COMPARATIVE ANALYSIS ON THE COGNITION OF DESIGNER'S IDENTITY THROUGH DIGITAL PRESENTATION DRAWINGS

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June, 2003

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ABSTRACT

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In parallel to the developments in computer technology and the broad use of computers in the design domain, computer media presentations are widely used today in architecture. Architectural presentation drawings are means of externalization the internal world, thoughts and identity of architects. However, the issue of the cognition of designer's identity in computer media presentations is rarely addressed in the researches as compared to studies on traditional media presentations. On the contrary, computers are mainly regarded as reflecting their own identity rather than providing designers potentials to express themselves and to achieve differences and variations. In this study, a comparative analysis of the cognition of designer's identity in architectural presentation drawings is carried out. The analysis provided enough evidence that similar to architectural presentation drawings of traditional media, computer media presentations hold potentials for the reflection of designer's identity.

Keywords: Architectural Presentation, Computer Aided Design, Designer's Identity

ÖZET

TASARIMCININ DİJİTAL SUNUM ÇİZİMLERİNDEKİ BİLİŞSEL KİMLİĞİNİN KARŞILAŞTIRMALI ANALİZİ

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Bilgisayar teknolojisindeki gelişmelere ve bilgisayarlarin tasarım alanındaki yaygın kullanımına paralel olarak, dijital ortam sunumları mimaride bugün sıkça kullanılmaktadır. Mimari sunum çizimleri, mimarların iç dünyalarını, düşüncelerini ve kimliklerini ortaya koyma yollarıdır. Fakat, tasarımcıların bilgisayarlı ortam sunumlarındaki kimlik bilişimi konusunun, geleneksel ortam sunumlarını ele alan çalışmalarla karşılaştırıldığında çok az araştırıldığı görülmektedir. Bunun yanında, yaygın olan kanı, bilgisayarların tasarımcılara kendilerini ifade etmede ve çeşitliliklere ulaşmada potansiyeller sunmak yerine kendi bilgisayar kimliklerini yansıttıklarıdır. Bu çalışmada, mimari sunum çizimlerinde tasarımcı kimliğinin bilişimi karşılaştırmalı olarak analiz edilmiştir. Analiz sonuçları, geleneksel ortamdaki mimari sunum çizimleri gibi bilgisayarlı ortam sunumlarının da tasarımcı kimliğini yansıtmada potansiyeller barındırdığına dair bulgular sağlamıştır.

Anahtar Kelimeler: Mimari Sunum, Bilgisayar Destekli Tasarım, Tasarımcı Kimliği

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1.1. Problem Statement

With the developing digital technologies computers became inevitable parts of our daily lives. In communication, in arts, in science, and in almost any profession, computerization became a necessity in serving for changing and expanding requirements we are faced with. Public and private sectors, work and educational domains along with arts and entertainment became computational at a rapid rate. The way the communication networks are making the physical distances virtually shorter or the way our virtual experiences became as important as the physical ones, are evidences for the extent of computerization in our lives.

Due to the role of architecture in society and in social structures, one may consider architecture as a discipline of communication, where arts and science are integrated. It may be said that the emergence of computers affects the nature of architectural discipline as well. The role of computers in design practice is a reflection of the role of computers in today's world and that is why the computers in design or computational design constitute an extensive area to explore.

Initially, integration of computers to the general building design process was observed primarily in effective coping with the increasing complexity and successful integration of new technologies in materials and construction processes. According to Carrara and Kalay, "[e]ach one of the building design, construction, and management phases requires the support and the integration of different disciplinary skills, whose theoretical, technological, and organizational contents evolve very rapidly through specialization and through the development of new knowledge…[which] further complicates the building design process"(389-90). In this context "designers need to work on giving through design a better control of complexity" (Nadin 55), which may be regarded as the initial reason behind the increasing level of computation in architecture.

However, computers are not only tools that help designers in various stages of the complex design process and assist in the time-consuming drafting activities, but they also offer a new way of approaching to the design problems. Contemporary complex design problems require fluid solutions that allow for the integration of diverse approaches and which open up new possibilities. Regarding these new possibilities Tweed says, "[s]tudents of architecture are primarily taught to 'see' as architects, and new technologies introduce new ways of seeing. Architectural seeing is both a seeing through a tradition and a seeing through the technologies of architectural communication" (625). Therefore, one may conclude that developing computer technologies and architecture have much in common and they affect each other in a higher level than just coping with the complexities of design problems.

While architectural seeing constitutes one way of approaching to the new technologies, architectural representation is yet another area in the design discourses to be further analyzed with the integration of computers. Human cognition is related with the representation and its power "come(s) from abstraction and representation: the ability to represent perceptions, experiences, and thoughts in some medium other than that in which they have occurred" (Norman 47). Representations help us to express ourselves and understand others i.e. communicate with our environment. Laseau brings a historical perspective to the importance of representations:

> "Man used signs and symbols long before written languages were adopted. Early written languages, such as Egyptian hieroglyphics, were highly specialized sets of symbols derived from pictures. The development of geometry, combining mathematics with diagrams, made it possible to think of structure and other abstractions of reality. This led to the construction of objects or buildings of monumental scale from designs. In addition to trying to make sense of his immediate surroundings, man used drawings to reach out into the unknown" (5).

Similar to its role in human life and his interaction with life-world, representation in architectural discipline has an important role as previously non-existing buildings and environments are first created as mental ideas and turn into physical realities through representations. "It is therefore important to view the role of graphics, particularly drawings, not solely as a series of image making techniques, but in the light of its relevance to the advancement of architectural thought" (Greenstreet and Shields 2). For this reason, beyond the new ways of seeing, technology and computers provide architects new dimensions for thinking and representing their ideas.

Carrara and Kalay assert that "[d]esign tools will help architects express their intents and evaluate the economic, social, and psychological and other implications of their proposed solutions" (390). Therefore, approaching to the use of computers in architectural discipline requires a wide scope covering the computer's role in the way architects think, create, and represent their ideas.

1.2. Scope of the Thesis

Regarding the use of computers in overall design practice, Pollalis argues that "The enormous increase in the use of computers has had a significant impact on the design process. Today computers in design cannot be ignored, even by the most conservative practitioners; whether to use computers in design is beyond discussion." (166)

In this respect, designers need to be aware of the situation and prepare themselves for the necessities of computational design. As such, they may make conscious use of the advantages computers provide for them and for the nature of design. Tweed argues the point that computers may help designers to improve their presentations and act as a leveller:

> "Design skills are corporeal as much as cognitive skills. Spatial visualisation and conceptualisation rely on the body's knowledge of being in space. Because we all grow up with bodies that differ in shape, size, motility and kinesthetic awareness, we develop different skills to different degrees. Drawing as a skill, is usually highly idiosyncratic and the results vary accordingly. The ability to master pencil and paper to articulate design intentions will inevitably colour our attitudes to alternatives. CAAD [computer-aided architectural design], in this respect, has been a great leveller. For many students who lack confidence in manual drawing, CAAD has allowed them to present designs at a higher standard of presentation than they could have done before" (624).

However, while thinking about computational design, the physical existence of the computers seems not the only issue to be discussed and moreover, it is not the unique requirement for its application and achievement. The designer is still the key aspect in the design process and the software acts as the communication agent between computer and the designer.

Until recently, the main discussion on computers in architecture focused on the indication that the emergence of computers will change the way architects design and "[s]ince the introduction of the computer into the architectural profession, many have assumed that digital technology would eventually assimilate the entire architectural process: Conceptual Design, Schematic Design, Design Development and Construction Documents" (Flanagan and Shannon 66). Accordingly, software were designed to impose a new way of designing. However, as computers were used more in architectural profession, it turned out that the success of the software depended on the degree it resembled the way designers design with traditional media. Therefore, rather than assuming that computers are radically changing the way designers design, the software are designed to suit the conventional ways of designing. Accordingly, the current discussions in computer-design interaction now focus on the final presentation product rather than the design process.

Within this framework, the scope of the thesis is situated as analyzing and presenting different aspects of the relation between the designer and the computer in terms of achieved differences in presentation drawings. For that matter, a theoretical framework is built upon three key points in this relation:

1. Computer as a representation tool
2. Comparison of traditional and computational tools of representations
3. Designer's identity in computer-aided representation drawings

1.3. Structure and Methodology

On the basis of the previously defined aspects of the relation between computer and designer, second chapter is devoted to the analysis of traditional and computational media of architecture. Traditional and digital design tools and tasks are also presented within this chapter. Third chapter is focusing on different approaches to computer use in architectural design. Therefore, developments in computer technology and computer-aided design are provided. Following, approaches to computer's role in architectural design are discussed both in historical and current contexts with an emphasis on the cognition of designer's identity.

Theoretical framework provided in second and third chapters is followed by an analysis in fourth chapter. An analysis is constructed for the comparison and evaluation of designers' presentation drawings prepared with computer-aided design (CAD) tools and traditional drawing tools.

The comparison and analysis of presentation drawings is carried out based on Durand's classification system. "The difficulty in classifying and comparing [architectural representation drawings] is parallel to the difficulty faced in picture studies to discuss very different styles of pictures" (Durand 55). To handle this difficulty, Willats developed a structural study of representations. Later, Durand adopted Willats's general study of representations into computer graphics for the decomposition of computer depiction and suggested four kinds of systems: spatial, primitive, attribute, and marks. These four systems provide an analytic approach to the analysis of the relation between scene and picture in the light of various dimensions like spatial properties, visual properties like color and texture, correspondence of marks etc. Although developed for the analysis of representations in general, this system analysis is adapted for the comparison and evaluation of architectural presentation drawings in the light of the analysis of transformations in spatial layout, inclusion and exclusion of details, color usage and finally line types in traditional drawings and bitmaps used in computer presentations.

At the end, the level of differentiation achieved in the projects due to the use of CAD tools is to be depicted. This shows the effects of computer use in the design process for achieving variations, as design process is still an activity, which is bound to the cognition of designer’s identity and design in essence requires different interpretations and variations in its outcomes. In short, "[c]omputational design acknowledges the association between tools and users. However, its goal is to turn this into an association of new possibilities, which are meant to become realities through design" (Nadin 43). Therefore this analysis tries to demonstrate how computers in design process affect the outcome as architectural representations and what are the dimensions of the computer use in relation to achieving new possibilities.

2. COMPUTER AIDED VERSUS TRADITIONAL MEDIA OF ARCHITECTURAL DESIGN

With the help of tools, we are able to give shape to our environments, transform the materials into products and build structures to make the life easier for us. Since the early stages of human existence, for the need of communication at a broader sense, we have created tools that enabled us to transform our thoughts and make them visible and accessible to others. From physical tools to words, from music to pictures, humankind used his intelligence to express himself. With his intelligence, human beings designed tools and developed tasks so that he talked and interacted with his life-world and externalized his ideas. Drawing in this respect "is the tool that designers use to 'talk to themselves', as well as the means [or task] by which they externalize their ideas and communicate them to others." (Baker 30)

In architectural design process, "drawing is important […] as an external representation that helps in solving problems and generating ideas. The roles that researchers ascribe to diagrams and drawing in design include:

- generating concepts;
- externalizing and visualizing problems;
- organizing cognitive activity;
- facilitating problem solving and creative effort;
- facilitating perception and translation of ideas;
- representing real world artifacts that can be manipulated and reasoned with;
- revising and refining ideas" (Do et all. 484)

In light of these roles, it may be concluded that drawing is an important means of communication for architects. For understanding the ways drawings are made by designers for the representation of their ideas, one may need to discuss various tools that are involved in the drawing activity.

As the methods of drawing shift from a physical activity, where separate tools are involved in a traditional sense towards a digital activity where the activity is carried out in the computer environment, digital tools are replacing traditional tools of the architect. For making a comparison between these two media (namely traditional and digital media) one may refer to Sanders' table of tasks and tools of architect, which not only describes physical tools -or what is referred in the thesis as traditional tools- but also presents what are replacing them in the computer-aided endeavor (72).

TASK	PHYSICAL TOOL	PHYSICAL MEDIA	DIGITAL TOOL	DIGITAL MEDIA
Sketches	Felt pen	Napkin, trace	Image editing	Bitmap
Diagrams	Magic Marker	Vellum, trace	Illustration	2D graphics
Model building	Exacto knife, saw, glue	Foamcore, wood, whiteboard	3D CAD	3D surfaces, solids
Visualization	Camera	Prints, slides	Rendering, animation	Bitmap, digital video
Graphic documentation	Pen, pencil	Vellum, mylar	2D/3D CAD	Model drawings, plot drawings
Written documentation	Pen, pencil, typewriter	8.5 × 11 paper	Word processing	Text streams
Information management	Pen, pencil, typewriter	8.5 × 11 paper	Spreadsheets, databases	Tables, lists
Publication	Pen, pencil, typewriter	8.5 × 11 paper	Desktop publishing	Composite documents
Presentation	All	All	Multimedia	All
Resource access	Bookshelf	Product catalogs, binders, brochures	On-line services, CD-ROM	All
Communication	Phone, mail, FedEx	All	FAX, E-mail, voice/data messaging	All, digital voice
Archive storage	Tubes, boxes, microfiche	All	Archiving software	Magnetic tape, optical disks

Figure 1. Tasks and Tool of the Architect (in Sanders 72)

Although Sanders' diagram defines the very basic requirements, the content may be further enriched by various other tools for instance standard metric drawing sheet sizes (A-format), certain types of drafting instruments (compasses, dividers, or triangles). However, all these instruments are basics for architectural education and most of the recent and almost all of the former architecture students are familiar with them. These instruments are also subject to change and improvement with new technologies. Therefore, rather than providing a complete list for the tools, it is necessary to look at each stages of architectural design activity or each task, where these tools are employed, in depth to understand how these tools are important or why they are needed in the way of generating architectural presentation drawings.

2.1. Traditional Design Tools and Tasks

Before discussing traditional design tools and tasks, one may need to differentiate tools and tasks of architectural drawing. Any kind of activity employed in various stages of drawing like sketching or rendering may be regarded as tasks; tools are the instruments or better to say media that are used within these tasks. However, the outcomes of these tasks like sketches or perspective drawings can also be regarded as tools of communication for architects.

While discussing traditional tools and tasks and their roles in architectural drawing one may begin with sketches that are freehand drawings, and mainly compromise the early stages of the design activity. In creating a sketch, designers are generating representations of their ideas and reasoning about the problem to be solved. Therefore, Sedivy and Johnson make a distinction between sketches that are used to explore ideas and drawings that are the outcomes of the sketching task (442).

According to Bailey, "[t]he hand sketch is one of the most important tools that architects uses in the design process. Rather than simply being a method [or task] to record ideas, the designer uses the sketch as a means to reason it" (331). Beyond recording and reasoning ideas, sketches are defined by Oxman as behavioral response to visual-mental process: "The sketch is seen as the basis of a visual and mental transaction between the designer and the representation. It is these transactions with the external representation which illuminate the visual-mental processes of designers" (93).

Sketches are commonly used tools in architecture not only because of their potentials to serve idea generation and manipulation processes but also because outcomes of sketching activity are tools for communication. Kivett outlines the characteristics of sketches in this regard:

- "Communications are almost instantaneous.
- A minimum amount of time is required to produce the images.
- Changes can be made on the spot, prior to developing the recommended concepts for implementation" (64).

As sketching is regarded as an early step of design activity and discussed as an important task of designers for "reasoning of visual analogies" (Goldschmidt 57), architectural drafting can be seen as a further step where the aim of drawing shifts towards presentation of already decided solutions. In the case of architectural design, drafting "uses lines, symbols, dimensions, and notes to describe a structure to be built" (Jefferis and Madsen, 71). Unlike sketches, the accuracy of lines and lettering play an important role in the success of the drafting as they are used for coordination and identification purposes. Outlines, construction lines, guidelines, and dimensions lines make the drawing to communicate in details for production purposes. According to Breen and Stellingwerff, technical drawings -the outcomes of drafting-, which are drawn to scale, cover floor plans, elevations, and cross sections. A floor plan is an abstraction and shows overview of different spaces simultaneously. Elevations are projections of facades whereas cross sections provide views of buildings where they are seemingly sawed through. Similar to floor plans, different spatial entities are presented simultaneously in cross sections (47). Electrical plans, plumbing plans, and heating, ventilating, and air-conditioning (HVAC) drawings constitute the latter steps for architectural drafting.

Perspective drawing can be seen as the last step of drawing in architectural design activity before the rendering. Developing a drawing comparable to what is seen when looking at the design project requires the use of perspective drawing method. Perspective drawings present organizations of structures close to their appearance in natural setting (Jefferis and Madsen 627). Moreover, perspective drawings "are notable examples of drawing types that offer a three dimensional suggestion, and as such can be seen as models which can give insight into a concept as a whole" (Breen and Stellingwerf 48).

All of the drawing methods described so far are used by architects either for thinking of problems (as in the case of sketches) or presenting and communicating a solution (as in the case of sketches, technical drawings, and perspective drawings). Rendering as a traditional design task can be regarded as a lateral step used by architects for the presentation drawings. Rendering is used "[i]n order to transform perspective drawing [or plans] into a realistic presentation of the structure […] A rendered perspective drawing typically shows depth, shading, reflections, texture, and entourage or surroundings" (Jefferis and Madsen 643). In other words, rendering brings the presentations closer to the reality, or helps the architect to represent a building as a whole with all its visible features in reality.

Modeling can be seen as a further step of the traditional means of architectural representation if not a step of drawing.

> "The artist's and designer's ability to create has not always been confined to a two-dimensional surfaces. Three-dimensional work has been a major form of expression in both fine art and design […] Three-dimensional objects have also dominated the crafts, and latterly, engineering and architecture, with models and maquettes used for scaled-down or full-size representation" (Baker 48).

Although being a part of architectural representation, modeling is different than above-mentioned presentation drawing tasks due to employing third dimension. In this sense, modeling may be conceived as the final stage of architectural representation. However, when concept models or muck-ups are considered, such tasks involved in modeling may be regarded as a way of reasoning just like sketching.

Until the step of rendering, all of the previously defined steps in traditional drawing require the same tools namely drafting pencils, sharpeners, compass, dividers, erasers, triangles and curves, scales and drafting papers. Besides the several steps of architectural drawing, reproduction of the drawings has an important role in the traditional techniques. Diazo reproduction (also known as blue-print), photocopy reproduction, and microfilms are among the widely used traditional media for the reproduction of architectural drawings.

Looking at rendering in terms of necessary tools and media, sketch paper, vellum, illustration board, graphite lead, ink, colored pencils, markers, watercolors, and airbrush can be called as the widely used tools. However, as rendering may be seen as the reflection of the architect's creativity, many other media may be applied depending on the desired effect to be given.

Finally, in the area of architectural modeling, wood, foam board, cardboard, and clay are widely used mediums, where glue, knife, saw, ruler, and spatula constitute the major tools. Similar to rendering, models are also ways of creative reflection and hence any material and tool to give the desired effect and expression may be applied.

Either as a means of conveying certain details and organizations about a designed form or as a way of expressing designer's creative approach, architectural presentations employ diverse tasks and there are different tools used within each task. Following the categorization of these tools and tasks of traditional design activity, looking at digital design tools and tasks will provide a base for comparison of two endeavors of architectural design.

2.2. Digital Design Tools and Tasks

"Computing has had only a few decades of experience with practice of architecture as opposed to drawing's long history" (Chastain et al. 242). When we think of the nature of digital design drawings and digital tools in this respect, it is not surprising that the concept and the theory behind drafting is almost the same as in traditional ways. However, "[a]utomation will handle more of the routine work such as review of submissions and shop drawings, leaving more time for design or, at the least, making onerous tasks more tolerable to everyone" (Ross 50).

Most of the differences between traditional and computer-aided tools appear in the accuracy and timesaving concerns with the replacement of traditional drawing, rendering and modeling tools by computers and software. Especially the results of the survey of Intergraph "to determine the relative efficiencies of handling drawings in a manual versus computer-based environment" (Fallon 31) presented in Figure 2 make the image comprehensible:

Survey Results on Handling Drawings

Time:	Manual	Computer
To Access	1-48 hours	5-10 minutes
To Revise	2-30 hours	5-10 hours
To Distribute	4-48 hours	less than 1 hour

Figure 2. Survey Results on Handling Drawings (in Fallon 31)

However, leaving the advantages or benefits of one media over the other on one side, it is necessary to look at the changing design tools in the computer-aided media in depth. First of all, computers or computer-aided design workstations replaced most of the tools, which were once the basics for the traditional techniques. For Mitchell and McCullough "a computer takes information as input, executes a process, and produces new information as output: its function is to transform information that we have into information that we want" (9).

Beyond the function of computers as information processing, their capabilities are different due to different types of memories, input and output devices, and processors. Although the computer itself became a constitute for most of the traditional tools, which were necessary in the pre-computer design activity, and became an environment for many of the tasks, the devices necessary along with the computer itself requires an analysis to understand their role in different stages of computer-aided design activity.

For a general overview of the new tools on the designer's desk and new tasks of architectural design activity, one may refer to Mitchell and McCullough's definition: "The input device might be not only a keyboard for characters, but also a digitizing tablet for coordinates, a scanner for images, or a microphone for spoken words. The output device might be a CRT display, a printer, a plotter, a film recorder, a speech synthesizer, or a robot arm" (10). These devices may be listed in relation to their roles as in Figure 4.

Role	*Input*	*Output*
Text processor	Character keyboard	Text display
Musical instrument	Musical keyboard	Sound synthesizer
Speech system	Microphone	Speaker
Read-aloud system	Text scanner	Speaker
Image processor	Video camera	Graphic display
Drafting system	Mouse or stylus	Graphic display
Virtual reality system	Dataglove	Head-mounted display

Figure 3. Roles and Disguises (in Mitchell and McCullough 10)

Besides the computer itself and the related devices, software are another important tools for the steps of computer-aided design. For Mitchell and McCullough, "[t]he modern alchemist's stone, the agent that turns the base-grade intelligence of a silicon chip into the higher-grade intelligence of a sophisticated computer-aided design system, is software-programs and databases that encode architectural knowledge in machine-processable form" (Mitchell and McCullough 5). Hence, diverse software may be regarded as helping the architect to manipulate computers like he wishes and according to his aims. It is also the software in digital design tools that enables an architect to visualize his ideas in two-dimensional drawings or three-dimensional virtual models. Today, with the help of improvements in CAD software, "three-dimensional modeling systems began to climb to the level of photo realistic representation" (Baker 50).

After discussing the computer with its physical devices and giving the definition of software not exactly as a physical tool but as a mean of turning computer into a design tool, it may be concludes that most of the stages of architectural design activity in digital media and digital design tasks are carried out through the use of diverse software and various input and output devices along with their different roles. There are certain possibilities of making one on one comparison between traditional and computer-aided design tools and tasks because the concept and the theory behind drafting is almost the same as in traditional ways. However, looking through a broader perspective, one may state that computer-aided design activity brought new and relatively different phases for architectural design and drawing activity.

2.3 Digital versus Traditional Media of Representation in Architecture

In the light of the changes among design tools and tasks and with the integration of computers to the architectural design profession, the design studio with its design tools can be seen in a way of transition. Traditional drawing and modeling tools are replaced by computer-aided design drawing and solid modeling systems and knowledge-based systems became substitutes for experts and consultants of traditional means. However, "[e]xploring new uses for the medium of computing, experimenting with new techniques, providing genuinely new solutions to new problems, and-above all-humanizing the technology" (Baker 198) remain the responsibility of designers to transform architectural practice for tomorrow's expectations.

While discussing humanizing the technology on one side, digital tools and tasks can also be seen as media to deal with information one gather from outside and to process them in order to understand or to use for creating new information. Today, considering the amount of information available, ways of reaching the information and means of organizing them to deal with successfully became important issues for everyone. Especially considering the vast amount of digital information, our connectedness to the world increased more than ever overcomplicating the situation:

> "We are entering an era in which designers -along with almost everybody else- will be required to deal effectively with quantities of digital information that are orders of magnitude too vast to be handled by traditional means. The rate at which digital information arrives will continue to pick up pace, and there will be a growing need to react and make decisions at an extremely rapid rate" (Mitchell 388).

With this increase in the ways of communication and sources of information, media of design demonstrate a rapid change and transformation. At this point, it is a necessity to compare traditional and computer-aided media of architectural design to understand their effects and the changes in the nature of design activity accordingly.

To begin with, one needs to define basic stages involved in the design activity in both traditional and computerized endeavors.

Stages of Architectural Design Activity

With Traditional Media	With Computer-Aided Media
Drawing	Drawing
Rendering	Rendering
Modeling	Virtual Modeling
	Animation
	Simulation
	Virtual Reality

Figure 4. Stages of Architectural Design Activity (in Sanders 75)

As given in Figure 5, in architectural design activity with traditional media, drawing and rendering activities are followed by the physical construction of the model for the designed environment. With the use of computer-aided media, on the other hand, several changes happened in the nature and content of the design activity. First of all, besides the changes in the tools for drawing and rendering, physical modeling activity is replaced by the virtual modeling, where buildings are constructed in virtual environments.

Beyond the abovementioned parallel stages of architectural design activity with traditional and digital media, animation, simulation, and virtual reality are completely new steps added to the design process after computer-aided design is introduced. “One approach at circumventing the limitations of design-build while retaining a significant portion of the virtues is to exploit the computer’s ability to represent ‘real world’ situations and provide a virtual design build environment” (Clayton et al. 229). Today, most of the workload of the perceiver of an architectural representation is carried out by computers through the virtual environments that allow the person to get into the designed environment and experience the space at certain levels rather than making predictions based on plans and perspectives. Moreover, with the powerful computers the ability of designers and clients are extended to play with alternatives because solutions are generated very rapidly (Ross 50).

Beside these primary differences, Belfour makes the comparison of both endeavors of architectural design in terms of their influences towards the nature of the activity:

> “In pre-electronic studio activity, the imagination would conceptualize from a wide array of influences, historical, technical, and phenomenal. Influences that were, in other words, external, diverse, physical. Designing with electronic media involves a complete inversion-it is an internalized, constrained, and virtual experience in which the creative relationship to the tools and information held within the machine seem to be more stimulating and to hold more promise than the experience of place, or the lessons of history” (271).

In brief, traditional tools and tasks of design activity are developed in parallel to the developments in architecture. For different needs and purposes, diverse tools are developed and various tasks are added into the design activity. The tasks of digital design activity are similar in essence to the ones of traditional design activity.

However, traditional tools are mainly replaced by computers and software, which also added new tasks for architectural design.

Following the description of design activity and looking at the tools that are used in traditional and computer-aided media in depth, approaches to computer use in architectural design may be analyzed in order to understand and draw the picture of the change in the architectural practice with the use of computers.

3. APPROACHES TO COMPUTER USE IN ARCHITECTURAL DESIGN

The history of computers in architectural design is almost as old as the history of computers. The introduction of computer related technology into the design domain dates back to late 1950's. If one take the use of computers as a revolution in architecture, it is possible to state that it is a very recent development as compared with the history of architecture; however, its effects in terms of advance in the methods and applications in theory and practice of architectural design are remarkable.

For understanding different approaches to computer use in architectural design, it is essential to analyze developments that took place in the computer industry because advances in computer-aided design and computer-aided architectural design are somehow parallel with the history of computers. For this reason, following chapters outline the brief historical background of computers and computer-aided design. Subsequently, the effects of computer use in architectural design and debates on its effects and outcomes are presented both in historical perspective and in current literature.

3.1. Historical Background of Computer Technology

For the early developments in computer technology, one may refer to Mitchell, who categorizes the evaluation of computer technology from 1950's to 1970's under four generations, which have a cycle of about 6 years:

Generation I: Generation I stands for the first commercially marketed computer since 1950's like UNIVAC I, which were used for scientific computation and business data processing. There were limited software provided for these low speed and limited-memory capacity computers.

Generation II: Generation II lasted from 1959 to 1965 and computers in this generation like IBM 7090, Philco 2000, and CDC 6600 brought a reduction in physical size and larger capacity in terms of memory. There were also advances made in software and computers became accessible to a wider range of users.

Generation III: Networks of remote terminals and sophisticated new types of software are major changes for the third generation along with further miniaturization in size and further improvements in performance. IBM 360 series and the UNIVAC 1108 are examples of this generation. 1971-1972 is the beginning for the fourth generation, where very small and cheap minicomputers like Digital Equipment Corporation's PDP-11 and MITS Altair 8800 were introduced. It is also the time when computer hobby stores began to appear (Computer-Aided 18-20) which may be a good example how computers became public unlike its early examples used only in university laboratories and large industries.

The four generations defined by Mitchell are continued by the introduction of personal computers with CRT displays and keyboards by the pioneers like Apple and Commodore in early 1980's. It is also 1980's, when minicomputers became standard in general business use. IBM led to a significant change in the computer technology with the introduction of the IBM PC, with a single operating system. Meanwhile, Unix workstations became popular for CAD applications. Later, developing technology of 1990's turned computers into even smaller and less expensive devices compared to the previous examples. Computers became faster and because of their popularity, personal computers were recognized as standard business equipments. Microsoft Windows made the use of personal computers even easier with its graphic user interface (Gibbs 34-36).

Currently, later versions of Microsoft Windows (Windows XP) are used in today's PC's. Moreover, with the ever-increasing capacity and capability of the computers, 3D graphics-once only possible to display in the large computer systems of engineering industries-became standard for the simplest computer games. Computer technology seems to continue developing making computers even smaller, cheaper, but most importantly accessible to everyone and to every architect.

3.2. Historical Background of Computer-Aided Design

Similar to the developments in computer industry, computer-aided design and computer-aided architectural design had a parallel evolution. Initial use of computers in architecture was to assist in engineering analysis. By the middle of 1950s, computers were widely used in engineering firms and programs were written for the calculations, which were done by hand previously (Milne 30).

Later, "[t]he emphasis on CAAD [computer aided architectural design] research shifted from developing better engineering analysis programs to finding more efficient modes for bringing the emerging design solutions to the computer: computational representation of buildings took center stage" (Kalay, Future of

CAAD 2). Early representations in 1960s were simple line drawings as Sutherland mentions the problem of gray scale picture production (hidden lines and shaded surfaces) as one of the ten unsolved problems in computer graphics in his 1966-dated article (77).

Although the interest towards the potentials of computer-aided architectural design had a rapid rise in the academic field during 1960's, applications of computer-aided design in architectural practice spread relatively slow. Engineering firms in the fields like automobile and aerospace, hosted computer technologies in design much earlier than architectural firms for which the reason was mainly economic. The budget for design in engineering firms was much larger than architecture firms and so was the capability of providing investment in new technologies. As technology continued to develop and the costs of computer systems declined accordingly, computer-aided design widespread in architectural practice during 1970's (Mitchell, Computer-Aided 15). Computer aided architectural design also began to appear in university curricula, in the subjects of conferences and workshops, and in a number of technical journals (e.g. *Computer-Aided Design*) in this period (Mitchell, Computer-Aided 18). "The late 1970s may be characterized as the time of CAD's breakthrough from a scientific endeavor to an economically attractive and-in many ways-indispensable tool in industry" (Encarnacao, Linder and Schlechtendahl 10).

From the period of 1970's till today and looking from a future perspective, Suzuki describe the developments in CAD in terms of their area of use under four stages as briefly described in Figure 6.

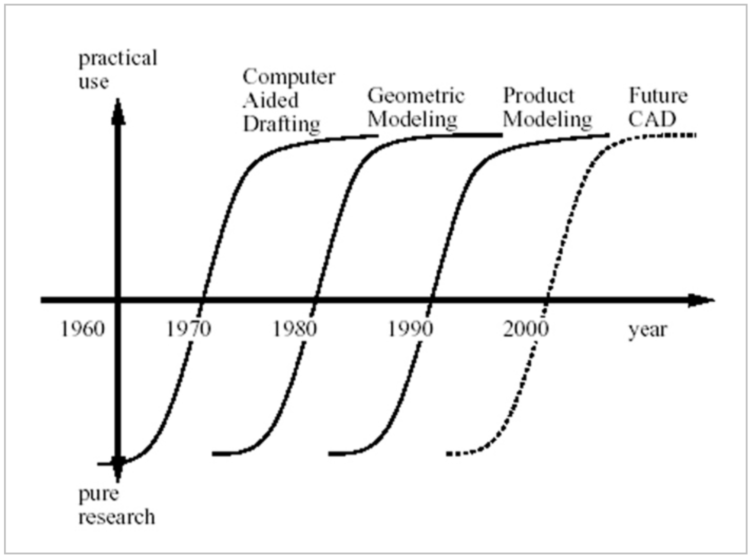

Figure 5. Four Generations of CAD System (in Suzuki 541)

Although Suzuki explains the generations of CAD in terms of their two-three dimensional drawing and modeling capacities in engineering product modeling, the capacity of CAD systems in architectural practice is almost the same in reference to Figure 6. In the first generation around 1970s, CAD was used for two-dimensional drafting that is to say generating plans and layouts. The second generation in 1980s covered the first three-dimensional constructions of buildings in CAD programs although they were simply geometric representations. Third generation covering 1990's is more related with the realization of the drawings: surface renderings and material assignments, improved lighting and shading, and generation of virtual-real representations. For the developments took place in the CAD systems, Suzuki comments on the decrease in the amount of difference while moving from one era to the other:

> "From the mid 1980s, researchers have moved toward 'Intelligent CAD' and actually many of so-called design expert systems were developed […] However, the criticism is that difference between the generations has became

> more unclear as the generation proceeds. The difference between pre-CAD era and the first generation was obvious, because drafting tables were replaced with computer terminals. The difference between the first and the second might be seen in the image on the screen which changed from two dimensional to three dimensional […] [For the difference between second and third generations] there is not apparent improvement in the productivity of the industry against the huge investment on CAD" (546).

Suzuki's analysis questions the future of CAD. For the future, Suzuki underlines several directions for the expansion of CAD namely,

> "1. Activity Model: models of human activities in product design, process design, etc.
>
> 2. Process Model: models of physical behavior of the product [building in our case].
>
> 3. Conceptual/Functional Model: more abstract model of product's [building's] attributes and functionalities" (547).

Directions for the expansion of CAD given by Suzuki describe how the future CAD systems may help designers, engineers, and architects in a broader perspective. Especially conceptual/functional modeling may bring computer technology more into the center of design activity by integrating computer technology and abstract models, which are regarded as possible only in human mind.

3.3. Approaches to Computer Use in Architecture between 1950 – 2000

The accelerating pace of the spread of computers use in architecture as briefly outlined in the previous chapters is not merely related with architects' own decisions. "Technologies are not planned, but rather, they are emerge from our culture as it learns and builds. Perhaps because of this, their effect on our practices is rarely guided by reflection" (Chastain et al. 237). The digital age brings the computers into the very core of any profession while making problems more complex every day.

Architecture in this sense is not an exception regardless of its creative and humane nature. For this reason, the wider use of computer technology in architecture also brought new discussions into the agenda of design theory. Sides outlines the context of architecture in relation to the use of computers in 1975 as

> "1. The nature and character of the current practice of architecture are anticomputer, not by design but in effect.
>
> 2. The nature and character of the individual architect are anticomputer, not by deliberate choice but by predisposition.
>
> 3. The 'state of the art' of Archiputer predicates against great leaps forward" (131).

In the light of these problems and seeing the phenomenon as, "a meeting of an infant science with an explosive future and a mature art with a proud history" (Sides 135), he stated that most of the architects will not use computers in the future.

Mitchell discusses the situation of computers in architectural design with a different point of view in his 1977 dated book *Computer-Aided Architectural Design*. Seeing design as problem solving, he argues that even stylistic variations might be achieved with computers:

> "A creative designer will not only produce an 'original' solution to a design problem, it is also likely that the solution will display certain recognizable stylistic properties. The idea of a solution possessing stylistic properties is meaningless if a problem is well-defined and there is one solution […] But where the goal set *G* contains numerous acceptable solutions there is room for variation, and different solution generation procedures may tend to generate characteristically different subsets of *G*. This holds whether the problem solver is a humane or a machine. So in principal we may expect that an automated design system might display not only originality, but a characteristic style as well" (59-60).

Coming to 1990's, it is observed that computer aided architectural design researches are focusing more on the design process and human cognition and also methods of improving the design process and its results. Knowledge-based systems for CAD are discussed within this context. Carrara and Kalay stated that, current CAD systems lack the cognitive aspects and therefore computational means of learning, creativity and judgment need to be supported by CAD systems for effectively serving the architectural design process.

Since the beginning of the use of computers in architectural practice, there are endless efforts towards developing new ways of computerization the architectural design. However, what we may conclude from Sides, Mitchell, Carrara and Kalay and the previously outlined researches on CAD is that, besides endless efforts towards developing new ways of computerization the architectural design, there were also opposing ideas on the conflicts between human nature and nature of design on one side, computers and its own techniques on the other side. Knowledge-based systems are therefore suggested to fill the gap between concrete methods of computers and flexible nature of architectural design process and human cognition.

More recently, the discussions in the literature moved from seeing computers as a way of improving creative design process towards using computer technologies as a tool just like the traditional tools and tasks for assisting designer's reasoning and communication acts in representations. Seeing computers within these perspectives, recent debates on Touch versus Tech – designers' versus computer's identity and non-photorealistic rendering with computer depiction in the architectural representation drawings compromise the essence of the following chapter.

3.4. Contemporary Discussions

As representations and drawings have great importance in architectural communication, "much of the education of the architect is spent towards learning to draw. This education includes learning to reason with lines and understanding the drawing as a shared conventional practice" (Chastain et al. 241). Computers in this context of architecture are regarded as great enhancement because of their potentials to present the reality in drawings. However, being as close as possible to the reality and improvements leading to photo realistic representations are no more evaluated as the only direction for CAD. Rather, in recent studies, possibilities of representing designer's identity through CAD drawings and in this sense, using computers for generating non-photorealistic representations are analyzed. Therefore, before discussing recent approaches to computer use in architectural design, one may need to discuss what is covered under identity in representation drawings.

3.4.1. Cognition of Identity in Presentation Drawings

For understanding cognition of identity in architectural presentation drawings, one may look at cognitive psychology of art or better to say, as the name of Parsons' book identify *How We Understand Art*. Parsons calls three kinds of cognition: the empirical, the moral and the aesthetic. He states that referring Habermas, the difference between these three kinds of cognition comes from their relation with three different worlds: "the external world of objects, the social world of norms, and the inner world of self" (xiii). For this reason the aesthetic cognition is related with the inner world of self. The self may be regarded as the self of the artist and the designer, or the spectator. Therefore cognition involves both sides of the representations: the one who represents and the one who perceives. However, for the scope of this thesis, the artist's or better to say architect's world of self and intentions to externalize this world taken as the base for the analysis of his or her identity.

Identity in architectural presentation drawings is related with style. Danto draws the relation between style and the character or personality:

> "The structure of a style is like the structure of a personality. And learning to recognize a style is not simple taxonomic exercise. Learning to recognize a style is like learning to recognize a person's touch or his character" (207).

Representations are related with externalization of ideas and thoughts. Bruner states that externalization "produces a record of our mental efforts, one that is 'outside us' rather than vaguely 'in memory'… It embodies our thoughts and intentions in a form more accessible to reflective efforts" (qtd. in Yamamoto et al. 376). In this sense, representations or presentation drawings may be "personal and intuitive" (Do et al. 485). Architects use presentation drawings to externalize their ideas and meanwhile represent their design solutions. As each architect has a different inner world and different ideas and thoughts, the way they externalize this ideas is very much related with their identity.

For the analysis of architect's presentation drawings in chapter four, aforementioned notion of externalization of self is taken as achieving differentiations in outcomes. In this respect, under current discussions of computer use in architectural design, discussions that focus on designer's identity are presented. As a way of achieving expression of one's self and his or her identity, non-photorealistic rendering (NPR) is also presented in this regard.

3.4.2. 'Touch' versus 'Tech'- Designer's Identity vs. Computer Identity

Computers are computerized tasks similar to traditional tools and tasks in the way that they help designer's to externalize their ideas and thought. "Before PCs became a part of the design studio, ideas were communicated through hand-drawn sketches and renderings. The PC revolution and the unprecedented availability of sophisticated, inexpensive computer visualization tools have radically changed the way design ideas are represented" (Budd et al. 1). Although this change attracted many architects and raised the interest to the advanced computer graphics, it was also this change which opened the discussion 'touch versus tech: hand-drawn or computer rendered techniques' (Shu 170).

Shu describes the situation, quoting Oles, as "Touch lives and works in growing fear that Tech, with its invincible computers, will sooner or later 'move in' or 'take over', obviating the need practitioners with merely traditional skills. Tech, on the other hand, often perceives Touch as becoming rapidly irrelevant, obsolete, and dispensable" (171).

There are various reasons behind the discussion on 'touch' versus 'tech' as there are various superiorities of one medium over the other. 'Touch' still carries widely accepted and respected artistic values because of its old traditions and history - older than the history of architecture when drawing alone is considered. Moreover, 'touch' provides some levels of ambiguity or uncertainness when initial sketching activity is considered. This ambiguity is somehow necessary for its openness to develop and investigate initial creative ideas. 'Tech', on the other hand, is regarded as superior due to its precise drawing possibilities and capabilities in presenting complex geometries. Collaborative design is yet another issue that is brought into the agenda of design and analyzed by many researchers (Chiu, Laiserin, Myers, Rosenman and Wang, Sherry and Porter) in the light of developing technologies and through 'tech's' supporting simultaneous teamwork.

Regarding these differences and qualifications of either medium, some architects began to employ both media and create hybrid representations (Shu 172). There are also certain computer programs developed to "mimic traditional media like Adobe PhotoShop or Alias/Wavefront Studio Paint. These software applications allow the designer to draw and paint with virtual simulations of traditional media" (Budd et al. 3), which may be seen as a collaboration of two approaches: 'touch' with 'tech'.

3.4.3. Non-photorealistic Rendering (NPR)

As some architects prefer to employ computers in presentations and in parallel to the development of some software packages that generate traditional looking presentations, non-photorealistic rendering (NPR) through computers became a research area among many computer scientists and software developers.

> "Computer graphics has long been defined as a quest to achieve photorealism. As it gets closer to this grail, the field realizes that there is more to images than realism alone. Non-photorealistic pictures can be more effective at conveying information, more expressive or more beautiful" (Durand 55).

Durand's approach to non-photorealistic pictures is related with the cognition of designer's identity through presentation drawings. As representations are ways of externalizing internal world, there are various methods developed within the field of NPR some of which suggests new methods for generating hand-drawn looking digital images and some of them discuss ways of achieving sketchy animations (Lansdown and Schofield, Masuch and Strothotte, Masuch et al., Meier).

The reason for the developments in non-photorealistic rendering is two fold:

1. Computers became essential part of today's presentation drawings including architectural presentations and non-photorealistic rendering is related with the use of computers in artistic drawings.
2. "Most Pictures do not only represent visual properties of the scene. The purpose of a picture [and a presentation] can be a message, collaborative work, education, aesthetic, emotions, etc." (Durand 59).

The first reason is a natural outcome of the developments in computer technology. The second reason, on the other hand, related with the nature, content, and the purpose of representations. Therefore one may conclude that non-photorealistic rendering aims at achieving renderings that both accommodate computers as tools and tries to move computer renderings from being an exact copy of the scene to the level of representation of the scene. In conclusion, NPR resembles a new era for computers in design and representation.

All of the current discussions on approaches to computer use in architectural design meet in the same ground: appreciation of designer's identity in computer era. As Gero argues, study of humans in design head to enrichment of theories of designing and making more appropriate tools (61). In this sense, rather than how technologies shape the design process, how designers use technologies to apply their identity into the design and representation became crucial.

In the light of the current approaches to computer use in architectural design process and architectural presentation drawings, the following chapter provides an analysis of digital presentation drawings of architects. The analysis searches for the base of discussing cognition of designer's identity as differentiations and variations achieved by computed media with a comparison of traditional media of architectural drawing.

4. ANALYSIS OF PRESENTATIONS

As developing technologies and computers affect our life in a broad perspective, architecture as a profession finds its place within this perspective. One way of approaching developing technologies and computers in architecture is to analyze what they bring to architectural seeing and architectural design process.

Architectural representation is yet another area in the design discourse to be further analyzed with the integration of computers. As Asanowicz puts forward, "[i]nformation technologies offer the possibility to model, manipulate and understand design in new ways. The possibilities of the computer, its form-creating potential and interactive abilities, together with the presentation of what was created and also of the entire process of creation, describe to us the areas where we can find the beginning of some new conventions" (qtd in Asanowicz 293). In the light of these developments, before discussing the details of the analysis, it is necessary to look at the importance of representations in architectural discipline and the potentials of new technologies in this respect.

Human cognition is related with the representation and its power comes from abstraction and representation. In this sense, representation is "the ability to represent perceptions, experiences, and thoughts in some medium other than that in which they have occurred" (Norman 47). In relation to architecture, it is also "a process that faithfully records all the pertinent characteristics of the designed artifact, so that it can be communicated to others and so that it can be tested" (Kalay Arch132). In this sense representations help us to express ourselves make others to experience our ideas, concepts, and designs.

Representation and drawing in architectural discipline have an important role since it is through these representations that mental images of previously non-existing buildings and environments turn into physical actualities. Moreover, "representation refers to not just the appearance but also to the appropriateness of chosen geometry and form" (Lau and Maher paragraph 12). For Durand,

> "Drawing serves to render account of ideas, whether one studies architecture or whether one composes projects for buildings, it serves to fix ideas, in such a way that one examine anew at one's leisure, correct them if necessary; it serves, finally to communicate them afterwards, whether to clients, or different contractors who collaborate in the execution of buildings" (qtd. in Vidler 9).

Besides the importance of presentations in architecture, architectural discipline in general and presentations in particular are seen as creative activities. Like in any creative activity, originality and uniqueness of the outcome and the characteristics or identity of the designer play an important role. Therefore over centuries, hand drawings of architects served not only as presentations of an idea but also as creative and characteristic reflections of designer's identity.

However, introduction of computers into the design domain and with the computational presentations, the idea of "a person's touch" (Danto 207) or 'characteristic reflections of identity' is replaced by the thought of limitations of computer-aided design in creative process of design. Grusdys defends hand drawings and states "with drawing, the subject becomes intimately familiar as an unmediated extension of oneself. Drawing [with traditional means] is not just representation; it helps the architect to think ideas through, allowing their independence from the tools that mold them" (65). Similarly Lawson and Loke say "CAD drawings are insufficiently conversational but seem more like imperative statements made by computer leaving little or no room for further contributions from the designer" (178).

There are also contradictory ideas stating that beyond the new ways of seeing, technology and computers provide architects new dimensions for thinking and externalizing their ideas. Moreover, these new dimensions in presentations were not possible to be achieved by traditional methods. For Marx, "[r]ecent advances in computer hardware and software have opened opportunities for a digital design process that does not diminish but rather enhances creativity" (paragraph 8). Regarding presentation drawings in architecture and the emerging capabilities of computer-aided design in architecture, Vidler argues that recent buildings and projects in architecture are not simply 'aided' by digital means but more importantly 'generated' with new possibilities of computers (6). Moreover, Chang and Szalapaj underline architects' being bound and tied to traditional constrains in presenting their work even after more than two decades of CAAD (computer-aided architectural design) development and state that "computational presentations of architectural design concepts have their own conventions of use" (560).

4.1. Aim of the Analysis

In the light of the aforesaid discussions in the computer-aided design domain, a study for the analysis of traditional and computer-aided architectural presentation drawings has been carried out. It is an important point to be mentioned that the analysis is not focusing on what kind of roles computer has today or might have in the future in the general design process. Rather it is focusing on the outcomes and presentations of the designed buildings. For Ulusoy, "[w]ithin the context of understanding design, graphic expressions of a design product done by someone other than the designer himself/herself can be taken as cases of visual thinking or visual conceptualization, as they involve visual interpretation" (124). Visual interpretation constitutes an important portion of representation and one's cognition. Therefore, the analyzed presentation drawings are made by different designers than the participants of the study, or better to say, participating designers were not asked to design a building but present the given buildings.

Traditional media presentation drawings are regarded as having a language, character, and identity of its designer and being different from each other in this regard as presented in the third chapter. Recently computers became widely used presentation tools, and therefore computer generated presentation drawings have been analyzed from the same viewpoint of traditional drawings: whether containing similar visual qualities and being different from each other due to expressing designer's identity or not. Moreover, if they contain, what these qualities are in CAD drawings that make us to define as the appearance of designer's identity compromised the essence of the analysis.

4.2. Methodology and Determination of Tools and Tasks

In order to understand the identity issue in both traditional and computer media presentations and make a comparison, a study is carried out within three sections including two design sections and an interview section as shown in Figure 6.

Design Sections		Interview Section
Traditional Media	Computer Media	
Section A	Section B	Section C

Figure 6. Sections of the Study

Two design sections aim at observing differentiations achieved in the architectural presentation drawings. In this light, the first section (Section A) asked the participants to draw the given image or better to say to present the building on the given photograph by traditional means on an A4 size drawing paper and without using computer. Therefore, participants were asked to use drawing pencils and colored pencils as medium to prepare their hand-drawn presentation provided that they submit an A4 size single page at the end. Moreover they were also free to add any visual qualities to their presentations according to their own choice and style that is to say project did not ask a simple copy of the given image rather presentation of the given building. However, to successfully separate the presentation process from design process, sticking to the general layout of the given image was a requirement.

The following section (Section B) was for the preparation of the presentations in the computer environment. Participants were asked to model given building using the software '3ds max' and prepare a final digital A4-size printout of their presentations. As in the former section, they were not limited with a single direction of achieving almost the exact copy of the given image or a photo-realistic drawing.

> "A non-photorealistic image can differ from a photorealistic image in shape, color, texture, light and shadow and even can leave out details in order to simplify the visual impression. Thus, the resulting image may have different

> levels of detail, i.e. fine detail in interesting areas and just rough lines in less important areas" (Masuch and Strothotte 92).

Therefore participants were free to use the potentials provided by the computer technology for creating their 'own' presentations of the given building provided that the graphical layout of the image was untouched.

Completing both sections, results are analyzed and the achieved differences and characterizations (if any) are evaluated to be bound to designer's cognition, as the given projects are same for every participant. With the comparison of the presentation drawings made by every designer, potential reasons that may make the outcomes different from each other in both sections (traditional and computational) is the key point to be analyzed and structured.

The interview section (Section C), on the other hand, intended to discuss and compare the outcome with the given drawing with every designer to analyze their approach verbally and to understand the reasons of potential differences in depth. Therefore, interview section was conducted separately with each participant.

Although the evaluation is based on the presentations of the participants completed within two design sections, the interview section provided an intense analysis of designers' approach towards two media for design and presentation in architectural design. The questions asked within this section are:

1. Have you achieved what you had in your mind when the project was given and have you fully expressed your identity in both design sessions?

2. Which session do you regard as the best presentation of your identity and why?
3. Which media do you prefer in your professional life and why?
4. How could a medium fully present designer's identity?

Questions of the interview aimed at addressing designers' internal world along with their aims and intentions, which may not be well defined in the evaluation and analysis. Their preferences are also asked to draw the relation between developments in CAD and professional practice of architecture. Finally, participants' ideas for ideal media reflecting designer's identity in full is asked with the aim of drawing the picture of designers' expectations and potential developments in computer media.

Lastly, there was no time limit assigned for the participants at any section of the study so that they were free to work on their drawings until they were fully satisfied with the outcomes.

Following the aim and details of the study and analysis, it is necessary to explain how the selection of the group is conducted and what is covered under the methodology in terms of design topic and the software and media.

4.2.1. Selection of the Group

Selection of the group to participate the study involved a pre-interview of twenty-five designers. An important criterion while selecting the pre-interviewed designers was the capability of using computers in presentations. As there are various software used in CAAD, the pre-interviewed designers were chosen among the ones who are successfully using ‘3ds max’ in their routine design process as the participants of the study are expected to prepare their presentations using this software. The reason behind this criterion was to provide equal conditions for each participant and avoid any differences in the presentations that are bound to the software’s capability.

Finally, six of the twenty-five pre-interviewed designers are selected in relation to their interest and enthusiasm towards participating the study and spending necessary time for the completion of design sections. The profession of these six participants, their level of professional experience, and their level of experience with ‘3s max’ software are shown in Table 4.1.

Participants	Age	Sex	Profession	Professional Experience	Computer Experience
Participant 1	25	Male	Industrial Designer	3 years	5 years
Participant 2	28	Male	Architect	4 years	7 years
Participant 3	24	Female	Industrial Designer	2 years	3 years
Participant 4	23	Female	Interior Architect	1 year	4 years
Participant 5	26	Male	Architect	3 years	3 years
Participant 6	25	Female	Interior Architect	3 years	2 years

Table 4.1. Qualifications of the Participants

As seen in Table 4.1, there are two architects, two interior architects, and two industrial designers participated to the study. Today, CAD tools are not only used in architectural design, but also in other design fields like interior architecture and industrial design. Moreover, as the study involves only presentation drawings and does not asks the participants to design an architectural building; this diverse participation to the study is regarded as a possibility to broaden the results into general design domain.

There is also a level of variations in ages and the professional and computer-usage experiences of participants. Age of the participants ranges from 23 to 28 and their professional experience ranges from 1 to 4 years. Moreover, the least computer-experienced participant was using computer tools and tasks in design for 2 years and the most experienced one for 7 years.

The data shown on Table 4.1 are collected within the pre-interview, as the capability of using the software was an important criterion for selection.

4.2.2. Selection of the Design Topic

As mentioned earlier, in both design sections, participants were asked to present the buildings in the given pictures. The first picture to be represented by traditional media is a view of Kız Kulesi – a historical tower in Istanbul, Turkey (Figure 7). The building is selected because of its simple yet rich massive form.

The second picture to be presented by using computer as the medium, a view of Aladdin Mosque in Niğde, Turkey can be seen (Figure 8). Again a historical building is selected. The reason behind the selection of this building is similar to the first section as the building has a simple form and the image provides an undemanding 3-D view, which is easy to model in computer media and it is possible to complete the presentation drawing in one session for advanced computer users.

F**igure 7.** Kız Kulesi, Istanbul, Turkey (Turkish Ministry of Tourism web site)

Figure 8. Alaeddin Mosque, Niğde, Turkey (Baloğlu 85)

The main concern while selecting two different images for two design sections is avoiding the participants' getting familiar with the features of the building to be presented while moving from one section to the other. On the other hand, some characteristics of the selected buildings are kept similar with the aim of keeping the design problems of both sections as equally difficult as possible for avoiding any bias:

- The observation tower of Kız Kulesi stands for the minaret of the Aladdin Mosque and both provide certain visual complexities as compared to the whole body.
- The main building of Kız Kulesi, which is used as a restaurant today, has a simple rectangular shaped form like the main building of Aladdin Mosque, which is used for gathering during ritual worship.
- Domes at the roof of Aladdin Mosque have almost similar formal qualities with the roof of the observation tower of Kız Kulesi and so are their enterences.
- Kız Kulesi stands alone in its environment and surrounded by sea without any other buildings and Aladdin Mosque rest on a grass-covered surface, where no other buildings are within the sight.
- The former image provides a not clearly visible background, which is mainly filled with trees, and in the latter image mountains compromises a background with certain level of shades.
- Finally, the sky in both images is clear without any clouds.

Although both buildings have simple forms, it was thought that there are also enough complexity levels in terms of different light effects, shades, reflections; different materials like stone, brick, metal, etc. which allow the designer to evaluate, interpret and use his or her creativity to express.

4.2.3. Selection of the Software and Media

Participants are asked to use '3ds max' for the completion of Section B of the study. This program is chosen for its capacity in modeling using standard primitives, various modification possibilities and nurbs surfaces along with visualization options through image mapping, texturing, lights and rendering capabilities (discreet web site) and its widely usage among design professionals. Prior to the study, participants have worked on similar projects through out their professional and educational life, which is regarded as that they are familiar with the type of project to be carried out. The reason for limiting the software is providing equal conditions for every sample and also to avoid and differences that are the results of the media rather than designer's contribution.

4.3. Implementation and Analysis

At the end of the study, twelve presentations were collected from six participants. Six presentations were gathered after Section A, which required using traditional media (drawing pencils and colored pencils in this case). Other six presentations, on the other hand, were prepared by using digital media in Section B.

Every participant is referred by a code P*x* where '*x*' ranges from 1 to 6. The presentations are labeled according to the code of the participant and according to being prepared in Section A or Section B. Therefore, the label of the presentations indicates both its designer and its section. For instance, P2-a refers to the presentation made by the second participant for the Session A. In the forthcoming sections, while referring to the presentations, their label names will be used. All of the presentations are given in Appendix B p. 83-94.

For the evaluation of collected presentations, Durand's computer depiction classification method is introduced, which aimed at discussing goals and context of computer depiction. Durand's method is based on Willats's classification of representations. Willats developed a structural classification of representations not only for fine arts but also any kind of picture from child's drawing to sign or logo. In his study, he classifies two systems: drawing systems and denotation systems. In Willats's words, "[d]rawing systems [are] the representational systems that map spatial relations in the scene into corresponding relations on the picture surface" (367). For denotation system he brings the definition of "[t]he representational systems that map scene primitives into corresponding picture primitives" (367). To summarize Willats's theory, representations may be classified according to their ways of representing the spatial relations on the scene (like using oblique projections or perspectives) and the primitives applied (like using points, lines, or regions).

Durand considers Willats's framework as a base for his proposed method of classification of non-photorealistic renderings and defines four kinds of systems:

> "**Spatial system:** The spatial system deals with the spatial properties of the picture […]
> **Primitive System:** The primitive system maps primitives in the object space (points, lines, surfaces, volumes) to primitives in the picture space (points, lines, regions) […]

> **Attribute System:** The attribute system assigns visual properties such as color, texture, thickness, transparency, wiggleness, or orientation to picture primitives […]
> **Mark System:** The mark system is the implementation of the *primitives* placed at their *spatial* location with the corresponding attributes" (56-63).

Durand does not provide an application of his system, but argues that above-mentioned four systems "provide a vocabulary to discuss basic techniques and to relate computer depiction to traditional picture production" (57). Therefore, for the analysis of architectural presentations in computer and traditional media endeavors Durand's four systems are adapted and used as a base for classification and evaluation of the study. In this way, not only an implementation for Durand's computer depiction methodology is provided, but also a systematic approach to the analysis of architectural presentation is provided.

For the spatial system analysis, the distortions on the presented building silhouette in comparison to the original picture silhouette are analyzed. Primitive system analysis is carried out to discuss the provided details of buildings in their picture plane and their inclusion or exclusion on the corresponding spatial locations in presentation plane. Colors and color choices constitute an important criterion for the comparison of presentation drawings. Hence, for this study attribute system analysis is constructed on the color usage of participants in both media presentations. Finally, under the mark system analysis, diverse rendering methods applied in traditional presentations and different usage of maps in computer-aided presentations are shown and they are regarded as a source for gathering information on designer's identity. According to Durand, "[t]he systems presented […] permit a principled coarse-grain decoupling of depiction issues. They are crucial to understand the various aspects of depiction. Nevertheless, it is equally important to discuss the complex interaction between these systems, and the inherent limitations of the decomposition of depiction into sub-tasks" (54). Therefore, besides the analysis, the discussion of the results is equally important for having a deep understanding of cognition of designer's identity through computer-aided presentation drawings.

4.3.1. Spatial System Analysis

The first analysis is based on the spatial organizations and correspondences in this relation between picture space and scene space. In order to successfully compare spatial organizations of presentation drawings, the given buildings' outlines are drawn on the photographs and a silhouette is achieved as shown in Figure 9.

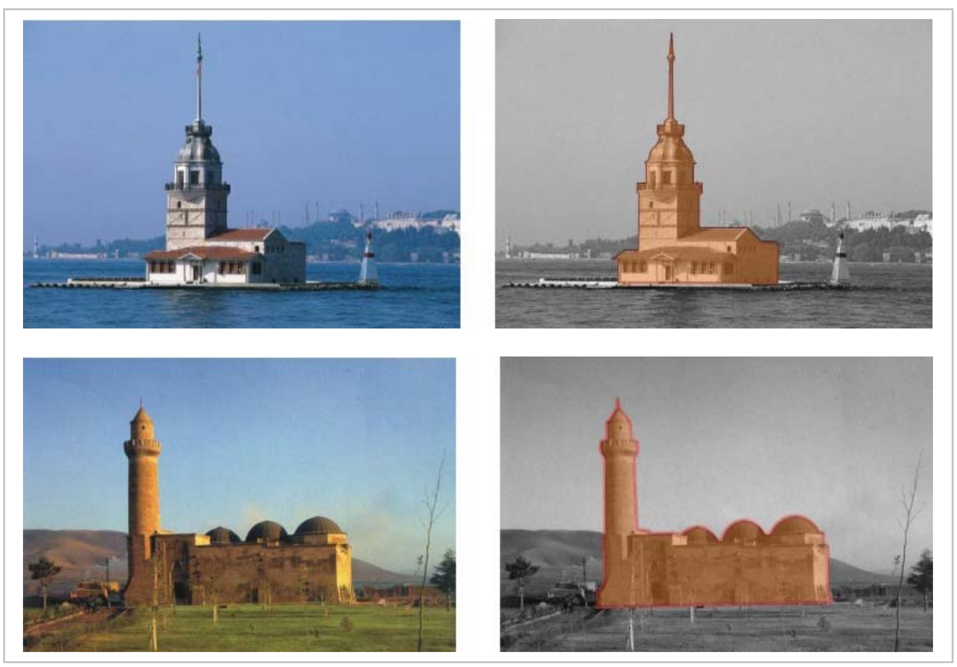

Figure 9. Outlines for Spatial System Analysis

Later, the outlines are placed on the submitted presentations. The outlines kept semi-transparent in order to analyze the differences between the original outline and the presentation meanwhile presentations are used in grayscale for the same purpose. The analysis is based on Willats's extendedness principle: "Extendedness it the most basic of all shape properties, and is used to describe the relative extension in space of scene and picture primitives" (Willats 14-5).

Extendedness in all presentations are evaluated according to their directions and shown with arrows. An arrow heading upwards refers to expansion in vertical axis; an arrow heading right refers to expansion in horizontal axis and vice versa. The analysis of presentations in traditional media is presented in Figure 10 and computer media in Figure11.

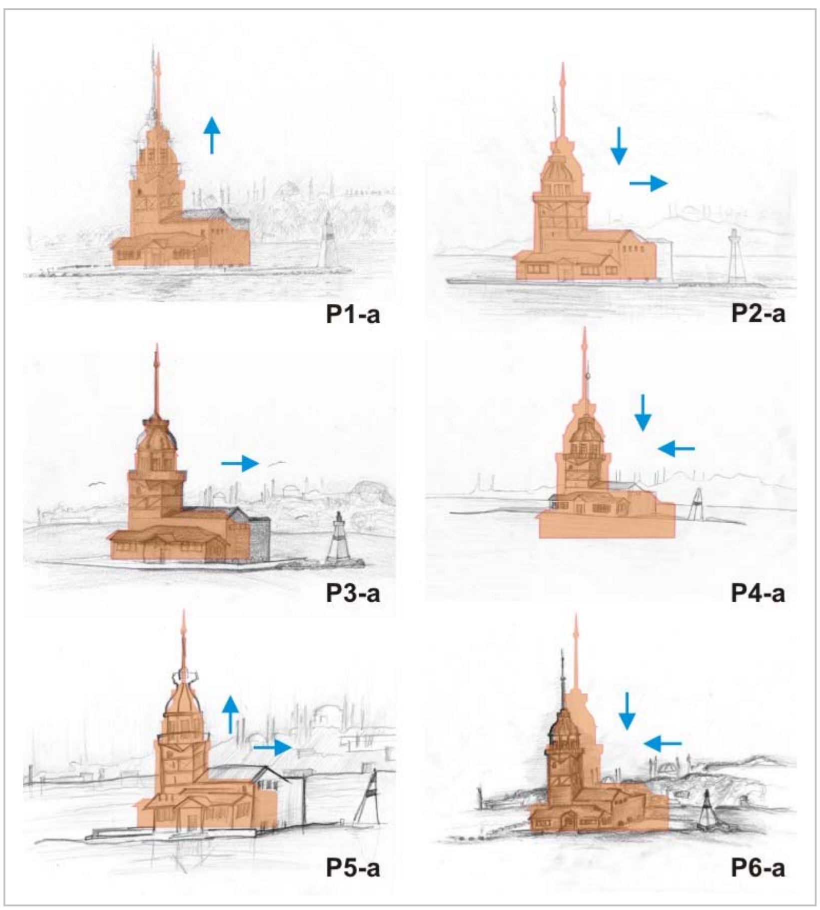

Figure 10. Spatial Analysis for Traditional Media Presentations

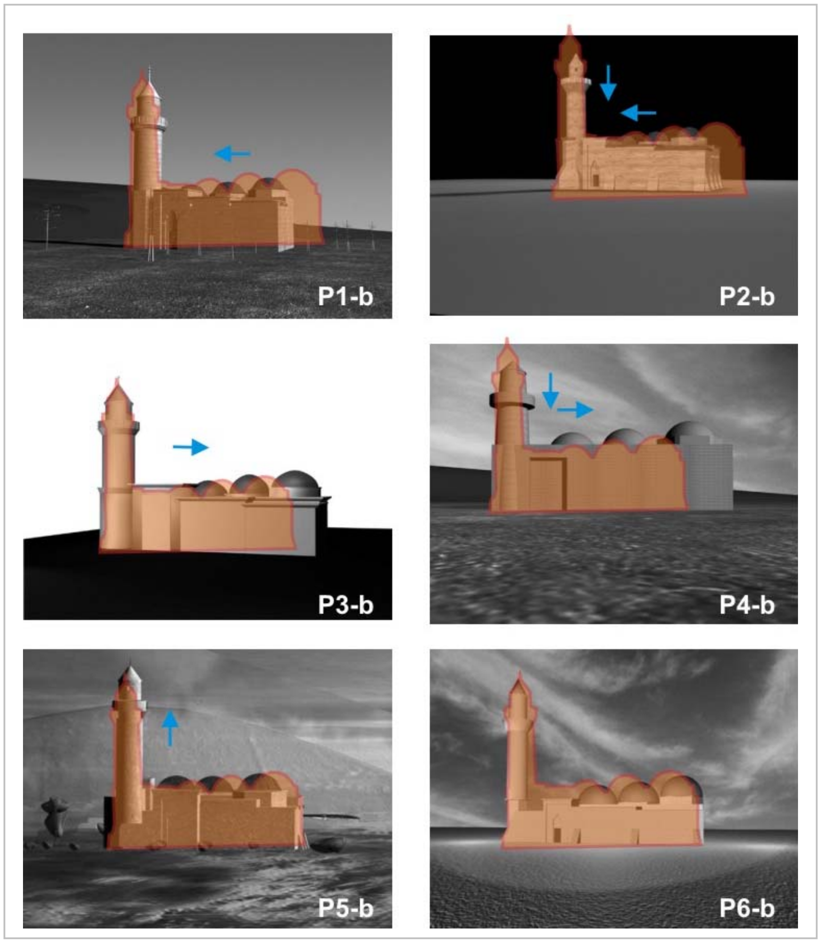

Figure 11. Spatial Analysis for Computer Media Presentations

For the evaluation of spatial system analysis, presentations are marked according to their positive or negative extendedness. The results are shown in Table 2. In the table, 'V' stands for vertical extendedness and 'H' for horizontal extendedness. The marks '+' and '–' indicate the expansion or decrease in the extendedness.

At first sight, Table 4.2 points out that all of the presentations have extendedness property regardless of the media with an exception of P6-b.

Extendedness	V+	H+	V-	H-
P1-a	*			
P2-a		*	*	
P3-a	*			
P4-a			*	*
P5-a	*	*		
P6-a			*	*

Extendedness	V+	H+	V-	H-
P1-b				*
P2-b			*	*
P3-b		*		
P4-b		*	*	
P5-b	*			
P6-b				

Table 4.2. Extendedness

However, an important point in extendedness principle is the relative extension. Willats says " The term [extendedness] originated from linguistics, and in this field three-dimensional objects are described as 'nonextended' if they are about equally extended in all three dimensions in space, and 'extended' if they are more extended in one or two dimensions than they are in a third" (77). In the case of presentations, therefore, positive or negative extensions in both directions are regarded like P-6b and shown in Table 4.3.

Extendedness	V+	H+	V-	H-
P1-a	*			
P2-a		*	*	
P3-a	*			
P4-a			*	*
P5-a	*	*		
P6-a			*	*

Extendedness	V+	H+	V-	H-
P1-b				*
P2-b			*	*
P3-b		*		
P4-b		*	*	
P5-b	*			
P6-b				

Table 4.3. Extendedness and Equally Extended Cases

When the equally extended cases are disregarded with P6-b, where there was no extension at all, the results indicate that three presentations of Section A have extension whereas four presentations of Section B are regarded as extended. The outcome of this comparison is further discussed in under chapter 4.4.1.

4.3.2. Primitive System Analysis

Following the spatial system analysis, primitive system analysis constitutes the second stage. As primitive system analysis deals with mapping primitives like lines and points between object space and picture space, it is decided to look at presentations based on their details carried from object space (given picture) to picture space (presentations). The level of details provided in the presentations is regarded as another important issue that leads to the differentiation and that allows one to compare presentations between each other.

In terms of details, fifteen points on the original photographs are determined (Figure 12). Most of the details are selected from the buildings; however some details are from background and the environmental effects. For instance, detail no. 15 for Kız Kulesi refers to the silhouette of Istanbul at the background, whereas detail no. 5 stands for balustrades around the observation tower.

Figure 12. Selected Details

Following the determination of the details, the presentations are re-examined in terms of including or excluding these predefined details. The details existing on the presentations are marked with circles and shown in Figure 13 for traditional media presentations and Figure 14 for computer-media presentations.

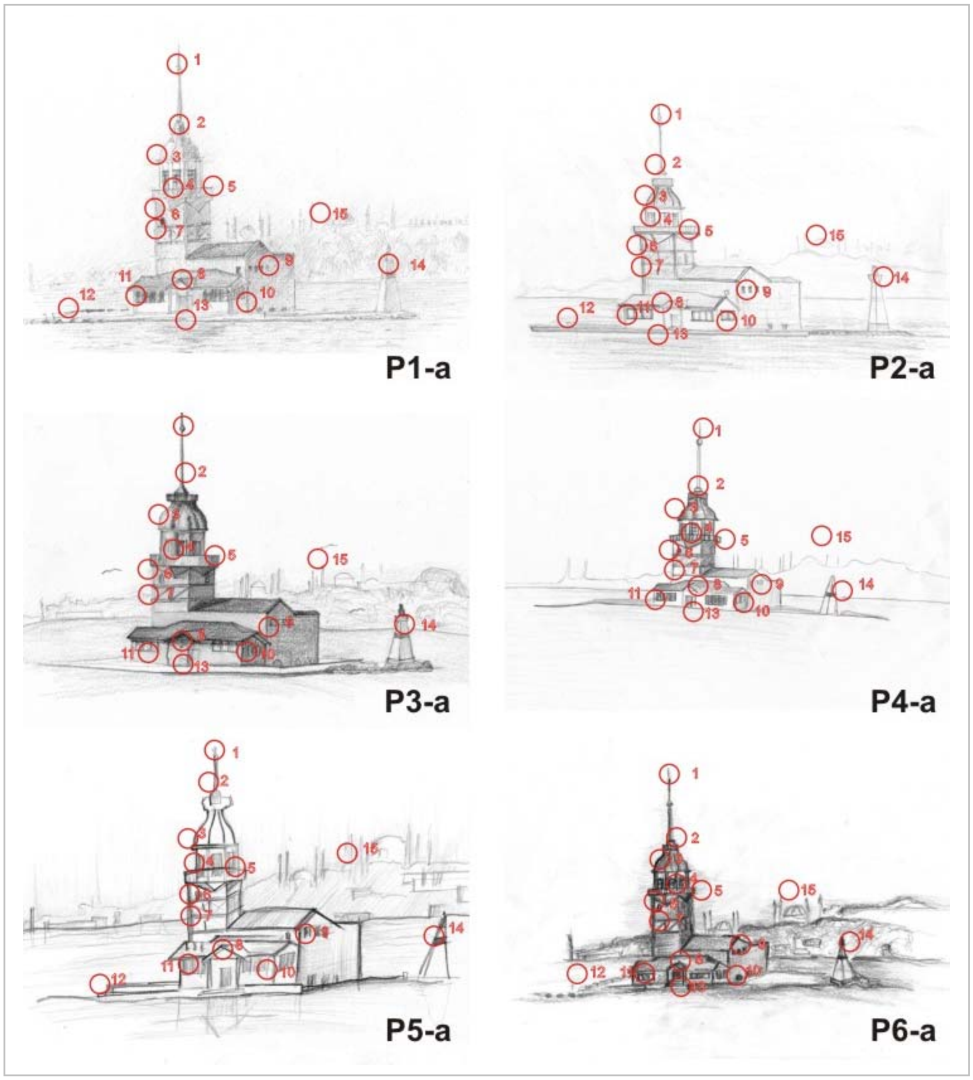

Figure 13. Primitive System Analysis for Traditional Media Presentations

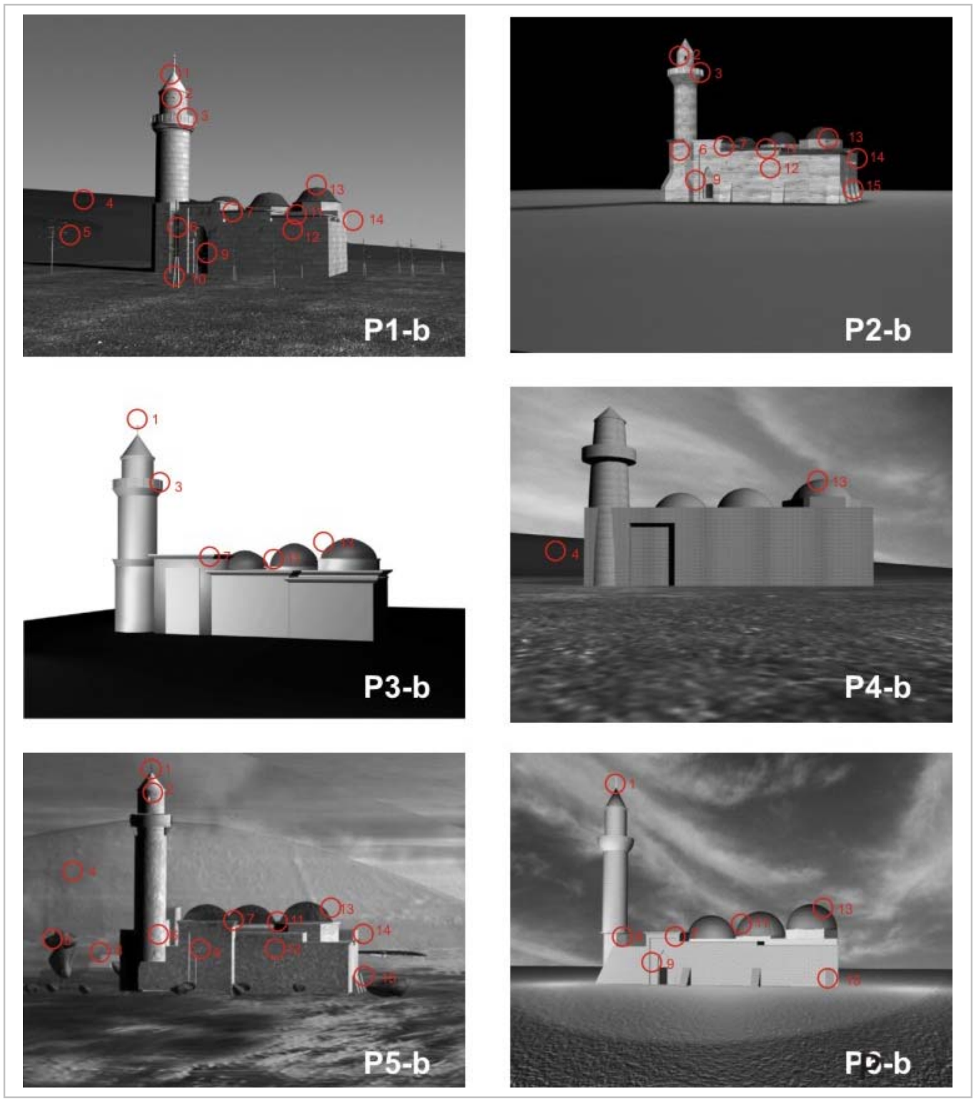

Figure 14. Primitive System Analysis for Computer Media Presentations

Finally, Table 4 presents the included details for both Section A and Section B presentations. Marks on the table stand for the inclusion of the corresponding details. The discussions of the results derived from the Table 4.4 are provided in the chapter 4.4.2.

Details	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P1-a	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
P2-a	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
P3-a	*	*	*	*	*	*	*	*	*	*	*		*	*	*
P4-a	*	*	*	*	*	*	*	*	*	*	*		*	*	*
P5-a	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
P6-a	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

Details	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P1-b	*	*	*	*	*	*	*		*	*	*	*	*	*	
P2-b		*	*			*	*		*		*	*	*	*	*
P3-b	*		*				*	*			*		*		
P4-b				*									*		
P5-b	*	*		*	*	*	*	*	*		*	*	*	*	*
P6-b	*					*	*		*		*		*		*

Table 4.4 Inclusion and Exclusion of Details

4.3.3. Attribute System Analysis

Color is an important design element. Color in any project must have a purpose, and constitutes one's choice of conveying one's message. Color can be used for reflecting mood, emotion, and time frame, and it can provide symbolism. These aspects work together with the principles and elements of design to convey what the artist, architect, or designer wishes the viewer to see and feel (Feisner 65).

Color in architectural presentation drawings is equally important like any other visual elements. Therefore, while applying attribute system analysis, analysis of color preferences are chosen among other visual properties defined by Durand (58) e.g. transparency, lighting, and shading.

For the analysis of colors in both traditional media and computer-aided presentations, there have been some difficulties about the selection of colors on the picture surfaces. On the traditional drawing presentations for instance, there are many different colored pencil marks on the same area, or there are various maps used in computer-aided presentations containing different levels of color degradations. In order to cope with this problem, a widely used image editing software namely PhotoShop 7.0 is used. With the mosaic filter under pixelate submenu, which "sharply define[s] a selection by clumping pixels of similar color values in cells […] into square blocks" (PhotoShop 7.0 Help Menu); the number of colors to be analyzed are reduced equally for all presentations. The way the filter is applied can be seen in Figure 15.

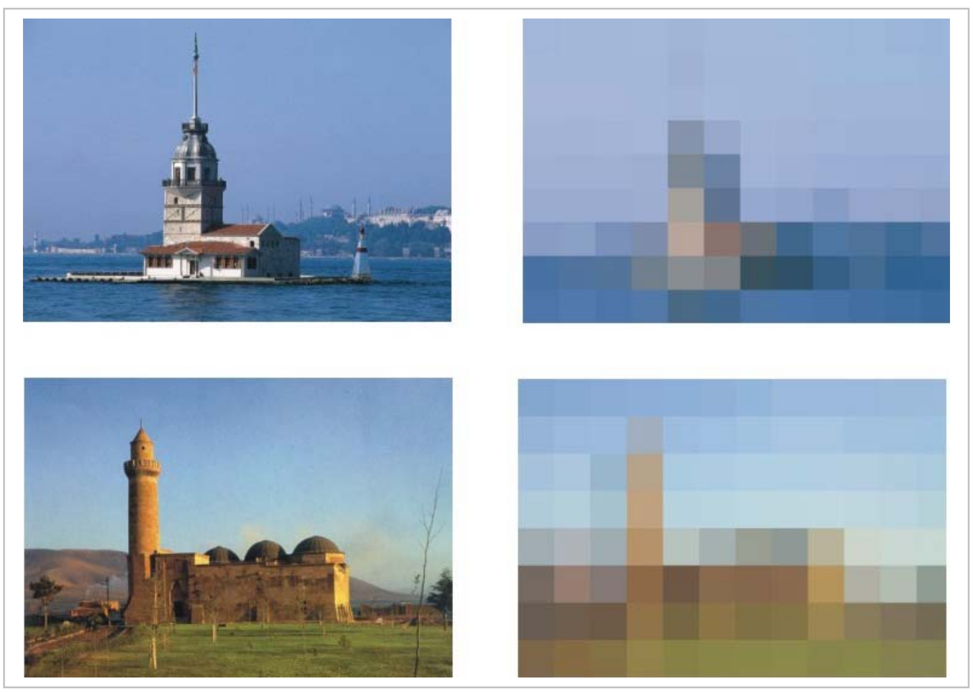

Figure 15. Mosaic Pixelate in PhotoShop 7.0.

Once the colors on presentations are reduced, it became possible to compare colors on presentations. For the comparison, eight squares from each corresponding regions are selected: building surface, sky surface, and ground surface.

The achieved color differences are sorted according to the corresponding presentation and available in Figure 16 for traditional presentation drawings of Kız Kulesi and Figure 17 for computer-aided presentation drawings of Alaeddin Mosque. The level of variations between each of eight squares and their difference in relation to other participants' presentations are taken as the base for comparison in analytical system analysis and discussed in chapter 4.4.3.

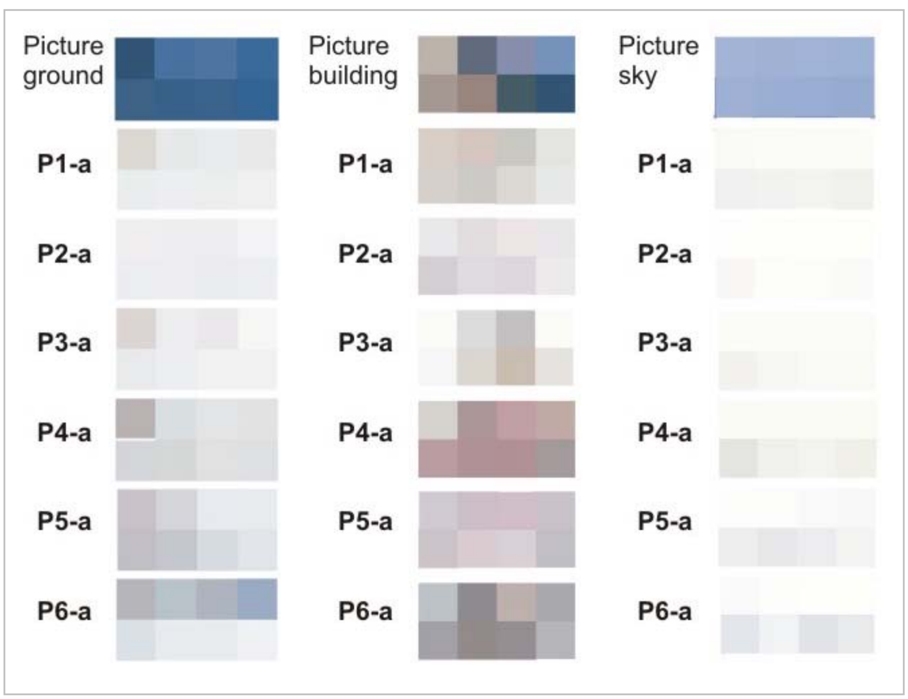

Figure 16. Color Variation for Section A

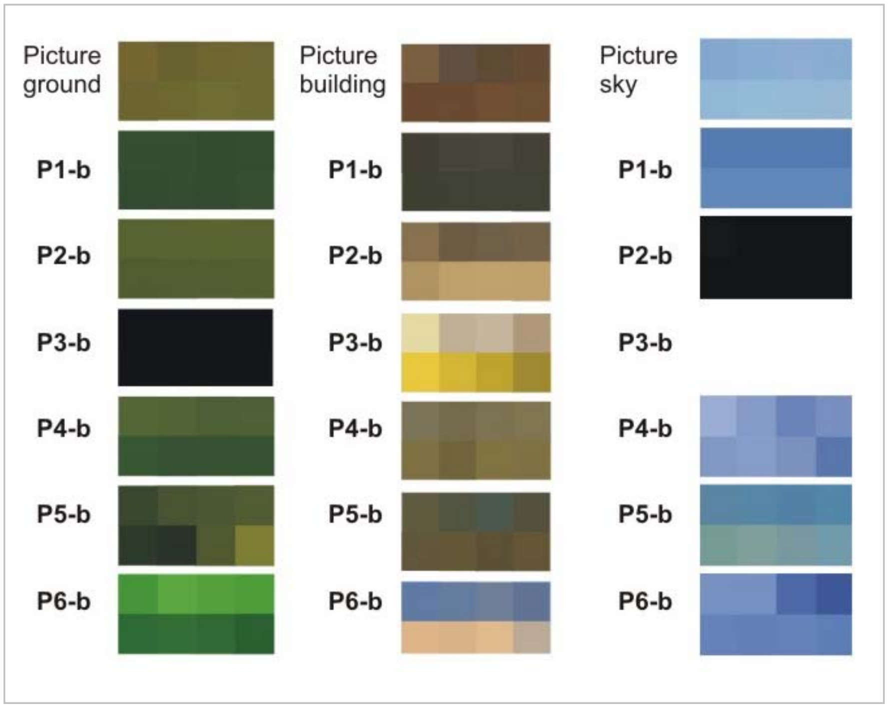

Figure 17. Color Variation for Section B

4.3.4. Mark System Analysis

Following the spatial system, primitive system, and attribute system analyses, mark system analysis constitute the final stage for the comparison of presentations. For Durand, "[t]he mark system describes the physical strokes in traditional depiction, and in rendering, it is responsible for medium simulation" (59). In this light traditional media presentations are classified according to pencil strokes on different parts of the picture surface. However, as the pixels replace the strokes on computer media presentations, most relevant issue to be base for classification is the selection of bitmap images that are assigned for mapping different parts of the picture surfaces. There are various standard bitmap images provided by 3ds max software like ground maps and sky maps. The software also allows the user to apply any image as a map to the model surface. These images are used for defining surfaces and in a similar manner pencil strokes on the traditional media presentations are used for the differentiation of surfaces between each other.

For analyzing different types of pencil strokes and map assignments, some parts of presentations are selected and shown in Figure 18 to Figure 21. While doing this, also inverse images of the selected regions are placed next to the original ones because, especially line weights and line densities became more visible when the images are inversed.

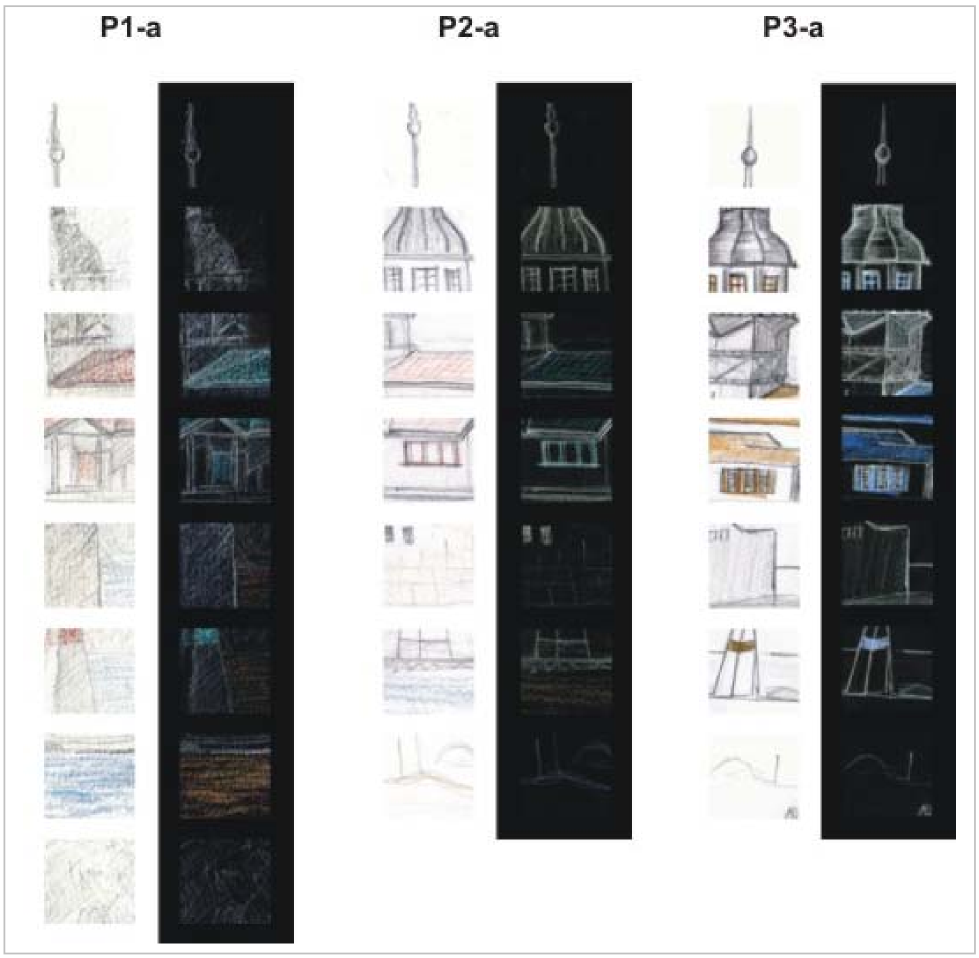

Figure 18. Mark System Analysis for P1-2, P2-a, P3-a

Figure 19. Mark System Analysis for P4-a, P5-a, P6-a

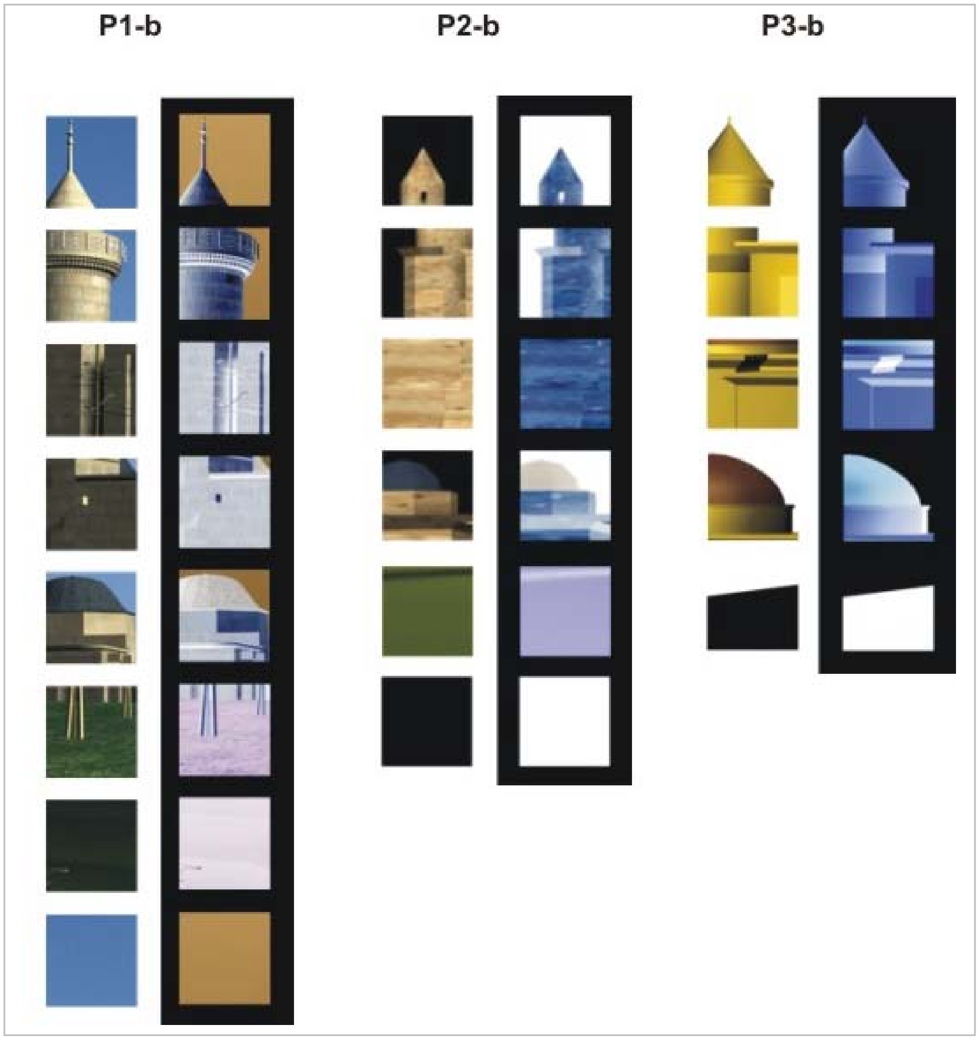

Figure 20. Mark System Analysis for P1-b, P2-b, P3-b

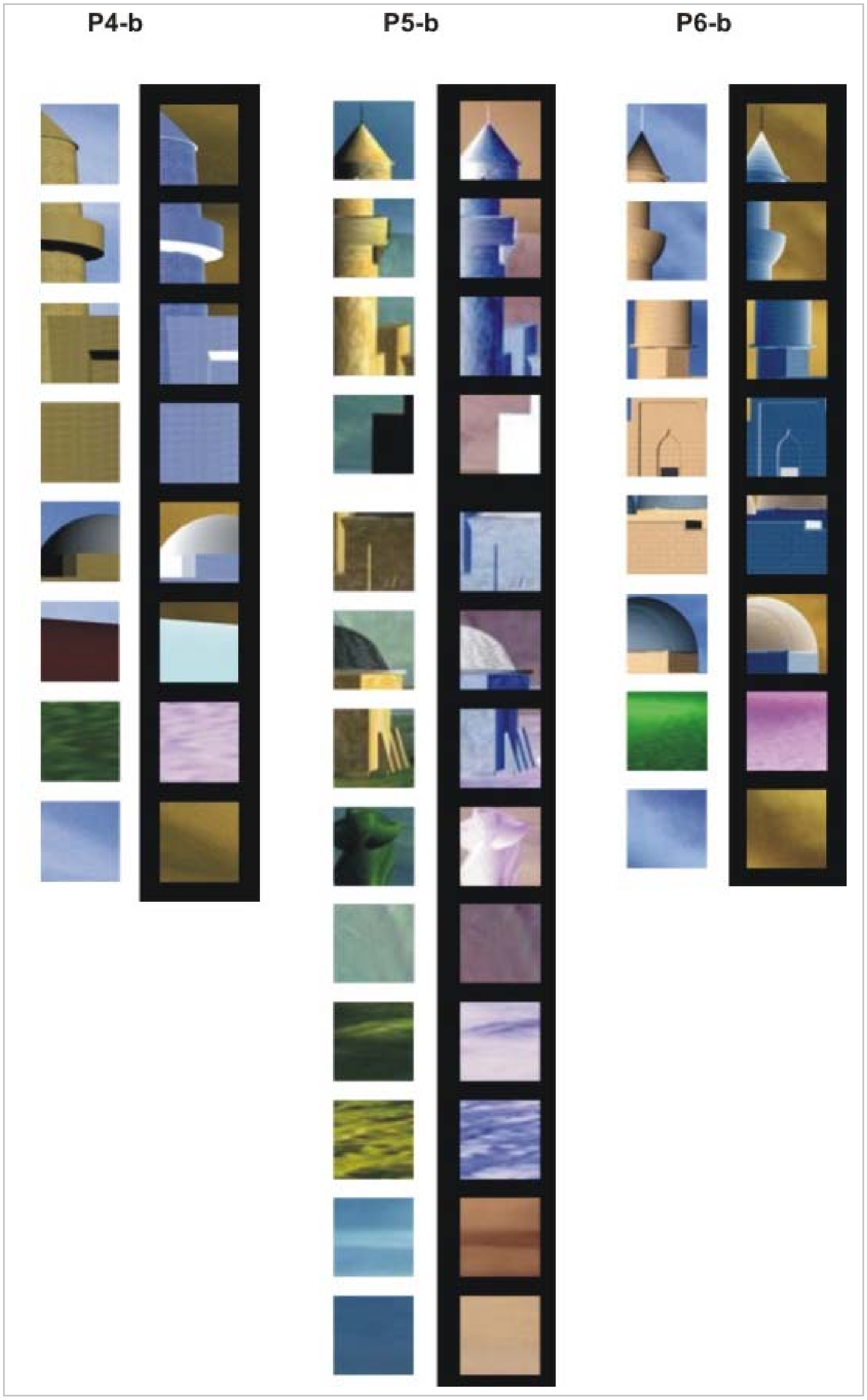

Figure 21. Mark System Analysis for P4-b, P5-b, P6-b

While analyzing the defined areas in traditional and computer media presentations, it is observed that main difference in terms of pencil strokes and maps; building surfaces, grounds, backgrounds, and skies worth analyzing and comparing. Besides, the observation tower of Kız Kulesi and the domes of Aleaddin Mosque hold some differences when the presentations are compared between each other. Therefore these surfaces were analyzed in depth and certain classifications in terms of line variations are placed on Table 4.5 and classifications in terms of map variations on Table 4.6.

Line Variations	**P1-a**	**P2-a**	**P3-a**	**P4-a**	**P5-a**	**P6-a**
Building Surface	Parallel Angular	Scribble Angular	Parallel	Scribble Parallel	Straight Angular	Scribble Angular
Tower	Parallel Angular	Scribble Parallel	Scribble Angular	Scribble Parallel	Parallel	Scribble Parallel
Background	Scribble Not Standard	Curvilinear	*	Curvilinear	Parallel Angular	Scribble Not Standard
Ground	Curvilinear Parallel	Parallel	Parallel	Curvilinear Parallel	Curvilinear Parallel	Curvilinear Parallel
Sky	Scribble Angular	*	*	Curvilinear	Parallel	Straight Parallel
Line Weight	Low	Low	Medium	High	Medium	High
Line Density	High	Low	High	High	Medium	High

Table 4.5. Line Variations

Map Variations	**P1-b**	**P2-b**	**P3-b**	**P4-b**	**P5-b**	**P6-b**
Building Surface	Not Standard	Not Standard	*	Wood Bubing 2	Brick Red Brick	Brick Yellobrk
Dome	Concrete Asphalt	Metal Steelplt	*	*	Concrete Concgray	*
Background	Ground Evgreen	*	*	*	Not Standard	*
Ground	Ground Evgreen 2	*	*	Ground Evgreen 2	Ground Foliage 1	Ground Evgreen
Sky	Not Standard	*	*	Skies Cloud 2	Not Standard	Skies Cloud 2
Surface Weight	High	Low	Low	Low	High	Medium
Surface Density	High	High	Low	Medium	High	Low

Table 4.6. Map Variations

For the line variations among the traditional presentation drawings, line characteristics are classified according to being straight or curvilinear. A further sub-categorization is made according to angular, scribble, and parallel line usages.

In the computer media presentations, on the other hand, map variations are classified according to being provided as standard by the software or being specifically prepared (or as it appear on the table, being ‘not standard’). Where standard maps are used, their names are also given on the table.

A final classification for both media presentations is made according to the line weight or surface weight, and line density or surface density, where the former stands for the level of contrast between figure-ground and the latter for number of line strokes or assigned map density. However, there are also some surfaces on the presentations, which were not rendered and no maps were assigned. Such surfaces are indicated with a mark.

4.4. Results

Before the discussion of results achieved in the previously defined systems in depth, one point need to be once more illuminated. All of the above analyses do not aim at comparing presentations of traditional media with that of computer media. Rather, looking at presentations as “a symbolic expression of some reality or an idea, [which] is a process [that] transforms, by way of abstraction and encoding, realities and ideas into communicable and presentable parsimonious format” (Chastain et al. 238), the comparison of the CAD presentations among themselves and analyzing whether they have certain differences between each other like traditional media presentations constitutes the major goal of the analysis.

4.4.1. Spatial System Analysis Results

According to the spatial system analysis, it is observed that spatial system results some differences on the computer media presentations just like traditional media presentations. Buildings' being transformed or as analyzed, being extended horizontally or vertically affect its visual appearance on the presentation. According to the results achieved, designers are presenting the given building with different levels (positive or negative) and directions of extendedness. As mentioned earlier, when the equal extendedness is omitted, four out of six computer media presentations and three of six traditional media presentations are regarded as holding spatial differences. As the spatial system of presentations holds some differences and express designer's understanding and presenting the given form, it may be concluded that spatial system in computer media presentations can be regarded as part of the cognition of designer's identity.

4.4.2. Primitive System Analysis Results

In terms of primitive system analysis, there is a different picture than spatial system analysis. When the results of appearance of details in both media are regarded, it is observed that in traditional media, almost all of the presentations hold determined details, whereas computer media does not express the same results. However, this situation can be related with the difference in the ease of the use of media and therefore does not mean directly that traditional media provide more difference in the light of primitive system. But, there is an important point when computer media presentations are compared among each other, which is the variation in selected details to be included or excluded. Another result obtained from the comparison of computer media presentations is that details from the environment (detail numbers 4, 5, 8, and 10) are rarely addressed by designers, which seem to be a handicap for primitive system. However, when the details of the building are considered, primitive system can also be regarded as an indicator of designer's identity for computer media presentations.

4.4.3. Attribute System Analysis Results

The results of attribute system point out one of the problematic issues in computer media presentations: closeness to the reality. When the color bars of computer media presentations are compared with the color bars taken from the original photograph scenes, a level of photo-reality can be observed. However, although traditional media presentation colors are extremely different than the colors of original photograph scene of Kız Kulesi, traditional media presentations also seem to be problematic in terms of being very close to each other. There is one point in computer media presentations that deserve attention in attribute system, which is the leaving the sky as black in P3-b, P2-b and leaving the ground as white in P3-b. These attitudes increase the variation among the computer media presentations.

4.4.4. Mark System Analysis Results

The mark system analysis provides the higher level of difference as compared to the previously discussed spatial, primitive, and attribute systems. Hence, this system may be regarded as the system where most of the variations not only in traditional media but also in computer media are achieved. The traditional media presentations are highly differentiated from each other because there are many dissimilar pencil strokes and many line types are applied by different designers. In a similar manner, bitmaps assigned in different computer media presentations provide a high level of variety. Especially not standard bitmaps seem quite challenging for the cognition of designer's identity as they are only limited with designer's imagination.

In conclusion, all of the four system analyses provide some level of differences and a number of variations among computer media presentations just like the traditional media ones. Although the analysis is made with limited number of designers and not the entire subheading of four systems are analyzed, at the end it is concluded that computer media presentations have the potentiality of presenting designers' identity in the way of providing variety and differences at some levels and considerations.

4.4.5. Interview

As mentioned beforehand, an interview was conducted with each participant they were asked to discuss their presentations and give their opinions on the identity issue in both traditional and computer media. In this regard, it has been observed that not only the results of the design sections but also the opinions of the contributed designers indicate the potentials of computer media presentations in terms of cognition of designers' identity.

An important point about the computer media presentations in terms of expressing oneself was given as experience: "I believe that [identity] is also bound to the experience you have with the media. As much experience you have, that much possibility comes to you to express yourself" (P1). A similar comment is brought by

P2 with an indication of the increasing rate of computer use in architectural profession: “In the first section I have achieved what I had in my mind and expressed my identity but it was not so easy because it has been a long time since I used freehand drawings in presentation stage. In the second section, it was much easier for me to achieve what I have intended to draw because I am using computer as a tool at every stages of design during my profession life” (P2).

Another important comment was made by P5 regarding the importance of the nature and content of design education towards the use of computer media. He stated that although he first met with computers in primary school, his design education was completely based on the use of traditional tools and tasks. Therefore, at first he did not find himself comfortable using computer media in the professional life: “At first I felt that there was a distance between me and the computer”. However, he states that as he was getting used to computer media in design, the distance was over: “I got used to this different medium for expressing my feelings and hence, my identity” (P5).

Unlike the aforementioned ideas, P4 was thinking that computer media was not an effective tool and task for the expression of the identity: “In freehand, it was so easy to show my identity but in computer I cannot say so because the computer tool does not provide me efficient menu bars and there are not many choices to achieve unique drawings” (P4). However, he was not defending traditional media in full: “In the future, with the help of developing technologies and improvements in software technology it seems like I will be able to show my identity on computers with more possibilities” (P4).

Lastly, P6 said, “In both sessions I believe that I showed my identity” (P6). However, she remarked an interesting point, which may deserve further researches to be constructed upon: “but in every session I felt that my identity has changed according to tool” (P6).

At the end of the interview, it has been observed that as the results of the analysis indicated, computer media presentations are reflecting designer’s identity. Moreover, the necessity of experience for productive use of tools and tasks was a common argument among the participants.

5. CONCLUSION

This study is an effort to analyse computer media presentations in light of reflecting designers' identity. Computer aided architectural design is a growing area, where many researches are carried out. However, most of the researches focus on the relation between computers and the design process without considering computer's potentials in architectural presentations as a way of externalising designers' ideas, thoughts and identity.

Throughout the thesis, not only the developments in computer technology or computer aided design are presented but also architectural presentation drawings are discussed considering traditional versus computational media. However, the main emphasis was given to the computer media presentations and current approaches like non-photorealistic renderings and computer depiction.

For the analysis of the cognition of designer's identity in computer media presentations, a study has been conducted with the participation of six designers. While analyzing computer media presentations, traditional media presentations are not ignored; on the contrary, how designers' identity became visible through traditional media provided a comparative analysis base. Therefore, taking into consideration Durand's four computer depiction analysis systems namely spatial, primitive, attribute, and mark systems, both traditional media and computer media presentations of six designers have been analyzed.

With the analysis, it has been concluded that in essence, whether prepared in traditional media or computer media, architectural presentation drawings serve designers for reflecting their identity in terms of achieving variations and differentiations. Moreover, new possibilities may be achieved with developing computer software, which may even enrich designers' tools and tasks to better integrate their identity into their presentation drawings.

Developments in computer technology provide designers new tools and tasks that were not possible with traditional media. In this regard, designers have many other ways and possibilities for their presentations beyond drawing. Therefore a future study on the cognition of designer's identity may be conducted not only with the analysis of two-dimensional presentation drawings but also with considering emerging possibilities of multimedia presentations.

As the computer technology is developing rapidly and meanwhile as it is providing new opportunities for designers, the future seem much more challenging for designers than today.

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APPENDIX A

Section A: *prepare an A4-size hand-drawn presentation of Kiz Kulesi*

Medium: *drawing pencils and coloured pencils*

You should draw the Kiz Kulesi with its surrounding and finally achieve a two dimentional representation. You are free to add any visual qualities to the presentation according to your own choice and style that is to say project does not ask a simple copy of the given image rather presentation of the given building as long as you keep the general layout of the given image.

MAIDEN'S TOWER - LEANDER'S TOWER - KIZ KULESI
Istanbul's city pictures almost always include "Kiz Kulesi". "Kiz Kulesi" is called in English Maiden's Tower or Leander's Tower. The Maiden's Tower is located on a small island at a very short distance from the shores of the district "Uskudar" in the Asian side of the city. Until today the tower is used as a lighthouse, semaphore station, quarantine, customs control area, and home for retired naval officers. The building that you can see today dates back to 18th century.

Presentation Brief of Section A

Section B: *model Aleaddin Mosque in the computer environment and prepare an A4-size presentation*

Medium: *The Software 3DStudioMax*

You should model the Aleaddin Mosque with its surrounding and finally achieve a two dimentional representation.You are not allowed to use any other software including 2D image editting programs like Photoshop. However you are free to add any visual qualities to the presentation according to your own choice and style that is to say project does not ask a photorealistic copy of the given image rather presentation of the given building as long as you keep the general layout of the given image.

Alaeddin Mosque, Nigde, Turkey.
Photo from the book The Foundations of Turkey, ed. Zekai Baloglu. TUSEV Pub. 1996.

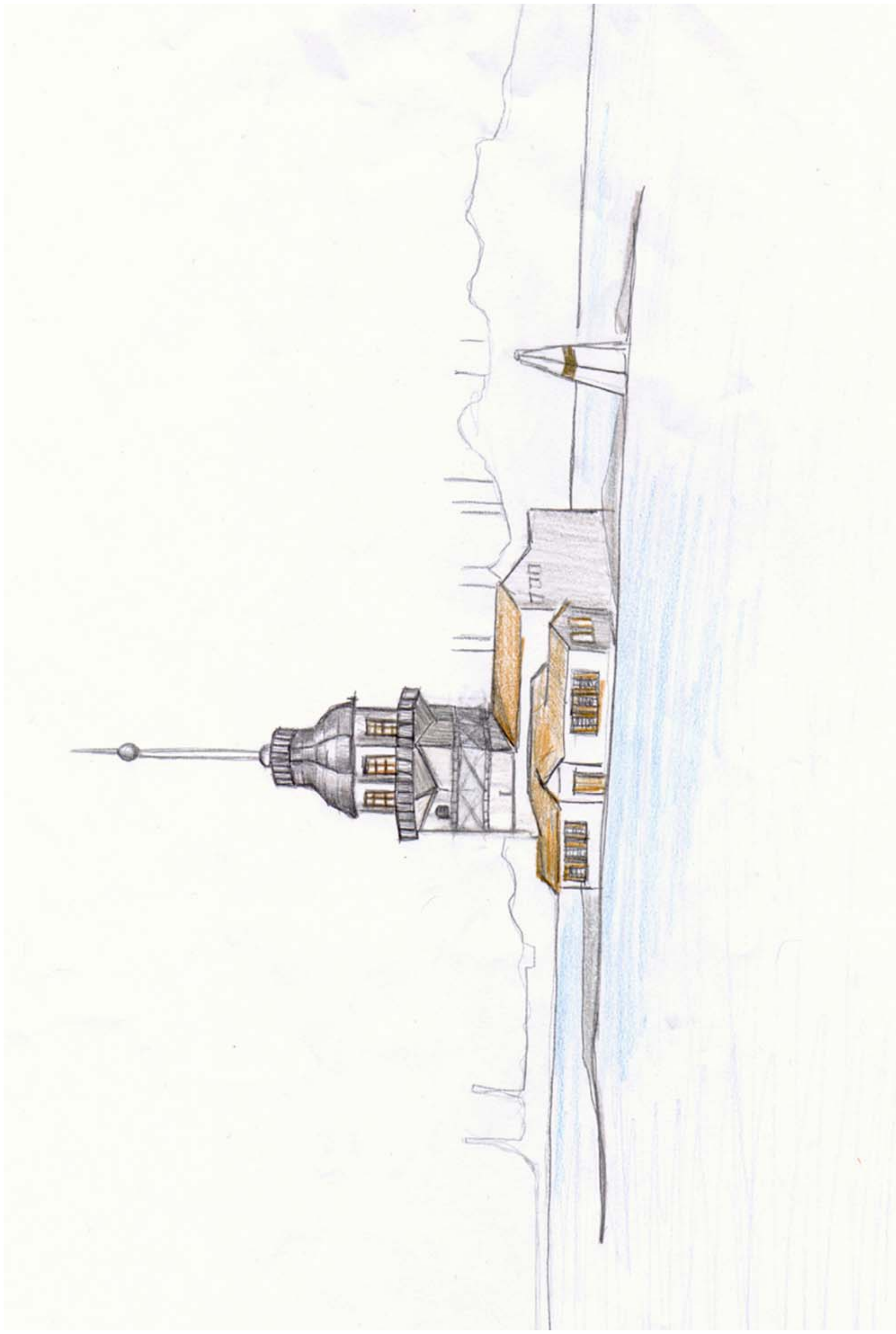
NIGDE, ALAEDDIN CAMII
This mosque was commissoned by Zryneddin Basare bin Abdullah, "master of horse" (a rank), by order of Alaeddin Keykubad in 1223, as we understand from the inscription. Its arhitects were Sıddık bin Mahmud and Gazi bin Mahmud.

Presentation Brief of Section B

APPENDIX B

Presentation. P 1 – a

Presentation. P 2 – a

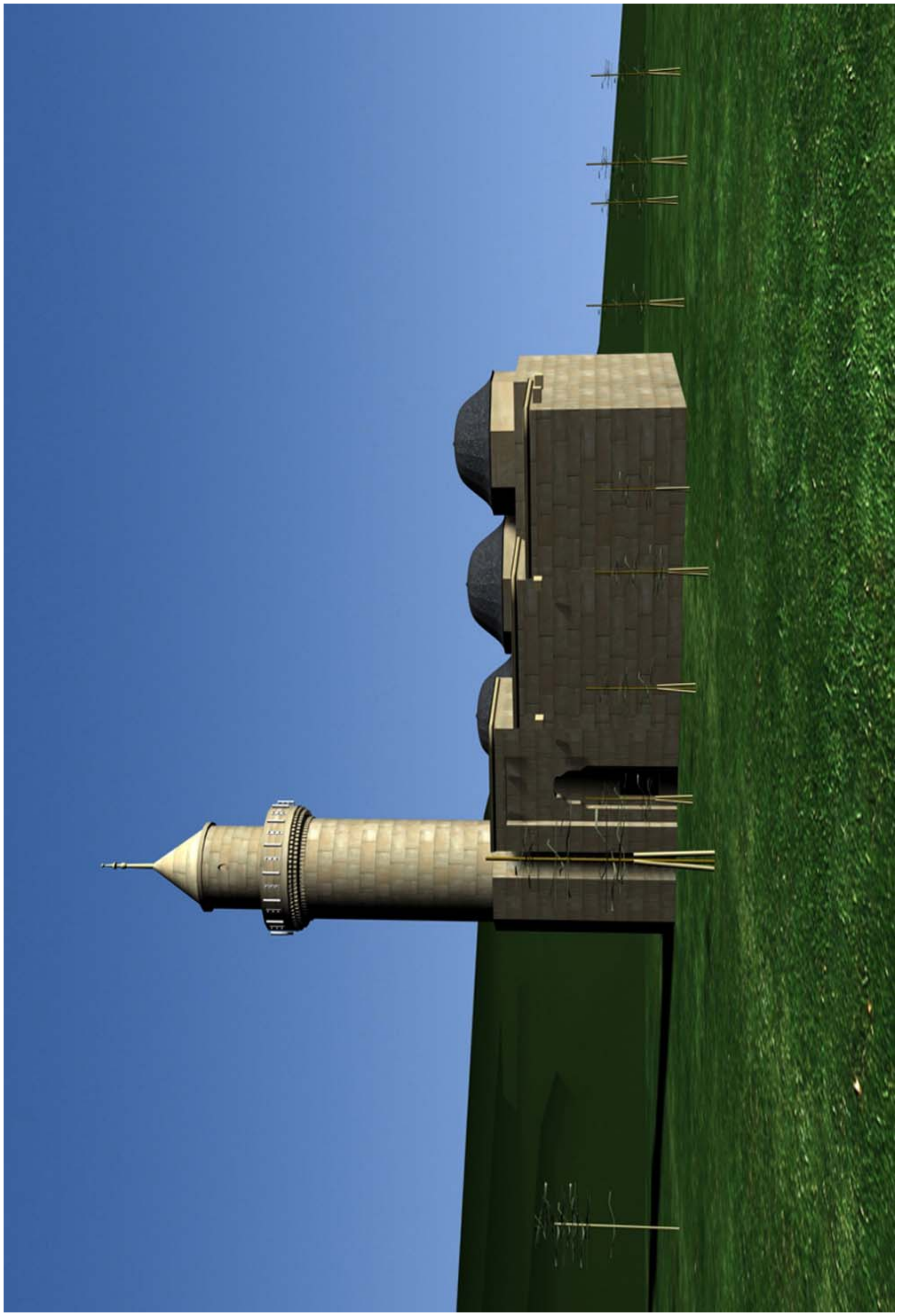


Presentation. P 3 – a

Presentation. P 4 – a

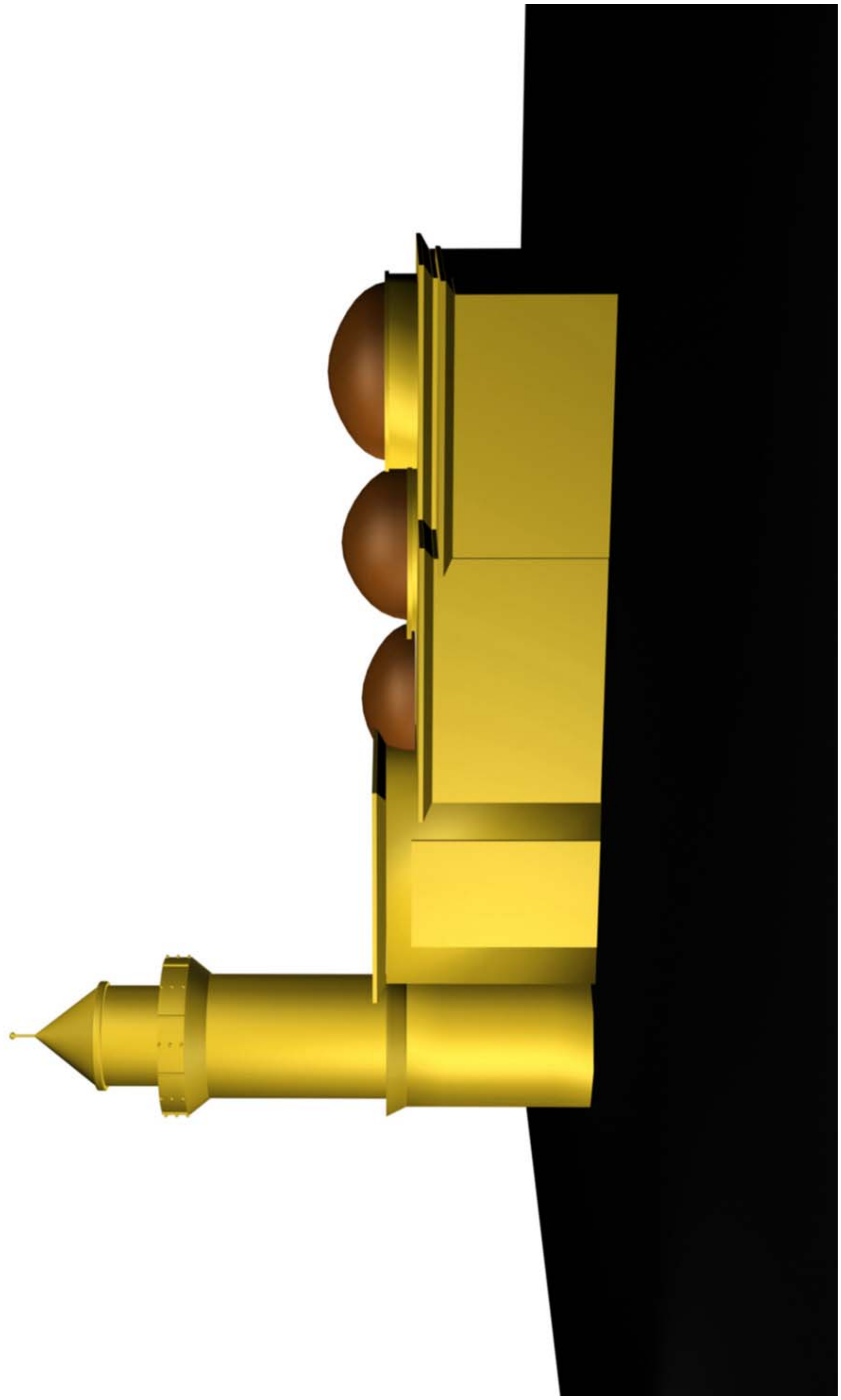
Presentation. P 5 – a

Presentation. P 6 – a

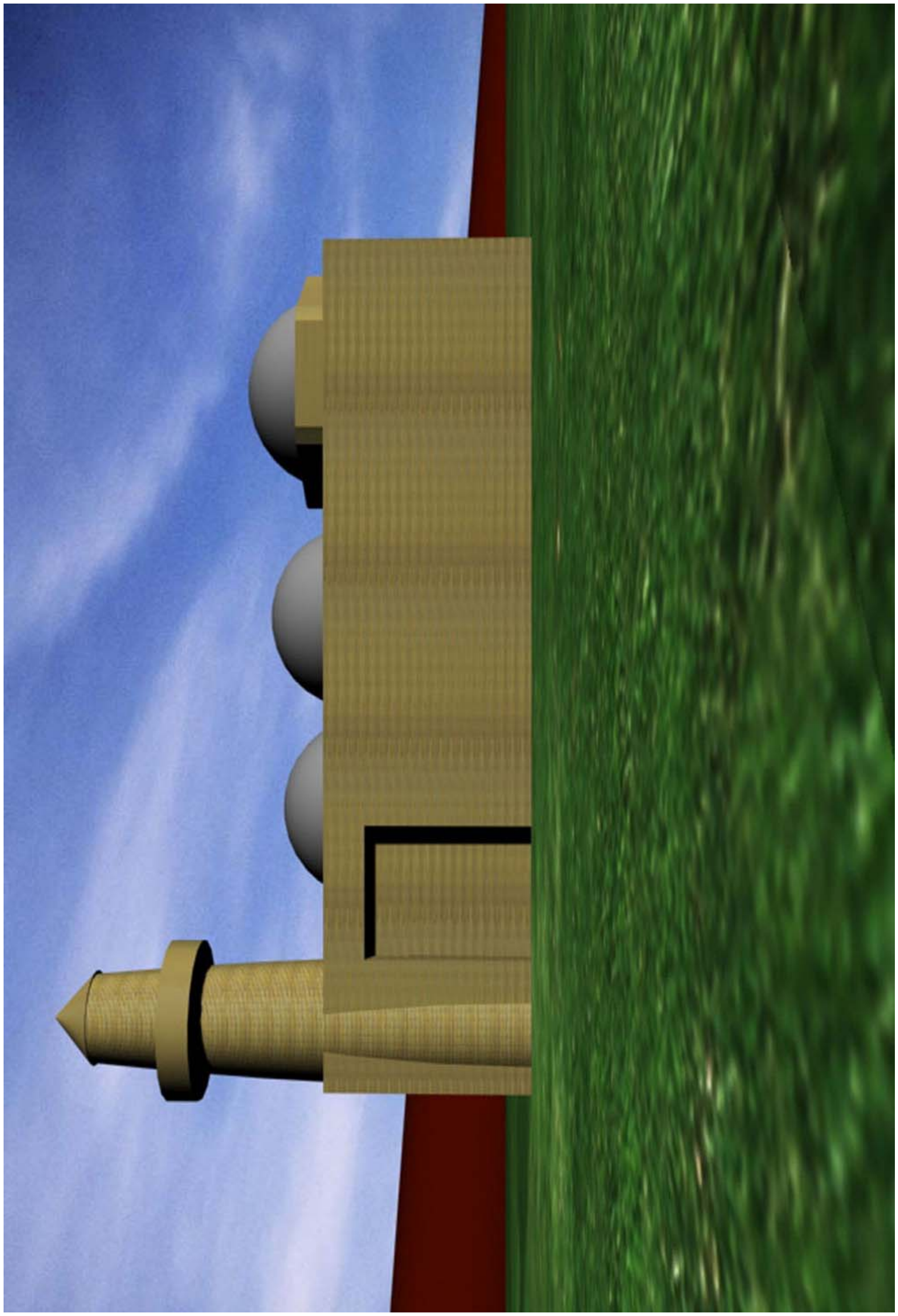


Presentation. P 1 – b

Presentation. P 2 – b

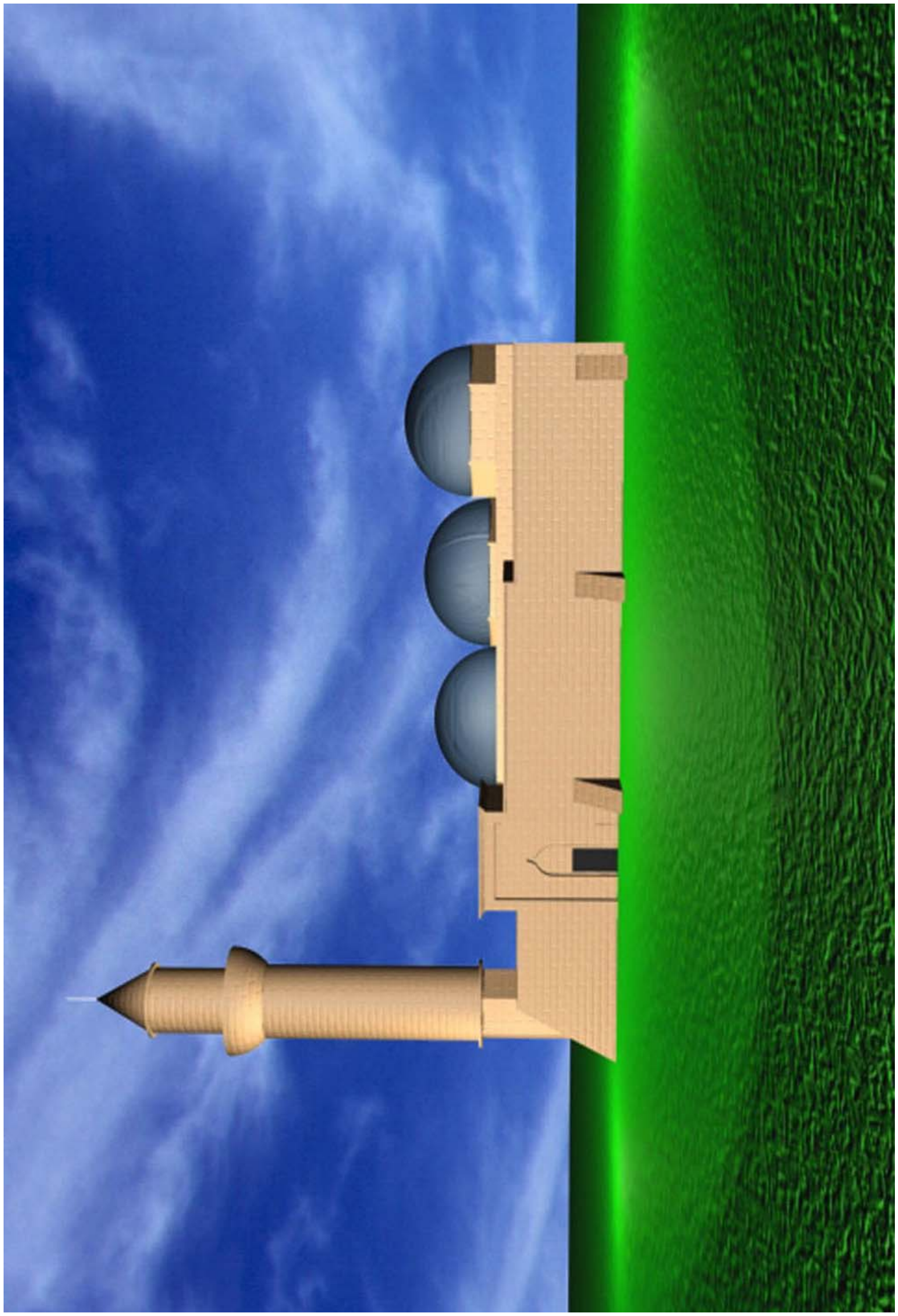


Presentation. P 3 – b



Presentation. P 4 – b

Presentation. P 5 – b



Presentation. P 6 – b