



The Relation between Visual Presentation and Architectural Design Products

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ABSTRACT

The aim of this study is to understand the relation and connection between the architectural design, architectural visual presentation and architectural product itself. How architectural visual presentation shows the real condition of the buildings? The "jpeg images" showing magnificent building details, materials, patterns, shade and shadow effects inside the well-done landscape environment affects not only the customer/user but also the designer himself/herself by means of Computer Aided Design Based Technology. Drawings, models, even movies as visual architectural presentation is satisfactory regarding design. However, when building is constructed and life flows inside with the reality the perception of satisfaction changes in general.

In this study, the famous design, Fallingwater House is analyzed regarding design, visual presentation and building itself. The methodology of this study is to get drawings, movies, pictures of Fallingwater House design by Frank Lloyd Wright in different CAD media. We prepared evaluation tables that show building and visual presentation. We asked 3th year architectural students at Selçuk University to fill this tables. Thus, this study as design experience using technology may get general concepts.

Keywords: Architectural design, visual presentation, architectural education, Frank Lloyd Wright, Fallingwater House.

1. INTRODUCTION

The profession of architecture is a design activity with different phases. Design idea develops and attracts attention in time. Design process triggers imagination and is



shaped by various events. Considering architectural design as an inception and a process, it is seen that many factors affect the main idea such as experiences and prevision. Moreover, there are many multi-dimensional principles determining the concept of design such as function, structure, detail, human scale, material, fullness-emptiness, light-shade and immediate surroundings. All the designs made with the modern architecture doctrines are transmitted to the users through chosen presentation techniques. That is, presentation techniques are a part of the design process in the presentation and transmission of the design in the head of the architecture to the users and implementers. Therefore, presentation techniques and tools may affect the design process in a positive or negative way. Designers can explain their designs via the presentations they make. However, no matter how good the design is, it should be expressed through technical and artistic transmission. Good design can only be concluded this way, because a good design process is the one functioning well, which is concluded on a smooth and intelligible basis and examined in a multi-directional way.

The main question in the present research is how efficiently computer media are used in the representation of architecture. For this purpose, how realistic the 3D images prepared according to the requirements of the profession is examined. Moreover, whether a relationship is established between visual presentation and architecture is examined. Today, the visual reflection of architecture means the creation of design in thoughts and its production afterwards. The visual aspect of design is reflected at the beginning of the presentation, and then technical expression is given in details. Therefore, design is interesting in its visual aspect.

Today, projects that do not conform to the submission rules of competition projects are eliminated at the first round regardless of its nature; therefore, minimum presentation conditions should be fulfilled. Designers who want to express their projects more efficiently use CAD programs in order to make more powerful and efficient designs, transforming concept projects into a realistic, not technical, expression. Moreover, computers are used in order to increase the quality of architecture projects and establish a better dialog with the customers.

Another issue to be addressed here is how designers having difficulty in the presentation and design of their works construct their buildings; nevertheless, some designers shape their drawings only via a visual presentation or in writing, e.g. utopic countries were only written down, not constructed. However, the generally accepted opinion is that projects should be expressed only via visuals; therefore, graphic presentations made via CAD



programs should be of a nature to convey the conceptual infrastructure of designs as buildings to be constructed will require a serious investment in terms of unit and cost.

2. EXPRESSION LANGUAGE AND DIGITIZATION OF ARCHITECTURAL DESIGN

Design is the interpretation, determination and documentation of the conceptual, functional, stylistic, structural and imperative characteristics and qualifications of the construction and its whole elements and environment, which would fulfill the functions determined to meet the requirements (İzgi, 1999). Design is a process of decision-making; it lays great responsibilities on the shoulders of designers and the phenomenon of design continues until the construction process. Ideas come to mind in the thinking process and then are designed. Design is reflected to the pencil of the designer through his/her thoughts on a two- or three-dimensional basis, which differs according to the methods the designer chooses to use. Therefore, the location, mass and environment of the design should be constructed first mentally and then visually. Living in a virtual space created according to the time dimension and acting as if things are real enable the designer to realize his/her thoughts easily. Moreover, considering the design in its environment and seeing the city in which it will be built is one of the key subject matters to be addressed.

Pencil is usually the primary design tool of an architect/designer. The sketches of the designers of the past or today who have proven themselves indicate that they choose to use pencil during the design process. Using a pencil or drawing sketches as architectures and designers put it is the most efficient method preferred during the primary design process, because pencil is the smallest portable design tool. Using a pencil during the design process and drawing sketches on any available paper enable the emerging of first ideas. Therefore, these first sketches are used in order to arrange the organization and function schemes of designs. First plan sketches drawn are the basis of function schemes, while sections (system sections, schematic sections etc.) are used to organize special percentages and vertical circulations. Design process should include various perspectives, drawings and models at different scales. Until recently, inside and outside of models were photographed for the purpose of making presentations on the computer. These studies were conducted in order to determine, observe, control, criticize, document and convey thoughts through the whole design process (Table 2.1).

Today, appropriate presentation media are required in order to make all these studies on a rapid basis. Computer Aided Design (CAD) has been adapted into architecture and became the major working environment. The rapid developments in information and

communication technology and its applications in architecture have introduced a new opportunity to the designers. CAD programs are used for this purpose, which allow for a detailed drawing, modeling and presentation of designs. For the last 20 years, many projects which were dreamt but could not be understood and drawn were realized thanks to CAD programs.

Table 2.1. Traditional and modern style of architectural presentations (Fallingwater Photos, 2012a, 2012b, 2012c, 2012d, 2012e, 2012f, 2012g)

	TRADITIONAL	MODERN
PLAN		
SECTION-ELEVATION		
SKETCH-PERSPEKTIVE		
SKETCH-PERSPEKTIVE		



Designs which cannot be expressed via pencil and models are made on the computer using high technology. The best examples of this issue are the designs of Zaha Hadid. Zaha Hadid expresses a space best on the computer through her different perception and interpretation of it together with its walls, floors and ceilings.

Therefore, designing with computers is not a systematic process by which a set of rules would generate design solutions (Madrazo, 1999). A designer, through analysis, investigation, research and interaction begins to synthesize an idea for a possible solution to respond to the situation at hand. The process is then to chase this idea down to see if it works, to test it, to modify it, and to branch out in a different direction, or to reject it back all together (Reffat, 2007).

Architecture works within the technical opportunities the society offers; she reflects the scientific and technical processes of the society to others in the most appropriate way. Therefore, an architecture should follow up the latest developments in technology (Kuban, 1998). Today, space setup is based on structure and form, and realized using visual materials in the design process. Although the concept of computer-aided design has a background of about 40 years, it has just started to be used in the design process and phases. Various approaches are adopted in the use of digital media within this process:

- Detailed testing of the product via various modeling software within the design process;
- Use of technology for the purpose of creating form at the beginning of the design process;
- Production of designs by the representation of design parameters and various factors through analytic and dynamic models (Çağdaş, 2005).

Digital technology obtained on the computer media has an important role in terms of its contribution to architectural design. It now has the power and capacity to interpret and evaluate different design parameters examined in the mental processes of the designer. Static models used for this purpose are now replaced by dynamic models, which include the examination of the effects of time, light, shade, material etc. and do not actually have an important role in the manipulation of design (Çağdaş, 2005). The programs commonly used on the computer media are CAD, Rhino, Form-Z, AutoCAD, Architectural Studio, Alias Sketchbook, SketchUp, ArchiCAD, Revit, MicroStation, Architectural Desktop, 3D Studio Max/Viz, Maya and SoftImage. These are among the most common CAD programs, which are used for different purposes as shown in Table 2.2.



Table 2.2.Tool typologies in digital design (Mathew and Barrow, 2004).

No.	Typology	2D/3D Software Application
1	Free Forms	Rhino, Form-Z, AutoCAD vb.
2	Conceptual Design	Architectural Studio (2D), Alias Sketchbook (2D), SketchUp vb.
3	3D Objects	ArchiCAD, AutoCAD Revit, MicroStation, Architectural Desktop vb.
4	CADCAM	ProE, SolidWorks, Inventor, Catia, Unigraphics vb.
5	Simulation/Presentation	3D Studio Max/ Viz, Maya, SoftImage vb.

On the other hand, software ability to create fluid diagrams, character animations, and other special effects, (first thought to be un-useful in architectural design), has proved to be extraordinary tools to test unproved architectural speculations. Circulation and mobility studies, building program variations, and quick diagrammatic ideas allowed paperless studio students to explain and experience in a totally new way for their design formulations. The software soon proved to be more useful than a mere rendering tool; it started to inform and transform the design process (Andia, 2001; Andia, 2002).

3. DIGITAL MEDIA AT DESIGN STUDIO IN ARCHITECTURAL EDUCATION

The developments in design computing and digital media in the last decades have been phenomenal and what the next decade will bring can only be imagined. However the advancements in digital design and communications are already reshaping architectural design studio teaching and design practice (Reffat 2007). Computer technologies were used only as assisting tools in design education until recently. Today, computer technologies are actively used in the representation and communication of architectural design product. The design process was developed through the expression and communication of the design on digital media. In 1970s, computer media were only used for mathematical analyses and estimation and evaluation models, while today they were integrated with visual models, an indispensable communication method in architecture. This way, design products are supported by and interpreted through not only graphical, verbal and physical expressions but also concrete visual, abstract conceptual and symbolic expressions (Çağdaş, 2005). When computers were not commonly used, many architectures/designers used pencil to express their designs and made presentations with models; while the fact that today architecture students use mouse even before they use pencil indicates that this technology has started to be used rapidly but not yet been



adapted. Expressing ideas by drawing via pencil is a limited design action in the architecture education, while the increasing use of CAD programs facilitates the drawing action and increases visual performance. Because, some of the design and architecture schools are still using manual techniques similar to those used at the beginning of the last century. For long time, design studio activities have been carried out using manual sketching, drawings and physical modeling. Since the late 1980s architecture and architectural education have witnessed an important transformation with the introduction of computers and information and communication technology (ICT) in which they have become pervasive in all aspects of practice and education. The pervasiveness of information and communication technology in architectural education and practice has been manifested in the growing proportion and importance of IT related courses in the curricula of architectural schools. Many schools have increased IT content in their curriculum and are investing to acquire computing resources to ensure that they provide their students with the necessary skills and competitive advantage. Modern information and communication technology and digital tools have been adapted in the architectural education and practice since the 1990's. However, unidirectional and limited education regarding computer technology at schools indicates that this facility is not being efficiently used. The fact that CAD programs enable an easier, more rapid and controlled designs in terms of volume and contextualization resulted in different designs to be made. The real-like representation of products on the computer media as a result of the evolution process is the most important factor triggering the imagination of human being. Making the designs on a virtual medium is one of the primary advantages of CAD programs. As a matter of fact, architectures are responsible from the discovery of the potential and power of technology in supporting creative design. The use of digital media not only as a drawing, modeling and animating method but also a designing method enable designers to expand the scope and boundaries of their inventions (Bielefeld, Kholi, 2007).

In architecture education, computer technology enables designs and relevant concepts to be properly understood and conveyed. That is, it increases visual perception in architecture education, which means the projects are addressed in detail and the restrictions of the fifteen to sixteen-hour education are removed. Integration of visual digital models with abstract computer models which enables the representation of relevant functions of the products on digital media results in the actual use of new technologies in the design process. Therefore, it can be said that this situation enables the architecture to use his/her knowledge regarding architecture, mental processes and representation opportunities (Çağdaş, 2005).



Today, there are certain approaches using the power of technology not only for the purposes of representation and communication of designs but also to manipulate and support them. Therefore, it is quite important that new methods and approaches are used and taught for creative design and communication. Integration of information and communication technologies with design education and process requires knowledge of not only the opportunities that these new technologies can be used in the design process but also the methods, approaches and techniques regarding how they can support the design (Çağdaş, 2005). Digital design studios act as media enabling the visual representation and modeling of the development of abstract concepts and ideas, spatial relationships, usage scenarios regarding the space and evolvment. Technology should be used not for the purpose of increasing the visual quality of the latest design but as a media enabling the development of creative ideas. Besides the fact that digital media are used as a platform where visual simulations of architectural products are designed, tried and developed, a new design approach called digital architecture emerges in this new and different reality (Çağdaş, 2005).

In this context, the digital-imperative to switch from analogue to digital mode has already begun to manifest itself at the schools of design and architecture. Design and architecture students routinely use the best of new technologies that provide information-rich and fully networked multimedia environments (Muir & O'Neill, 1994).

On the other hand, there have been various ways to integrate computation and digital media into design teaching that led to alternative models for digital design studio including computer augmented design studio, CAD-plus studio, virtual and web design studio, cyberspace design studio, intelligent building studio, and toys and tools studio (Do & Gross, 1999).

The practice and teaching of architectural design is changing radically in response to the new digital media that augment, if not replace, traditional paper and pencil drawings and basswood and chipboard models. The change, spurred by technology, reflects changes in society at large as well, as the information age takes hold on our communities and society. For many years, it has been said that the discipline of architecture is in crisis; yet architecture reinvents itself again and again to respond to a constantly changing societal context. Once more, we must reconceive the roles and practice of architectural design, as we find ways to incorporate digital media and computation in design teaching and practice. Schools of architecture must be leaders, not merely consumers, in developing design practice with digital media and anticipate, not just adopt,



technological change. Architecture schools, like architects, must work with technology and must work to make it more useful. New digital design media have great potential; we must turn this potential into reality. We are shapers and makers by trade. We must live up to this tradition in the way we teach design with digital media (Do & Gross, 1999).

4. PERCEPTION OF FALLINGWATER OF 3D PRESENTATION AND PHOTOGRAPHS

The Edgar J. Kaufmann House, better known as Fallingwater, was designed and built by Frank Lloyd Wright between the years 1935 and 1937, and it is one of the most important representatives of modern time residences. Fallingwater designed with modernist approaches, which is considered to be one of the most famous private houses in the world according to the literature of architecture. In this study we focused on Fallingwater. Fallingwater is located 80 km away from the southeastern Allegheny Mountains in Pittsburgh, Pennsylvania, USA. It was used as a holiday house from 1937 to 1963, and then was turned into a museum in 1964. Frank Lloyd Wright adopts the central indoor setup in order to provide a broader liveliness in his buildings he designed in light of spatial continuity. Main volumetric units are in touch with the nature.

According to Wright, free plan has no specific expression within the architectural volume, and includes a non-divided open space from the center to all directions (Zevi, 1990). In this study we used Fallingwater House a case study to understand the relation between visual presentation of architectural drawings and architectural design production itself.

Frank Lloyd Wright's Fallingwater was accepted because of powerfully expressed drawings and presentations. However, it is told that Frank Lloyd Wright could not make the molders of the time to take the mold of wide cantilevers, and started formwork himself even when the house was completed. As a result, easily-produced 3D drawings enable the constructions to be well understood thanks to the CAD programs on the computer media. The building in question was compared in terms of recognition/description, material and texture, concepts related to reality, plan, façade and three dimensions; and for this purpose, the drawings of Frank Lloyd Wright, certain CAD programs and real photographs were used in the present study.

Table 4.1. The visual documentary of Fallingwater obtained from the literature and web

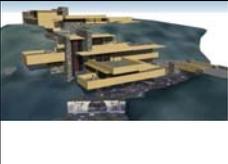
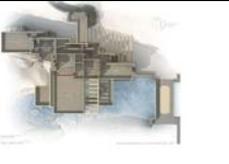
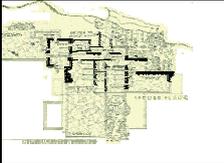
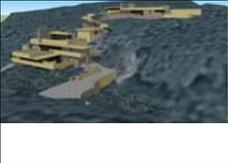
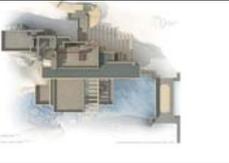
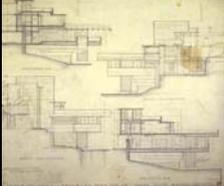
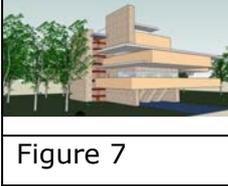
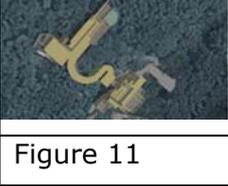
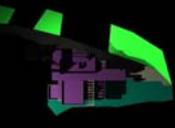
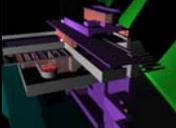
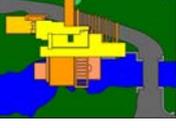
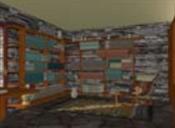
Figure 1	Figure 4	Figure 8	Figure 12	
				
Figure 2	Figure 5	Figure 9	Figure 13	
				
Figure 3	Figure 6	Figure 10	Figure 14	
				
	Figure 7	Figure 11	Figure 15	
				
Figure 16	Figure 20	Figure 24	Figure 28	Model 1
				
Figure 17	Figure 21	Figure 25	Figure 29	Model 2
				
Figure 18	Figure 22	Figure 26	Figure 30	Model 3
				
Figure 19	Figure 23	Figure 27	Figure 31	Model 4
				



Photo 1	Photo 4	Photo 7	Photo 11	Photo 15
				
Photo 2		Photo 8	Photo 12	Photo 16
				
	Photo 5	Photo 9	Photo 13	Photo 17
				
Photo 3	Photo 6	Photo 10	Photo 14	Photo 18
				
Photo 19	Photo 23	Photo 26	Photo 30	Photo 34
				
Photo 20	Photo 24	Photo 27	Photo 31	Photo 35
				
Photo 21	Photo 25	Photo 28	Photo 32	Photo 36
				
Photo 22		Photo 29	Photo 33	
				



Table 4.2. An analysis of architectural design product and visual presentation over
 Edgar J. Kauffmann House

G r o u p	Properties		Observed figures number	Relation with observed figures nu.	Points	Results
A	PLAN PROPERTIES	Wet spaces	2, 11, 12, 13, 24	16	8	Wet spaces could be perceived.
B		Entrance perception	2, 10, 11, 18, 21, 26	5, 11, 13, 15 Model 4	7	Entrance is perceived just from the plan media. The visuals performance of entrance is weak.
A		Dimensions	2, 10, 11, 12, 13	8, 9, 10, 16, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30	9	Interior space dimension fits what plan shows.
A		Function	2, 10, 11, 12, 13	3, 6, 7, 8, 9, 10, 16, 17, 20, 21, 22, 23, 24, 26	10	Images and drawings find out the functions clearly.
A	SECTION/ELEVATION PROPERTIES	Material	7, 8, 14, 15, 27, 28, 29, 30	2, 4, 7, 13, 14, 16	10	Both images and drawings have tactile sensing.
A C		Colour	1, 31, Model 4	36 36	9 1	Colored hand drawing match to building itself. On the other hand without render 3dmax drawings gave distorted perception.
A		Solid /void	6, 15, 19, 31 Model 4	6, 36	8	Solid/Void effects are managed by transparency, blank walls and relation of them.
B		Details (window /door)	19, 27	3, 6, 14, 23, 25, 31, 32, 34	5	Building presentation is weak, comparing constructed details.



C	3D DIMENSIONAL EFFECT	Shade shadow effect	1, 21	6, 8	4	Shade and shadow effects could not be seen from drawings despite the fact that building has strong shade/shadow.
A		Mass effect	1, 4, 6,7, 8, 15, 18, 25, 31 Model 4	1, 11, 12, 30, 36,	9	Mass effects -unlike shade and shadow effects- could be seen from drawings.
A		Green effects	1, 4, 25 Model 2	1, 2, 5, 12, 13, 15, 31, 32, 33, 34, 35, 36	10	Green texture is emphasizing strongly.
C	GENERAL PERCEPTIONS	Human scale	3	18, 19, 22, 29	3	Although building designed focusing on human scale, presentation of building is not sufficient enough.
A		The build-up relations	2, 4, 6, 24 Model 3	2, 13, 31, 36	8	Structural elements could be seen images and visual presentations.

The analysis about the buildings has been obtained through the comparison of the house's visuals via CAD program with its real photographs together with the third grade architecture students from Selçuk University at 3rd year.

The 3D presentations were compared with real photographs, the results of which were given as Table 4.1;

- Beginning from Figure 1 to Figure 15 and Figure 25-28-30-31 Sketch-up
- Figure 26 Autocad with Photoshop
- Beginning from Figure 16 to Figure 23 3D MAX
- Figure 24 Lightwave
- Model 1-2-3-4 is prepared to express the visual documentation of the building.
- To support Table 4.1. and to give the opportunity of comparing the architectural presentation of the building and the photography of the building 36 photos have been chosen.

Students are asked to give numbers between 1-10 by looking at 3D drawings and the photos of them. The evaluation has been done regarding plan properties,



section/elevation properties, 3D dimensional effects and general perception. The points has given according to success of 3D presentation and suitability of the photos entrance perception, dimension, material, colour, solid/void effect, details, shade/shadow effect, mass effect, green pattern, human scale and built-up relations. The evaluation of 60 students is as above;

GROUP A: The architectural presentation and the photos of the building is so matched that the points 8-9-10

GROUP B: The architectural presentation and the photos of the building is not so much matched and the points 5-6-7

GROUP C: The architectural presentation and the photos of the building is not matched anymore so the points less than 4

The evaluation of the students is shown in Table 4.2. showing the plan, section/elevation properties, 3 Dimensional effects and general perception and how much architectural drawings match to photos.

RESULTS

The results were evaluated by 60 students, and then similar/equivalent drawings and photographs were compared. Wet spaces and entrance could be perceived just from the plan media. On the other hand, the visual performance of entrance was weak. Interior space could be perceived what architectural drawing has shown. Images and drawings found out functions clearly. Both images and drawings had tactile sensing. Colored hand drawing matched to building itself. On the other hand without render 3D MAX drawings have been poor expressing color and material. Solid/void effects are managed by transparency, blank walls and relation of them. Green texture has been emphasized strongly. However, building presentation has been weak comparing constructed details of the Falling Water. Shade and shadow effects could not be seen from drawings despite the fact that building has strong shade/shadow. Although building designed focusing on human scale, presentation of building has not been sufficient enough. All this comments could be summarized as there is a strong relation between visual presentation and architectural design product. The better presentation means the better design or the vice versa? The better design means the better architectural presentation.

Future architectures and designers should be educated in a way that they can follow and use technology closely and efficiently in light of his/her experiences and work in the above-mentioned media. A design product to be developed on digital media should not



be considered independent of the physical environment it will be in; and decisions related to design regarding space setup should be integrated with the decisions related to the physical characteristics of the product. How a presentation is done varies according to time and place. Therefore, a presentation should be organized according to the medium it will be done, and the expression type and language should be supported with the latest technology. Moreover, the powerful characteristics, reputation, previous works and popularity of the presenters and designers are related to not only such factors as where and how the presentation will be done but also the context in which it will be done; because the originality of an idea is as important as the presenter or influencer himself/herself.

As a result, we live in a universe of continuous change; a world in which most the unchanging things in the past keeps on changing based on discoveries and interpretations. On the other hand, information and communication technology and digital media are real indicators of a changing world. Such a world requires responsive designers or architects to make the best use of latest developments including information and communication technology. This will help architects to improve the quality of design processes and products in addition to enhancing their design skills to better adaptation them for an ever changing world of everything where in architecture is not an exception.

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