

Architectural Drawings New Uses in the Architectural Design Process

By Amos Bar-Eli*

Architectural drawings role as a source of inspiration as well as a means of interpreting the past has always been key within the architectural design process. Unique to the 21st century is the increase in the sheer amount of existing drawings attainable. This abundance is manifested by the aspects that drawings are: accessed, collected, and manipulated. Consequently, it becomes crucial to critically engage new possibilities of using images of architectural drawings in the design process. The paper explores this by posing design exercises which correlate to each of the issues mentioned above i.e. - accessing, collecting, manipulating. Each of the exercises is targeted specifically for new tools unique to each. Accessing - sketching with drawings, using existing drawings as sketch models. Collecting - creating personal association boards, which serve as triggers for the subsequent studio project. And finally, an exercise of altering and changing an existing photograph is conducted to challenge the issue of manipulating. The three exercises conducted in a design studio teaching environment over the past three years were analyzed by visual qualitative research methods and design process understandings. The exercises served as case-study to examine translations, understandings, and possible new uses of existing architectural drawings in the architectural design process.

Introduction

Architectural drawings role as a source of inspiration as well as a means for interpreting the past has always been key within the architectural design process. Unique to the 21st century is the increase in the sheer amount of existing drawings available. This plenitude is manifested in the aspects by which the drawings are: accessed, collected, and manipulated. This situation does not unfold without problems or complexities, such as rights of use, the distinction of quality, authenticity, and deciphering meaning. Either way, this prolific state enriches and challenges the impact drawings have on every aspect of society, much more so on visually-based disciplines such as architecture. Consequently, it becomes crucial to critically engage new possibilities of using images-of-architectural-drawings in the design process. The two most imperative questions that arise in relation to the process of architectural design are: what is the impact that the immensity of images have on it? And in what ways can we utilize the reality of image abundance more efficiently?

The paper explores these questions by posing 3 design exercises which correlate to each of the issues mentioned above i.e. accessing, collecting, manipulating. Each of the exercises is targeted specifically for new tools available and emerging understandings unique to each. Accessing is challenged through

*Senior Lecturer, Faculty of Design, HIT - Holon Institute of Technology, Israel.

sketching with drawings, using existing drawings as sketch models. Collecting is challenged through an exercise of creating personal association boards, which serve as triggers for the studio project. And finally, an exercise of altering and changing an existing photograph is conducted to challenge the issue of manipulating. The manipulation is conducted in several stages and is used to trigger the initial phase of the design process. This 3-stage exercise, with minor modifications, was conducted repeatedly during the past 3 years with various groups of students engaged in an architectural design process. Some of the groups were 1st year students, and some were more experienced 4th year students. The exercises conducted in a design studio teaching environment were analyzed by visual qualitative research methods and design process understandings. The exercises served as case-study to examine translations, understandings, and possible new uses of existing architectural drawings in the architectural design process.

Images

The discovery of photography and cinema, and especially their reproductive qualities, has brought about a true revolution in the way culture evaluates and produces art and visual imagery.¹ Today digital imagery production, even of very high quality, is readily available by almost any common type of smart-phone. Technical production, which required expensive equipment and complex technical skills until a few years ago, is available today at the fingertips of any computer user with basic skills. The ease of producing, storing, transmitting, and sharing images, has advanced tremendously in the period of the last few decades. Images are represented on a multitude of devices and projected in varied ways. Digital imagery technologies have by no means exhausted itself, on the contrary, all indications suggest that we will experience more diverse manifestations in common use. The influence of this digital-imagery-overload is central to understanding contemporary society and culture. This reality is transforming society, art, and not the least architecture.

Photography and the ability to copy reality is relatively a young technology. Earliest photos were first taken around the mid-decades of the 19th century. Cameras and modern age film evolved rapidly making photos rising in popularity over the following decades of the 19th and early 20th century. A first digital photograph was taken at 1957 making the traditional film almost obsolete. Toward the end of the 20th century, the 'web' became a popular place to store and share images.²

Coping technology marked what can be referred to as the image revolution. This revolution is characterized by the way images are accessed, collected, and manipulated. The concept of searching the mass number of images was introduced with the launch of "Google"-image-search at 2001. At this time, it including a modest 250 million images indexed. This number continued to rise reaching over

1. S. Moses, *Walter Benjamin and the Spirit of Modernity* (Tel-Aviv: Resling, 2003).

2. Wikipedia. History of Photography, 2019.

100 billion images by 2010.³ As images became so readily to produce and transmit, their presence in the web rapidly increased. Exchanging images through varied social networks has immensely multiplied the amount of images existing in the web. Today any figure between 5-20 trillion images can be considered as an accurate estimate for the number of images that will be added yearly.⁴ Smart-phones as we know them today, with wide screens and the ability to view and fast scroll images, were initially introduced by “apple’s” “iPhone” at 2007, merely a dozen years ago. Today it is estimated that about 66% of people on the planet own a smart-phone. This makes a colossal incalculable number of images readily available, rather literally, at the fingertips of most of us.⁵

The ability to store, index, and retrieve images in personal and self-organized collections has evolved alongside the multiplication in image numbers and accessibility. The availability and ease of creating, organizing, and indexing, huge personal collections mounting many thousands of images is not uncommon. Ignoring the meaning, quality, and relevance of such collections, still anyone wishes to do so, can do it in very simple and accessible means. The third most relevant issue regarding images is the ability to manipulate them. Computer editing software is readily available. Ranging from professional editing software to automated filters that allow complex and sophisticated manipulation created effortlessly. Some such editing capabilities are built-in to social networks applications making image manipulation, distortion, and refabricating an effortless, common action, as immeasurable number of images are transmitted and exchanged.

One interesting example which is a direct result of the image revolution and the way it transforms culture is the revolutionary act of Amsterdam’s Rijksmuseum. In a controversial and exceptional decision from 2013, the museum made digitally available and completely free for any use its entire collection of artworks. It is not only free, the museum actually takes great care to digitize, in high quality, its approximately 1 million art objects and goes so far as to encourage the public to copy and use it. Rijksmuseum officials claim that this business and strategic model makes viewers more interested in art and also encourages people to visit the museum, as an opportunity to view the real works of art. It makes the works much more popular, e.g. Vermeer’s Milkmaid receives about 3,000 downloads a month on average. The high-quality free rights use makes people appreciate more the trustworthy web site of the museum and as a consequence use and observe better quality of the original rather than poor quality and in other ways mistreated images of works of art.⁶

3. Google Official Blog, 2010.

4. Mylio.com, 2017.

5. Bankmycell, 2019.

6. Made with Creative Commons, 2017.

Theory of the Image

Society gives preference to the sense of vision. Starting from Renaissance understanding of the ability to portray the visible in precise perspective mathematical method, as is pointed out by Finnish architect Juhany Pallasmaa:

*"The dominance of vision over the other senses - and the consequent bias in cognition - has been observed by many philosophers. ...western culture has been dominated by an ocular-centric paradigm, a vision-generated, vision-centered interpretation of knowledge, truth, and reality."*⁷

This preference is an ever-accelerating movement, culminating in a never-ending process of technological advances related to manufacturing images. The consequences of the proliferation of images on society are profound and have been central in research and discourse already early in the previous century, emerging from seminal critical texts like that of Georg Simmel's, the German sociologist and philosopher, and that of Walter Benjamin's "The Work of Art in the Age of Mechanical Reproduction", 1936. Benjamin suggests that the copying abilities of the camera and the cinema have changed significantly the role of art. Benjamin points to the fact that any work of art can have an endless number of copies. This eliminates the crucial essence of authenticity, which until that point was essential for any work of art. The ability to mass-copy the work of art eradicates its metaphysical\religious attributes to something that belongs to the masses, and as such social and political.⁸

The American philosopher and filmmaker Susan Sontag published in 1977 her book titled: "On Photography", in which she argues that the proliferation of photographic images had begun to establish within people a "chronic voyeuristic relation" to the world around them. Among the consequences of photography is that the meaning of all events is leveled and made equal. Sontag claims that the individual who seeks to record cannot intervene and that the person who intervenes cannot faithfully record, for the two aims contradict each other. With this text, she explores critically a range of artistic, moral, and cultural issues related to modern society and the interaction between reality and its image through the set of dimensions arising through the camera and its uses.

French semiotic philosopher Jean Baudrillard is best known for his analysis of media, contemporary culture, and technological communication, as well as his formulation of concepts such as simulation and hyperreality. In 1981 he published "Simulacra and Simulation", Simulacra refers to copies that depict things that either had no original, or that no longer have an original, and by Simulation he means the imitation of the operation of a real-world process or system over time. In the text, Baudrillard seeks to examine the relationships between reality, symbols, and society, in particular, the significations and symbolism of culture and media involved in constructing an understanding of shared existence. In the realm of architecture, the manifestation of such process became explicit in Rem

7. J. Pallasmaa, *The Eyes of the Skin* (Great Britain: Wiley-Academy, 2005), 16.

8. Moses, *Walter Benjamin and the Spirit of Modernity*, 2003.

Koolhaas's "Delirious New York". First published in 1978 it interprets Manhattan as a continuous attempt to establish in reality an illusion, based on a multitude of images, not specifically formulated in a program but rather a manifestation of the will to establish sort of simulacrum. An urban reality completely man-made extracted from delusions and made-belief popular agendas.

More contemporary thinkers continue a pessimistic view of the consequences that countless images have on society. Like British architectural theorist Neil Leach's analysis of images influence:

*"In the media society of today, technological advances in telecommunications and in methods of visual reproduction ensure that we are constantly being inundated with images. ... (screens, computers and copiers) ... have become the virtual windows of the age of the information highway, ... the modern office and home are deluged with reproduced images and information... it is the culture of the copy, a society of saturation, the second flood. The world has become "xeroxized" to infinity."*⁹

His ideas tend to be prophetic warning against the hazards of image overload:

"We live in a world where there is more and more information, and less and less meaning."

"...the function of the image shifts from reflecting reality to masking and perverting that reality."

*"in sum, the surfeit of the image - the excess of communication and information - implies the opposite, a reduction of communication and information."*¹⁰

Culminating to the ultimate and unavoidable conclusion:

*"A society awash with images will experience a consequent reduction in social and political sensibilities, as the intoxication of the image leads to a lowering of critical awareness, the saturation of the image will therefore promote an uncritical acceptance of the image."*¹¹

Leach's statements, already almost 20 years old, are arguable, regardless more than everything else, they are a testimony for the un-denied change the world has gone through as a consequence of the 'flood' of images. More than a reliable analysis of a condition or even an educated prophetic assumption it is rather a farewell to a reality in which the image was not so dominant, a world where it was not so accessible. It is rather more impartial to assume that the image has established a different reality, a different layer that has assimilated our reality. It is not dystopia nor devoid of meaning, yet it is definitely different.

9. N. Leach, *The Anaesthetics of Architecture* (London, England: The MIT Press, 1999), 1.

10. Ibid, 1, 5, 7.

11. Ibid, 55.

It is crucial to acknowledge that a profound understanding exists in the discourse about the image. The visual is not merely the content of the seen, it is always about potential, of unfolding, of possible interpretation, of a hint toward something else that resides elsewhere. There is mental depth in what is seen. As such images cannot be thought of as mere copies or a thin cover, nor they are distortion or a mask of reality. On the contrary, images, invite, penetrate, resonate with complex truth, with ambiguous possibilities, with irreconcilable truths of reality. Images can expose things that reality does not show. Images do not really copy, they rather obscure, make things lose their undeniable and concrete manifestation while in turn, they gain an existence as potential, as open to interpretation. The image opens up windows toward new ideas and feelings which the visible cannot unveil. As such the image and the copy cannot be ignored; we cannot turn back to a world with no images, and we cannot un-live its social engagements. Yet, we are obliged to understand its influence and to explore its possibilities and pitfalls.

Architectural Experiments

Architectural thinking is experimenting with the conceivable consequences of the integration of images, projections, data, computer-generated forms and methodologies, and their influence on architecture. Works of Toyo Ito, Marcus Novak, Kas Oosterhuis, among others, has aimed toward finding the integration of form, methods, and production for this new era. It is of importance not only to point toward the current state of affairs but also to mention the transforming concerns of architectonic issues: the position of nature, the transition from outside to inside, the facade, design methodologies, the role of data, the architectural coherency and visibility of the architectural object, the symbolic characteristic of the architectural object, and more. It is not contended that these values and ideas have disappeared but rather that their importance and dominance are in a radical state of transformation. This takes place on the expense of the submergence of the individual in, a mixture of the real and the images to a point that neither can claim to have complete authority over the other.¹²

Many architects have tried to explore the possibilities of an image-saturated world. Viennese architect Adolf Loos, active in the early decades of the 20th century, was much concerned with the gap between the experience of space and images of space.¹³ He was well aware that images cannot convey the full extent of experience of the real, especially in relation to space. Yet he was aware of images un-denied force to engage the viewer and carry complex visual concepts. Loos used to manipulate images of his architectural projects. He refused to let his designs be published un-edited, and in most cases, his published designs were accompanied by carefully staged photographs. For him, the experience of space

12. P. Gregory, *New Scapes: Territories of Complexity* (Basel, Switzerland: Birkhäuser, 2003).

13. A. Loos, *Spoken into the Void Collected Essays 1897-1900*, (trans) Newman and J. Smith (London, England: Oppositions Books, The MIT Press, 1982).

and the image of the space were not the same, and photographs of a space should not be understood as mere copies of it.¹⁴

First designs that experimented with the sensory indeterminacy of image projections were conducted by the Eames couple. During the late fifties of the 20th century they designed large multi-media exhibitions. Their metaphoric model was the circus, an event which offers a multiplicity of simultaneous experiences. They used many screens of extremely large size, with multitude of image sequences projected on them, choreographed and synchronized, with the aim to:

*"... produce sensory overload ... The audience drifts through a multimedia space that exceeds their capacity to absorb it."*¹⁵

American architect and critic Robert Venturi, does not rally against the superficial world of the commodified image, he rather embraces and celebrates it. He sees it as a source of inspiration for architecture. In his already seminal research, he reversed the notion that image saturation is a source of alienation and superficiality. He analyzed reality generated from images as a carrier of meaning and form, not to be disregarded but rather to be a source for understanding and education, not something to be avoided but rather an object for revelation.¹⁶

American architecture firm Diller, Scofidio+Renfero (DS+R) created thought-provoking projects that question the relationship between digital media and architecture. Among them many screening installations, moving screens and shifting viewpoints, and carefully sequenced projections that are choreographed with spatial and architectonic conditions.

American architecture researcher Sylvia Lavin discusses the emerging relationship between the projected images and the architectural surface. Her notion of the interaction between solid form and materiality - architecture, and the 'soft', transformable nature of the projected media, is correlated to the act of kissing. This superimposition transforms both the architecture and the projection. The projection receives a unique context, and the architecture gains new visibility. Lavin refers to this as a kiss-like relationship:

*"But their effect on architecture is to cause architectural facades to disobey notions of frontality, coherence, and transparency. Projected images break the planes of a building into parts that never come together again to compose an envelope."*¹⁷

14. B. Colomina, *Privacy and Publicity: Modern Architecture as Mass Media* (Cambridge, Massachusetts: MIT Press, 1994).

15. Colomina, "Enclosed by Images: The Eameses' Multimedia Architecture," *Grey Room*, no. 2 (2001): 19.

16. R. Venturi, D. Scott Brown and S. Izenour, *Learning From Las Vegas* (Cambridge, MA: The MIT Press, 1972).

17. S. Lavin, *Kissing Architecture* (Princeton & Oxford: Princeton University Press, 2011), 47.

Architectural Education

It is not a question of possible utopia or feared dystopia, the paradigm of either of them also lost much of its relevance. It is the here and now, the submergence experience of the body within the accumulated data and visual overload, with its shifting, fragmentary, partial, discontinuous nature. It is rather the reality with all its possibilities, endless occurrences, and constant undetermined conditions, which requires our utmost and constant attention. It is in the realm of the architectural education process that it becomes essential and possible to examine the consequences and prospects of new uses of images and drawings.

Design problems are problematic in their formulation and their meaning. This is, even more, the case in the educational format of the design studio.¹⁸ Hence, the issue of how a problem should be stated or what problem should be defined in the design studio becomes very important. This is well put by British educator Nigel Cross:

*“It is also now widely recognized that design problems are ill-defined, ill-structured, or ‘wicked’ ... They are not problems for which all the necessary information is, or ever can be, available to the problem-solver. They are therefore not susceptible to exhaustive analysis, and there can never be a guarantee that ‘correct’ solutions can be found for them.”*¹⁹

According to research in the field of design problem-solving, the state of uncertainty with respect to problems and their definitions is one that designers must learn to live with and even thrive under. Some researchers go so far as to claim that designers, both students and professionals, prefer uncertainty and even create it in situations where it does not exist.²⁰ Further, some researchers claim that the ability to overcome the stagnation caused by uncertainty is essential to ensure good designers and an efficient design process, as indicated in this statement from a study by Restrepo and Christiaans:

*“The less successful students asked for large amounts of information, but for them, gathering data was sometimes just a substitute for any design work” . . . as some senior students also were trapped into information gathering for problem structuring. Instead, they suggested that the need to gather information (to structure the design problem) is related to the (in) ability of the designer to cope with uncertainty.”*²¹

One of its main goals of design education is to teach and enhance creativity. The creative teaching process, taking place in the design studio, is sometimes referred to as “reflection-in-action”, a term coined by American philosopher

18. R. Buchanan, “Wicked Problems in Design Thinking,” *Design Issues* 8, no. 2 (1992): 5-21.

19. N. Cross, “Designerly Ways of Knowing,” *Design Studies* 3, no. 4 (1982): 224.

20. J. Restrepo and H. Christiaans, “Problem Structuring and Information Access in Design,” *Journal of Design Research* 4, no. 2 (2004): 1551-1569.

21. *Ibid*, 1556.

Donald Schön to explain the unique way designers are educated.²² Creativity resides not only in the outcome of student work but also in the actions and definitions provided by design educators. As Wiley states:

*“Altering the instruments, tools, and the process used during design increases the students’ awareness of the influences exerted by their method, and such awareness could further the expression of an idea.”*²³

The 3 Exercises

As is marked by several researchers of contemporary architectural education current cultural reality is very much delivered and understood via the image, the visual rather than the haptic.²⁴ The influence and meaning of this condition on architecture and architectural education are vital for contemporary culture and society and are in the core of current research.²⁵ The rapidly evolving conditions of technology and the conceptual developments in architecture, and its relationship with the image described earlier in the paper, need to be researched. The aim of the paper is to address these issues via experimental intervention in the educational architectural design process. The case-study exercises presented confront the specific issues raised by current digital-imagery technology and their relationship with architectural spatial complexity.

The exercises were devised for, and positioned in, the initial phase of the design process, commonly referred to as “problem structuring” or the “analysis phase”.²⁶ The proposed exercises were positioned in the initial phase of the design studio as they are more fitting to the origin of things, to the purity and mystery that may reside in the point of departure. This comes from the understanding that the starting point or method will have a considerable impact on the solution. It is believed that the starting point can encompass all possible continuations and outcomes. In other words, the beginning paves the way forward while at the same time serves as a reference for the resulting progression. The beginning stage is where the primary, preliminary and unformed concepts, are created. Hence the focus here is directed toward the process rather than the solution. A research study by Birer and Yazici provides an example, one of many, of a creative approach to presenting a design problem at the early stage of the design process. Their study explores the creative benefit of transforming concepts and methods from other

22. D. Schön, “The Architectural Studio as an Exemplar of Education for Reflection-in-Action,” *Journal of Architectural Education* 38, no. 1 (1984): 2-9.

23. K. Wiley, “Re-Framed: Challenging Assumptions of Process and Making in the Design Studio,” in *Intersections: Design Education and Other Fields of Inquiry: Conference Proceedings* (2006): 350.

24. H. Casakin and G. Goldschmidt, “Expertise and the Use of Visual Analogy: Implications for Design Education,” *Design Studies* 20, no. 2 (1999): 153-175; A. Salama, *Spatial Design Education: New Directions for Pedagogy in Architecture and Beyond* (London: Routledge, 2016).

25. J. Ockman, *Architecture School: Three Centuries of Educating Architects in North America* (USA: MIT Press, 2012).

26. Restrepo and Christiaans, “Problem Structuring and Information Access in Design,” 2004.

disciplines into architectural concepts. The researchers conclude that introducing students to "fantastic fiction" early in the studio will benefit their creativity:

"[It is] ...safe to assume that starting design process with fantastic fiction and gradually increasing information that would improve visual perception would enhance creativity."²⁷

As such the beginning phase of the studio is understood as a fitting setting for experimental methodology.

In accordance 3 design exercises were prepared to correlate to each of the ways the 'flood' of images is manifested: accessing, collecting, and manipulating. The exercises were conducted as part of a design studio course with a group of about 20 students. The exercises, with some minor adjustments, were conducted over the past 3 years. Some of the groups were 1st year students, and some were more experienced students in their 4th year. The sequence of exercises, specific instructions, as well as, evolving outcomes were tuned in accordance with the different students' level of expertise.

Accessing

During initial meetings of the architectural studio, lectures consisting of architectural precedents were presented. The examples shown were aimed at enriching the students general understanding of the design problem they were about to be given. These presentations included images of section and plan drawings of some of the presented projects. Students were asked to draw\sketch using these images of architectural drawings as 'models', much in the same manner as 'still life' or 'nude models' are used in traditional drawing classes. A multitude of sketch\drawing exercises were employed: fast drawing, one-line-continuous drawing, improvisation (adding, altering stylistically), collage (cut & paste), as well as traditional drawing such as copying measuring, scale, shade and tone, some use of colors, etc. During this exercise students were encouraged to access, using their smart-phones or laptops, drawings of their choice to complete and enhance the drawing exercise, starting from accessing different drawings of some of the projects shown and then expanding to other drawings and projects of their preference. On the course of this activity, a wide range of issues were discussed freely among the group: Internet resources, the quality of the images, their meaning, relevance to their project and ideas, and more. This exercise, using drawing images as sketch-models was conducted several times during the semester and was used both as sketch exercise and a method to 'boot' students into working and creating.

27. E. Birer and E. Yazici, "An Analysis of the Fantastic Fiction on Conceptual Space," *World Applied Sciences Journal* 13, no. 5 (2011): 1102.

Collecting

Students were asked to collect and show a collection of images that were defined as “inspirational objects” (Figure 1). The collection was used as infrastructure for discussions, idea generator, and material to inspire creativity and to work with. The students' collection of images was the basis for creating ‘metaphoric collages’, triggers for creativity, and formed the basis for the students' initial conceptual ideas for their design project. The collection was allowed to expand, transform, and change its meaning during the first few weeks of the semester. The images were printed and then arranged and rearranged in an attempt to suggest, inspire, and reinterpret ideas and implications which in turn can be abstracted toward further developments as the architectural project evolved.



Figure 1. *Students Working in the Studio on Image Collections*

Source: Author.

Manipulating

Students were given 3 sets of 9 images, each of well-known photographer: Irving Penn, an American focusing on portraits, Ansel Adams, an American landscape photographer, and Henri Cartier-Bresson, a French humanist photographer renowned for street photography and the concept of the 'Decisive Moment'. The students were asked to select 3 images from at least two of the sets, present them and manipulate them according to their idea relating to the project. At the final stage, they were asked to alter a selected image by adding an additional 2 layers to it. One made of only transparent and reflective materials, and

the other made of a short video they made which was inserted into or projected on the image. The result was a complex multi-layered object\image manipulated with different methods. The final object carried with it many possibilities for further development of the student's architectural project (Figures 2 and 3).

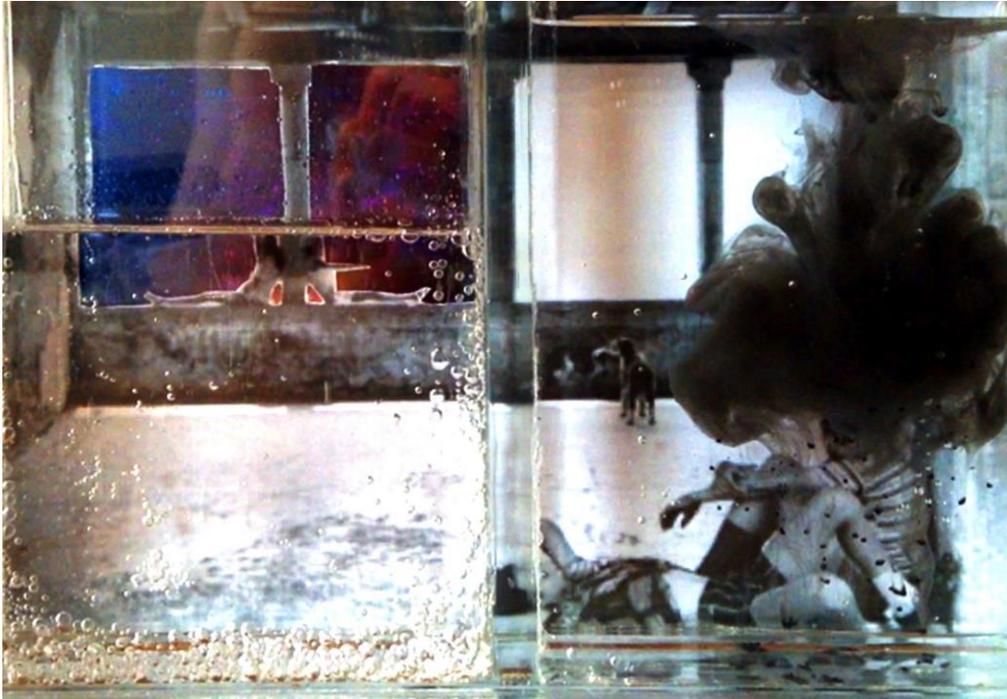


Figure 2. Student's Manipulation Work on a Photograph by Cartier-Bresson. Water, Glass, Ink, and a Video Inserted into the Image.

Source: Author.



Figure 3. Student's Manipulation Work on a Photograph by Cartier-Bresson. Glass, and a Video Projected on the Image.

Source: Author.

Methodology

The visual culture, discussed earlier in the paper that we experience and consume should be understood through research tools which arise from this condition, in which case the visual qualitative research is highly relevant toward a better understanding of current architectural education pedagogy and experimentation. The data collected, was created and used by the students as their design process developed. The research was almost ethnographic in nature, as I was involved with the process and part of it, both as instructor and researcher. As such it offered various engagements with the data, and the architectural design process. The data creation and collection process included these stages:

- (1) Creation of the exercise (accessing\collecting\manipulating) expressing the participants' ideas.
- (2) Verbal explanations by each participant of each exercise.
- (3) Reflection:
 - a. Dialog between instructor and participants about the different uses and meaning of the images in relation to the evolvement of their personal process.
 - b. Group dialog, ranging from couples to the whole group.
 - c. Informal discussions with colleagues in relation to the exercises and their results.
- (4) Analysis, including an overview of the materials, and a comparative analysis of the visual and verbal data collected.

This qualitative analysis was conducted several times throughout the semester. The collection of data and its analysis gave less importance to the systematic collection and categorization and more emphasis on the intuitive reflections. While this resulted in less specific conclusions, it allowed openness of reflections and suggestive understandings of the process. It allowed the combination of a multi-disciplinary approach to flourish and gave room to, sometimes conflicting, ideas to co-exist. The qualitative visual research methodology allowed to engage with the students, and students work on various levels, and at different times in relation to the exercises and to the correlative advances in the architectural design process. This qualitative and 'ethnographic' observation and analysis allowed great flexibility in the treatment of the materials and necessary adjustments required from time to time.

Findings

Accessing

Students enjoyed the drawing and the activity. There was no specific advantage to drawing from architectural drawings over drawing from other models, such as other types of images or human figures. On the contrary figurative subjects gained more favorable response than 'abstract' subjects such as

architectural drawings. The understating of architectural precedents did not seem to benefit from the act of drawing the architectural drawings of the projects. This may be due to the gap between comprehending the architectural concepts and concentrating on the physical act of drawing.

Students drawings were more sensitive and accurate after training with sketching from architectural drawings. The gap between the hand sketching and the computer drafting and design process was not easily abridged and students' testimonies differed too much as to draw specific understandings. The drawings of drawings proved very interesting and had an apparent impact further into the project, although students rarely referred back to drawings and precedents they used. They seemed confused about bridging the gap between hand drawings and creating their own computer-generated drawings. Nevertheless, the act of drawing had many benefits. The design process seemed much less frightening, the sources of inspiration 'allowed' had broadened their ideas, the working and creating in the studio benefited from the exercise, and in general it had positive responses.

Students were all but too familiar with means and possibilities of accessing images through the internet, yet their search keywords and findings were somewhat limited. It seems that the need to direct them as to what to search for, and what is the relative quality of what they find, is essential for a productive 'search'. Once they understood the search capability as a relevant tool and a beneficial design skill, they became very exhilarated and effective. It seems that the tool of accessing images and specifically architectural drawings still has much potential and needs to be further defined as to carry more conclusive and relevant results toward the process of design, technique, and design process.

Collecting

Searching through the Internet was surprisingly hard. Specific sites were declared "interesting" but the search itself was not perceived as 'knowledge' or something useful such as a tool, it was not easily understood as a source relevant for the design process itself. Students many times were uncertain of what is it they are looking for, as a result, the collections were unimaginative and relatively confined to the known and the familiar. Students collections presented rarely exceeded a few images, many of them were existing personal collections or family related. Such as "this is my grandparents' collection of..." etc.

Students rarely used architectural-drawing-images as part of their drawing collections. They tended to select images that were a testimony of a known experience or images from a personal inventory, their initial images were presented and explained with personal statements, such as: "this is from a trip with my boyfriend...", or "this is the collection of toys of my brother...", etc. It seemed that the overwhelming possibilities that arise from the images available were not an opportunity but rather a burden. The images by themselves did not readily generate curiosity or triggered intrigue. Searching through the 'web', although a very common experience was not perceived as a working experience related to data collection relevant toward gaining material for their project. The haptic experience of material, the sensory response of experiencing objects, the context

of their initial use or environment was not transmitted solely through the images themselves.

On the other hand, students enjoyed telling stories through images they selected. They were motivated by the images and delighted to work with them, constantly being inspired and motivated by them. After working with the same images for some time they were not treated as mere 'ready-mades' but were referred to as if they were their own creations. Students tended to stick to the initial images they selected. Rather than expanding the image collections they created. They preferred to work with the same few images. As they became more and more fond of the images they already had, as they draw more and more understanding and inspiration from a few images rather than expanding and maybe losing interest.

Overall students' collections became richer and more complex only after they were directed toward specific ideas or connections or after they were given an explanation or incentive toward using this or that subject matter. When directed toward selecting and collecting architectural drawings many did so and responded positively. Students who did use architectural drawings in their collections tended to use them more, and in a more direct fashion further into their projects. The abstractness of the architectural drawings and the similarity of the visual language (plan\section) to that required in the design process proved very readily for them to use. They altered more freely and imaginatively the architectural drawings than they did figurative images. They changed scale, connected smilingly unrelated drawings, used plans as sections and vis versa, and more. It seems that the similarity of language was inspiring in itself and made more sense as the projects evolved (Figures 4 and 5).

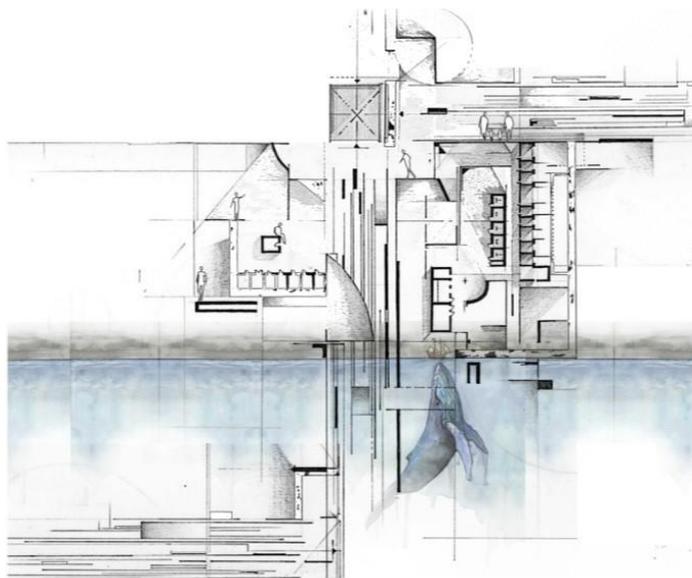


Figure 4. *Student's Conceptual Section, Using Existing Architectural Drawings*
Source: Author.

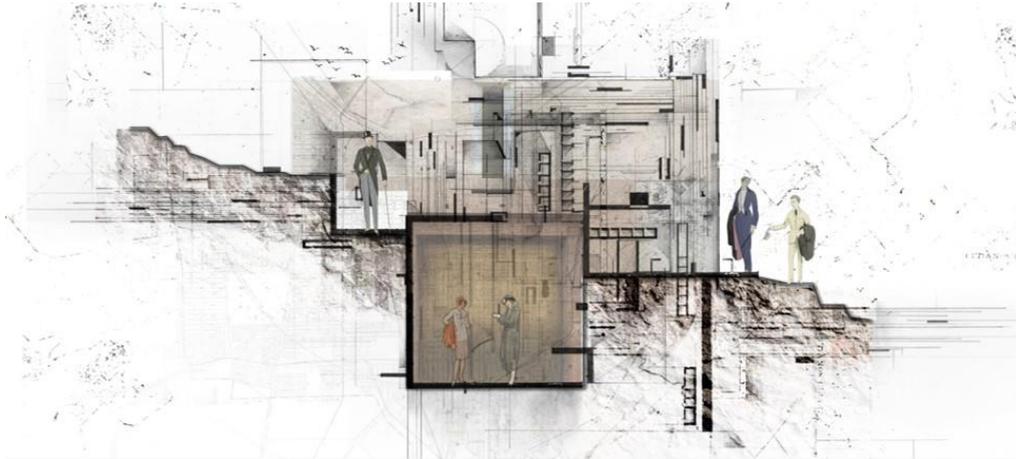


Figure 5. Student's Conceptual Section, Using Existing Architectural Drawing
Source: Author.

Manipulating

At the first stage, selecting known images from given existing photographs, the students were very intrigued by the images. On the one hand, they were given seminal works of art, and at the same time they were given a choice. This proved to be a successful method. They were not supposed to make a mindless selection, they were not judged about their selection, and they had a broad enough choice to make among interesting examples of which they were briefly introduced to. As a result, they made their choice in a very confident and intuitive fashion. They readily related to their selected images, and in a variety of ways, ranging from the personal: “she has freckles like mine...”, to conceptual: “the woman’s face is so strong and full of character...”, to free associations: “the curve of the river feels a relaxing thing to me...”, and so forth. Students were very communicative about the images, using many associative connections and drawing many inspirations from them. The students were very enthusiastic about verbalizing their responses and feelings about the images. In general, it proved to be a very useful tool to generate motivation, ideas, creativity, and inspiration.

This exercise had multiple stages asking the students to create different overlays of manipulation to the images they selected. This proved intriguing and challenging for the students. Most of them enjoyed the unfamiliar treatment of materials and working with the context of an image. The most interesting finding, however, was the ease and richness by which the students moved from the final objects they created into the continuation of the design studio project. This exercise proved as inspiring and encouraging creativity, allowing the students ease of coping with the uncertainty of ‘wicked-problem’ solving.

Design Project Development

As mentioned earlier in the paper the exercises were given at the early stages of the design project, i.e. the “initial phase of the design process”. The 3 exercises overall aim was advancing the students projects and thought process in multiple

ways. Students were instructed to use the products of the exercises into three main issues: to develop a design language, a conceptual idea for the project, and a methodology for production of design materials (such as plans and sections). For the overall clarity of how the design project continued after the 3 exercises the following image is given as an example. Student's work shown in Figure 5 above (a 4th year student) was further developed to as a "Hit-man's Asylum" (Figure 6). The concept, the design language, and the methodology of mixed media, which evolved in the preliminary 3 exercises, were all utilized throughout the whole semester and reached their maturity in the final project developed.



Figure 6. Student's Project: "Hit-Man's Asylum", Sections

Source: Author.

While the same exercises were given to different groups of students (1st and 4th year students) the impact of this difference was insignificant, same results were found in both groups. This can be understood due to the fact that the exercises required no expert tools or experience. Nevertheless, it was understood that there were considerable differences to be expected in the continuation of the design project between those groups. That is due to differences in the overall semester objectives and experience of the students. For example, 1st year students were asked to design a specific and simple project while in the 4th year the design project was given for their own choice and continued throughout the semester.

Conclusions

Reflecting on the case-study and process, we came up with some understandings and questions. We registered many benefits of the constructed methodological use of sequenced exercises upon the architectural design process. It assisted creativity, generated design solutions, and prompted the evolution of ideas. The constant reflections and translation from the verbal to the visual stimulated discussion, sharing of knowledge, and overall encouraged a much-improved process. We strongly believe that it provided the students with improved design skills and a tool of great visual stimuli which reflected throughout their design process. Overall the students enjoyed the use of the availability and richness of using images. It gave them inspiration and confidence in dealing with the uncertainty of the 'wicked' design problems.

The gap between images of architectural drawings and the act of drawing itself remains, and it seems that much more research and experimentation is necessary. The scope of this paper was limited to the relationship between the images and the exercises, the precise influence of the use of images further into the design project can be examined in a continued research with additional parameters. Furthermore, exercises themselves can be adopted to better suite specific educational aims. For example, they can be utilized more into the design process, not only the initial phase, even to the final stages of the project design. They can be better tailored to specific knowledge and expertise of the students. Lastly specific tools for the use of images can be better incorporated into the design process methodology.

It is our duty, as architectural educators, to find creative and relevant methods to utilize the abundance and availability of images, as to enhance their meaning as an essential part of the design process. The present generation of architectural students, lives in a culture saturated by images in which the role of the image and the tools to consume it are multiplying almost daily. This reality requires to engage with the image intellectually, intuitively, critically, and creatively. Architects that will understand better the evolving relationship between society, culture, architecture and the image will be more suitable to interact with society and with contemporary design problems as more prolific architects. The dystopia and pessimistic critic aimed at the way society and architecture are failing at the light of the image overexposure, is missing the point. We are not at the final frontier protecting against an overwhelming flood, but rather fast surfers catching a tidal wave carrying us fast toward exciting, exhilarating horizons. It is for us, as a duty and joy, to embark on this journey and discover the new lands that unfold in front of us.

Bibliography

- Bankmycell, 2019. [Accessed 5 May 2019]. <https://www.bankmycell.com/blog/how-many-phones-are-in-the-world>.
- Birer E. and E. Yazici. "An Analysis of the Fantastic Fiction on Conceptual Space." *World Applied Sciences Journal* 13, no. 5 (2011): 1100-1105.

- Buchanan, R. "Wicked Problems in Design Thinking." *Design Issues* 8, no. 2 (1992): 5-21.
- Casakin, H. and G. Goldschmidt. "Expertise and the Use of Visual Analogy: Implications for Design Education." *Design Studies* 20, no. 2 (1999): 153-175.
- Colomina, B. *Privacy and Publicity: Modern Architecture as Mass Media*. Cambridge, Massachusetts: MIT Press, 1994.
- _____. "Enclosed by Images: The Eameses' Multimedia Architecture." *Grey Room*, no. 2 (2001): 6-29.
- Cross, N. "Designerly Ways of Knowing." *Design Studies* 3, no. 4 (1982): 221-227.
- Google Official Blog, 2010. [Accessed 5 May 2019]. <https://bit.ly/2Oogq4B>.
- Gregory, P. *New Scapes: Territories of Complexity*. Basel, Switzerland: Birkhäuser, 2003.
- Lavin, S. *Kissing Architecture*. Princeton & Oxford: Princeton University Press, 2011.
- Leach, N. *The Anaesthetics of Architecture*. London, England: The MIT Press, 1999.
- Loos, A. *Spoken into the Void Collected Essays 1897-1900*. Translated by Newman & J. Smith. London, England: Oppositions Books, The MIT Press, 1982.
- Made with Creative Commons, 2017. [Accessed 10 May 2019]. <https://medium.com/made-with-creative-commons/rijksmuseum-2f8660f9c8dd>.
- Moses, S. *Walter Benjamin and the Spirit of Modernity*. Tel-Aviv: Resling, 2003.
- Mylio.com, 2017. [Accessed 5 May 2019]. <https://mylio.com/true-stories/tech-today/heres-how-many-digital-photos-will-be-taken-in-2017-repost-oct>.
- Ockman, J. *Architecture School: Three Centuries of Educating Architects in North America*. USA: MIT Press, 2012.
- Pallasmaa, J. *The Eyes of the Skin*. Great Britain: Wiley-Academy, 2005.
- Restrepo, J. and H. Christiaans. "Problem Structuring and Information Access in Design." *Journal of Design Research* 4, no. 2 (2004): 1551-1569.
- Salama, A. *Spatial Design Education: New Directions for Pedagogy in Architecture and Beyond*. London: Routledge, 2016.
- Schön, D. "The Architectural Studio as an Exemplar of Education for Reflection-in-Action." *Journal of Architectural Education* 38, no. 1 (1984): 2-9.
- Venturi, R., D. Scott Brown and S. Izenour. *Learning from Las Vegas*. Cambridge, MA: The MIT Press, 1972.
- Wikipedia. *History of Photography*. 2019. [Accessed 5 May 2019]. https://en.wikipedia.org/wiki/History_of_photography.
- Wiley, K. "Re-Framed: Challenging Assumptions of Process and Making in the Design Studio." In *Intersections: Design Education and Other Fields of Inquiry: Conference Proceedings* (2006): 350-354.

