningful connections and thus, generating knowledge. There is a tight relationship between design and creativity in this sense.

Simply but significantly design is defined as the “...collected experience of the material culture, and the collected body of experience, skill and understanding embodied in the arts of planning, inventing, making and doing.”(Cross, 1982). It inherits the conception and the realization of the new things. Design is related to creativity by organization of data and information in order to create a new body of knowledge.

This brings us from building activity to design activity within the framework of creative actions. There are transitions among the notions of poiesis, phronēsis, Technē, and praxis regarding the historical flow of architectural creations. Thus to determine the relationship of creativity with architecture in time is required for a better understanding of the shifts and transformations in the field of architecture and its education; an understanding of the story of architectural doings and makings, architectural thinking and architectural design.







2.3. Mapping the relationship of Creativity with Architecture

In order to map the changing quality and the role of creativity in architecture and to read the linkage of creativity with architecture, a historical analysis may become helpful. A critical reading of the architectural history to understand the impact of the thresholds on the process of architectural development and to observe the changing source of architectural creation may return to be a useful tool to draw a general understanding of the contemporary architecture and its contemporary constituents including the education.

Structuring such a historical timeline to make explicit the discourse of architectural doing and makings, which could be revealed in a chronological and interrelated manner by means of the critical mapping of thresholds (see table 2.1). The map would be a pattern of *Phronēsis* in architecture from which one can grasp the facts that in the end influenced the education (Table 2.4).



Table 2.4. The critical mapping of the relation of creativity and architecture

	Stone Age	Egypt	Greek Civilization	Roman	Scholasticism	Renaissance (14th-17th Century)	15th Century	16th century	17-18 the century Baroque	Enlightenment	Romantic rebellion	19th century	20th Century	
education of the architect	Stone age: 5500 BC through trial and error over generations they developed buildings	Ancient Egypt (1.500 BC) Drawings-priestly class-formal innovation-Architect was master-education of them was depending on the transfer of the tradition. Although some early Egyptian kings took the responsibility of to design the God-given temples-representative on earth the divine authority- increasingly they devolved this responsibility to the first professional architects. They handle the problem with geometry and symmetry in order to reflect the divine order and regularity	a story form Homeric Hymn: Apollo himself provided the design for the temple, one standard comment on this text suggests, the architects/ master builders Trophonios and Agamedes laid the first courses, and then other workmen completed the building, the architect appears to stand halfway between the god and the work-force, physically interpreting the divine source of form and then directing the builders according to its instructions .	320 AD. Downey (1948) outline that the architectural designing as studied in this period, delineating architects from other craftsmen. Diverse specialists and knowledge suggests the beginning of a systemization of architectural design education.	The Christianity became the sole religion in Rome	320 AD- 1050 AD: Immense architectural growth and creativity 1050-1350 AD. Building explosion in England, France, Germany. Gothic masters who were designer-builders. Craft apprenticeship.	new forces began to stir which eventually dismantled the medieval cosmological system and replaced it with modern conception still largely used today (Gelernter, p: 80). Reorientation of thinking. rise of the cities and the resumption of the trade-increasing contact with the intellectual Islamic world (p: 82). Change from Plato to Aristotle in the scholastic age corresponds to the change from Romanesque to the Gothic (Paul Frank argues). Gothic sought to delight the senses.	1440- Invention of the printing Press	1453- The fall of the east Roman Empire- The concurrence of Istanbul by Ottomans	Mannerism	Enlightenment : The formation of the architect as an ideologist of society, the Revolutionary foundations of the modern world.	a new conception of the individual. Jean-Jacques Rousseau (1712-78).		
	apprenticeship system-imitation-trial-error system, this pragmatic education changed once the early architects took up the challenge of designing according to the divine principles.	when the knowledge- a kind of secret- that the architect require involved little more than a command of a physical skill and mental image of the successful forms (that is to say imitation of the existent- geometry came to agenda)	Greek revolution in philosophy transformed the early ideas about cosmology, art and the architecture. First acknowledgement of the importance of the individual. The change in the perception of the world and the emergence of the object-subject problem. There were books transferring the technical knowledge and the rules of the orders for training of the young architects written in the later books, which are not survive today. In treatises of the 4th BC. an argument of the style emerged for the first time	Vitruvius introduced a new criterion: the truth of nature- perfection arrived at the end of a process of eliminating failures after trial and error experiments. According to Vitruvius, the essential knowledge required by the architect is the child of practice and theory. An architect should both have apprenticeship and scholarship then. "the architects who have aimed at acquiring manual skills without scholarship have never been able to reach a position of authority, while those who relied only upon theories and scholarship were obviously hunting the shadow, not the substance. During Roman Empire the existence of Craft guilds, or Collegial as informal voluntary organization is not clear. Vitruvius made a proposal for basing education on abstract principles found in the liberal arts.	Specialization of the architect as Vitruvius describes	In the 4th Century semi-public organizations with responsibility for supplying essential services and materials.	Regulations of the workers in a guild system (some common ground for material supply, some social rights and religious activities) in order to regulate quality of work, the guilds naturally took over responsibility for training the young. An apprentice learns in the course of time under the training of his master some trade secrets such as how to generate plans, elevations through geometrical manipulations and how to design important construction details and design facades. Guarded pattern books with drawing upon the master's own experiences and innovations design traditions naturally evolved in time. Education in the guild was based first and foremost on particular examples of architectural, geometrical and decorative forms.	University stressed the development of the personality and character of the individual. The intention of guilds was not to reason why certain things are do, or, to dream up other possible ways of doing things, but rather to assimilate existing bodies of knowledge and skill. Renaissance could not tolerate this kind of education, the self-conscious awareness of consciousness itself meant that the individual could no longer rely upon pre-ordained dogma for knowledge of the world. The Renaissance ideal was the Universal Man, so where the old educational system explained how to do a particular task, a new system would need to explain why it is done that way.	Many textbooks and treatises were written at this time which claimed to establish the objective and universal rules of art and architecture, without reference to personal insights or skills. In this period the subject-object problem engendered the most extreme distinction yet between inner personal and outer shared artistic resources.	French Classicism and the Royal Academies. After 1660 with French dominance with Cartesian reason and rational order. Logical method of Descartes is believed to be competence in leading a discovery of certain truths about the world. 1648 King's Minister Mazarin founded Academie Royale de Peinture et de Sculpture; 1671 Colbert founded the Academie Royale d'architecture. The aim was not to replace the apprenticeship system but rather to teach the universal principles of art and architecture.	Carlo Lodoli (1690-1761), a Franciscan Monk, was not an architect himself, was the first to apply Positivistic concepts to architecture Theory. First, in architecture only that shall show that has a definite function, and which derives from the strictest necessity; and second, architecture must conform the nature of materials. Influenced the 20th century modern architecture.	Classicism and Ecole de Beau-Arts Ecole polytechnique	Bauhaus was seen to rise dramatically above competing 'isms' of the time and to offer a modern vision of design and education appropriate for the new century. It developed a modern and progressive alternative to the old art academies before itself. The master-apprenticeship system based in the workshop without separating the practice and the theory (it was seen as the basic problem of the academia) no separation of design from application.	
the source of creation	cosmology-nature-Gods; although the individual creates the art, there is no sense of individuality	the architect was aware of his skills (e.g.: Semnut an Egyptian architect wrote himself as superior of the great, favorite of the king, have access to the writings of the prophets, know everything from the beginning...)	Geometry and proportions- orders of the columns, building temples to capture divine sources of form. Geometry is important reflecting the order of nature. Artist was the agency in between the Divine and the reality. He looks into Divine and sees something and then recreate his vision in a physical medium.	According to Vitruvius the resulting form of a building on a site are also attainable by flashes of genius and not only by mere science. What Vitruvius means here is that the architect may occasionally have to step outside the mechanical rules and use his own intuitive judgement or sense of correctness when attempting to accommodate all of the building's various and conflicting requirements, which is the solving of intricate problems and the discovery of new principles by means of brilliancy and versatility.	There is an analogy of the Creator and the created which sees the human as a passively being and organized by the Creator. Geometry is important reflecting the order of the Divine. God gives the information to override the technical problems that the geometry put forwards (e.g. -challenging proportions of the cathedrals). Divine illumination. Medieval view had conceived the physical world as a symbol of the divine.	how to design buildings should be constrained and directed by long-standing cultural traditions-scriptures (p:85) the important thing in designing buildings was not the individual creative perception or expression.	these new instructions - the universities- were interested in neither developing new knowledge nor in developing the students original creative skills. They intended to reveal pre-established divine truths more exactly.	Leon Battista Alberti (1404-72) attempted to explain the source of artistic and architectural ideas within the Aristotelian tradition. He conceived of a painting as a window through which the painter sees the world. He adds that a painter has nothing to do with things that are not visible. Artist is a passive recorder of phenomenal appearance. Alberti accepted that the typical nature is more real than the idiosyncratic. Alberti aimed to make art as objective as possible and a structure which he implicitly assumed must exist independently of any individual mind perceiving it, he hoped to avoid the unpleasant possibility of that every mind might perceive a different beauty. Alberti has the theory of the ideal beauty and blames the particular taste and fancy supporters by being ignorant. According to Leonardo, images taken from sensory nature, and then draws upon this reservoir of knowledge when constructing the artistic image, the mind can combine these image creatively to form imaginative forms.	Michelangelo has a different view from both Alberti and Leonardo. He pushed stronger than anyone before him towards the priority of the subjective. He is obsessed with the ideals in his mind and he was complaining that his work does not reach the image he had in his mind. Expressionism.	Baroque period is the period of dualities. Baroque as a synthesis of the Renaissance's Classicism with the emotion and tension of the Mannerists. It is a struggle to reconcile the inner and outer sources of art that artists and theorists inherited from Renaissance.	In his essay "Architecture, Essay on Art" Etienne Louis Boullée (1728-99) poses a question: is architecture merely fantastic art belonging to the realm of pure invention or are its basic principles derived from nature?	Each age has its own values and forms of artistic expression. So what is the new style of the philosophical relativism? Most of the 19th century architects avoided this problem by looking for previous styles that might fit the new circumstances. This was a century of architectural eclecticism. Architects like Schinkel discussed how to invent their own styles. No architect was interested in a complete Nietzschean relativity, where architectural forms are developed purely at the whim of the designer. The shift to abstraction in art. It is discovered that the painting was structurally made up of rhythm, balance and contrasts. It is something beyond the depicted	 	
	the source of knowledge	the source of knowledge still lies outside of himself II- writings of prophets in the authority and tradition. Rules are divinely given.	Reasoning powers of the individual and the physical causes of physical events. the shift in the source of knowledge from the divinely given to the individuals own perception and and sense of clarity. In Greek times, the human and the natural events were all in connection and integrity. The individual can know about the organizing principles of the world because part of that organization is within himself. then man could rely on his own powers of perception, reason or intuition to gain knowledge of the reality.	Christianity turned its back on the physical world and focused attention firmly on the otherworldly divine. But there is a critical divergence in Christianity from the earlier views in the relationship of the God and His relationship to the physical world. So the knowledge of ultimate reality- and their personal fate- depends entirely upon a God standing outside themselves and their world. Any knowledge man did possess about the ultimate reality had been given to him by God, in various divine scriptures.	the knowledge was pre-established and shared body of information which linked architectural form with the spirit of the Divine (p: 85).	Re-assertion of a self-conscious awareness of the individual's powers of observation and reason. Looking to the physical world. Empirical spirit emerged. There are two modes of acquiring knowledge: reasoning and experience.	Sense of experience is the source of the knowledge. Alberti implied that the mind poses an irremediable filter for discriminating between those objects which possesses the ideal beauty and those which do not. Mind is dependent upon the outer world for its knowledge of ideal beauty. According to Leonards, all our knowledge has its origin in our perceptions, so the main task of the artist is to imitate nature as accurately as possible.	According to Descartes, the essential knowledge about the world's structure, he agreed with Plotinus, is infused or prefigured in the mind. Only on the occasion of some sense experience of the outside world does the mind awaken and then comprehend the knowledge which is already potentially existing within itself.	The strongest reaction was to split the various components apart, and to assert for the first time relatively independent versions of theories in which world is freed from mind and mind is freed from world. The philosophers of the French Enlightenment undermined the Empiricist concepts and attempted to extend Empirical tradition into new areas. Existing of free will was discussed. From this point of view, the influence of outside forces on the development of the individual become paramount.	According to Rousseau, in mans natural state, emotions and feelings provide reliable guides to behavior, and supply more certain knowledge of the world than can reason itself.	The period of architecture after the World War II can be called as Late Modernism. The characteristics of this time is the return to subjectivity as a reaction, after the objective, positivist and deterministic approach of the International Style. Even the pioneering actor of the Modern Movement, Le Corbusier, exemplified this subjective attitude in Notre-Dame-du-Haut at Ronchamp (1950-55) violating most of his own previous universal rules for design. Basing architecture on objective principles was devastated by this personalized building. Another example of this rebellion is the Frank Lloyd Wright's Guggenheim Museum in New York (1946-1959). Perhaps this new mood reflected a similar struggle in contemporary philosophy to reconcile the subjective self with an objective world.	  		
there is a relationship between design and the cosmological beliefs. Material was determinant in the design	inventiveness of the architect w	Greeks believed that the part of the designer's skill involved the gift of invention. E.g.. First architects of Greece, Deadalus, was credited with and admired for inventing a number of new building forms and mechanical devices, from labyrinths and steam baths to wax-and feather wings for manned flight. It is not clear if Greek and Egyptians reconcile the notion of invention with rule-governed-design.	In the entire medieval period the artists and the architects attempted to capture in their work mathematical harmony, proportion and number that they believed expresses and celebrates God's divine order.	Renewed interest in the sensory world and the faith in their ability to see things for themselves. The aim was to have deeper insight for the divine. This makes the scholastic period different from the coming Renaissance.	According to Alberti, all minds are the same, all minds connect up to the same reality, and all minds work only on material taken in by the senses and cannot invent new things from within their own resources. Alberti suggested that the artist should use Classical ideas as springboard for his own creative inventions. Classical language can capture the universe's ideal beauty. Alberti never reconcile this ambiguity between individual invention and timeless principles.	the important thing was the personal expression, not the objective rendition. Paradoxically, the age that saw the first extreme of artistic subjectivity and the first philosophical explorations of creativity also saw the solidification of the Classical tradition with its claims to objective truth and its reliance on precedence								

2.4. Contexts Shaping the Architectural Education

Since creativity and architecture are two vast fields of research, it becomes crucial to distinguish some juxtaposing areas and clarify some points. In Chapter 3, the history of architectural schooling is discussed from guilds to the studio in order to totally understand the current dynamics and condition of the architectural design studio. This understanding is gathered by evaluating the history of changes and shifts. However, before jumping to that specific history of architectural education with a main concern and focus on the studio, it seems necessary to understand the parameters shaping the architectural education. Hence, in this section, it is intended to put forward the outer dynamics together with inner ones which surrounds and influence the architectural schooling and educative strategies both institutionalized or not. This understanding is framed by some specific periods such as:

- From antiquity to modern times: where there is no institutionalized architectural education
- During modern movement: where there is a visible and great paradigm shift in every disciplines as much as architecture
- Period after 1950s: where two world wars were left behind and new global concerns are of great importance
- A shift from Structuralism to Post-structuralism: where the design studio recently gets its current characteristics from

So, the following sub-sections are not directly related to the architectural education, but they are forming the contextual developments which at the same time determine the parameters molding the contemporary studio.

2.4.1. From antiquity to modern times

History of architecture will be the main source to understand the relationship between creativity and architectural design until the renaissance when an institutional formation of modern education began. Scarce writings material but enough architectural edifices would help to map and read the thresholds for pre-modern times. Thus a reading from antiquity to renaissance is done through architecture itself to map the holistic pattern of the change in the source of creation.

During Stone Age, there are a few known settlements which demonstrates architectural and primitive artistic features for a discussion of the creation. Cosmology, nature and Gods were the directories of the creations at that time. Although the individual creates the art, it is known that there is no sense of individuality. There is a relationship between design and the cosmological beliefs. Material was determinant in the design. Imitation and trial-error system was valid. Designing according to the divine principles was prevalent view (Gelernter, 1995, p.37-38).

In Egyptian civilization, architects were the members of a priestly class and responsible for the formal innovations. They were skillful and the education of the Architect was depending on the transfer of the tradition (Golja & Schaverien, 2015; Kostof, 1986). The divine authority was represented on earth by solving the problem of geometry and symmetry in order to reflect the divine order and regularity. By generating mental image of the successful forms the imitation of the existent geometries came to agenda (Gelernter, 1995, p.39-44). Not only the geometrical solutions but also the technical skills had mounted more than ever before (Kostof, 1986).

In Greek Civilization, there was a breaking point with the emergence of the object and subject dualism for the first time in the history. Geometry and proportions, orders of the columns, building temples to capture divine sources of form was important in reflecting the order of nature. Artist was the agency in between the Divine and the reality. He looks into Divine and sees something and then recreate his vision in a physical medium. The architect appears to stand halfway between the god and the workforce, physically interpreting the divine source of form and then directing the builders according to its instructions. Greek revolution in philosophy transformed the early ideas about cosmology, art and the architecture. First acknowledgement of the importance of the individual was emerged. There were books transferring the technical knowledge and the rules of the orders for training of the young architects written in the later books, which are not survive today. In treatises of the 4th BC an argument of the style emerged for the first time. Greeks believed that the part of the designer's skill involved the gift of invention (Gelernter, 1995, p.43-77).

In Roman Period, Vitruvius was a key figure for architecture, because of his survived writings on architecture. According to him, the intellectual source of an architect should be based on an understanding governed by those words of him “let him

be educated, skillful with the pencil, instructed in geometry, know much history, have followed the philosophers, understand music, have some knowledge of medicine, acquainted with astronomy..." (Vitruvius, 25 B.C). This approach have continued to effect the faith of architecture for centuries.

Even though Kostof (1986, p.29) criticizes the overestimation of Vitruvius, since his writings had been concluded before the original works of Roman period and within an unawareness of the prophetic qualities of the buildings of the time, he could be celebrated by his contribution of opening a new discussion about the source of architectural creations.

Vitruvius concerns with not only the technical and theoretical background of an architect, but also his intuitive judgement and sense of correctness outside the mechanical rules. This means the solving of intricate problems and the discovery of new principles by means of brilliancy and versatility. According to him, theory is related to the principles of proportion; while practice is to the continuous and regular exercise of employment. There is also a loyalty in the works according to the design of a drawing (Broadbent, 1995, p.10).

Another Vitruvian opinion whose footprint is felt even today, is that the essential knowledge required by the architect come from the practice and theory. According to him, An architect should both have apprenticeship and scholarship (Gelernter, 1995, p.63-89). Here, he implies the combination of *techné* and *phronēsis* upon a theoretical ground.

In Medieval times, the analogy of the Creator and the created was dominant in which the human is a passively being. Geometry was a medium to underline the divinity. For the master-builders it was believed that the knowledge of doing is prescribed by the God. Medieval people trusted in the Divine illumination through which the physical world is perceived as a divine symbol. The conception of God, and His relationship to the material world standing outside the world of the human was a divergence in medieval times from the earlier periods. The knowledge is believed to be given by God, thus all the medieval artists and the architects tried to encapsulate the divinely celebrated mathematical harmony and proportion (Gelernter, 1995, p.72-77).

By this perception, it could be stated that the medieval architect, was finding his source of creation from his beliefs and the religious concerns. Hence, the individual creative perception or expression was not the important thing in designing buildings. Even though there isn't an identity of "Vitruvian architect", the person who is responsible for the construction, masonry and carpentry of a cathedral, that is to say the master-builder, is accepted as the architects of the time (Kostof, 1986, p.61).

Towards the end of 11th Century, a new condition happened which is called scholastic age. During this period, the medieval cosmological beliefs disrupted and it started to be replaced with a modern understanding. By the emergence of cities and the raising communication with the intellectual sources reoriented the thinking. Awareness of the individuality depending on the observation and reasoning of the physical world had begun. First empirical discussions emerged and experience and reasoning were accepted as the source of knowledge. The sensory world and experiences from it were utilized to have a deeper understanding of the divine. (Gelernter, 1995).

From the "master builders" or "mason- architects" of the medieval age, the architect, as a profession started to emerge in the period of Renaissance. As understood from the scripts of Giorgio Vasari, who published "*The Lives of the Most Excellent Painters, Sculptors and Architects*" in 1550, there was a known conception of the architect which is thought to embrace both the theoretical and the practical knowledge (Kostof, 1986, p.96). The Renaissance was born in Florence. What really needs to be emphasized here is that with the Renaissance, art and architecture are perceived as a creation and that the artist and the architect become a self-dependent creator, not a practitioner who fits for a purpose other than himself (Erdoğan, 2015, p.77).

Under the period of Renaissance, medieval world views rejected and the philosophy, art and architecture of the ancient world retrieved. This retrospective approach is preoccupied with secular rather than the divine and the individual has an awareness within a self-consciousness. The architecture of this context has his source of creation within a subjective manner. According to Leonardo, the artistic image is constructed upon the knowledge and images taken from sensory nature. The human mind can make creative combinations of these images to form new forms. (Gelernter, 1995, p.93).

During Renaissance, by the enthusiasm of the new thinking and new perception of the physical world with a more aware individual of his potentials, there was a proliferation of ideas. Not only had the statements of Leonardo about productions of the artists, but also different opinions had emerged. For instance, Ockham pointed that the sense of experience is the source of the knowledge. For this sensory approach, Alberti implied that the mind, which is dependent upon the outer world, possess an innate filter for distinguishing the objects with the ideal beauty. Similarly to Alberti, Leonardo da Vinci, believed that all our knowledge depends upon our perceptions, so to imitate nature as correctly as possible is the main task of the artist. According to Alberti, all minds work only on data taken in by the senses and new things cannot be invented from within. Thus, Classical ideas for creative inventions could be utilized. For him, Classical language can represent the ideal beauty of the universe. Leonardo Da Vinci was not as strict as Alberti, for him anything reaching the senses can be represented. Another different view was manifested by Michelangelo. He has a different perception from both Alberti and Leonardo. He prioritized the subjective expressions than anyone before (Gelernter, 1995, p.99-102). This expressions of Michelangelo correspond to the period of late Renaissance (1530-1620) called Mannerism. It is characterized by experimental trials in artistic creations. The artistic style of this period has an exaggeration and distortion, playful and experiential, most of the time self-expressive, trials of different colors.

For the period of Renaissance, the problem of the subject-object duality defining the artistic source of creation reached the most extreme distinction whether it is related to inner personal or outer sensory resources.

In the Baroque period, the dualistic conditions mounted. Baroque is a combination of the Renaissance's Classical intentions with the mind of the Mannerists. It is an effort to negotiate the inner and outer sources of Renaissance artists and theorists own.

Getting closer to the Enlightenment, the logical method of Descartes was a cornerstone in the 17th century. His idea about the essential knowledge about the truths of the world constituted the logical method. For him the knowledge is created by the experience and the mind comprehend it which is readily present there. (Gelernter, 1995,

p.123). From this point of view, the effect of sensory world on the development of the individual become important.

During the Enlightenment period, the architect is formed as an ideologist of society (Tafuri, 1976, p.3). The Revolutionary transformations towards the modern world has started.

In Romantic period, a particular time during the enlightenment, a new conception of the individual emerged. Jean-Jacques Rousseau (1712-78) was a key figure of the era. According to Rousseau, in man's natural state, emotions and feelings provide reliable guides to behavior, and supply more certain knowledge of the world than can reason itself.

The 19th century has its own values and forms of artistic expression. The philosophical relativism of the 19th century brought about a new understanding. A great number of the architects looked for previous styles that might fit the new parameters of the age. The architectural eclecticism reigned in this century. The shift to abstraction in art emerged. It is discovered that the painting was structurally made up of rhythm, balance and contrasts. It is something beyond the depicted. A new conception of art started, which moved art increasingly from its source of many centuries, sensory nature. For instance, George Seurat used scientific theories of color and light, developed a new method with a harmony and structure in the painting that was independent of the subject matter it represented. Art in the 19th Century, both sought the structure behind the appearance that stands independently of particular phenomena and explored the expressive capabilities of the form. Former lead absolute objectivity of De Stijl, latter extreme subjectivity of German expressionism.(Gelernter, 1995, p.213-217).









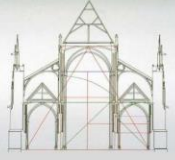



With an increasing complexity of thoughts and views, the 20th-century turned to be a harvesting period of long lasting previous periods. There was a struggle in philosophy after relativism. Philosophers like Nietzsche and John Dewey accepted that no absolute certain knowledge of the world is possible, where Hegel believed that the certainty in knowledge could be attained. Most of the 20th-century philosophers tried to eliminate or minimize the damage of relativism by finding strong foundations for objective knowledge. It was a search for how subjective perception can reveal objective truths. For instance, Henry Bergson stated that certain knowledge of the world can be

gathered by intuitions and looking inwards to one's own nature, one will experience "duration" or a "life force" that comprises all things from consciousness and matter to time and the absolute. He founds this force creative and evolutionary. For him it is responsible for the existence and the qualities of the objects seen in phenomenal state. Kant, on the other hand, had shown that space, time and causality are the constructions of the subjective mind.

The interrogation for certainty mounted in Edmund Husserl, one of the significant proponents of Phenomenology. He wanted to establish a new method showing that a certain knowledge of the world can be gained. According to him, one must get rid of all prejudices and reach the essences of the things, by this way makes reductions and abstracts timeless essences from the raw data. In this process mind becomes aware of the changeless forms-essences-behind sensory appearance. There is two source of form: form derives from purely material determinants like structure, climate and purpose; form at one moment to derive purely from inner sensibilities and feelings, and the physical manifestation of a transpersonal Spirit (Gelernter, 1995,p.220-225).

All of these uncertainty had its reflections in artistic and architectural handlings. Moving away from sensory nature and duality continued as in the 19th century. One stressing the objective, suprapersonal characteristics of form, the other stressing form's personal, expressive possibilities which had reflections on the creative powers and sources of the architects throughout the history (Table 2.5).

Table 2.5. *The source of creation in architecture through history*

<p>Stone Age</p>	 <p>Çatalhöyük, 6250 BC. Shrines inside proves the relationship of the design and the cosmological beliefs</p>	<p>Renaissance (14th-17th Century)</p>  <p>Saint Andrea Matuta, Alberti (1470), Canonized forms of Classicism, capturing the ideal beauty of the universe.</p>
<p>Egypt</p>	 <p>The Temple of Queen Hatshepsut, Egypt, 1480 BC. Reflection of rational order of the divine world</p>	<p>16th Century</p>  <p>Rondanini Pietà (1554-64) and Laurentian Library (1524-33), Michelangelo's Neoplatonism, his mannered expressions in art and architecture.</p>
<p>Greek Civilization 6th - 4th BC</p>	 <p>The Temple of Hera, Italy, 460 BC. Geometry and codified rules to capture the rational order of the divine.</p>	<p>17th Century Baroque</p>  <p>Chateau, Maisons, Francois Mansart(1642) and Seaton Delaval, the English Baroque School (1721): rational ordering and use of Classical orders</p>
<p>25 BC-In the Reign of 1st Roman emperor Augustus.</p>	 <p>The ideal man of the Vitruvius represented by Leonardo da Vinci. Vitruvius made a proposal for basing education on abstract principles found in the liberal arts</p>	<p>Enlightenment (1750-early 19th Century)</p>  <p>Etienne-Louis Boullée, Project for a Memoria to Newton (1784), Rational and pure constructions of architecture.</p>
<p>Medieval age</p>	 <p>Basilique Saint-Urbain de Troyes, 1262. rational geometrical system to capture the essential order of the Divine.</p>	<p>Romantic Rebellion</p>  <p>Thomas Gainsborough, Market Cart, (1787), Romantics support primitive and naive over civilized and sophisticated.</p>
<p>The end of 11th Century- Scholasticism</p>	 <p>Giotto, Raising of Lazarus, 1305-06. personal expressions on a spatial plane</p>	<p>19th Century</p>  <p>Royal High School, Edinburgh, Scotland, (1825), Greek revival for the original source of Classicism. Eiffel Tower (1889), the changing material and construction technologies</p>

2.4.2. Modern movement

In the 20th-century, there was a proliferation of ideas and movements. One of the most important movements for architectural history was De Stijl. The mentality of the movement depended on an object, natural forms and colors where abstraction has reached the highest level, capturing the simplest, most elemental structure behind all of nature, thus had universal significance. It was a search for timeless forms with pure geometry. The artist who uses these laws frees himself from individual sentiments and from particular impressions received from outside. Banham called this as “depersonalization of the art”. Form exists as an independent entity, governed by objective laws (Friedman, 2006).

Conversely, for the abstract expressionists, form originates in the soul of the artist, responds to his or her inner emotions, and depends to a large part on the soul's personal and even mystical nature. After Gropius had an attempt to combine these two attitudes for defining universal design principles through the establishment of Bauhaus in 1919, the communication of art and technology gained another meaning for the production of art and architecture.

Avangarde artists and architects interested in this synthesis of Gropius. To declare and propagate the new consolidated ideas they formed the Congress Internationaux d'Architecture Moderne (CIAM) in 1928. Five years later, Modern Architectural Research Group (MARS) was founded in Britain. They offered the international style as the one true way of building that would forever replace all style. Since this new all-responsive style was not about mere image, it was about how to build functionally, rationally, and economically, the protagonists of this movement interpreted the new style as the inevitable result of the materials and constructional processes. At this point, modern movement with its positivistic slant, speak of architecture as a "problem-solving" activity. In this Positivistic approach, the individual is accepted as an object in a purely materialistic world, who is defined by physical forces outside him. Moholy-Nagy is a good example of this materialistic view. According to him, the experience of space results from external sensory material impinging upon the human organism. He tries to define the universal language of form, the objective properties of materials and the importance of learning by doing. This kind of architectural determinism remained a theme during the Modern Movement. With this

respect, modernism has also expressed a preference for the regular solids of cubes, cones, spheres, cylinders or pyramids as the most beautiful forms. Yet, dualities between objective-subjective, timeless-contingent, Classicism-Positivism continued (Gelernter, 1995, p.251-253).

Modernism echoed in the world after Gropius, Nagy, Albers set up schools in America. (Chicago Bauhaus, Harvard, Black Mountain, Yale). They transformed the architectural education based on the Beaux Art system with the spirit of Bauhaus. Thus, this school spread all over the world. It can be said that Bauhaus's thought is still present, especially where basic design principles and promotion of creativity rather than tradition are favored (Artun & Aliçavuşoğlu, 2009; Weiner, 2005). This specific situation of Bauhaus for the history of architectural education and its transformative role on the educating architects are discussed in detail on section 3.1.

2.4.3. Period after 1950s

The period of architecture after the World War II can be called as Late Modernism. According to Jencks (1973), the Late-Modern architecture emerged as a reaction to the Modern Architecture and to some of its failures. That's why there is a dramatic enrichment and variant in architectural approaches, since Modern Movement drew very strict rules for the production of space within the universal design principles. Thus, the characteristic of this time is the return to subjectivity as a reaction, after the objectivist, positivist and deterministic approach of the International Style. Even the pioneering actor of the Modern Movement, Le Corbusier, exemplified this subjective attitude in Notre-Dame-du-Haut at Ronchamp (1950-55) being disloyal to most of his own previous universal rules for design (Image 2.1). Basing architecture on objective principles was devastated by this personalized building. Another example of this rebellion is the Frank Lloyd Wright's Guggenheim Museum (1946-1959) in New York (Image 2.2). Perhaps this new representation of space and demonstration of the artistic side, reflected a similar challenge in contemporary philosophy to patch up the subjective self with an objective world (Gelernter, 1995, p.259).



Image 2.1. *Le Corbusier, exemplified a subjective attitude in Notre-Dame-du-Haut at Ronchamp (1950-55), where he disobeyed the principles of international style ([http-3](#)).*



Image 2.2. *Frank Lloyd Wright's Guggenheim Museum (1946-1959) in New York ([http-4](#)).*

The prosperity in architectural and innate philosophical approaches also related to the search for an exit from the depression of the World War II. War did made scientists, artists, architects and philosophers to think about the sources of the world and to interrogate the limits of the mind. Together with the opposition to the modern rules, there was a contextual, metaphorical, historical and communicative search with respect to local and cultural references (Jencks, 1973, p.374). In this context, the most architecturally concerned philosophies and the figures can be counted as: phenomenology, existentialism, positivism and environmental design, structuralism, post-modernism, post-structuralism, and deconstructivism; Jean Piaget, Norberg Schulz, Christopher Alexander, Robert Venturi, Jacques Derrida, Peter Eisenman, Daniel Liebeskind, Zaha Hadid, Bernard Tschumi, Frank Gehry,...etc. The list could be prolonged, however, it may give an idea as it stands, firstly about how rapidly introduced new perspectives to the architectural scene and lastly how the connections of the philosophies and their proponents utilized architecture as a mean of communication and representation of their ideas.

Starting from Phenomenology, Maurice Merleau-Ponty elaborated his ideas after the 2nd World War, and tried to reaffirm the reality of a world outside our consciousness of it; where Jean Paul Satre took for granted of an external world introducing existentialism. For him, self turns to be an artificial construction. Sartre then asserted, individuals are free to choose their own focus and direction, and they must undertake responsibility for their choices.

It is required to make a statement about the post-colonial era in which radical political changes were influential throughout the world indicating the new economic and political milieu. Many colonial countries freed from their colonial bounds and had a chance to reflect and represent their national identities. This opened up new perspectives in architecture. Vernacular architecture and regional characteristics considered significant to create a national architecture. One of them was the movement of tropical architecture which was emerged after 1950s. Tropical architecture is a description used for the modernist architecture within the periphery of the central West. It especially gained importance after a conference held in 1953 in London with a concern on critical regionalism. Parallel with this conference "The Department of Tropical Architecture" in Architectural Association (AA) in London was founded in

1954 with a specific course outline (Le Roux, 2003). This global interval has influenced the modernist spatial handlings of the local authorities through which the architectural education took its sources and field of discussion as well. The interrogation of the climate, tradition and the local capacities within a modern perspective had resulted in a combination of local and global for the sake of rationalization of the architectonics.

These forms of support have helped architects create modern architecture in remote areas under difficult conditions. Despite this expansion of environmental areas of application through communication with the colonial metropolis, tropical architecture was seen as something other than colonial architecture. Changing political and economic opportunities at the end of the colonial period pushed architects to develop a post-colonial identity for architecture (Le Roux, 2003).

The Tropical architecture brought about the prevalence of modernism through critical regionalism. Therefore, it is not surprising that the International Style were weakened after the Second World War and the personal expression became primary throughout the 1960s. As usually seen through the history, when the subjectivism arises, there always comes a positivist reaction. After 1960s, it was so for the subjective formalism of the period. The favor for the more responsive architecture concerning the needs of people has been aroused. The architecture was defended not to be an art but a rigorous empirical science. The new research attempted to develop two key components: a body of scientific knowledge about the usage of the buildings and about how people are affected by built environment; and a methodology for applying this knowledge to design problems first developed into the environmental psychology movement in mid 1960s. Man-environment relations was separate. Thinking of man and world as two objects in a system allows us to see how two sides might interactively shape each other. The second component grew into the Design Methodology movement. This methodologist approach mounted during the 60s. Horst Rittel, Christopher Alexander, Geoffrey Broadbent are some contributors to the design methodology. Especially, Christopher Alexander developed most influential design method referring explicitly to Gropius and Moholy Nagy, he revived the Bauhaus arguments for a design method. He discussed whether the design consists of solving functional problems, or problems of the modern world are too unfamiliar to solve with habited solutions. Another view is that the modern problems are too complex to solve with personal

intuitions. At this point Alexander offered a design methodology composed of stages: analysis, synthesis. This mostly ended up with abstract bubble diagrams. This method suffered from its inductive character: without an idea of the pattern, you cannot discover it (Gelernter, 1995).

In 1970s, Horst Rittel proposed a second generation of methods including participatory design movement. However, the more closely an architectural form was adopted to the willing and culture of a particular user at a specific time, the less could it be a potential space for the future users. Environmental determinism was discussed in the schools of architecture, with a belief that the architect must be taught something of anatomy, physiology, and psychology of the special senses along with the physics to predict the physical conditions in his design (Gelernter, 1995, p.265).

The period in between 1960s and 70s was very productive in the sense of divergent ideas through the mainstream of the architectural discussion. Structuralism is one of them, which is not a disciplinarily organized movement at first. By time, the term applied to a general philosophical attitude that had emerged in many fields as to the architecture (Söderqvist, 2011).

Language as a system draws a method for other applicable fields. Levi-Strauss in anthropology and Piaget in developmental psychology looked for deep structures within the mind that guide behaviors. According to supporters of this movement, there are shared human structures. Structuralism drew close attention to the relations between mind and world. Structuralists asserted that the mind does not passively receive knowledge from the outside; it actively imposes structure on to this material. Unlike existentialists, the Structuralists pointed that there are limits to freedom of action and choice, since the structures of the mind is finite and limited. Kant's idea of mind providing the form while the world is providing the content.

In adaptation of structural approach to architecture, it is seen that a primary and a secondary structure essential to structuralism. From this definition, the primary structure's system of rules determines how the secondary elements are placed in relation to one another where a rule based design approach is utilized. Structuralism in architecture became world-wide from its development (Valena & Vrachliotis, 2011).

Jean Piaget is a key figure for structuralist theory from the physiological side of the approach. As stated before, Kant thought that the structures in the mind are innately wired into every human brain, which ensures the objective knowledge; whereas Chomsky, supported this idea of the human brain possessing a universal set of linguistic rules. Piaget, at this point, articulated the mental schemata idea, mutually constructing patterns in mind according to outside stimuli. The most striking point of Piaget's ideas is that the physical world cannot totally determine the behavior of an individual, because the individual creatively produces his or her own behavior patterns deriving from inner resources. Physical world strengthens those proposed schemata which work and rejects the opposite. Piaget's theory also explains the relationship between knowledge and creation. They both employ the same inherent mechanism in the mind, actively creating form to test against the outside world (Gelernter, 1995). From this standing point, Piaget supported the idea that “learning involves the active processing of information and that it is organized and constructed in a unique way by each individual” (Nadimi, 1996, p.145). Consequently, the views of Piaget has influenced the architectural education and the source of creation regarding both learning and teaching strategies which are examined in further chapters as a pedagogic tool for design teaching.

Following Piaget, Christian Norberg Schulz deepened the “our inner sources” idea in comprehending the outside world from a phenomenological point of view. His ideas owes more to Piaget than to Husserl as a Phenomenologist. According to him, our awareness of the physical world is given through perception, we can only infer from our inner sense data the existence of an outer world of objects; and we build up from our inner data abstract knowledge like causality. Norberg Schulz showed how our sense of space is also organized by mental schemata. Culture and socialization shape the individual's experimentations through previously formed lines, and bring about a particular patterns of socially acceptable behavior. Moreover, Schulz supports an adaptive and evolving design languages for different cultures and different individuals (Gelernter, 1995).

After Schulz, there was a period of research for design. Knowledge, design and the methodologies were primary concerns of that period, hence the design issues were handled along with a scientific approach which parallels ideas of Piaget. In this theory some cognitive schemata are assumed to be ready in the mind of the designer in order to

solve a design problem. This idea was later elaborated by Christopher Alexander, for whom the universal design principles and the principle of good design resides in the traditional patterns of form. Staying within the limits of structuralism, he investigated several types of buildings in several cultures and tried to decode the patterns, breaking the forms into smaller structures. He tried to find out the common points of the forms. Those patterns are repetitive in time and again because they successfully resolve the design problems. These repetitive applications are the tendencies of human nature and so anyone who tries sensibly to accommodate them in a design will inevitably produce the same geometrical pattern. Unlike Schulz and Hillier, Alexander is not flexible. Schulz instead, supports an adaptive and evolving design languages for different cultures and different individuals (Gelernter, 1995).

Consecutively, the period especially after 1970s could be assumed different in character. Since the variations in the theories and their finding place with their strict relation to the field of architecture had shown some sharing ideas of the earlier Modernist look. They all handled science and creativity as a problem solving medium for the complex matters of the world such as human behavior, ecological systems, social structures, meaning...etc. However, after 1970s the mood of all responsive attitude disappeared because of the pessimistic reality of wars, societal, public, economic and environmental problems as much as of the failed design methods reflecting an ugly built environment. This awareness of the real conditions have resulted in a change of direction in the arts and philosophy, opening the page of Postmodernism and the Post-structuralism. Those views intentionally positioned themselves in opposition to Modernist approach.

2.4.4. From structuralism to post-structuralism

Having an intentional decision to stand inverse of what modernism advocates, post modernism reoriented itself towards a historicist and eclectic referential ground. By this way, postmodernism demonstrated cultural references which were once deported from the modernist language. On the philosophical side, the post structuralist stream developed a more theoretical basement for their opposition to structuralism comparing it with the eclectic and superficial intervention of post modernism on the built environment.

After the question of structuralists about the signification within and without the architectural field, post-structuralists discussed the issues of originality and authorship (Nesbitt, 1996). Deconstruction was the tool in order to destroy and discover the meaning layers of all kind of texts including buildings. In this destruction and reconstruction, metaphors were important in producing meaning and references intertextually.

The philosophy of post structuralism mostly depends on the Nietzschean view where the perfect access to objective truth is impossible. Formerly Heidegger, latterly Derrida elaborated this theory within the argumentation of deconstructivism for which there is a more obvious interpretations and the representations of these ideas in architecture. According to Derrida, all individuals see the world differently and all judgements including the aesthetic ones cannot escape this subjectivity. The critical element of deconstruction is deconstruction of all previous thinking in order to create a clear ground to generate new ideas (Culler, 2008). Order and logic is dismissed in order to break existent hierarchies. With this respect, the works of Peter Eisenman, Liebeskind, Zaha Hadid and Bernard Tschumi could be counted as examples of the deconstructivist approach, where fragments of forms crashes into others with disoriented grids and structures freed from their gravitational references.

This process of architecture was narrated by Allen (2012) where he concentrates on the architecture after 1990s, especially after the computer-aided design has emerged. He mentions global events such as Demolition of Berlin Wall, Iraq war, prevalence of internet and cellular phones and their effects on social relations as well as the architecture. He underlines the figures such as Rem Koolhaas, Eisenman, Liebeskind, Meiers, etc.

Allen (2012) states that:

“The 1988 Deconstructivist Architecture exhibition at the Museum of Modern Art, while exhibiting for the most part buildable projects by practicing architects, promoted an interpretation of architecture that, in addition to commenting on the utopia of Russian Constructivism, was based on metaphors of instability and concepts borrowed from literary theory. The effect on schools of architecture was a proliferation of theory courses, and a widely accepted view that knowledge of structural linguistics and poststructuralist philosophy was fundamental to an architectural education.”

This was a total transformation regarding the philosophical, technological and social events at the beginning of the 1990s. As mentioned before, the time and space perception, the theoretical and societal arguments of time and space had their impacts not only in praxis but also at educative fields of architecture. Derrida and Deleuze as philosophers, Harvey as geographer, Jenks as architectural theoretician, Tschumi, Eisenman, Gherry and Liebeskind as architects were the dominant figures of this period.

2.5. Evaluation of the chapter

As a matter of fact, the evaluation of this chapter would not be concerned with nor the historical arranging of the events, neither the changing status of the architect as a designer. The main point, and may be the independent aim of this chapter is, to reveal the shifts and transformations of the way of thinking which has a deep impact on our perception of the world and ourselves. From antiquity to modern times, it can be followed that the source of creation had undergone great transformations. In this historical excavation, those transformative moments are revealed within contextual parameters and within a cause and effect relation.

With a reference to the Platonic and Aristotelian definitions of Poiesis, Phronesis, Techné, Praxis and Mimesis, it is understood that the doing and making of human being is divergent in character due to their idiosyncratic mechanisms. Activities of “making” predominated by technical knowledge where activities of “doing” characterized by creative knowledge. It can be concluded from this point that the technical knowledge stands for objectivity where creative one for subjectivity. Here, the theoretical knowledge is an intellectual instrument which transforms both the technical and poietic creations of man.

Returning to the discussion of the historical flow of architectural productions of man, it is seen in some cases that the technical demonstration overrides the subjective preferences, while in other cases the artistic expression surmounts the practical issues. The former implies for creating repetitions, whereas the latter implies for the uniqueness. This preference of the artist, craftsmen or the architect (it is known that the architect has a blur definition of tasks in the history) is related to the contextual

parameters which have a great importance in the determination of the individuals' limits of creation.

It is known that the wars, the religion, the economic crises, the global events with wide effects could direct the overall flow of the history making the creative cracks become larger breaks (Runco, 2014, p.236). Yet, it is once more clearly understood that the belief systems, the societal forms, the philosophical questionings and the world views (including cultural, political and geographical aspects) bidirectionally shapes the individual and the society. The reflections of these interactive process unstraightforwardly seen in the processes of creation and determines the degree of objectivity or subjectivity (Table 2.6).



Table 2.6. *The Source of Creation through Thresholds (interpereted from: Broadbent, 1995; Gelernter, 1995; Kostof, 1986; Tafuri, 1976).*

Period	The source of Artistic and Architectural Creation
Stone Age	There is a relationship between design and the cosmological beliefs. Material was determinant in the design. Cosmology- nature-Gods; although the individual creates the art, there is no sense of individuality. Imitation and trial-error system according to divine principles
Egypt	Transfer of the tradition. Representation on earth the divine authority. Problem with geometry and symmetry in order to reflect the divine order. Imitation of the existent- geometry
Greek Civilization 6th - 4th BC	Object - Subject dualism emerged. Geometry is important reflecting the order of nature. Artist was the agency in between the Divine and the reality. First acknowledgement of the importance of the individual.
25 BC-In the Reign of 1st Roman emperor Augustus.	Vitruvius introduced a new criterion: the truth of nature -perfection arrived at the end of a process of eliminating failures after trial and error experiments. The essential knowledge required by the architect is the child of practice and theory. An architect should both have apprenticeship and scholarship then. Vitruvius made a proposal for basing education on abstract principles found in the liberal arts.
320 AC.	There is an analogy of the Creator and the created which sees the human as a passively being and organized by the Creator. Geometry is important reflecting the order of the Divine. God gives the information to override the technical problems that the geometry put forwards. Medieval view had conceived the physical world as a symbol of the divine. In the entire medieval period the artists and the architects attempted to capture in their work mathematical harmony, proportion and number that they believed expresses and celebrates God's divine order.
380 AC.	The important thing in designing buildings was not the individual creative perception or expression. The knowledge was pre-established and shared body of information which linked architectural form with the spirit of the Divine.
Towards the end of 11th century- Scholasticism	Reorientation of thinking. Change from Plato to Aristotle in the scholastic age corresponds to the change from Romanesque to the Gothic. Gothic sought to delight the senses. These new institutions - the universities- were interested in neither developing new knowledge nor in developing the students original creative skills. They intended to reveal pre-established divine truths more exactly. Re-assertion of a self-conscious awareness of the individual's powers of observation and reason. Looking to the physical world. Empirical spirit emerged. There are two modes of acquiring knowledge: reasoning and experience. Renewed interest in the sensory world .
Renaissance (14th-17th Century)	Art and architecture of the ancient world. In the re-birth of the ancient Classical world, we find an emphatic return to the two essential characteristics of Greek thought: preoccupation with the secular rather than the divine; and a self-conscious awareness of the individual and his powers. The source of artistic and architectural ideas within the Aristotelian tradition. Artist is a passive recorder of phenomenal appearance . Art was aimed to be as objective as possible and a structure which the implicitly assumed must exist independently of an individual mind perceiving it. According to Leonardo, images taken from sensory nature, and then draws upon this reservoir of knowledge when constructing the artistic image. The mind can combine these image creatively to form imaginative forms. University stressed the development of the personality and character of the individual. The Renaissance ideal was the Universal Man. Sense of experience is the source of the knowledge. According to Leonardo, all our knowledge has its origin in our perceptions , so the main task of the artist is to imitate nature as accurately as possible. There was a belief that the Classical language can capture the universe's ideal beauty.
16th Century	Many textbooks and treatises were written at this time which claimed to establish the objective and universal rules of art and architecture, without reference to personal insights or skills. In this period the subject-object problem engendered the most extreme distinction yet between inner personal and outer shared artistic resources. This age that saw the first extreme of artistic subjectivity and the first philosophical explorations of creativity also saw the solidification of the Classical tradition with its claims to objective truth and its reliance on precedence. MANNERISM.
17-18 the century Baroque	Baroque period is the period of dualities. Baroque as a synthesis of the Renaissance's Classicism with the emotion and tension of the Mannerists. It is a struggle to reconcile the inner and outer sources of art that artists and theorists inherited from Renaissance. After 1660 with French dominancy with Cartesian reason and rational order. Logical method of Descartes is believed to be competence in leading a discovery of certain truths about the world.
Enlightenment (1750-early 19th century)	The Revolutionary foundations of the modern world. The strongest reaction was to split the various components apart, and to assert for the first time relatively independent versions of theories in which world is freed from mind and mind is freed from world. Existing of free will was discussed.
Romantic Rebellion	A new conception of the individual. According to Rousseau, in mans natural state, emotions and feelings provide reliable guides to behavior, and supply more certain knowledge of the world than can reason itself.
19th century	A century of architectural eclecticism. Architects like Schinkel discussed how to invent their own styles. The shift to abstraction in art. It is discovered that the painting was structurally made up of rhythm, balance and contrasts. It is something beyond the depicted. A new conception of art which moved art increasingly from its source of many centuries, sensory nature. Art in the 19th Century, both sought the structure behind the appearance that stands independently of particular phenomena and explored the expressive capabilities of the form.
20th Century	There was a struggle in philosophy after relativism. Philosophers like Nietcche and John Dewey accepted that no absolute certain knowledge of the world is possible, where Hegel believed that the certainty in knowledge could be attained. Most of the 20th century philosophers tried to limit the damage of relativism by finding strong foundations for objective knowledge. How subjective mind can discover objective truths. Two source of form: form derives from purely material determinants like structure, climate and purpose; form at one moment to derive purely from inner sensibilities and feelings, and the physical manifestation of a transpersonal Spirit. The Age of proliferation of ideas,- especially after Second World War- multiple coding, complexity, heterogeneity and pluralism.

At the beginning of the 20th-century , the theory of Relativity, had changed the worldviews from Renaissance. Einstein stated that we are living in a 4 dimensional space-time where he explains being at one place at the same time is not absolute but relatively changing from one observer to another. This assumption had changed the perspective-dependent creations of art and architecture combining the space with time and motion (Image 2.3).



Image 2.3. *Picasso, Poet, 1911(left); Marcel Duchamp, 1912, Nude descending a staircase no.2 (right)*
([http-5](#); [http-6](#))

Based on this contextual shifts on the world views, a more recent idea for the perception of the world was emerged in the mid of 20th-century Merleau-Ponty tried to verify the reality of a world not depending upon our consciousness. David Bohm, famous for his studies on explaining relativity, and one of the recognized scientists of the 20th-century supports this idea of reality as well. According to him, the reality is something continues to exist, even when someone does not see it (Bohm, 1998). This paradigm shift on the perception of the world and relativistic uncertainty has transformed the acceptance of the latent creativity in the human mind and illuminates and prescreens of creativity in nature and the universe at large. From this shift point,

thought can be defined as a system. Those views were a breaking point for the everlasting object-subject struggle for the sake of a new perspective transforming the structure of mind and thought outside that struggle. That is, the duality and the sides of that duality were no more important within the new paradigm. The proliferation of the individual minds and reflections of the personalization on all faculties of the human activity were dominating the new era. Every subject could create his/her own object. The production of knowledge is interrelated to this subject-object definitions which causes new connections and knowledges enormously. Once the potential move the mind has discovered, there is innumerable subjective worlds inside the so-called objective world. So what does this shifts mean for the architectural education and then for the studio?



3. CREATIVITY AND ARCHITECTURAL DESIGN EDUCATION

3.1. A Brief History of the Education of the Architect: From “Guilds” to the “Studio”

When the education of the architect is historically considered, it is important to set clear the identity, status and the responsibilities of the architect as well as the contextual characteristic of the time. Through history, “the architect” has mostly had a privileged status, regarding his intimate relations with the administrative forces and his skills and genius to be able to create spaces for the sake of his community/king/queen etc.¹ This capability, sometimes discreet, sometimes anonymous, was transferred to the upcoming “architect” in order to have a continuous and sustainable system of architecture. From antiquity to the modern times, the subject matter and the method of this transfer of architectural knowledge and the scope of creating buildings have been transformed. Even though historiography is not central to this chapter, the main intention here is to perceive what constitutes architectural education in its historical landscape.

Starting from ancient times and in a chronological manner, little is known about the architectural education from the close of the ancient world to the end of the 11th century. At the times of building tradition depending on imitation-trial error system, the basic methods to transfer knowledge was observing and communicating within an apprenticeship structure. It is estimated that semi-public organizations served as the architectural sharing platforms with responsibility for supplying essential services and materials (Gelernter, 1995, p.85; Kostof, 1986).

¹ According to Kostof (1986), the privileged status of the architect was not very clear in medieval ages. Moreover, during medieval time, the designation of the architect was done by naming him as carpenter, builder or mason. Even though he is responsible for the constructive issues and the coordination of the site, the patrons who financialized the construction was foreground. This underestimation was valid for the Ottoman architects too, who were classified as “mimar”, “banna”, “muhandis” though not synonymous with the architect as we know. Yet the most qualified laborer in the field is called the “master”. This situation changed in Renaissance by means of the societal transformations appreciating the individual’s potential and questioning the pre-ordained perceptions and the reality.

When the architects started to design according to divine principles, the education of an architect required more than observation and conversation (Kostof, 1986). The geometry, knowledge of form and imaginary to build that geometrical form according to mathematical and proportional rules became more complex. The knowledge was accepted as a kind of secret, so that the architect require little more than a command of a physical skill and a mental image. The architect should surpass his skills reduced to a mere imitation of the existing. According to Gelernter (1995), the semi-public organizations disappeared in between 5th -11th Century. Training is supposed to be handled as an informal issue solved within the family. Yet, the apprenticeship system continued.

Encompassing the medieval age, the guild system emerged from the beginning of the first centuries where there were regulations of the workers. This more formal structure of the guilds can be accepted as a systematized version of apprenticeship. In order to guarantee the quality of work, the guilds introvertedly undertook the responsibility for training the young. Under training of his master, an apprentice learns a great deal of constructive secrets such as how to generate plans, elevations, facades through geometrical calculations and displacements in detail. Education in the guild was based on particular examples of architectural, geometrical and decorative forms. The existence of Craft guilds, or Collegial as informal voluntary organizations during Roman Empire is not clear. Yet, it is known that Vitruvius as an important figure of the period, made a proposal for basing education on abstract principles found in the liberal arts (Gelernter, 1995, p.63-89). Another medieval structure of education was the church. Since the construction of the cathedrals to highlight the divinity of the Divine was the greatest occupation of the church, educating or sponsoring master-builders also with the organizational parts was very critical to maintain a sustainable building strategy.

In the 12th century, the universities emerged as new institutions parallel with guild system. The emergence of cities and the new requirements for the new demands of urban life resulted in the institutionalization of universities. Educationally, they were with the structure of guilds and teach the pre-established knowledge of the cathedral schools. (Table 3.1).

Table 3.1. *The Comparison of Architectural Education in Between 5th Century-12th Century; interpreted and visualized from (Gelernter, 1995)*

Apprenticeship System of the Medieval World in the Guilds (5th Century-12th Century)				
Master	1st Stage -Apprentice	2nd Stage - Journeyman	3rd Stage-Approval	4th Stage- Master
Supplies his apprentice with food, cloth and shelter. Teaches him the essential skills and knowledge	Apprentice gains theoretical and the practical knowledge and has access to secrets about how to draw plans, design important buildings and design facades. Works in construction as well	3 years as journeyman: Travelling Europe, sketching and working in diverse constructions	Constructs his own masterpiece of work and prove his competence.	Becomes a master with 7 years of experience and trains apprentices.
Parallel with guild system grew a new Institution - Universities (11th Century- Scholastic period)				
Student	1st Stage	2nd Stage	3rd Stage	4th Stage
University student was an apprentice teacher	4-5 years to learn interpretation of the few standard texts (mostly Aristotle)	Examination for his Bachelor's degree	Helping master to teach. Undertakes similar exams for Master's or a Doctor's certificate	Fellow master and entitle him to teach

In Renaissance, New art academies were established. University underlined the development of the individual, whereas the intention of guilds was not to awaken the individualistic potentials. Within the master and apprentice relationship depending on the one-way transfer of the knowledge, the reasons of why things are done in some particular manners were not questioned. Conversely, the existing bodies of knowledge and skill were rather to be assimilated. Renaissance could not tolerate this educative approach. According to the “Universal Man” ideal of the Renaissance, the individual could not rely on the dogmatic knowledge of the world anymore. Thus, there was an interrogation of why some particular things are done in particular ways. This is why, the Renaissance separate the value of the practical craftsman and the theoretical scholar, and prioritized the latter.

In the fifteenth century Vitruvius’ Ten Books turned to be the foundational text in the education of the architect (Newman & Vassigh, 2014, p.68). Nevertheless, there were different views as well. In 1470 Marsilio Ficino founded Academia Platonica without no teachers and taught; without any formal structure and limits. For this foundation, Broadbent (1995) states that the aim of the schools was to encounter the impact of the craft guilds. Being two of the graduates from the Academia, Leonardo Da Vinci and Michelangelo well exemplify the intention of the school.

After 1660 with French dominancy, the period of Cartesian reason and rational order had begun. Logical method of Descartes is believed to be a competence in discovery of certain truths about the world. In 1648 King's Minister Mazarin founded Academie Royale de Peinture et de Sculpture in France. Then in 1671 Colbert founded

the Academie Royale d'architecture (Collins, 1979; Cunningham, 1979; Golja & Schaverien, 2015; Kostof, 1986; Tzonis, 2014c). The aim was not to invalidate the apprenticeship system but rather to teach the universal principles of art and architecture. The modern schooling of architecture starts with the Royal Academy which is accepted as the origin of the present concept of architectural education (Collins, 1979). It is the precursor to the Académie des Beaux-Arts, later École des Beaux Arts in Paris (Newman & Vassigh, 2014, p.68). Moreover, the Royal Academy of Architecture had its specific intellectual tradition looking back to Renaissance Rome as its source of inspiration. “In the meantime, the bulk of building activity was performed by the craftsman architect, who inherited skills from the Middle Ages, through oral teaching and practical example” (Broadbent, 1995). According to Nadimi (1996, p.65), this is the very point in time where the gap between the 'academic architect' and the 'craftsman architect' originated.

After the French Revolution, which is one of the critical turns in the history due to its global effects, all academies in France were dissolved. The outcomes of the revolution were not limited to academic structures. Long term effects of it led to the industrial revolution through which a reaction to the any association with the aristocratic period had grown. Hence, the distinguishing and discontinuous establishment of Ecole des Beuax-Arts in Paris in 1863 from its processor-Royal Academy- with a tendency of classical aspirations should be evaluated in this context (Nadimi, 1996).

Ecole des Beuax-Arts is noteworthy in the history of architectural education not only for its methodological characteristics of education, but also for its contribution of new concepts to the educative terminology. The notion of ateliers, design exercises, “esquisse”, competitive spirit, and “concours” are a few of them. For this reason, most of the scholars announces the Ecole des Beaux Arts as the beginning of the institutionalization of the architectural education. (Broadbent, 1995; Cunningham, 1979; Kostof, 1986; Tzonis, 2014c). The Beaux-Arts tradition dominated for nearly two centuries and it had a great influence on the modern architectural education (Cunningham, 1979).

Parallel with the Beuax- Arts, the first schools in Europe could be listed as The Architectural Association in London (1847), the ETH in Zürich (1855). Simultaneously

the first schools in the USA were established, too. These are “The Cooper Union for the Advancement of Science and Art (1859), Columbia (1881) and Harvard (1893).” The polytechnic institutes are established in Paris in 1794, Prague in 1806 and Vienna in 1815 as the forerunners of these schools of architecture (Weiner, 2005).

The historical facts discussed here upon reveal once more that the most of the modern architectural schooling originated from the Western European models. (Nadimi, 1996, p.62). From this departure point and after the institutionalization of the architectural schooling, it may be meaningful to recall the contextual developments before coming to the foundation of Bauhaus which has a critical importance in emergence of the studio culture.

The period before Bauhaus was including a closing of a century and opening of a new one. At the beginning of the 20th-century, there was a progressive spirit among society thanks to the rapid technological, urban and communicative developments. As a signal of the upcoming events, the theory of relativity in science, the shift to the abstraction in art, great meetings such as Paris exhibition as a showcase of technological improvements accelerated both contacts of the countries and the economical rivalry among them. Therefore, the First World War was unfortunately inevitable. It was a reflection of the economical, technological, industrial, and political struggle underway. Bauhaus was formed in such a context, shortly after a world war, in 1919, in Germany. Germany was one of the leading parties of the war.

In 1919, Walter Gropius, who is at the same time one of the founders of modern architecture, established Bauhaus in Weimar. “Bauhaus was seen to rise dramatically above competing 'isms' of the time and to offer a modern vision of design and education appropriate for the new century” (Gelernter, 1995). It introduced a modern and progressive model other than the old art academies before itself (Artun & Aliçavuşoğlu, 2009; Gothe-Institut, 2019). The master-apprenticeship system based in the workshop did not separate the practice and the theory in Bauhaus, which was seen as the basic problem of the academia. The idea of combination of design and application was the main concern of Bauhaus. According to Gropius there was no difference in between the craftsmen and the artist. Emotions could be directly expressed through abstract form itself. Design and execute could be done in one continuous process. Freely creating and feeling is the source of inspiration, of invention.

There were both positivists and expressionists under the roof of Bauhaus. This was natural, since the idea of Gropius grounded on an ideal combination of technology and art. Yet, according to Gelernter(1995), there was a split between “werklehre” and “formlehre”.

Instructors agreed upon the pre-established forms should not be given to the students since it may avoid the releasing of creative inner forces, and prevent the any potential formal creation from becoming. For an open mind released from past conceptions, Gropius consulted to Johannes Itten, a painter, who had already discussed the underlying characteristics of form in the abstract. Thereafter, Itten developed the first theoretical design instruction. He desired an amalgamation of subject and object, man and nature, spirit and matter by providing the students of being freed from their previous cultural references. In the preliminary course, Itten intended to liberate the students' creative powers.

After a trial with Ittens and with his expressionist ideas, a period of positivist approach started in Bauhaus with Albers and Nagy in 1923. Gropius believed that the subject-object problem can be solved. He also believed that there would be no more 'styles', only correct solutions to architectural and artistic problems. According to Gropius, this new way of thinking in design unearthed the creative skills of the students and leaded accurate solutions to the new problems of the 20th-century. His own design for the school of Bauhaus was a medium to express his ideology. In the 20th-century, Gropius's new proposal for the education embodied the new Spirit of the Age. Thus, it was not surprising that it was eventually taken an example by most of the schools of architecture all over the world (Gelernter, 1995).

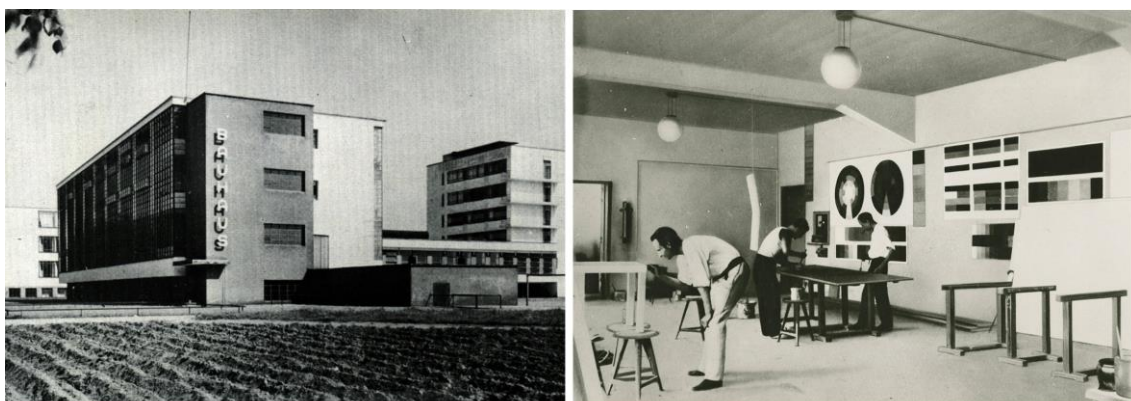


Image 3.1. Bauhaus School building, exterior and the interior view (<http-7>)

Among other schooling experiences of architectural education before itself, Bauhaus constitutes a quite significant place, due to the fact that it has influenced hardly all following academic route of architectural schools in a global scale. The methodology for design teaching and the ideology to combine art and technology as the zeitgeist of the time contributed to this worldwide impact, as much as the contextual circumstances which distributed the leading actors of the Bauhaus across the globe (Image 3.2).

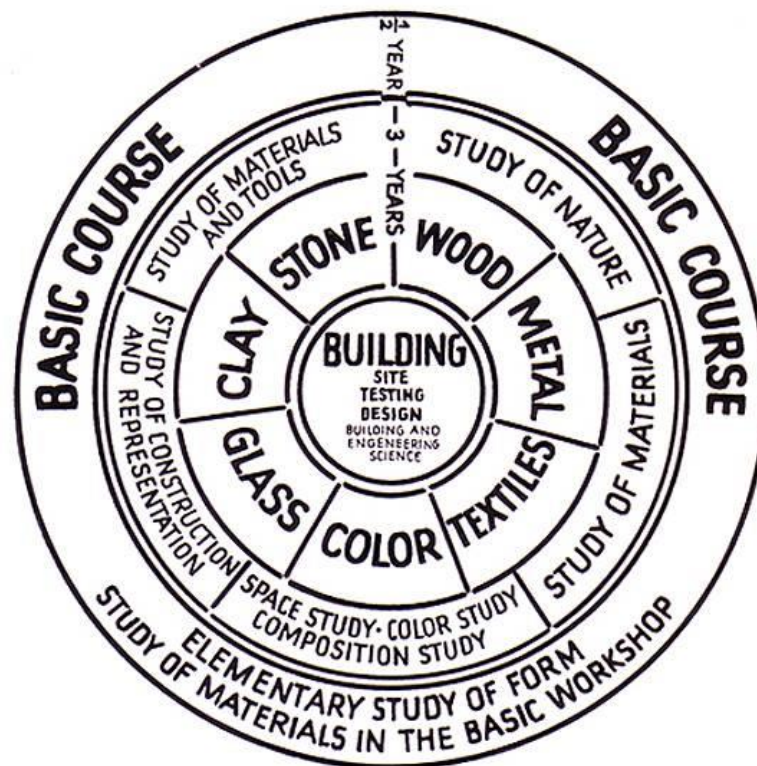


Image 3.2. Bauhaus curriculum (<http-8>).

During the same periods of Bauhaus, there was a formation in Russia called Vkhutemas which is founded in 1920. Even though the scope of this research is European based, Vkhutemas is noteworthy for its similar curriculum and ideology to that of Bauhaus. The philosophical and artistic quest for the positioning of the individual within a material world and testing the limits of representation and abstraction are all related to the Spirit of the Age. Additionally, most of the avant-gardist Russian painters were invited to the exhibitions of the Bauhaus as well. It is not wrong to say that there was a contact in between those schools. For instance, Kazimir

Malevich, who is the founder of suprematism, was an impressive figure of the time, yet he did not actively participated the Bauhaus instruction. Another good example of Russian-German communication is Vassily Kandinsky, who was one of the important painters of the period with a direct contribution to the education in Bauhaus (Image 3.3).

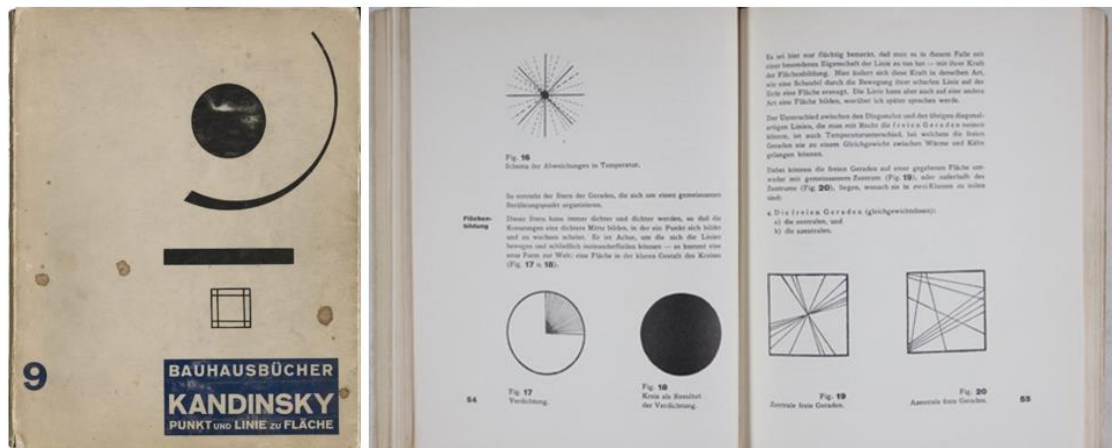


Image 3.3. The book for line drawings published in Bauhaus, by Kandinsky (Kandinsky, 1926).

Bauhaus was a milestone in design and design education regarding the context of the early 20th-century. It offered a new way of thinking- design strategy- starting from the very beginning, cutting all the past references off, forgetting about the history and defining a holistic medium in between art and technology. This way of thinking was directly related to the mode of production and had its economic ground by the proliferation of designed objects (e.g., carpet, seat, typography...etc.). The aim of the school was blurring the boundary between production and design, problem solving by mechanization and standardization of the production; yet the designed products were created in the ateliers. The standardization and rationalization were in every field, even in painting and drawing. Bauhaus, a revolutionary school, which tremendously affect the design education all over the world centenary, was surprisingly lasted for only 13 years.

After the Bauhaus is abolished, and just before the World War II, the important figures such as Albers, Nagy and Gropius migrated to America where they constituted new architectural schools. This time, with the experience of Bauhaus, they reconfigured the curriculum and the methodology, but not growing distance from the basic design

principles and studio pedagogy. These varied, yet repeated versions of Bauhaus education strategy reinforced the centrality of studio for architectural education. Thereafter, the studio became the backbone of the design education with its modifiable, interpretable and adjustable components.

It is also critical to particularly mention the period after 1970s regarding the architectural education. Starting with Bauhaus at the beginning of the century, and continuing with its global effects through 1950s, there was another transformation in 1970s. The changing paradigm in context have resulted in a change in architectural education too which corresponds to the developing third world modernism, modernization of the post-colonial world and the emphasis on cultural and vernacular. Those developments effected the architectural discussions within the architectural design education. Moreover, within a more globalized and connected world and by means of the speed of getting homogeneous, to catch up with the current architectural arguments became easier.

Another important process of architectural education had started by the technological, environmental and societal impacts which are all had changed the direction of the discussion at all. Thanks to the technology and networked industry, the new firms such as OMA, MVRDV, FOA, SANAA, Morphosis, Steven Holl and DS+R are the leading architectural brands (Allen, 2012). These companies are design-oriented, technologically skilled and agile, and can make quick adjustments as required by the project or market. They use new technologies and strategic collaborations to take advantage of their expertise to respond to larger and more complex commissions. They reform mind habits and ways of working associated with experimental practice or academia and re-contextualize it in this new practice environment. This has its reflections on education as virtual design studios, distance education, competition-based architecture or architectural office-like studio experiences. Helsinki Aalto University can be a good example of this kind. This approach is not away from the Beaux arts pedagogy.

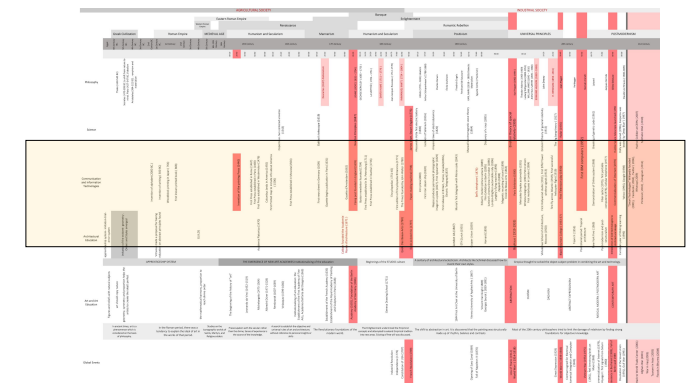
In order to conclude this section about the brief history of architectural education, a table including the important processes and events about how the architects have been educated is presented (Table 3.2). In this table, not only the improvement of apprenticeship to the studio culture is seen, but also the responsive structure of the art

and architecture to the context-dependent developments can be observed. Eventually, arriving at the 21st century, the current circumstances that the architectural design education is passing through is discussed in successive section. The discussion mainly focuses on whether the current architectural design studio is still responsive to the shifts at rapid frequency of the century, or it is conservative and resistant about its modernly originated traditions.



Table 3.2. The history of architectural education; interpreted from (Allen, 2012; Cunningham, 1979; Golja & Schaverien, 2015; Kostof, 1986; Nadimi, 1996; Newman & Vassigh, 2014; Tzonis, 2014c; Weiner, 2005).

AGRICULTURAL SOCIETY											INDUSTRIAL SOCIETY																
Egypt	Greek Civilization			Roman Empire		MEDIEVAL AGE	Renaissance	Mannerism	Humanism and Secularism	Positivism	UNIVERSAL PRINCIPLES			POSTMODERNISM													
	6th C.BC.	5th C. BC.	4th C.BC.	1st C. BC.	2nd -4th C.	5th -14th C.	15th Century	16th century	17th Century	18th Century	19th Century	20th century			21st C.												
Apprenticeship system- imitation-trial-error system	Imitation of the existent- geometry. Orders and Styles			Vitruvius made a proposal for basing education on abstract principles found in the liberal arts		GUILDS		Academia Platonica (1470)	Academie Royale d'architecture (1671)	Ecole Des Beaux-Arts (1790) Ecole polytechnic (1797)	London AA (1847) ETH Zurich (1855) Cooper Union (1859) Harvard (1893)	Bauhaus (1919-1933)	Vkhutemas School of Architecture, Moscow (1920)	Black Mountain College (1933-57)	Chicago Bauhaus, Moholy Nagy (1937-1955)	Conference on Tropical Architecture (1953)Team X (1953)	Department of Tropical Architecture, London AA- Postcolonial Period (1954)	Hochschule für Gestaltung, Rittel (1958-1968)	New York Five (1969)	Deconstructivist Exhibition at MoMA (1988)	Introduction of CAD technologies to Architectural design (1990s)	Rural Studio (1993)	Schools such as Columbia, MIT, SCI-Arc, UCLA retool their technological infrastructure and teaching methods (mid 1990s)	European year of lifelong learning (1996)	Emily Pilloton's Project H, Berkeley (2008)	Small Scale, Big Change: New Architectures of Social Engagement, at MoMA (2010)	low-cost disaster-relief housing (Hurricanes, earthquakes and floods)
APPRENTICESHIP SYSTEM						THE EMERGENCE OF NEW ART ACADEMIES- Institutionalizing of the education				Roots of the STUDIO culture: ateliers	A century of architectural eclecticism.	Abstraction: Gropius trial to combine the art and technology.	Post-war: Globalization of Bauhaus for design education, from ateliers to sterilized studios for design pedagogy			The era of digital technologies, disasters and environmental concerns											



3.2. Describing the Current Architectural Design Studio

The “studio” is a modern notion embracing modern characteristics. When introduced as a pedagogy during Bauhaus period, studio transcended the mere spatial and formal meaning of ateliers functioning as larger drawing classes and it became a generative and transformative arena of architectural education with its modern connotations. According to Adolf Loos’ description, modernity is the broken specific continuation of tradition and a discontinuous continuity (Heynen, 2000). The studio is a good example of this broken continuity, yet with concerns related to the Spirit of the Age. Studio primarily owes its current fragmented structure to this modern essence.

Editors of the book “Educating Architects”, Martin Pearce and Maggie Toy (1995), underlines the heterogeneity and multiplicity of architectural education which causes a loss in the definition of what is and what it is not architecture and in this inherently creates both the diversity and accompanying anxiety/ paranoia of architectural education today. The “rhizome” analogy of Deleuze and Guattari for architectural education is discussed as well for Heidegger’s “behind the current condition”, stressing the idiosyncrasies of the contemporary times.

Deleuze and Guattari compare the rhizome with its opposite; the binary, vertical, linear and hierarchical model of knowledge represented by the tree (tree of life, tree of knowledge). The rhizome, on the other hand “ceaselessly establishes connections between semiotic chains, organizations of power, and circumstances relative to the arts, sciences, and social struggles” (Deleuze & Guattari, 1988, p.7).

Supporting that analogy Senagala (1999) stated that the rhizomatic studio, within a rhizomatic curriculum would be predicated not on “training,” but on establishing new and multiple connections with the world, bodies of knowledge, people and things.

According to Salama (2016), design education in architecture is the principle filed of the design professions that results in major contributions in shaping the built environment. But it is generally thought that, that there has been a lack of awareness of the transformations regarding the design pedagogy and the academic standing points involved. Moreover, it is believed that there has been insufficient articulated knowledge on the evolutionary nature of design pedagogy and its contemporary condition.

Salama continues his statements emphasizing the contemporary necessities of the design pedagogy:

“In today’s rapidly changing academia, critical thinking and inquiry, creativity and innovation, research and investigation, collaboration and civic engagement, and environmental awareness and technical competence, are increasingly valued and are now being viewed as salient and integral qualities of contemporary design pedagogy” (Salama, 2016).

Emphasizing the fragmented structure of the design pedagogies, many scholars point out the issues is often dealt with either by subjective criticism or by undeveloped and even untried solutions (Broadbent, 1995; Dutton, 1991; Nicol & Pilling, 2005; Salama, 2016; Snell, 2014; Tzonis, 2014c).

The multiple educational, social, cultural, environmental, socio-political and socioeconomic transformations that are currently taking place change the fabric of societies around the world. These changes make it essential that architectural pedagogy as an educational system needs to rethink its long-term goals in order to better and more broadly adapt itself to this change. The acceleration of these transformations and the impact of technological advances require an immediate response as education moves to learner-centered inductive learning practices that digital natives expect. To some extent, it has been a joint effort to introduce more inclusive and collaborative pedagogical approaches in architectural and urban design; some attempts have been made to reconstruct the structure of the studio and to reconsider how the knowledge is presented and experienced (Salama, 2016).

Thus, an examination of the relationship of creativity with architecture, design education and a comprehensive investigation of architectural design studio are requisite.

3.3. Relating the Concepts of Creativity with Architectural Design Studio

Architecture is considered including creativity, so does architectural design studio, where almost the main concern is to teach how to design creatively. “Of all aspects of architecture what mystifies most the layman is the power of architects as ‘creators’, their apparent capability to invent, conceive and construct ‘out of nothing’ unprecedented daring forms” (Tzonis, 2014b). According to this pretentious definition, to be a favorable and successful architect requires to be creative. However, to construct

out of nothing may be interpreted as to reconstruct from familiar or unfamiliar things a new thing, to combine divergent ideas innovatively and imaginatively.

As discussed in previous sections (Section 2.2.2), architecture is a mimetic discipline enveloped by layers of meaning. Architects as creators and as the sculptor of the meaning into a structure, can be considered very much related to the concepts of creativity. To some extent, the words, naming and the title of the concept may differ, yet most of them from several disciplinary outlook are intersected (Figure 3.1). Those disciplines successively are: theory, physiology, clinical physiology, science, education, art and architecture.

Rob Pope (Pope, 2005)	Mark Runco (Runco, 2014)	Mihaly Csikszentmihalyi (Csikszentmihalyi, 1997)	David Bohm (Bohm, 1998)	Ed. Thomas Kerry, Janet Chan (Thomas & Chan, 2013)	Ken Snell (Snell, 2014)
Creativity, Theory, History and Practice	Creativity, Theories and Themes	The Psychology of Discovery and Invention	On Creativity	Handbook of Research on Creativity	Towards a New Paradigm in Architectural Education
Creation Production Aesthetics (Radical) Imagination Inspiration (by an "other") Problem-solving Divine creation from nothing(ex-nihilo) Re-creation In(ter)vention Extra-ordinary Originality Play-game Order-chaos Copying-reproduction-simulation Artificial-artful-intelligence Design Conscious-unconscious Collaboration Installation Confrontation Fresh Deleuze&Guattari Critical Novel Modern	Creative thinking Problem-solving Problem finding Creative process Unconscious Logic Intuition Metacognition Mindfulness Over inclusive thinking Adaptability Intrinsic motivation Collaboration Competition Innovation Leadership Marginality Brainstorming and social judgment Serendipity Discovery Invention Memes Originality Chaos Irrational-rational Pseudo-creativity Optima Reproduction Flexibility Proactive	Discovery Invention Process Cultural domain Memes Attention Domain of knowledge Productive Fulfilling Mental activity Insight New Interaction of thoughts Sociocultural context Novel Original Fresh Change-transform Adaptability Imagination vs. fantasy Past knowledge Environment Incubation Novelty Muse Fantasy Picture-image Inspiring environments Creative environments	Art Science Imagination Perceiving movement Discovery New Unknown Oneness (originality) Whole and total Harmonious and beautiful Invention Perception Thought Language Incompleteness Fragmentation Intelligence Process of thought Rational insight Rational fancy Imaginative insight Imaginative fancy Reality Muse Implicate order Consciousness Participation	Little "c" Big "C" System in action Design Capitalism Science &Engineering Creative process Myths of creativity Imagination Malevolent creativity Creative thinking Chance Collaboration Inhibition Perception "Illusio" Creative performance Aesthetics of design Authorship Re-enactment Science-technology-innovation Creative industries Deleuze&Guattari	The creative Stereotypes Little "c" Big "C" The 4 P's (person, process, product, problem) Transformation- Metaphor-Meaning Thought-Action-Object: A creative model Creative process The Design Process The Design Studio Creativity and context Process of thought Rational insight Rational fancy Imaginative insight Imaginative fancy Reproduction Flexibility Proactive

Figure 3.1. Creativity related concepts from major studies of different fields

Looking at the conceptual table of creativity, it is seen that some characteristics come into prominence such as: imagination, originality, collaboration, innovation, new, production, problem-solving, participation, design, language, and so on...All of these

concepts are thought to have a relation with novelty and freshness. Contemporary attributions are especially related to re-production and re-interpretation which does not damage the principle of nor originality, neither newness. Thus, this presents an extreme potential for creativity regarding the accumulated knowledge up to the 21th century. Additionally, perhaps it is about the collection of all information of the humanity which is introduced as an accessible source and served as a ready to re-use reservoir.

As a result of this new orientation of the notion of creativity, or the evolved modes of thinking in compliance with the shift at our format to create, the scope and content of the creativeness has also transformed regarding the parameters to learn and to teach it. Thus far, to relate and adopt the new conception of the creativity, to the architectural design studio, where the creative aspects are of paramount importance, seems essential for the sake of the definition of the architects as ‘creators’.

3.4. Evaluation of the chapter

In this chapter, the brief history of architectural education and the current situation of the design studio are tried to be understood, with keeping its supposedly continuous relation to creativity in mind. It is seen that the education of the architect along with the expected responsibilities of the architect have been evolved. Contextually, the sufficiency and the efficiency of the institutions have been discussed and the educative space of the architect moved from the guilds to the academies and the universities. At the beginning the system to transfer knowledge- knowledge of theory and knowledge of practice -was apprenticeship system, where the knowledge was undoubted and controllable. After the theoretical knowledge increased and the practical knowledge enlarged by both the scientific and the philosophical developments, the methodology to educate the architect had compulsorily transformed. This, firstly caused the emergence of the guilds, and then the universities. Finally, the period of academies and institutions with a determined architectural curricula and specified methods of teaching had begun. The causes of the transformation in architectural education can be roughly counted as the expanded knowledge, progressing technical opportunities, developing contextual circumstances, (e.g. enlightenment, rise of individual, introduction of the cities, and increase in the population...) up to the architectural education distilled and directed to the studio context. Especially after Bauhaus and its

globalization, the studio became the indispensable ground of teaching architectural design. In fact, it can be remarked that it is a valid and effective ground as well. The studio context is not only a pedagogic, cultural, communicative, interactive and generative field, but also a hybrid and controversial one where discussions, conflicts, clashing of divergent ideas and sharing of opinions can find possibility. Even if this potential and character of the studio is activated or not, it is allied with this communicative structure.

Coming to the current condition of the studio, it is discussed as being fragmented and rhizomatic thanks to the local, temporal and contextual prehensions through the lenses either of the instructors or of the institutional identities. Along with the potentialities of the studio, the content of it is very divergent and discontinuous depending on the components of it. Those components are dynamic in character and liquid in the 21st century. The ambiguously growing exposures of positive and negative instruments of both the external and internal stimulants of the studio renders it intensely difficult to define the studio.

Although the hardship in having a common description of the architectural design studio, it is not difficult to define its insufficiencies for its discordance and conservativeness considering the stable or heterogeneous character which makes us once more remember the long-lasting relationship of architecture with creativity. As understood from the history, the educative field of architecture had been affected from the holistically transforming faculties of the life, yet this parallelism have been broken. It is discussed that, this is the very reason for the unresponsive position of the architectural education today to the complex developments of the time. The relationship of the architectural design education with the actual definitions of the creativity is seen problematic in this sense.

Subsequently, the contemporary perception and conception of the creativity is studied from the point of different disciplines such as theory, psychology, clinical physiology, science, education, art and architecture (see figure 3.1). By this way, the notion of creativity is not only seen out of the limited perceptions structured through the architectural endeavors, but also terminologically analyzed which unearthed the commonly and interdisciplinary used concepts of the creativity. Moreover, the intersected terms regarding the architecture with the other disciplines is another

outcome of such an analyses. One another conclusion from the table is that the contemporaneous character of the terminology. All keywords or concepts are gathered and discovered from the up-to-date sources most of which published in the 21st century. Furthermore most of them are regarded as the major works in the research of creativity.

Another different connection for architecture and creativity can be done for their social conditions. Creativity in the middle of the last century was viewed as a comparable ability particular to individuals no matter what their origins or where they resided, more recent conceptions acknowledge creativity as a social construct. (Zimmerman, 2009). The studio, in this sense, is a generative medium, which renders the social interaction for creativity possible. At this point, these qualities of the studio and the creativity stated above can be utilized now for discussing a paradigm.

4. THE NOTION OF CREATIVITY FOR A NEW PARADIGM IN ARCHITECTURAL DESIGN STUDIO

As discussed in previous chapters, creativity which dominates the productive processes of human being throughout the history, is thought to be central for defining a new paradigm of architectural education. The new conception of creativity, focusing on the individual potentials and intends to utilize all aspects of personal productions, finds its opportunities and possibilities within the technological ground of the 21st century. Consequently, the paradigm shift happens with a confusion of near and far, present and future, real and unreal which renders vertical hierarchical relationships horizontal and homogeneous where the space have ability to get liberated from time and body. Under the light of these developments, there is a great question if the architectural design studio insists on continuing the traditional methods, pedagogies and tools which is controversially completed its lifetime in the previous century, or it reconfigure itself according to the contemporary parameters, even questioning the existence of its own self.

4.1. The Contemporary Parameters of Architectural Design Studio

A new paradigm- a paradigm shift- regarding the architectural design studio has been discussed in several major studies in the field of architectural education. Most of them were introduced approximately at the end of the 20th-century or at the beginning of the 21st century. To count, Ashraf Salama's "New trends in architectural education: Designing the Design Studio" has a central concern with the principle features of architectural design studios in United States of America; David Nicol and Simon Pilling's "Changing Architectural Education: Towards a New Professionalism", Martin Pearce and Maggie Toy's "Educating Architects", the most recently Salama's "Spatial Design Education: New directions for Pedagogy in Architecture and Beyond"; as an earlier work, Schön's "The Design Studio: An exploration of its Traditions and Potentials"; Ken Snell's "Towards a New Paradigm in Architectural Education"; Thomas Dutton's "Voices in Architectural Education: Cultural Politics and Pedagogy", and so on. Here, the main point is not to list an academic literature review, however, it is important to emphasize the emerging and accelerated discussion of "the studio" in an

academic manner. In all those studies related basically to the studio- which is readily accepted as the primary medium and ground of architectural design education- the focus of the argument is the dramatic change and the transformation that the architecture confronted towards the new century. On the other hand, it is underlined that the studio is not responsive to that external transformations. The causes and effects of this discordance are all discussed and some inferences about the future of the studio are concluded under some headings. Within the contemporary contextual circumstances those prominent headings can be stated as:

Design thinking, Design Tools and Digital Architecture, Production of Knowledge in Studio, Research by Design, Technology, Image, and Representation, Re-defining the Design Pedagogies, Re-defining the Body-Space Relation in Architecture, and Ethical, Social and Environmental concerns are the distilled, but primary titles under which a creativity connected studio discussion can be maintained. Those could be classified under the evolving theoretical, technological, pedagogical and spatial faculties of the architectural education.

Although, all of these can be a subject matter of an independent research, discussing the new paradigm of the studio necessitates an encompassing approach for all the current components of the studio with respect to the creativity centered argument of the dissertation.

Putting forward the linkage of creativity and design issues (see table 3.3.1) and the modern characteristics of the both, this integrated perception of two concepts and the holistic undermining of the related themes along with their interrelations becomes critical.

As mentioned before, in 21st century, a shift from problem-solving to innovation, from transferring knowledge to producing it have become visible. However, as most of the colleagues state, architecture schools and the profession still labor under an older epistemological paradigm (Newman & Vassigh, 2014). This conventional approach is discussed in previous chapters through a historiographic approach. Now, it is time to discuss probable components of the architectural design studio within the framework of the new paradigm.

4.2. Design thinking

In 1974 Adrian Leaman wrote “How is Design Possible” and developed a method of design that refers to Piaget's and Popper's ideas. In this theory, a designer possesses a repertoire of solution types which have successfully solved design problems in the past. This theory reinterprets the design theories up to now. As the romantics maintained, design ideas are created within inner creative resources; but these ideas derive from previous ideas, not mystical resources, and they are eventually adapted to the requirements of the problem. As the Positivists insisted, design ideas are shaped by material constraints; but instead of generating the form, material constraints test forms already existing. And as the Classicists maintained, designers draw upon a pre-existing repertoire of forms; but the elements in this repertoire are not static entities derived from nature or the mind of God. They derive from previous solutions to similar problems, and they grow and change over time as they are employed to solve new problems (Gelernter, 1995).

This distinction is important so as to locate the current approaches of 21st-century upon the design thinking. The source of creation and the contemporary way we look at this question is important in shaping the design thinking. If the source is limited to internal references or vice versa there is a set intersected and a set excluded.

According to Hatchuel and Weil (2009), design can be modeled as a relationship between two interdependent spaces with different structures and logic: the space of concepts and the space of knowledge. Space of knowledge contains all established knowledge available for designers, while Space of concepts includes concepts that are neither true nor false about an object. Design proceeds in a step-by-step partitioning of sets until a partitioned set becomes a Knowledge-set, that is, a set of objects, well defined by a true proposition. Thus, for Hatchuel and Weil, design is a reasoning activity that starts with a concept about a partially unknown object and attempts to expand it into other concepts and/or new knowledge.

Studies in the field of design found that design thinking is best developed through the iterative refinement of artifacts that are being developed to represent design ideas throughout design episodes (Cross, 2011; Lawson, 1994). This process allows the designer to consider how the opportunities and constraints within their problem space can be optimized to create new products or experiences (Koh, Chai, Wong, & Hong,

2015). It is important to remember that the process of design is messy and episodic rather than systematic. This is because designers go back and forth between the design phases until they reach a desired understanding of the problem to pinpoint a solution (Lawson, 2006). Here, Schön's concept of "reflection in action" fits this episodic process well (Schon, 1987).

Design thinking in 21st-century is an issue transcended the limits of the studio. It is a broadly examined field in order to adopt the fertile process of designing to the processes of learning and increasing the potential of knowledge production (Koh et al., 2015).

According to McAllister (2010), design process for each individual is personal and unique. Hence, it is not easy to find a standard path regarding designing facility (Cross, 1982). Yet, we can generally draw a framework describing the nature of the design that is to say it is the organization of experiences and information according to a need or a purpose. It is like language but it includes a construction in variant dimensions. It is a complex pattern which has both abstract and concrete reflections in reality and in thought. Weiner (2005), supports this idea by saying "to think of architecture as literature is to think about it passionately" addressing the spatial design.

Design is a behavioral pattern developed to elicit values that have not yet existed (Gregory, 1966). So, design and creativity are superposed by some scholars regarding their similar undiscovered processing. Creativity is a mental mechanism in which all cognitive skills in our mind work together. It includes seeing, thinking and producing innovation (Saebø, McCammon, & O'Farrell, 2007).

This characteristic of the design, which incorporates the creativity and is thus nourished by the individual's personal, mental and past experiences, makes the design processes personal. Lawson (2006), likewise states that the design process is personal and that the mental mechanisms of individuals change according to the way they operate. He also argues that the act of designing is a very complex and sophisticated ability. For him, design is a process in which regular and irregular patterns of thought are conducted simultaneously (Lawson, 1994).

The emphasis for this unique character of design process for every individual is thought to be a key element in reconfiguring the design teaching approaches which is mentioned in the following sections.

4.3. Design Tools and Digital Architecture

When architectural design process in terms of creativity, mediation and knowledge with concepts of tools are studied, a number of attitudes are confronted. Here, to recall the aim of Bauhaus and to restate the difference between, art, crafts and thinking may be necessary once again.

When establishing Bauhaus in 1919, Gropius believed that the architecture has fortified its status as a unifying art. With the confidence in that idea, he declared his ideas about bringing art and technology together; and gathered the important scientific and artistic figures of the era for this goal in his school of design. It is perhaps this dare and belief which rendered Bauhaus impressive in the history. Moreover, it was the new guilds (studios) introduced without the class distinctions; the distinctions which puts barrier between the craftsman and the artist (Gothe-Institut, 2019, p.18).

According to Sennett (2008), the crafts creates intimate linkage between problem solving and finding, technique and expression, play and work. It is both related to rationale and the intuitive characteristics of the human being. It is both captures poiesis and praxis with the Phronesis of the techné. Through the history, the idea of the craft and its embodiment of the thinking produced discomfort as it upset a social order where thinking and making were separated and making subordinate thinking (Doyle, 2016). The emergence of digital tools and technologies emphasizes this discomfort and further undermines conventional orders. Nevertheless, the new possibilities of the technology driven new tools cannot be ignored. On the contrary, their contribution in defining a new paradigm of studio, is of great importance.

Digital age in architectural scene occurred in the early 1990s and is defined by differentiated concepts such as the computerization of design, digital design or computer-aided design (Doyle, 2016). As a result of this, there is a transition from designs based upon a Cartesian grid to those constructed from a digital field condition abstracted within computational space. Specifically, the introduction of continuous

computational splines that are variable within defined limits and can be notated as parametric functions or mathematical relationship between parts. The computer-aided productions which can be defined as “Digital Craft” may derive from computational thinking, digital fabrication and robotic construction. The digital design processes allow the architects fully participate in the production of buildings and as an outcome architecture’s agency extends to engage in a larger platform of networks.

In addition to these communicative and productive transformation, the digital technologies have unprecedentedly changed the visual language of design education. The digital outputs have displaced the traditional hand-made drawings and models. New equipment like computer numerically controlled machines and three-dimensional printers and the rise of digital modeling have emphasized software proficiency over manual skills, causing older notions of creativity and craft to be reconsidered (Doyle, 2016; McCullough, Mitchell, & Purcell, 1990).

Although the potential of sketching in generating creative ideas for design is highly accepted and it is not resolved that the digital tools overtop the sketching, as a fresher field of medium, digital tools presents an area which limits need to be discovered. There is an indisputable side for sketching as Belardi (2015) points out, the mind rules the hand and the hand rules the mind where sketches are the DNA of an idea. Thereby, the point is not replacing all the operant tools of design and abandonment of them, but to understand the limits and the contribution of new technologies.

Digital worlds are an additional dimension which allows architects a new freedom of movement in the physical world (Carpo, 2013). Moreover, the digital tools constitute the new agencies for construction of virtual and unreal space which cannot be designed by traditional tools deprived of numerical correspondence in a digital world.

It is supposed that imagination is barren when design is done with only analog representation tools. In addition, it seems impossible to express the experience that prioritizes holistic thinking in contemporary design world with analog methods. Lack of imagination in the multitude environment cannot carry the “represented” into the plane of reality. The ability to stand in the invisible boundary line / space between the analogue world and the digital world, called intermediate-space, enables the viewing of both sides from an equal distance. In order to dominate both sides, the student must be

able to use digital and analog representation tools simultaneously and develop unique design tools depending on the situation. The student, who has the ability to combine conflicting issues in different layers, overlaps, can be an extension of a process that can renew itself continuously.

Under the light of these expressions, the digital technologies could be activated as a mortar between the 21st century's creativity and architecture discovering new ways of representation and spatial perceptions. As mentioned in the section 3.3, this is very much concerned with the concepts of creativity such as innovation, discovery, imagination, new and design with a given priority to the technological mediums. However, this does not mean having distance to the other concepts of creativity such as language, collaboration, participation, perception and insight.

To give an example for a new way of representation, numerical applications and the fabrication can be discussed for their idiosyncrasies in not only representing but also producing the space. A very recent activity in Bartlett School of Architecture exemplifies this new potential by the 4th conference of a serial called "Fabricate" in 2020 (Image 4.1). It has been held since 2011 and concentrates on the discussions of digital fabrication. The aim is discussing the progressive integration of digital design with manufacturing processes, and its impact on design and making in the 21st century.

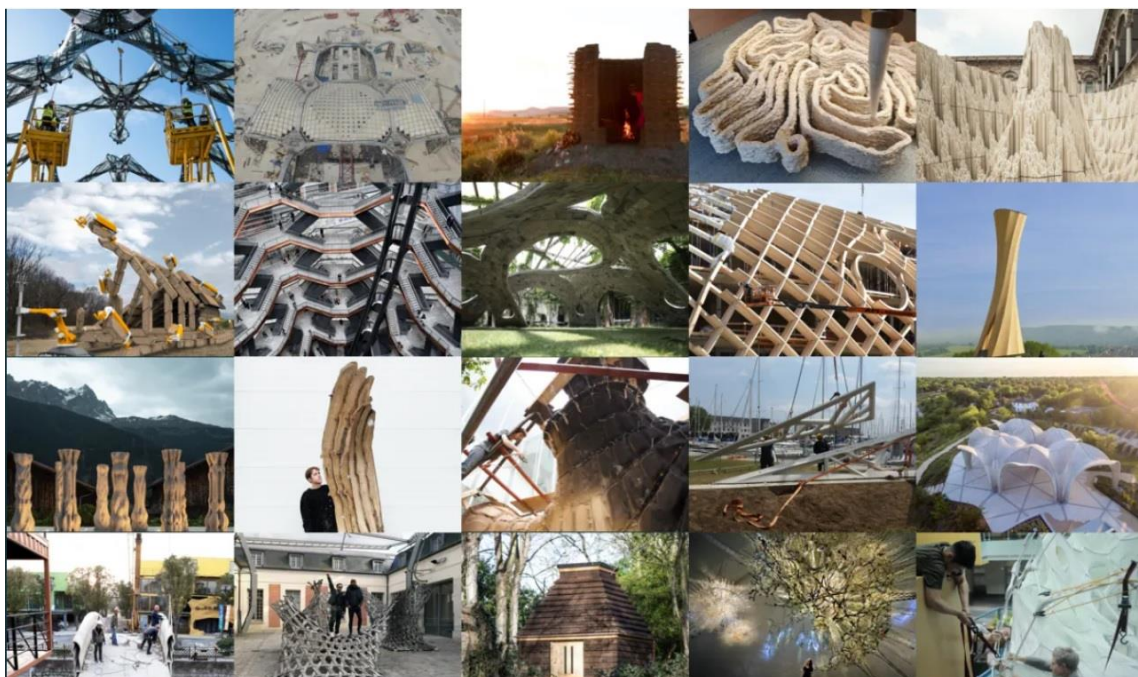


Image 4.1. *Digital fabrication as a new way of representation and manufacturing (<http-9>)*

In order to exemplify a new perception, usage of drones, which is one of the recent technologies open to improvement, can be shown as a noticeable instance so as to detect the urban impacts of climate change in the cities. A project is maintained by architectural department of Massachusetts Institute of Technology (MIT) developing a computational tool to model heat risk in urban areas that incorporates building performance, available urban resources for adaptation, and population adaptive capacity into its data. This example demonstrates the shifting concern for environmental issues and juxtaposing of technological and architectural knowledge (Image 4.2).



Image 4.2. *The use of drones investigating climate change in cities, MIT, School of Architecture, 2020*
(<http-10>)

4.4. Production of knowledge in Studio

There is a body of knowledge gathered in design product (Cross, 1982). Although the design process is personal and unique, there are some specific features in common. For instance, design process is non-linear and anachronist and has some phases. Those phases evolves to a body of knowledge interacting with previous and next phases simultaneously translating data to information, and information to knowledge, interpreting information- probably but not certainly- with an understanding and reaching to a level of wisdom. In a research indicating design as a science, the design is expressed that it cannot proceed without an articulation of the goals of the

designed artifact; knowledge of the constraints imposed and affordances provided by the inner and outer environments; mechanisms to produce design alternatives; understanding of the effects of design decisions, with respect to articulated goal (Baskerville, Kaul, & Storey, 2015).

Every phase of design is a subject matter of a stand-alone research in order to understand the great potential of it in producing creative knowledge. Moreover, the design being per se a type of knowledge now gains much more attention than before under the circumstances of the 21st century.

Thus far, the ingredients of design and creativity and their tight relationship needs a close apprehension. The design and creation are mutually related. Another fact that there is designerly ways of knowing that are embodied in the process of designing. But there is an equally important area of knowledge embedded in the products of designing, too (Cross, 1982).

“The studio culture makes a strong case for architectural creativity, arguing that a “culture of innovation” needs to be fostered in design studio by recognizing that the very essence of design is the creation of something new and unique. In addition, an essential component of creativity is creative thinking which entails questioning existing conditions, which will allow for new levels of innovation and creative discovery” (Elsheshtawy, 2007).

At this point the opinions of Polanyi is of great importance. Michael Polanyi bases his knowledge theory on a post-positivist perspective. In his book called “Personal Knowledge: Towards a Post-Critical Philosophy” he mentions a kind of tacit knowledge. He emphasizes that no scientific research can be objective because of this tacit knowledge that varies in each individual. According to him, nothing is a problem until someone is curious about it, nothing is invention until one solves the problem (Polanyi, 1958). Similarly, under the influence of Polanyi, Thomas Kuhn criticizes the dogmatic state of science, which reduces it into methods and paradigms (Feyerabend, 1975; Kuhn, 1962).

Not only Kuhn and Feyerabend were influenced by Polanyi’s ideas, but also Donald Schön who is one of the well-known figures of the design research. According to him, design is a method of solving a problem with multiple correct answers. In his

book “The Reflective Practitioner: How Professionals Think in Action”, he presented the concept of “reflection-in-action”. According to this concept, the person who undergoes a projective application process becomes a researcher in practice. In the research process, the designer makes instant changes which affect the next steps (Schon, 1987). Therefore, the unique individual character of the designer, and the design process self-referencing itself through the back and forth reflections are very critical components in the production of knowledge. For fostering and promoting the knowledge production in the studio, those facts could be utilized as pedagogic tools.

Besides these tool, there is another important medium to produce knowledge creatively in the studio context, which is accepted as one of the intricate competencies of the 21st century: Research

Within the context of architectural education the learning environment for design education is the studio which is at the same time a pedagogic, social, and experiential ground for design learning. The studio, to some extent, could be regarded as a generative arena with a principle concern of knowledge production. The design thinking with its productive structure and its quest for theoretical ground imposes research and gathering of data in order to reach the newer and more creative approaches. The data gathered, combined with the background knowledge and processed through the unique mind of the designer are the elements of the creative potential. Those facts underline the importance of research in the studio, research by design and design by research all of which are the remarkable sources for the production of the knowledge.

4.5. Research by Design

In his essay called “Teaching Architectural Programming: Cultivating a Culture of Inquiry-based and Process-centered Design Pedagogy”, Salama (2017) once again emphasizes the importance of research in studio context which is at the same time very much related to the process-centered pedagogy of constructive model (see section 4.7). According to him, the need for research-based and process-centered architectural design pedagogy should be pointed as a proactive approach to negative trends that continue to define mainstream teaching in architecture. As a practice in the studio, the design should be based on theories that have been tried and tested according to the defined problem. These theories can be obtained through research. In professional practice,

architecture is always the result of group work and collaborative effort, but the style of teaching in product-oriented studios does not encourage this approach.

According to Zimmerman (2003), design and research are essentially the same that both has the potential to generate knowledge. However, research by design is not that generalized for Yüncü (2008a), which refers to the design of architectural research as an integral part of architectural design processes. The implementation of the act of design in research transforms the design from being an object of inquiry to being a research approach. Additionally, he constructs a relationship among the epistemology of research by design and the Phronesis concept of Aristoteles (see section 2.2.1).

The concept of Phronesis (practical knowledge, prudence, or practical wisdom) is Aristotle’s elaboration of knowledge generation in action. Adapting this concept to the architectural design studio and the design process is formulated as a process of research by design, there may be an increase in the generated knowledge which may contribute to architectural improvement too (Yüncü, 2008a).

The first example of the design studio defined by a research strategy and combination of design and research is the well-known studio of Denise Scott Brown (with Steven Izenour) and Robert Venturi in the late 1960s at Yale (Allen, 2012). The research has ended up with the book called “Learning from Las Vegas” and continued with “Learning from Levittown” a few years later. Venturi directed his expertise and academic resources to a foreign urban environment to collect data, draw maps and charts, and explore new analytical frameworks (Image 4.3).

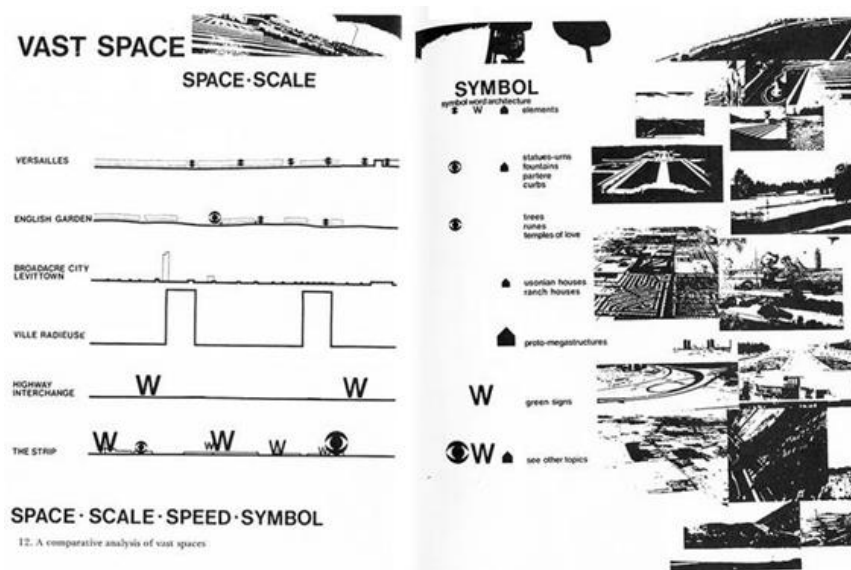


Image 4.3. Mapping, charts and some visual data in Learning from Las Vegas (<http-11>)

After this productive experimental study, the content of the studio and the border of the topics for design have been argued from a different point of view. Venturi's experience and contribution became a milestone for the research based design studios, not only for systematically organized research stages, but also for the integration of research to the design processes.

Another example is the project on the City at Harvard, led by Rem Koolhaas, resulting first in a book on shopping, then one on the urbanization of the Pearl River Delta in China in 1990s.

More recently Columbia's Graduate School of Architecture, Planning and Preservation set out to address similar issues, creating Studio-X, a "global network of advanced research laboratories for exploring the future of cities." These initiatives constituted an acknowledgment that exposure to global urbanism was, by the turn of the 21st century, an essential part of a complete architecture education. Studio-X realized collaboration with Istanbul Bilgi University in 2017, using the potentials of technology and global instruments (Image 4.4).



Image 4.4. *Studio-X Istanbul strives to host the flourishing of good ideas around urban issues (<http-12>)*

4.6. Technology, Image, and Representation

Technological achievements accessible for everyone has not only occupied the daily life but also captured the construction of social relationships. This occupation has its specific reflections regarding the production of space, since the body-space relation is re-structured through a shift from real to unreal; from real to represented, from

represented to image. All of these constitutes their own meaning other than itself and start to be self-referential liberated from the essence.

Therefore, the image and representation turn out to be critical elements in creating new meanings which is very much connected to architectural design for its uncontrolled intercourse with representational arguments which at the end reveals images of a thing with direct or indirect meanings. Semiotics and intertextuality can be reminded here, yet it is important to underline a divergent kind of meaning layer, where the first degree representation is not even known. There is a semiotics of the represented and the image of the represented.

Being a little bit complex, the new network of these connections among the represented and image and among the image and image have an incredible potential for defining creative combinations of knowledge sets. Recalling the definition of the design thinking done by Hatchuel and Weil (2009) “design can be modeled as a relationship between two interdependent spaces with different structures and logic: the space of concepts and the space of knowledge”. Thus, the representations or images defining themselves as new sets of concepts to which the existent sets of knowledge can be applied in order to generate another concept or knowledge.

This idea has been supported by Burnett (2007, p.22) who claims that images can be defined as information, objects of interpretation, openings of some focal points of empathy and creativity. According to him, the ubiquity of images has gone far beyond the traditional conception that sees them only as generations of consumption, games or information. Images are mediums that make access to a range of different experiences possible. Images are interfaces that shape interaction, people and environments they share.

Here, the opinions of Deleuze is important in order to relocate ourselves in the context of 21st century. In his book called “The Difference and Repetition”, he tries to develop a metaphysics. For him, this metaphysic concept structured on a ground where the concept of multiplicity replaces that of substance, event replaces essence, and virtuality replaces possibility (Deleuze, 1994).

Another important figure who concentrated on the images and their somehow suspicious character is Jean Baudrillard. In his major work called “Simulacra and

Simulation” he discusses the divine irrelevance of the images and describes the difference between the simulacra and simulation (Baudrillard, 1994). For him, to simulate is to feign to have what one does not have. One implies a presence, while the other an absence. Simulation threatens the difference between the “true” and the “false”, the “real” and the “imaginary”. Simulacra is the image that wants to be perceived as a reality. The abstraction, at this point, stands more sincere since it does not hide its existence through the inspiration of a reality. However, simulacra tries to replace reality by simulation. Images, reproduction of them, easily copying and transferring of them could mean more than something through the Simulation idea of Baudrillard.

Those statements show that the culture of representation and image invades the lives and replacing the reality to a degree. The balance and limits of shift is critical so as to not to lose the sense of reality. As physical creatures, a kind of anchor is required to provide the connection among the imaginary and the real. The space was such a staple bounding time and body for creating chronology and memory, but this function of the space has weakened due to simulacras. For this reason, architecture should draw a new framework to take the advantage of the power of the images within this network society. Since images are a part of representation-dependent simulative design education, the new ways of thinking could be cultivated from the characteristics of the notions of reproduction and copying.

In this sense, for architectural concerns, experiencing the natural and built environment as a kind of perceived world through daily life expands the horizons of sentiments. This directs individual to search for imaginary ways of thinking. Perceptual, physical and social experience helps to find the way to think of the language and culture of architecture. The ability of imaginary thinking is not a direct visual, auditory, tactile perception, but a complex operation of processing sensations in consciousness. When the continuous movement of images in consciousness and the production of different images by changing places with new perceptions occurs, it plays an important role in the structuring of architectural knowledge (Aydınlı, 2015).

The question of how digital technology affects our perception of the world is important in the construction of knowledge in design education. First, digital technology leads to imaginary thinking; it allows us to look through different lenses to discover new ways of thinking and new ways of seeing (Berger, 2010). Transitions between

digital and analog worlds, intertwining, interface formations, increase awareness and develop the ability to think divergently. There are too many potentials of some hybrid applications of the tools. Collaboration and mixed representation tools in the digital environment, which allows the ability to think different scales together, helps the student to internalize the problem of scale which is difficult to assimilate in the reality level. The ability to relate the virtual world to the physical opens the door to the development of creative thinking (Image 4.5).



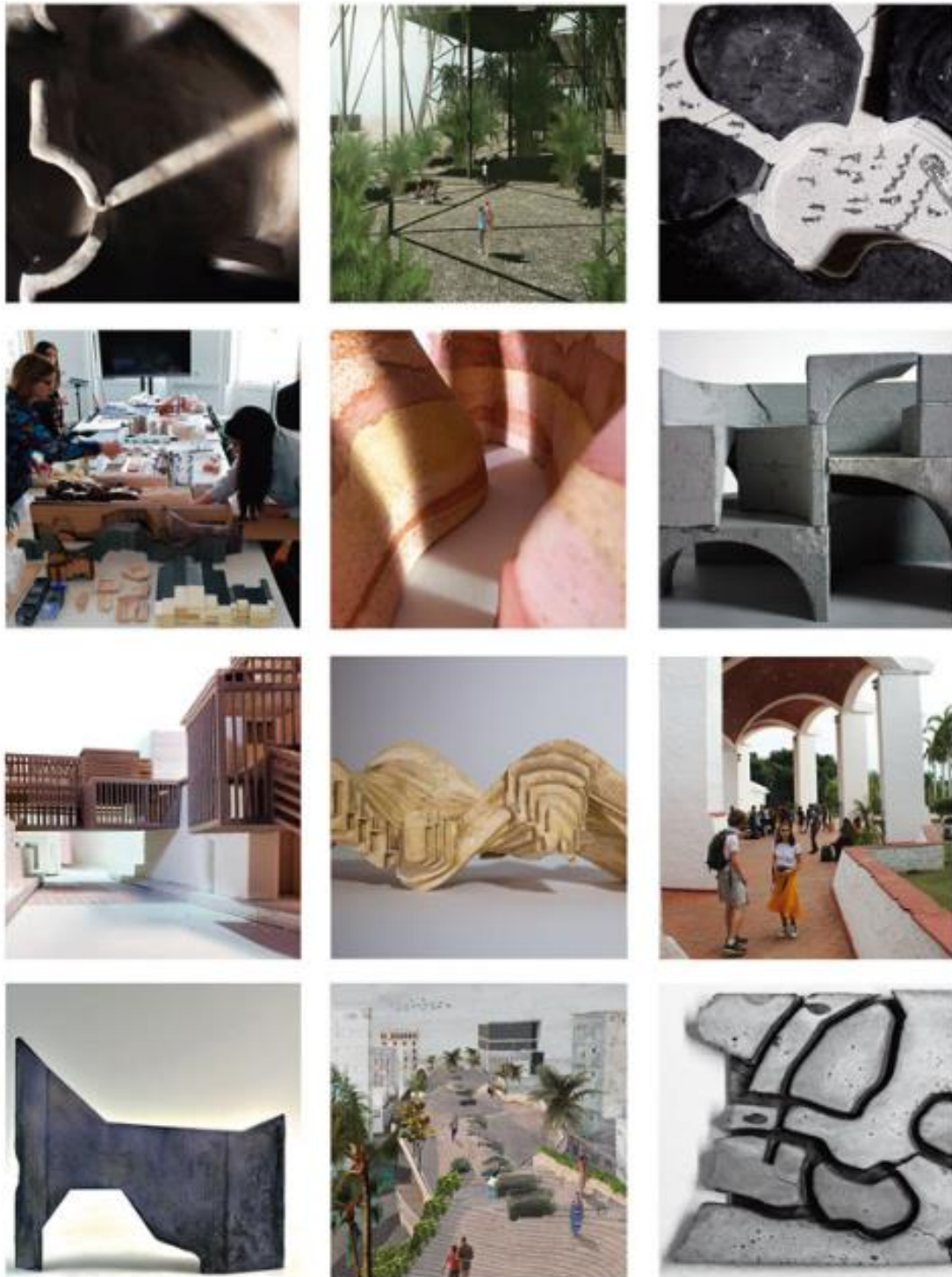


Image 4.5. *A Graphic Diary of Unit 8 at AA, London, 2018: an example for technology, image and representation ([http-13](http://13)).*

On his essay where he discussed how to provide a critical framework and raise a debate to understand the spatial and temporal impact of information technologies on architecture, Senagala (2000) pointed out that the Architecture could mediate between

the tangible and the intangible, between the material and the virtual, and between space and time by using new technologies.

Another important point other than criticizing approaches of image and imagery materials configuring relations, space and architecture, is the necessity of visual thinking. Architecture is a visual discipline, however the visual thinking implies the capacity to imagine and to think with images in order to arrive some creative results and use linkages through visual reservoirs of the mind so as to design creatively. Arnheim (1969), with his major work called “Visual Thinking” discussed the mechanism of this visual connections. According to him, the thought and word occur in the mind as images and human think through images. Therefore, pictures, symbols and signs as well as words are all abstractions of individual which are reproduced differently from one person to another. After very critical explanations, which are excessively critical for architectural education, he concludes that images are the bridges of the past and the present and construct the memory from where a person gather information as well as produces new connections. Vision and abstraction are intrinsic mechanisms of the brain and activating and recognizing this natural process is important in designing the education for a better learning levels. Here, it is significant for triggering the creative paths in the mind.

4.7. Re-defining the Design Pedagogies

Phenomenology comes to the scene once again as a critical philosophical and theoretical ground in describing the contemporary primarily societal and then architectural conditions. As a matter of fact those conditions could define the responsive pedagogies motivating the creative knowledge generation. Therefore beginning from the 20th-century the accelerated confidence in the potentiality of the uniqueness of each individual becomes a source for the foundation of new pedagogic approach in the studio.

As a result of the impact of this opinions based on the mining and excavating the inner, unique and phenomenological idiosyncrasies of the individual, learner-centered, experiential, constructive and personalized types of teaching methods in the studio are

accepted as the most adaptive to the contemporary societal and architectural atmosphere.

Starting from Phenomenology, the other pedagogic types is argued accordingly to the phenomenal conditions. According to the phenomenology, all kinds of claims about the world are meaningful only if they appear as an outcome of claims about real and possible experiences (Baergen, 1995).

The phenomenology can be described as a method that begins with the individual and his / her conscious experiences and tries to avoid pre-existing assumptions, prejudices and philosophical dogmas. Phenomenology examines appearances as perceived 'directly'. According to the meaning to be extracted from here, phenomenology tries to understand how individuals perceive events and situations (Husserl, 1970). Phenomenology asks us not to accept what we have learned as it is, to question it, to question our view of the world and our presence in the world. . In phenomenology there is a discourse developed against positivism that "we can know every phenomenon through science". The fact that our knowledge is limited to sensory data means that the information provided by the sense is relative. If the information is relative, the knowledge of each person is meaningful. The important thing is to grasp the meaning imposed by the individual and to understand how he describes the world. Thus, how objects appear to us can be directly determined without interfering with the obstacles posed by our language and other symbolic systems (Husserl, 1970). Phenomenological approaches focus on the individual's subjective perceptions and assert that the individual's way of interpreting himself, the world and events which forms the basis of personality.

Appreciating this potential of the individual, the new educative strategies emerged such as constructive, deep learning, learner-centered, experiential and at the end personalized are under estimation.

Constructive model moves the student from the passive participant position to an active one and leads a shift from the delivery of knowledge to production of it (Aydınlı, 2015). According a research done by Milne and Taylor (1995) and schematized by Aydınlı (2015), the qualities of traditional and constructive educational models are compared (Table 4.1).

Table 4.1. *The comparison of traditional and constructive educational models; interpreted from (Aydinli, 2015; Milne & Taylor, 1995).*

	Traditional Model	Constructive Model
Knowledge	Transferred knowledge independent of student experience	Configured by the student; is not constant, it changes continuously
Learning	Receiving and repeating knowledge(memorization)	Construction of knowledge; constructed knowledge is subject to change. Built on what the student already knows
Teaching	Teacher's transfer of knowledge	In social interaction, the students reveal their preliminary knowledge, examine it or construct meaning for change.
The role of teacher	Authority for the source of knowledge and transmitter of knowledge	It creates an environment for experience and experimentation that helps students construct information.
The role of learner	Passively takes information	Actively takes information, structures and reproduces knowledge
The condition of learner's mind	It is an empty container where new information can be easily filled.	Mental journey with preliminary concepts based on experience; the game of search and find
Interactivity	Students mostly work alone	Students work in collaborative learning communities that continually construct meaning in social interaction.
Assesment	Exams focus on correct answers and evaluation of outcome products	Alternative measurement tools and assessment methods are used to determine students' thinking and learning styles.

A very important actor for the constructive approach in education is Jean Piaget. Piaget (1972) emphasized that active participation in children's learning process plays an important role and became the basis for learner-centered teaching practices. According to Piaget, children learn by discovering they reconstruct existing mental schemes in an environment that supports open-ended learning. Although learning by discovery is suitable for preschool children, it has been found that the creation of a learning environment and the balanced application of learning motivations such as curiosity and discovery in the reconstruction of knowledge are important in all levels of education. Piaget emphasizes that experience is assimilated within the framework of existing structures and that mental balance can be maintained in this way. According to him “learning is a series of internalized actions” and learning cannot take place unless a mental connection is established. Understanding is embedded in thoughts; in every encounter, perceptions and associations call thought and knowledge is reproduced through understanding.

An application area of the constructivist paradigm in architectural education is the design studios that enable the culture of learning together in the environment of dialogue created between the instructor and the learner.

When we consider the application of constructive learning, another related contemporary concept is “deep learning”. Deep learning involves developing expertise in a field of knowledge and then demonstrating the ability to transfer this new

knowledge to a new context. In addition, the areas where learning develops are grouped as cognitive, intrapersonal and interpersonal (Council, 2012). In addition to the characteristics of the learning individual, the learning tools are changing and the methods followed in order to acquire the skills of the age are developed.

Which brings us once more to the individual and personal strategies to motivate the capacity of the students at the highest levels. Learner-centered education is another important heading in this respect.

According to Norman and Spohrer (1996), in the learner-centered education, the focus is on the needs, skills, and interests of the learner. Learner-centered is often accompanied by an authentic approach, where the problems are picked so as to fit the interests and needs of the learners. Supporting this idea, Kolb (2014) also studied on the different learning styles showing that every individual has a divergent type of comprehension and perception; so each individual requires differentiated teaching approaches. As a proponent of Dewey's experiential learning theory (1938), Carl Rogers raised this issue during 1970s. In his book called "Freedom to Learn" he discusses the specific grounds for an augmented learning capacity. He relates the psychology and the learning environment as well as the behavior of the teacher are of great importance in fostering the readiness of the student to learn enthusiastically (Rogers, 1970). Therefore, the basic components can be counted for a learner-centered model as the environment, the psychology and the attitude of both the teacher and the learner, the learning style of the individual and the authentic approaches.

It can be concluded that the learner-centered and experiential understanding which fosters creativity and learning coincides with the learning by "making" (poietic creative production) philosophy of the architectural education. It is an indispensable part of architectural teaching methods. However there is a differentiation among studio ground and atelier ground. The studio presents a simulative productive atmosphere depending on representation while ateliers are truthfully manufacturing and fabricating spaces for materials and scaled models those which are not a part of a simulative narrative yet. Thus studio supported by fabrication atmospheres-digital or hands-on fabrications-demonstrates more creative processes. This is actually related to the creative concepts of the 21st-century such as participation, multidimensionality, search of innovation, research for design, and so on (Image 4.6).



Image 4.6. *Rensselaer Architecture, School of Architecture, USA (<http-14>)*

Learner-centered model, as mentioned above, is related to not only constructive approach, but also to experiential learning theory where the experiences of individuals are decisive in learning. Moreover, the learner-center model together with constructive and experiential theories is very much related to the phenomenological philosophy which focuses on a cognition, driven by the perception and senses of the individual. Thus, the critical status of the individual at the intersection of all these approaches, underlines and implies a personalized type of education.

Personalized education is diversely defined in different sources. For instance, Runco (2014, p.203) describes Personalized System of Instruction (PSI) as a specialized type of education where students work alone with a clear specification of terminal skills, getting immediate feedback. The emphasis is here on the shift from a standardized syllabus for a shared schedule. In this definition, the isolation of the student may lead its own problematic for the studio context. Yet, Runco puts forward another definition called individualized education:

“Virtually every major theorist (e.g. Piaget, Skinner, and Vygotsky) has pointed to individualized instruction. Very frequently, when fading or any other operant procedure fails it is simply because the consequence was not powerful enough, and what worked with others does not work with everyone.” (Runco, 2014, p.210).

Another argument of the personalized education, especially for the disciplines related to design is raised by Enid Zimmerman. According to her (2009), although there is an authentic education and assessment system of schools of art and architecture, the

education may become more personalized to reveal the creative potentials of the students. For architecture, it is important to create a course content, syllabus, and thus specific exercises according to the abilities and learning tendencies of design students which can be adapted to their personal preferences and aptitudes.

Together with the personalized approaches, an idealized learner-center education is essential for an empathetic dialogue between the student and the educator (Dokgöz, 2014).

When a discussion about the studio and its pedagogic side is made, it is crucial to mention the spatial qualities of “the studio” as a mediator in between instructor-student and student-student with the cultural ground it creates for participation, collaboration and communication. Hence, the spatiality, which is one of the underestimated component of the studio, is a strong vehicle to motivate the creativity. What is more it fosters the tactical preferences and communicative strategies which at the end all contributes to a more creative atmosphere (Image 4.7).

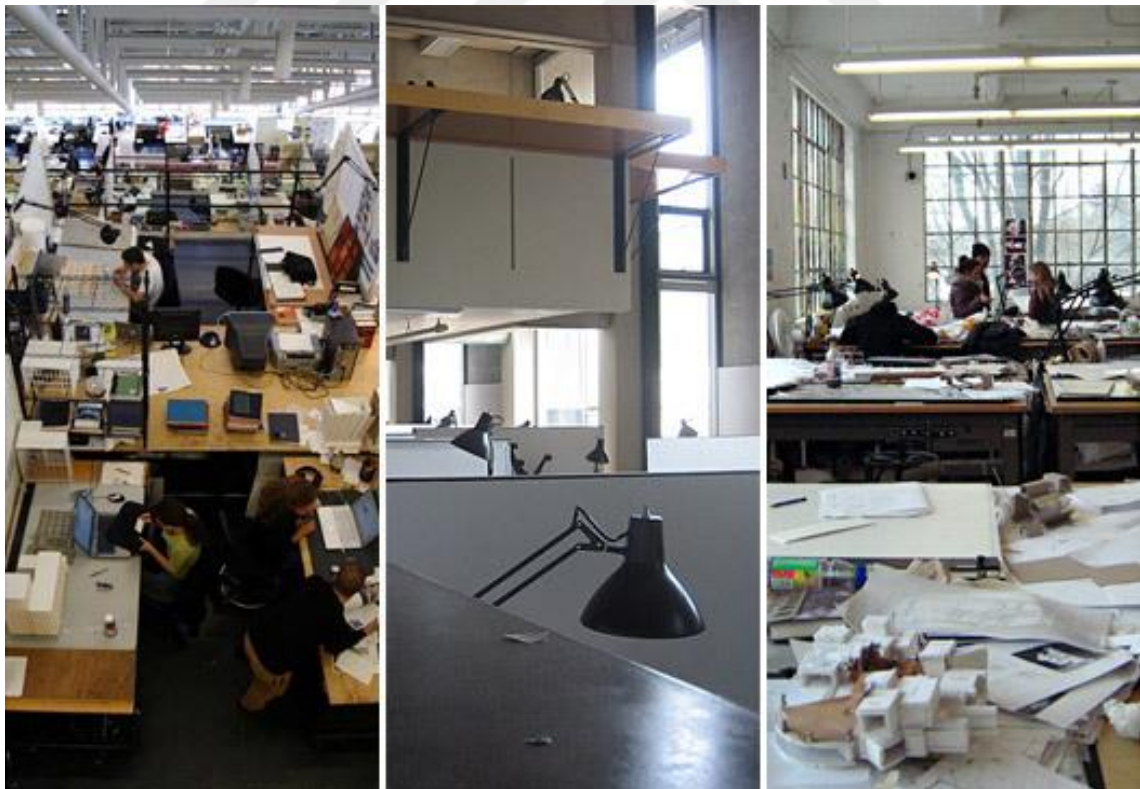


Image 4.7. *Architecture studios at Harvard University, Princeton University and Cornell University, 2012 (http-15).*

The spatial character of the studio, thus could turn to be a pedagogic tool. Another pedagogic promotion is the new approaches related to the concepts of creativity. For instance, the concepts such as innovation, collaboration, participation and communication are all underlined with new conception of learning by doing/ making idea within an interdisciplinary perspective. It is the live projects, which have become prevalent during last decade. In fact, this is the contemporary interpretation of Dewey's experiential learning, however it houses new considerations especially ethical, social and environmental ones. 1:1 building projects are familiar to the architectural schools, but the fresh side of the live projects is their intention ranging from design after disasters to design for unprosperous communities. Climatic concerns are of great importance for both. The live-projects, for some resources design-build projects, are the intertwined application of poiesis, phronēsis, praxis and techné with collaborative architectural design and thinking (Image 4.8 and Image 4.9).



Image 4.8. Yale school of Architecture, first-year live project, 2013 (<http-17>)



Image 4.9. *Utas, University of Tasmania, Australia, The Learning-by-Making Program (<http-16>)*

Here, the pedagogic and teaching potentials of the live projects are the main point of the discussion. Their ethical, social and environmental side is mentioned in section 4.9.

4.8. Re-defining the Body-Space Relation in Architecture

The body- space relation in architecture is seen as a two-sided issue. One side is about the architecture shaped by the bodily dimensions, the other side is the melting physicality of both the body and the space by contemporary technologies. So, the discussion for re-defining the body-space relation in architecture is handled firstly by physical construction of the space and secondly for the virtual construction of it, all of which is deeply related to changing time and space perceptions of human being (Giedion, 1967; Senagala, 2000; Virilio, 1991).

Firstly, starting from the physical dimension of the body-space relation, in the history, the production of space gained its sources from divine associations throughout centuries up to the 20th-century . The divine referencing of the space rendered it monumental and split its relation from human scale. The bigger the structures, the more desirable they are. Keeping in mind that the canonical and monumental architecture is not the only spatial productions of the past, it may be argued that the civic or vernacular architecture -architecture without architects- concerned the bodily sizing of the space to some extent. Domestic architecture was a tool to underline the divinity of the architecture with architects. Together with the unelaborate, poor and small scale housing pattern, the elevated, prosperous and majestic scale of the architectural product was highlighted (Sennett, 2013).

From Antique times to the industrial revolution, the production of the space was related to the geometry and the proportions according to which the form is articulated and utilized as a mediator in between the impotent individual and the competent God. This passive positioning of the individual has begun to change towards enlightenment. The individual started to be aware of his potentials and to rely on his mind, reasoning and capability. With a society compound of the rational individual, the scientific and technological improvements augmented. Briefly, this constituted the origin of the change in the creation of the space. During industrial period, it may not be concluded that the space was taking its scale from the body, but it may be well stated that not from the divine attribution anymore. Hereafter, the emergence of cities and the new urban requirements directed the nature of the space production. Cities and urban fabric was an experiential tool to find a way in correlating the functional needs of the rapidly growing dwellings and the maintenance of it by means of human sources.

Consequently, the classical and traditional approaches adopted to spaces of the enlarging cities which did not response the optimum conditions for a healthy living of the users (Benevolo, 1995). Towards the 20th-century modern architecture begun to question those pre-established and adaptive spaces. The story of Truss Schröder is a good example of this questioning. She, with Gerrit Retvield who is one of the members of De Stijl, interrogated all familiar parameters of a house in order to re-construct a new idea of living shaped by the space (Friedman, 2006). The Schröder House, is one of the icons of the Modern Architecture with its insurgent scale, flexible space organization and the space generated from the anthropometric dimensions (Image 4.10).



Image 4.10. *Schröder House in Utrecht, Netherlands, built in 1924, designed by Truus Schröder and Gerrit Rietveld (Friedman, 2006).*

This example within its period raised the discussion about the space produced by different concerns other than the unquestioned repetitive application of some pre-ordained templates for architecture.

Parallel with the De Stijl, the influence of Bauhaus and Modern movement on the logic of designing the space is created a shift, breaking with the past not only for its formal representation, but also for its spatial configuration and dimensioning. Le Corbusier is an important figure who worked especially on the anthropometric reflections on space. La modular was a guide formed by him to find the accurate dimensions for the specific spatial design (Image 4.11 and Image 4.12).

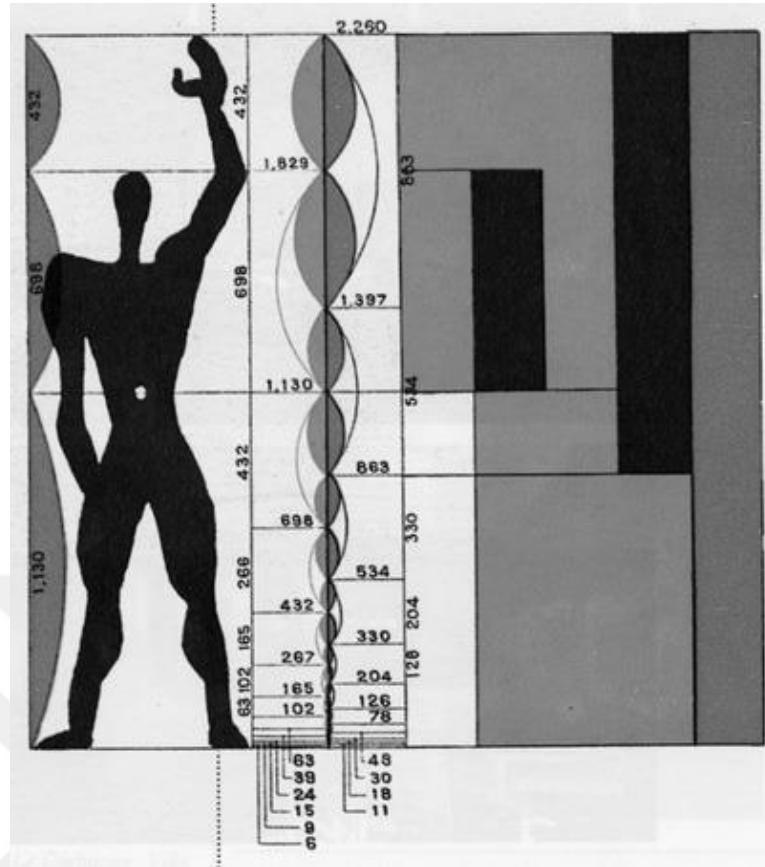


Image 4.11. *Le Corbusier's La Modular* (<http-18>).

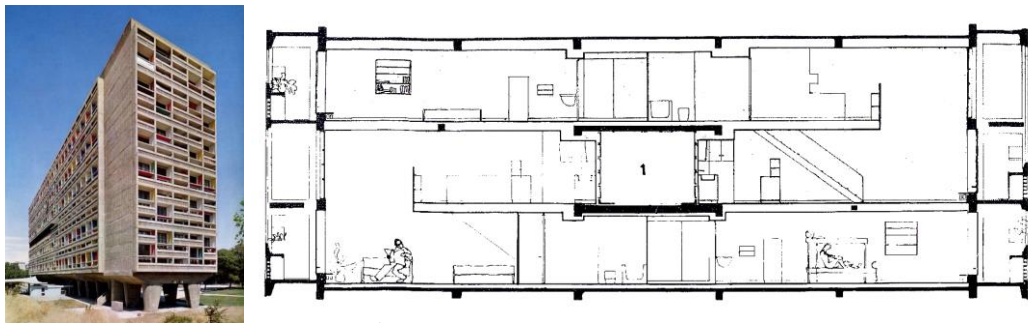


Image 4.12. *Le Courbusier's Unite D'habitation in Marseille* (<http-19>).

This relation and guidance of body in production of space as a referencing parameter has continued through modernism and onwards. Today, it is still one of the important concerns of the spatial design of different scales and programs. However, despite this progressed anthropometric approach, another field of architectural production has emerged where the dimensions of neither the body nor the space is not important. The limits of the body and the physical world melt, thus the dimensions are reduced to numerical codes, which brings us to the second type of body-space relation of in architecture: metaphysical construction of space.

As Paul Virilio (1991) states “Speed finally allows us to close the gap between physics and metaphysics” , the temporal changes leading an increase in the speed of life brings about new spatial experiences along with the technological possibilities.

In this respect, on one hand, the theory of relativism and the quantum is one of the initiators of this unphysical relationship of body and space; on the other hand the computerization of the architectural design and digitalization of the tools can be assumed as a turning point for the virtual relation started to be established in between human and the space.

By the Theory of Relativity, a long lasting judgment about the inseparability of time, space and movement has collapsed which transformed the understanding about the time and space. Senagala explains this transformation by expressing the change through a comparison of the space gradually in the history. According to him, there is four types of spaces regarding the speed, body, movement and time through architecture: Somatic, Textual, Broadcast and Cyberspacetime (Senagala, 2000).

Senagala(2000) states that the somatic space is material space which is described historically at the beginnings of this section. In this physical space, the movement of knowledge is synonymous with the movement of the body which is central to the materiality of the space. In somatic space, architecture is the central realm of communion and communication. Textual space emerged after the printing press invented. The knowledge became liberated from being embodied in architecture and the body, so architecture has lost its central political and cultural role. However, architecture stays as a place to “commune” while communication has migrated to printed medium. The next type is broadcast space, where radio, telephone, telegraph, cinema, photography, and television, transformed the composition of how societies are constructed. While print media undercut the epistemological contiguity of the built world, electronic media undercut the ontological contiguity of experience and context. The most strikingly, traditional notions of wall, enclosure, perspective, horizon, etc., which were based upon somatic space, became meaningless in the light of televisionic space. Fourth type is the cyberspace, is related to the advent of general-purpose computers. Unlike the previous media, there is a new medium which is truly cybernetic and digital with its interactivity.

“Another bastion of spatial primacy is being breached through technology’s pursuit of ubiquity. To be everywhere negates the spatial notion of being here or there. Being everywhere also negates the notion of center and periphery. Whole world becomes a homogeneous field of unvarying value. Architecture has traditionally worked with configuring body’s position in space in relation to another body or activity. This configuration created the notions of here, there, orientation, direction, juxtaposition, adjacency, distance etc. These notions are now being replaced with the arrival of ubiquity” (Senagala, 2000).

Ubiquity is motivated by the technological opportunities. For instance, the virtual spaces and the spaces experienced by augmented reality could barrier the body and actual space for another connection to the virtual or to the augmented. Virtual spaces are online defined areas for some purpose and they are not as enveloping as the space experience introduced by augmented reality. The latter creates a new version of phenomenology which is not depending on the material facts. The feelings and perception is activated as if the real situation, but it is just a simulation of the reality. This two technological possibility could be utilized in architectural education and defining a new body space relation. For instance, the virtual space was firstly used for a distant education trial in 1998 through “www.studio-space.net” for a virtual design studio (Allen, 2012).

Augmented reality could also be adopted as both design and representation tool so as to reach more accurate and creative alternatives for the built environment. Moreover, it is seen as a complementary tool for design not only creating the new but also understanding the existent and the built environment. This part signifies the technological potential which is innovatively and ethically used could turn to an effective medium when it is worked for some universal purposes and concerns such as ethical, social and environmental ones.

4.9. Ethical, Social and Environmental Concerns

Most of the scholars underline the primary importance of the ethical, social, and environmental concerns rather than the educational preferences prioritizing the enhancement of creativity, knowledge and design issues. As a matter of fact, both sides can be assumed functionless without each other. A studio pedagogy without ethical, social and environmental preoccupations would create an isolated culture. Within that

culture the educative strategies may well operate, yet the essence of becoming architect may stay unsatisfied. At his point, a holistic pedagogical construction of the studio with ethical, environmental and social argumentation from the beginning which does not behave as an ornamental subsequent attachment, could be an essential element in the re-definition of the contemporary studio.

Supporting this idea, Tzonis (2014b, p.333) points out that the need of architectural education under the present circumstances of unparalleled, ecological and socioeconomic, environmental crisis is not boost of freewheeling narcissistic ‘freedom’ from constraints faking newness, but real creativity, capturing and embracing ecological and human reality through method, knowledge, and public responsibility.

Parallel with Tzonis, Snell (2014) also emphasizes the value attached to innovation and design. According to him, the competitive advantage that comes with it, definitions of creativity will be hitched to production /task/ purpose. Curricular activities in schools will need to be relevant and skill based. Institutions will need to demonstrate that they are accomplishing these objectives. New scholarly research into pertinent assessment methods necessitates to accompany these educational changes and the academic institutions into the 21st century.

Perhaps, the most important challenge that architectural education faces today, perhaps even more serious than responding to the technological development of computer based design and drafting, is the recognition of the fact that next to the ‘global’, ‘universal’ ‘knowledge’ of architecture, – or ‘core’ as it is often called – there is ‘local’ knowledge that corresponds to each of the many regions of the world and that this ‘local’, ‘regional’ knowledge has to be taken into account in architectural practice and in architectural education (Tzonis, 2014a).

Acknowledgement of such a need for transformation of architectural education and the studio around the ethic, society and environment based approaches would change the direction of a blindly evolving processes of the studio. The pedagogical expansion of learning reveals that learning is a behavioral change, not merely putting information in the head, and reminding that behavioral change is one of the learning outcomes. Mediating this quality of learning for ethical, social and environmental concerns is seems requisite for a transforming studio culture. In other words, after the

ethically, socially and environmentally accurate definitions are done extensively, the intended behavioral changes through learning could be determined accordingly. By this way acquisition of exact behavior towards the complicated problems of the century could be provided.

In fact, the environmental and societal responsibilities of the architects and the architectural education have been argued through theory and practice beginning from 1950s. However, those discussions were local and somehow realized individually. In current conditions, the climatic and environmental concerns became the main parameters for the design and central to the continuity of life which also constitutes the ethical responsibilities for the discipline. The early example of such an understanding before it turned to an obligation like today is Rural Studio, which is founded in 1993 by Dennis K. Ruth and Samuel Mockbee at Auburn University. Rural Studio aimed healing the living conditions of the rural poor in western Alabama and imparting practical experience to architecture students (Image 4.13). Following this example, in the aftermath of Hurricane Katrina in 2005 and the 2010 earthquake in Haiti, many schools of architecture devoted studios to the study of low-cost disaster-relief housing or to landscape and urban design studios (Allen, 2012).

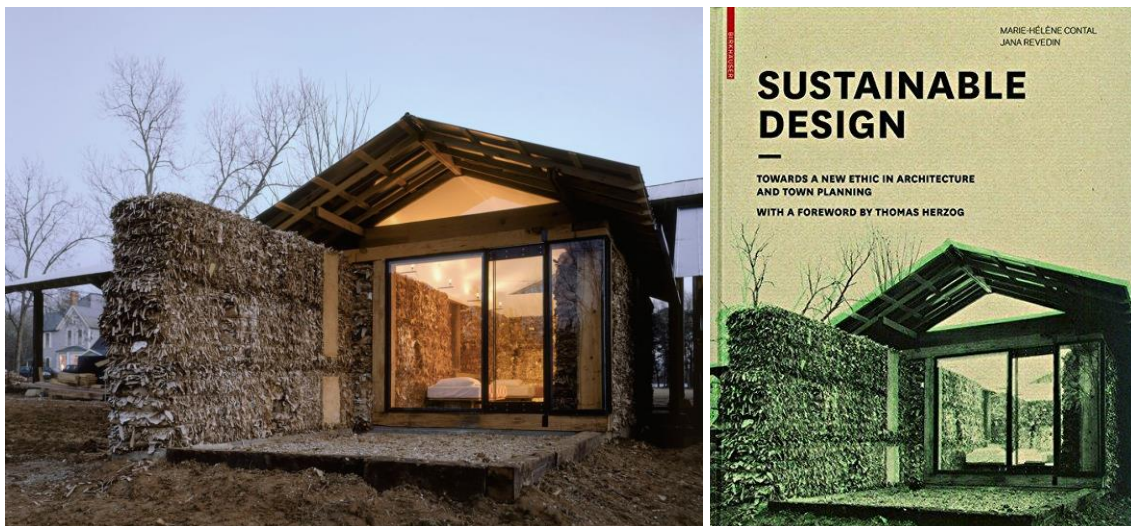


Image 4.13. *Corrugated Cardboard Pod, Rural Studio, 2001(left); the same image used for the book called “Sustainable Design: Towards a New Ethics in Architecture, 2013 (right) ([http-20](http://20); [http-21](http://21))*

In this sense, Emily Pilloton's Project H, is another studio concerning design collective and educational initiative from a societal point of view, using the power of the design process to catalyze communities (Image 4.14).



Image 4.14. *US Berkeley Environmental Design, Emily Pilloton's Project H studio, 2015, Tiny Homes for the Homeless (<http-22>)*

4.10. Evaluation of the Chapter

In this chapter, the contemporary parameters shaping the design studio and the dynamics effecting the configuration of the priorities are discussed. The 21st century's concepts relating the creativity to architecture are mapped in Figure 3.1. With respect to this mapping, it is seen that the notion of creativity is related to innovation, participation, imagination, design and knowledge which renders creativity of 21st-century different from the creativity of the 20th. Creativity was mainly accepted as a problem-solving process which belongs to an individual brilliance or genuine. However, today creativity has transformed for capturing all kind of accumulations and benefiting from them. Thus, a contextual, collective, participatory, responsible and communicated version of creative actions are determined which also corresponds with the key concepts revealed from the interdisciplinary sources.

In order to understand this shift in architectural education, the parameters are interpreted through those key concepts and are all related to creativity of 21st century. Therefore, the studio contents and the concepts of the creativity are juxtaposed in order to describe the main components of the new paradigm for defining the new studio (Table 4.2).

Table 4.2. *Contemporary concerns of the design studio related to the concepts of creativity*

Contemporary Design Studio Concerns		
Year	Subject matter of the studios at some leading schools	Related parameter
1998	www.studio-space.net for virtual design studio	Technology
2000	Research studio:1996 to 2000, Rem Koolhaas's Harvard Project on the City	Research
2001	Landscape Urbanism for the abandoned industrial city centers Research studio: Harvard Project on the City, Shopping, Ecology from	Research
2002	"Landscape Urbanism: A Genealogy," Praxis 4	Urbanism
2003	Good Design: Community Service Through Architecture The Emergence of 'Landscape Urbanism,'" Harvard Design Magazine	Ethical
2004	Rural Studio, Perry Lakes Park Covered Bridge, Marion, Alabama	Environmental, pedagogical
2006	Architecture for Humanity, Design Like You Give a Damn	Ethical and Social
2007	Design for the other 90% (societal responsibilities)	Ethical and Social
2008	Berkeley, Emily Pilloton's Project H - Expanding Architecture: Design as Activism	Ethical and Social
2009	Emily Pilloton, Design Revolution: 100 Products That Empower People	Ethical and Social
2010	Small Scale, Big Change: New Architectures of Social Engagement, at MoMA	Ethical, Social and environmental
2011	Low-cost disaster-relief housing (Hurricanes, earthquakes and floods)	Ethical, Social and environmental
2014	Architecture Live Projects: Pedagogy into Practice	Pedagogy, research, environmental
2019	MIT, Health, wealth and cities	Collaboration, urbanism
2020	MIT, deploying drones to prepare for climate change	Technological, environmental

Most of these headings can be seen as examples within the sections. The striking point in this table is the increasing tendency for ethical, social and environmental issues. The examples are gathered from the most recent studio studies of the world's leading architectural schools. However, keeping in mind the heterogeneous structure of the design studio, it is accepted that a generalization cannot be done. However, the

globalism and its spreading effects can be concluded as a positive agent for accepting the general tendency towards the environmental concerns.

On the axis of learning to learn, it is possible to apply different strategies according to the subject, student profile, and institutional expectations and develop different tactics according to the situation. The main problem in contemporary architectural education is the lack of motivation and the lack of creative thinking. In a world where the accumulation of knowledge was less and the knowledge learned had not changed for a lifetime, it was meaningful to load with some information and to memorize them as sacred texts. Today, however, information in the information society is waiting to be restructured with new expansions everywhere.

Today, knowledge has become the driving force of society, and therefore, it cannot meet the requirements for the practice of architectural education, which cannot train questioning and creative minds. Architecture schools in the information society are no longer the place where knowledge is transmitted; it should be the place where learning environments are created that enable the structuring and reproduction of knowledge.

As Figure 4.1 implies that the studio could be reconfigured through the primary concerns of the contemporary parameters which are all questioned under the 4th Chapter. Those parameters are transformed and reached at their current status passing through the actual creative approach and world views. After the inquiry and re-positioning of the new conditions of the studio, it is inferred that the ethical, social and environmental issues are of great importance. Metaphorically, the new paradigm of the studio could depend on a base constructed by those concerns. Metaphorically again, the roof of this basement could be defined by constructive, learner-centered, experiential and personalized design pedagogies, all of which are supporting the individual potentials of creativity. In between the ethical base and pedagogical roof, the theoretical and practical equipment of the design education could be placed with their creatively interpreted contemporary expansions and meanings.

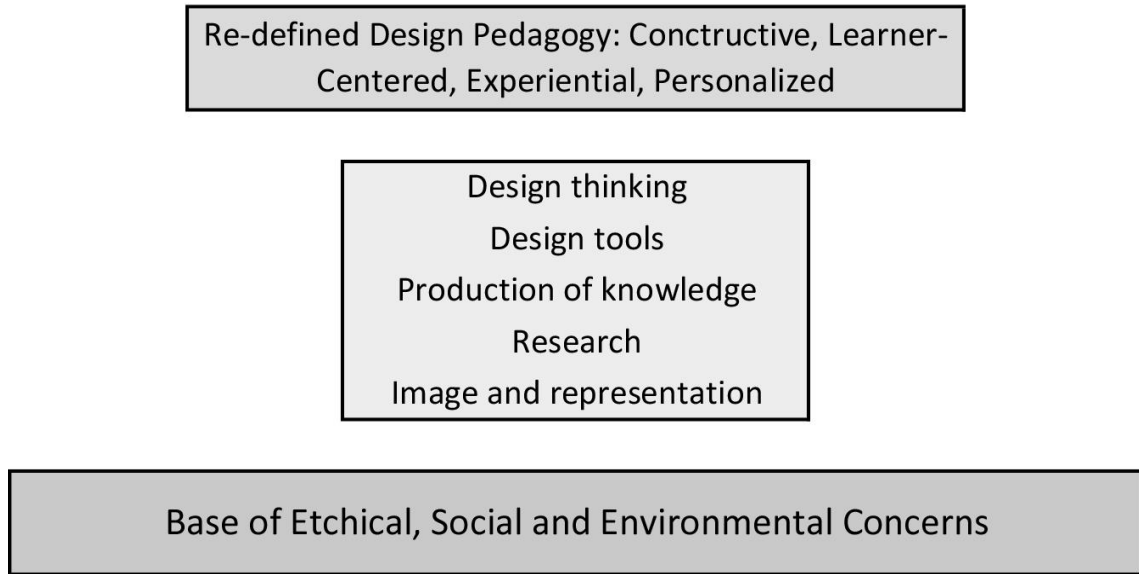


Figure 4.1. *The schematic hierarchy of the contemporary parameters of the studio*

5. DISCUSSION-CONCLUSION

While defining the competences of the individual for twenty-first century, it is seen that the definitions are the basic features that are tried to be given in architectural education. Architecture is a discipline that requires creative and critical perspective with intense communication and cooperation which necessitates to produce original designs. Therefore, the most important objectives of the architectural education are revealing creativity, developing critical thinking, and gaining design knowledge and skills. These goals are mostly realized in the ground of design studio. Therefore, it is seen necessary to discuss a new studio open to changing roles, which can respond to increasing complexity, define and update its position through the new design parameters.

The implications of how the new studio are tried to be obtained within the framework of the discussion of the question of how to teach architecture defined by the parameters of the age. After this discussion, it has been revealed that architectural design studios should position themselves on the axis of creativity with the new awareness brought by the era. In this new studio approach, the idea that design thinking will evolve with the concept of creativity as well as the ability to understand and transform the built environment.

However, fragmented structure of the era, causes fragmented studio approaches. As rhizomatic heterogeneous assumption of Deleuze and Guattari (1988), the studio is a self-dependent cell which subsumes the overall architectural educative process under. It is unique and cannot be unified. The only common ground for studio education is the necessity to teach creativity creatively with social, ethical, and environmental concerns. From the open buffet of experimental categories of the teaching techniques and approaches along with the shifts in the educative strategies and technological developments for representation occurred in the course of time, the instructor of the studio can select or combine one or more ways to construct his/her curricula freely. This may be a research dominant studio with a constructivist approach, or may it be a visual experimentation questioning the sovereignty of image society. Can the using new tools and methods be the primary aim of the studio, or using new technologies with an old fashion teaching approach? The question is here not about how we do that in the studio but what we do in the studio. The most critical distinction for the use/ teach/ learn creativity is to utilize it for a better future. So the learning/ teaching – doing/making

activity of creativity which is a must for the architectural design education should be surrounded by an awareness of the ongoing events. An awareness of the context and preoccupations for the future. This brings us to the contemporary experience we have.

Today, the experience and perception of the people forming the society is fed by the reality of the unreal, virtual, imaginary and nominal. The perception of the reality is transformed and bended by the immaterial elements of the space. Hence, our sources of imagination, inspiration and creation is constantly changing according to this surrounding elements, even if they are real or not. Yet, the number of the stimulants are highly variable with a deep impact on our ways of livings, understandings and thinking. At this point, the long lasting object-subject dualism and its outcomes have also started to be evolved.

In a life where perception and environment shaped by such cybernetic data, the conflict between the subject and the object where the creative processes are in contradiction is becoming insignificant.

As a result of this, architect, architecture, architectural education and architectural productions affect each other and find themselves within a fundamental change. The source of creation is the individual and his ubiquitous environmental layers. These layers have increased more than ever before in the 21st-century and radically change the way individuals perceive, think and understand. Phenomenology is insufficient in order to describe the sentimental reflections for the production of space. The experience which leads a perception is not limited to the physical anymore. The metaphysical components and immaterialization of the space which cause “space-time compression” (Harvey, 1989), creates its own values for society as well as the ethos of architectural education.

In such an environment, it is quite usual that architectural design education, which is based on fostering the ability to design the spaces and physical environment we live in, shows a direction, stance or resistance according to these changing parameters. It is better to remember all the way made through history and taking the advantage of the knowledge gathered through this passage. It is better to re-state, re-position, re-configure and re-design the design studio according to what have been learnt.

Nevertheless, it is significant to remark that the new parameters which are the debatable issues concerned with the studio context are not totally the products of this century. They are a result or a part of an ongoing flow of time, they are not ends or beginnings, but the middle parts of the continuous happenings.

These parameters being internal or external to the studio, are listed successively as design thinking, digital design tools, production of knowledge, research, representation and image, pedagogies and ethical, social and environmental counterparts, after a review of the researches about the argument. When the relation of these headings to the creativity is considered, the complementary connection of each takes attention. For instance the connection of image and representation cannot be denied with the digital tools and the new definitions of body-space relation liberated from the mandatory implications of the physical limits.

Another parameter is the design thinking, for instance, which is a relatively fresh concept and needs to be handled accordingly to the century's idiosyncrasies and demands (here the demand is not an economical term, but an ethical one); while the digital tools are the most heated discussion of architectural education since it is one of the most conservative and at the same time one of the most evolving area. The preference among the analog or digital tools somehow defines the condition of the adaptation, yet this is seen as a limited perspective to evaluate the multi-layered studio. This view is also criticized, from an ethical and societal point of departure, because the potentials of the digital tools in producing the space are not thoroughly grasped. Its effects on life and society, its reflections on the body, mind and physiology has not been studied yet. This is one side of the discussion. The other side and criticism is about the reductive character of the digital preferences. There is an illusion that the utilization of the digital technologies and conversion of analog methods in favor of the computerization are thought to be the only problem of the architectural education which is blamed for not being updated. The problematic of the "tools" issue, in fact is an independent argument and constitutes just a small part of the studio discussions regarding the overall picture. It can be argued that, tools are mediums and they cannot exert dominance on what is done. However, there is much more controversial points in this statement. Firstly, the tool is becoming an end in itself as well as the design and tool are combined and nested that the tool is not a medium anymore, it is the self-regulating actor for design. Here, it is

important to return to the architectural design which is basically occupied with the spatial or built conditions. Therefore, the limits and possibilities endowed with the digitalization process of the space production can be re-considered across this critical thinking. Furthermore, this critical outlook may feedback the ethical, social and environmental basement of the new paradigm of the studio together with the sheltering pedagogic shifts from traditional to constructive, learner-centered, individualized education.

Under such a constructive pedagogic umbrella, the aim of the educator should be to stimulate curiosity, to provoke, to think about the ways and states of knowing, and to create an open-ended experience rather than a linear and direct one. Concentrating on states of knowing is related to production of knowledge as well as the connecting designerly, theoretically and technically ways of knowing. Moreover, it is also about doing research in the studio, where the design and the process are the accumulators of the knowledge.

Finally, the ethical consideration is of great importance in defining a new paradigm for architectural design studio. Ethically correct designs lead socially and environmentally correct design. However, this is not valid for other parameters that a technically or pedagogically accurate and creatively successful design may not always be ethically or environmentally right. This is the very reason why the re-configuration of the studio is based on the parameters related to ethics, society and environment (Table 5.1)

Table 5.1. *The creativity related parameters of the studio for a new paradigm*

Design thinking	Design thinking in 21st century is an issue transcended the limits of the studio. It is a broadly examined field in order to adopt the fertile process of designing to the processes of learning and increasing the potential of knowledge production
Design tools	There is a transition from designs based upon a Cartesian grid to those constructed from a digital field condition abstracted within computational space. In addition to these communicative and productive transformation, the digital technologies have unprecedentedly changed the visual language of design education.
Production of knowledge	Every phase of design is a subject matter of a stand-alone research in order to understand the great potential of it in producing creative knowledge.
Research by design	It refers to the design of architectural research as an integral part of architectural design processes. The implementation of the act of design in research transforms the design from being an object of inquiry to being a research approach (e.g. Learning from Las Vegas)
Image and representation	The ubiquity of images has gone far beyond the traditional conception that sees them only as generations of consumption, games or information. Images are mediums that make access to a range of different experiences possible. Images are interfaces that shape interaction, people and environments they share.
Re-defining Design Pedagogy	Constructive, Learner-Centered, Experiential, Personalized, Collaboration
Re-defining Body-space Relation	Physical and virtual construction of space
Etchical, Social and Environmental Concerns	The need of architectural education under the present circumstances of unparalleled, ecological and socioeconomic, environmental crisis is not boost of freewheeling narcissistic 'freedom' from constraints faking newness, but real creativity, capturing and embracing ecological and human reality through method, knowledge, and public responsibility. Urban problematics.

Looking from a larger perspective, it can be concluded that, up to now, the architectural considerations, from the definition of the architect to the education, had always been parallel with the source of creation which is in fact shaped by the contextual dimensions (see Chapter 2). Although the source of creation is multiplied

and complicated in the 21st century, the architectural education is assessed that it acts slower than the context and misses the fertile sources of creation.

In this dissertation where the role of the creativity questioned to re-define the architectural design studio, creativity is treated as a catalyzer across the contemporary determined parameters as well as the historical process experienced. So, at this point, creativity is reformulated through the interrogation of philosophical and practical foundations. It is discovered that the individual is the main determinant of the era, from who the spirit of the time takes its fragmented, multiple, plural, heterogeneous, yet ubiquitous character. This statement underpins and concretize the necessity of personalized strategies both in teaching and in assessing architectural design education.

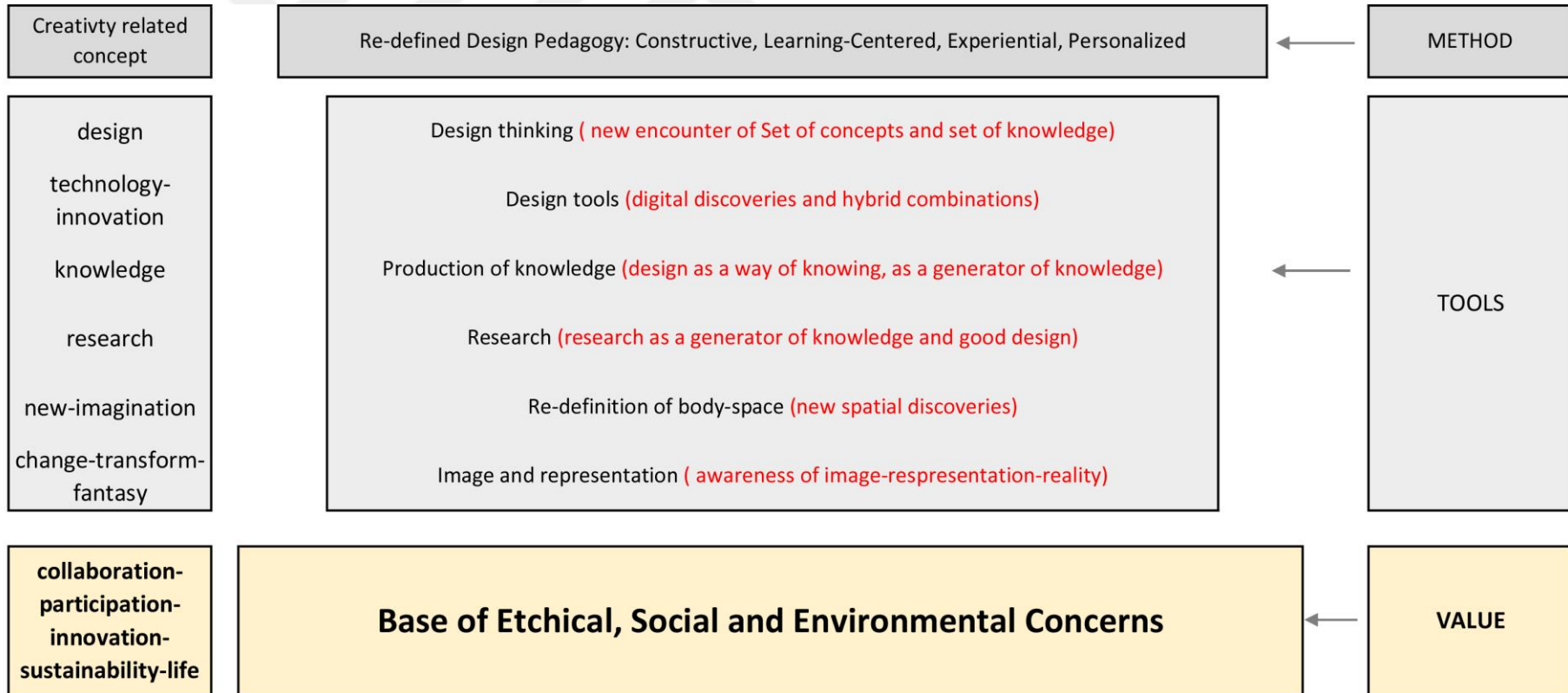
It is important to emphasize here the definition of the creativity again done by Pope (2005, p.27):

‘...the application of knowledge and skills in new ways to achieve a valued goal...’

It is critical to define “what is the new?” and “what is the valuable?” as much as “what is the goal?” As a matter of fact, the last chapter is dedicated to inquire the new, the valuable and the goal for the new paradigm of the architectural design studio where there is a historical connection of it underlining the necessity to position itself on the axis of creativity. This research points out that those questions defines the characteristics of creativity in 21st century in which innovation took place the role of creativity to produce the economically valued ‘new’. However, creativity is a historical part of architectural thinking process in spite of its changing nature and newly defined “new” as well as the newly defined “creativity” implies to ethics and the continuity of life more than to the economic benefits. Thus to contribute designing ethically and environmentally is valued as ‘new’. Applying this point of view to the architectural design education, it is understood that the priority, once given to the abstraction during Bauhaus period, is now given to the environment which is very much related to the contextual parameters. Concerns for the context is now appreciated and become the source of creativity in producing the meaningful “new”. The meaning-making is essential in design which is deeply connected to the ethical argumentation of the new “creativity”.

Therefore, in this research it is seen that the ethical, social and environmental side of the design constitutes the value and a starting point for a new paradigm of the architectural design studio together with the changing notion of the creativity. After these basement combined of values, there is the method of the studio which is determined by the pedagogical preferences adopted to the 21st century's context. The other parameters are left as tools, whose dominancy and presence are dependent to the instructors' design of the studio, to the scenario of the educative strategies, to the requirements and the content of the exercises or to the conditions of the students, etc. The conclusion is that the total process experienced up to now for running the design studio, including all simulative and experimental studio works, could be utilized as a new material re-defined as a new problem within a new context. The important point here however is the change towards a more critical process where there are environmental, societal and social problems gaining more significance day by day. So, a studio based on these considerations is perquisite for good and creative design, and then for a well-defined built environment (Table 5.2).

Table 5.2. *The outcomes of the research connecting creativity studies to the design studio suggesting values, methods and tools for the new paradigm*



5.1. Further Researches

In this dissertation the transforming relation of creativity and architectural design education with their evolving character is discussed. For supporting the discussion, the knowledge related to the changing contextual parameters related to creativity and architectural design education is located on a critical mapping. By this way, the cause and effects of the events effecting each other are visualized and thus are revealed to make further evaluations. Finally some intervenes are done regarding the design studio and the context of the 21st century.

Since the universe of this dissertation is limited to scope determined as the relation of creativity with the architectural design studio in the 21st century, mostly from a European standing point, the other fields remaining outside the scope are not mentioned. This out of scope fields are the space where the further researches can be done.

For instance by utilizing the critical mappings of this dissertation, another concentration other than architectural education may reveal not only several interpretations but also original knowledge. The line of art education, communication, scientific discoveries and the philosophy and their possible interconnections have the potential to produce knowledge in different researches. Another research area is the geographical determination using the same mappings or adopting them for a new place and locality. In order to exemplify, Turkey would be a case for a new articulation of the mappings. The data of Turkey could be inserted on the maps and the new pattern could be analyzed as well as a new concentration could be developed on the existing pattern. At this stage, it is expected to have fruitful data and it is foreseen that the new combinations and new relations have the potential to draw new understandings. Changing the parameters and adding a new line of another discipline to the map and relating them with the architectural developments could generate original perspectives. As mentioned before the critical mappings in this thesis are productive, infinite and generative. Therefore they could be utilized for further studies.

In addition to the adjustable methodology of the study for other future researches, the research and concepts related to the creativity is another fertile field to be studied. It is supposed that the contemporary resources about creativity could be enlarged so as to enrich the creativity related key concepts and some statements could

be made about the new pattern. It is possible to improve the discursive method and to coincide it with the mapping technique for original and creative linkages.

Another further research area is the area of the new studio parameters, which are all aspirant for independent studies. To exemplify design thinking, research by design, re-defining the body-space relation from a technological point of view and examining its effects on architectural design education, the power of the image and its influence on the representation in architecture could be counted as new discussions for the educative route of architecture. The pedagogic arguments done in above sections are also other possible research subjects that could be interrogated and be associated with the research of creativity.



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B.Arch.	Middle East Technical University	2000-2006

ACADEMIC WORKS

Papers:

KOLSAL FATMA, ÜSTÜN BERNA (2018). “Activating Connections During Design Process: A Study on Spatial Visualization”, Marmara Üniversitesi Güzel Sanatlar Fakültesi Sanat ve Tasarım Dergisi,(9), 52-63. (Yayın No: 4845781)

KOLSAL FATMA (2017). AYDIN TEKSTİL YERLEŞKESİ'NE AİT BARINMA YAPILARI. Ege Mimarlık, 1(96), 32-35. (Kontrol No: 3529094)

KOLSAL FATMA, KOCA GÜLER (2015). Historical Physical and Social Development of Odunpazarı. International Journal of Social Science and Humanity, 5, 557-560., Doi: 10.7763/IJSSH (Yayın No: 3256485)

KOLSAL FATMA (2014). MİMARLIKTA BÖLGESELÇİLİK VE SÜRDÜRÜLEBİLİRLİĞİN İLİŞKİSİ. Yapı Dergisi (392), 58-61. (Yayın No: 2267029)

KOLSAL FATMA (2006). Dosya: Politecnico di Bari. Arredamento Mimarlık Dergisi, 1(12), 84-86. (Yayın No: 2265239)

Proceedings:

KOLSAL FATMA, ÖZASLAN NURAY (2019). Re-Thinking Creativity in Design Education for the 21st Century. Hacettepe University-2nd International Education in Interior Architecture Symposium (Tam Metin Bildiri/Sözlü Sunum)(Yayın No:5050747)

KOLSAL FATMA, ŞENSOY GAMZE, YEŞİLTEPE AYŞE DENİZ (2018). Fragmented Urban Experiences. I. Uluslararası Çevre ve Kentleşme Sorunları Sempozyumu, 4, 135-142. (Tam Metin Bildiri/Sözlü Sunum)(Yayın No:4304716)

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ÜSTÜN BERNA, KOLSAL FATMA (2017). Poli-Örüntü Olarak Tasarım Süreci. I. Uluslararası Mimarlık ve Tasarım Sempozyumu, 1(1), 20-22. (Özet Bildiri/Sözlü Sunum)(Yayın No:3662672)

ÜSTÜN BERNA, KOLSAL FATMA, BULUT AYŞE DENİZ (2015). A pioneering model of modernization during the Republican era: Eskişehir Sugar Factory (1933) industrial heritage. STREMAH-Structural Studies, Repairs and Maintenance of Heritage Architecture XIV, 1, 483-494., Doi: 10.2495/STR150401 (Tam Metin Bildiri/Sözlü Sunum) (Yayın No:2263552)

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KOLSAL FATMA, KOCA GÜLER (2014). Historical Physical and Social Development of Odunpazarı. International Conference on Environmental Engineering and Development (ICEED 2014), 5, 557-560., Doi: 10.7763/IJSSH (Tam Metin Bildiri/Sözlü Sunum)(Yayın No:2261188)

KOLSAL FATMA, YEŞİLTEPE AYŞE DENİZ, GÜVEN ULUSOY FERAN ÖZGE (2019). Aydın Tekstil Fabrikası İdari Binası. DOCOMOMO TÜRKİYE MİMARLIĞINDA MODERNİZMİN YEREL AÇILIMLARI XV, 19-19. (Özet Bildiri/Poster)(Yayın No:5050742)

KOLSAL FATMA, ÜSTÜN BERNA (2019). Aydın Tekstil Yerleşkesi. DOCOMOMO TÜRKİYE MİMARLIĞINDA MODERNİZMİN YEREL AÇILIMLARI XV, 17-17. (Özet Bildiri/Poster)(Yayın No:5050646)

ÜSTÜN BERNA, KOLSAL FATMA (2016). Eskişehir de Mansard Çatının Kent Mimarisine Etkileri. 8. Ulusal Çatı Cephe Sempozyumu, 1(1), 185-193. (Tam Metin Bildiri/Sözlü Sunum)(Yayın No:2822160)

Art and Design Facilities:

Organizing Committee Member of “Kültür Miras Mimarlık 1: Endüstri Mirası Sempozyumu”, 19.11.2015-20.11.2015, Anadolu Üniversitesi, Öğrenci Merkezi, (No: 59037)

Instruction of WORKSHOP, 10.04.2017-10.04.2017, “Erişiyorsam Varım! Eskişehir Herkes için Tasarım Atölyesi” / Accessibility for Everyone, Eskişehir Büyükşehir Belediyesi Opera Binası, (No: 144975)

Instruction of WORKSHOP, 07.04.2016-08.04.2016, “Temel Tasarım/Sanat Eğitimi Çalıştayı I Kapsamında Nesnelerin Değişimi Dönüşümü”, Anadolu Üniversitesi Öğrenci Merkezi Eskişehir, (No: 88759)

Participation to WORKSHOP, 07.04.2016-08.04.2016, “Temel Tasarım/Sanat Eğitimi Çalıştayı I Kapsamında Spontane Yaratıcılık-Sarıma Atölyesi by Oruç Çakmaklı”, Anadolu Üniversitesi Öğrenci Merkezi Eskişehir, (No: 88761)

Instruction of WORKSHOP, 01.03.2019-03.04.2019, Açık Oku_L Bauhaus 100 Yıl Sonra Etkinliği: Bauhaus Retrospektif Atölyesi, Eskişehir Teknik Üniversitesi Mimarlık Bölümü, (No: 260662)

Organizing Committee Member of 100th year of Bauhaus Facilities, 01.03.2019-03.04.2019, Açık Oku_L Bauhaus 100 Yıl Sonra Etkinliği (Seminars, Workshops, Film Display, Exhibition), Eskişehir Teknik Üniversitesi Mimarlık Bölümü, (No: 260659)

Instruction of WORKSHOP, 01.02.2019-03.04.2019, “Açık Oku_L Bauhaus 100 Yıl Sonra Etkinliği: Installation Workshop”, Eskişehir Teknik Üniversitesi Mimarlık Bölümü, (No: 260661)

Awards:

Architecturally Spatial Narration (Mimarca Mekan Anlatımı) - Honorable Mention Prize, KTMMOB- Chamber of Turkish Architects and Engineers of Cyprus, 2018

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Okyanus Group, Romania, Bucharest, Architect (2009-2010)

Ant Yapı, İstanbul, Architect (2006-2009)