# DISCOVERING THE HYBRID MODEL OF ARCHITECTURAL DRAWING AT THE BEGINNING OF THE XXI CENTURY

A B S T R A C T

Professional, as well as research framework of contemporary architectural design implies a field articulated by the development of information technologies. So far, it has represented an area of the most rapid exchange of opinions and ideas, being subjected to various interpretations and speculations in different phases of the architectural design process – from initial ideas to final architectural simulations and realisations. Radical changes in architectural thinking have directly reflected on the usage and ways of understanding architectural drawing in the architectural design process. Furthermore, this situation led to radical changes in the traditional process of designing the architectural space. In the context of understanding the relationship between the architect and the drawing as his/her only authorial work, this relationship is being usurped by the implementation of the computer software as an intermediary tool between the two. The introduction of software in the architectural design process influences the emerging forms of the architectural drawing, offering new possibilities such as direct, current and omnipresent manipulation, as well as a multitude of representational possibilities.

This paper problematizes the position of architectural drawing by examining its manifestations at the beginning of the twenty-first century as a consequence of the paradigmatic changes brought about by the digital revolution. Architectural drawing at the beginning of the century is disappearing in its traditional sense and is being replaced by different forms and roles in the architectural design process. Since the conducted research is observed primarily through the discipline of architecture, and more closely, through the field of visual arts, it will examine the role of drawing in the area of architectural representation. Additionally, the research results emerging in the form of a hybrid model of architectural drawing, will be discussed in terms of its creative potential and further explorative applicability within the field of architectural education.

Hristina Meseldžija
University of Belgrade – Faculty of Architecture
hristina.stojanovic@arh.bg.ac.rs

KEY WORDS

ARCHITECTURAL DRAWING,
VISUAL LANGUAGE,
REPRESENTATION, TWENTY-FIRST CENTURY,
DIGITAL PARADIGM,
VIRTUAL REALITY

## INTRODUCTION

The emergence of information technologies in the 1990s has changed the way the work of art is being produced. This led to the creation of variable products and the use of parametricism in the architectural design process, which positioned the discipline of architecture within the digital framework and opened a spectrum of new possibilities in thinking about the visual language of architecture. The accessibility and variety of computer technologies have, once again, enabled to reconsider, reshape and expand the field of architectural design and research. This paper assumes that the drawing in the architectural design process, as a consequence of the digital shift becomes a versatile, multi-layered and hybrid tool, which has an increasingly important role in the field of architectural research. In the contemporary context shaped by the development of information technologies, the use of digital tools in architecture results in re-examining the creative relationship between thought processes that take place in the architect's mind and the material expressions produced by the architect's hand.

The initial hypothesis is that the digital technologies are influencing the way in which the architectural drawing participates in the design process and the process of representing architectural space by establishing different models of drawing. One of these models based on the methodology of transcribing the architectural space,[1] which includes the simultaneous use of drawing as a means of research and representation, develops a hybrid 'representationally-transcriptive' architectural drawing. Specified model combines the use of hand drawing techniques, everyday tools for documenting space and digital applications to simulate virtual reality experience used for perceiving the architectural space. In order to examine the relationship between traditional (analogue, manual, made by hand) drawing techniques and contemporary digital platforms, established methodology examines the possibility of creating a new visual language in architecture. The above-mentioned model of the architectural drawing is a result of a research art project developed in the Architecture and Visual Language postgraduate course during the 2016/2017 academic year. It has been further developed as part of the extracurricular course at the student workshop in Rijeka in 2018 and exhibited within the Modern in Belgrade (MuBGD) art and architecture project in 2019.

The first section of this paper will discuss the contemporary context of the architectural research and design practice with the focus on the role of the architectural drawing at the beginning of the twenty-first century shaped by the

103

development of information technologies and the use of digital tools. Furthermore, it will elaborate the consequences of the digital shift that took place at the end of the twentieth century, when numerous technological discoveries influenced the way of perceiving and understanding space as the basic architectural concept. Finally, this section will try to identify new ways of producing the architectural drawing and new, emerging roles of drawing in understanding and representing architectural space. The second section will present the established research methodology developed in the Architecture and Visual Language postgraduate course that shaped the hybrid architectural drawing that is being discussed, as well as its creative potential in the fields of research and exhibiting practice. The methodology will be explained within three phases of the project, describing the tools that are being used, drawing steps and final results, as well as possibilities of manipulating the obtained results. Additionally, it will focus on analysing the selected final drawing generated as a result of transcribing the interior of the National Library of Serbia in order to indicate the scope of its creative potential and explorative applicability. The third section of the paper will elaborate further the application of this methodology within the field of architectural education. Given that the entire process of architectural education can be considered as a particularly experimental procedure of mastering the skill of thinking about architectural space and using drawing as a tool for research and representation, this section will present a two-week student workshop in Rijeka in 2018. This implies a presentation and discussion on the workshop process and workshop results, focusing on the comparative analysis of three intently selected drawings produced by the students. The comparative analysis uses the selected cases that vary in subject, location of representation and technical virtuosity of drawing.

## 1. ARCHITECTURAL DRAWING AT THE BEGINNING OF THE XXI CENTURY: INFORMATION TECHNOLOGIES AND THEIR INFLUENCE ON THE VISUALITY OF THE ARCHITECTURAL LANGUAGE

Despite numerous technological discoveries and the rapid development of digital technologies in art and in different fields of architecture, the drawing remains the fundamental tool for communicating and representing crucial ideas and concepts in architecture. This implies not only its use in the architectural design process, but also its role in understanding and thinking about space. The long and rich evolutionary path of architectural drawings is closely related to the technological innovations that have changed the way of perceiving and understanding space as the basic architectural concept. Architectural drawing has always had several roles, three of which are dominant today. The first can

be named as the role of the informant, when the architectural drawing transmits information between different phases of design process and construction work. It can be thought of as a common language of all disciplines involved in the design and building process. The second role is the associative or collaborative role, when the architectural drawing embodies the thoughts of the architect and becomes an integral part of the design process, helping the architect to materialise all mental processes related to the design. The third role is the representational role, when the architectural drawing is a commercial product that follows the market needs and trends of design and building. As the focus of this paper is observed within the scope of architecture and visual arts, it will further discuss and examine the emerging representational role of drawing at the beginning of the twenty-first century.

For centuries the role of drawing as the architect's creative work had one aim, and that is to communicate the characteristics of the designed space. In that sense, during the twentieth century, drawing was dominantly used as the ultimate design product, most often taking the role of informant, and somewhat frequently the representational role. Until the paradigm shift, the research role of drawing was minimised to the initial conceptions of space which were presented and communicated in the form of the first drawings of space - sketches. With the development of society, its emancipation, the rise of avant-garde architecture, then the implementation of humanities and digital technologies into the discipline of architecture, the framework in which drawing plays a significant role is being expanded. The interweaving of digital and analogue tools, which can be classified as hybrid, emphasises research attributes of drawing - a shift in perceiving and using the drawing arises and accommodates it within the research corpus of architectural knowledge. From a historical perspective, in the greatest scope of its application, drawing represented a communicative apparatus between the architect and the builder, which has the role of transmitter of all the objective characteristics of the designed space that are necessary for its understanding and construction. Additionally, from the present perspective, it can be said that the relationship between the architect and the architectural space is not exclusively related only to the activity of designing a new or existing space, but also to the way of perceiving, understanding and representing it, that is, translating it into a visual expression.

At the beginning of this century, continuous emergence of new information technologies changed the position of architectural discipline, thus the use of drawing in relation to the digital tools. As a consequence of these changes, there is a re-examination of the creative psychophysical connection between

ideas as thought processes that take place in the architect's mind and their materialisation in the form of drawings produced by the architect's hand. Therefore, the presence of information technologies has influenced not only the way of producing and thinking about architectural drawings, but also the architect's position as the only author of his drawing.[2] In this sense, it is important to mention two fundamental paradigm shifts shaping the production of architectural drawings - from a construction site to paper in the fifteenth century,[3] and from paper (manual or hand drawing) to computer drawing in the late twentieth century. The latter had two leaps at a decade's distance which are specifically important for understanding the present relationship between the architect, software, drawing and space.

The overture to the development of the digital shift in the early 1990s occurred as an extension to the rise and popularity of electronic media. The influence of digital tools in the architectural discipline began in an atmosphere of global fascination and inspiration with the new and yet undiscovered possibilities that these tools were offering. Remaining in close relationship with electronic media, digital tools anticipated the future of architecture with the transition to virtual space as an alternative to the real and physical space.

The first paradigmatic leap, which Mario Carpo discusses in detail in his book The Alphabet and the Algorithm, is characterised by the emergence of new software based on direct manipulation of curves constructed through vectors and points on a computer, and therefore of architects' pursuit of mastering them in order to expand the possibilities of drawing manipulation and then deriving certain, complex forms which were by the time unable to draw and build.[4] In contrast to previous Cartesian understanding of space, this shift changed the way architectural objects are being built. The second digital paradigmatic leap, discussed by the same author in his later book 'The Second Digital Turn: Design beyond Intelligence,' resulted in developing new models of processing and distributing information using artificial intelligence. Building on the previous shift, this one changed the way of thinking about architectural objects.[5] The consequences of the second paradigmatic leap in terms of digital technologies resulted in changes that affected the visual perception, enabling quick and easy access to virtual space as a new spatial or architectural field of experimentation. Being introduced to new tools offering new perspectives of the world, present-day architect stands on the threshold between real and virtual, and the emergence of new tools, appliances and applications allows constant leaps from one field to another and the creation of combined, hybrid perspectives, as well as blurring the borders between architecture and its related disciplines, such as visual arts, illustration, graphic arts, etc.

## 2. IDENTIFYING THE HYBRID ARCHITECTURAL DRAWING: REPRESENTATIONALLY-TRANSCRIPTIVE MODEL

Before entering the process of searching for the hybrid model of drawing, it is necessary to narrowly profile the concept of the architectural drawing and to define the contemporary environment in which it emerges and establishes itself at the beginning of the twenty-first century. The first subsection searches for a position for architectural drawings between two standpoints – Robin Evans speculates about architectural drawings relying on the relationship between the architect as the author of the drawing and the drawing itself, whilst Marco Frascari distinctly separates two types of drawings, naming them both as architectural. The second sub-section explains how the use of digital technologies inspires and participates in experimenting with drawings today, introducing the first prototype of representationally-transcriptive model of drawing. Nonetheless, the third sub-section advocates for the established hybrid model of drawing, analysing its basic features and elaborating on concluding observations.

### 2.1 Between The Architect And The Architectural Object

Relying on Robin Evans' thesis, in which there is a connection with Alberti's statement that architects do not make buildings, but drawings of buildings,[6] it can be said that drawing as an author's work has two original forms, when it is created before what it represents, most often an object of architecture, and is given the title architectural, that is, when it is created on the basis of an existing object or space, remaining in the domain of architecture but gravitating towards fine or visual arts.[7] Another viewpoint refers to Marco Frascari's work 'Splendour and Miseries of Architectural Construction Drawings,' where he focuses on explaining the difference between drawings as carriers of ideas about architectural space and drawings as instructions for building an architectural object. Frascari writes about the insurmountable gap between two types of drawings that are equally present in architectural activity - architectural drawings characterised as being subjective and rather suggestive, and construction drawings as being objective and neutral.[8]

Relying on these two points of view, the architectural drawing in this paper can be positioned as a peculiar and idiosyncratic representation of ideas about physical space. This position frees the architect as the author of the drawing from determinants related to a certain space. At the same time, it allows him/her to step back from the physical space on the one hand, while, on the other hand, it brings him/her closer to it while affirming author's distinct and very

personal interpretation of space. Drawing as a medium of representation remains the subject of experimentation with tools that are increasingly coming from the domain of digital technologies. In this way, new technologies expand the creativity of architects by encouraging them to re-examine traditional techniques and tools and find their place in the contemporary architecture. As already mentioned in the previous section, the relationship between the architect and the architectural space can be further examined through the lens of understanding and representing the existing physical space using drawing as a representational tool.

### 2.2 Virtuosity Of (Going) Virtual

Virtual reality as one of the carriers of the second digital turn imposed itself as a new medium for experimentation in the domain of perception and representation of space. Additionally, with the development of smartphones, technology for this means of representation has become more available for everyone and is gaining popularity thanks to social media. Virtual panoramic images, as one form of commercialised or simplified illusions of virtual reality, are more often being used in architecture in communicating with clients for presenting a newly designed or existing space, depending on whether it is a conceptual solution or an already constructed object. Such virtual panoramas provide a full, spherical view of the documented space (360x180°), where the perspective can be easily controlled and changed in all directions. Additionally, multiple panoramas can be combined into a unique virtual walk, which adds to the illusion of walking from one space to another, making the virtual tour appear less static. This way of presenting space is becoming an increasingly frequent way of communicating with the clients or the future users of the space.

In 2015, one of the largest technology giants Google launched a free application that enabled its users to browse 360°x180° panoramic images of every corner of the world. Additionally, each user is able to contribute to the entire public database of panoramic images, since the application enables not only to search for desired images, but also to create personal panoramic images by capturing the 360°x180° image using smartphone. Every captured photo can be viewed as a spherical image using this one or any other suitable application, or it can be downloaded and stored in the phone as an unwrapped two-dimensional image. This way, this kind of medium becomes easy to reproduce, hence, opening a spectrum of new manipulative possibilities in the fields of visual and fine arts and architecture.

The starting point for the project conducted in the Architecture and Visual Language postgraduate course in 2017 was to explore new possibilities for using digital tools in architecture, such as the mentioned application for making virtual panoramic images, in conjunction with architectural drawing, focusing on representing the existing physical space as an architectural object. The selected case study for the first drawing experiment was the interior of the Reading Room at the Faculty of Architecture University in Belgrade. It was important to build on the thesis of questioning the usability of traditional drawings in architecture, hence the methodology of manipulating the captured panoramic image concentrated on using various hand drawing techniques to explore the specific characteristic of the analysed space. Furthermore, experimenting with hand drawings shaped the whole process of the project, resulting in manually transcribing the captured panoramic image into a series of hand drawings, which were afterwards digitally processed and manipulated using computer-aided tools and finally presented as a virtual panoramic drawing (Figure 1, p. 196).

The applied methodology consisted of seven steps divided into three phases of pre-production, production and post-production that combine a myriad of analogue and digital tools such as photography, ink on paper, marker pens, technical pens, Photoshop CS editing. The pre-production phase involves capturing a 360x180° panoramic image of a chosen physical space, in this case the interior of the Reading Room (Figure 2, p. 196). The unwrapped two-dimensional image of the captured panorama is then used as the initial basis for the work. The production phase includes four groups of drawings done in different techniques - drawing on tracing paper using ink, technical and marker pens. The analysis of the obtained photographs determined four categories of space transcription that correspond to different layers of the spatial image, and which together, superimposed, give an abstract image of the same space. Each technique involves making 12 drawings which together form an image corresponding to the aforementioned unwrapped panoramic image. Each group of drawings represents one level of space transcription - edges, surfaces, light and shadows (Figure 3.1, Figure 3.2, Figure 3.3, and Figure 3.4, p. 197).

The post-production phase involves translating 48 drawings in total into digital form and assembling them into four corresponding spherical images. The obtained images are then being superimposed using computational tools, such as Photoshop CC 2015. As the final result, the obtained spherical image, must be added up with certain metadata, becoming suitable for wrapping back into the application as a new, transcribed, panoramic image or panoramic drawing.

The established drawing model resulted in four large-format hand drawings, i.e., 48 small-format drawings which were scanned, digitally post-produced, superimposed and merged into a single image. Finally, the two-dimensional image was made spherical using metadata and presented via the same application used for capturing the initial photo. The final result, a spatial drawing can be viewed by following the appropriate link[9] which gives the observer the freedom to choose the vintage point and therefore, the most preferable fragment of the drawing as a separate image (Figure 4.1, Figure 4.2, Figure 4.3, and Figure 4.4, p. 198-199).

### 2.3 On Methodology: Drawing Before Analysis

Being a member of Modern in Belgrade group,[10] which held several solo exhibitions during 2019, the last exhibition in the series served as a testing ground for further research on the topic of presentational possibilities of the established drawing model. The exhibited work for the exhibition titled 'Black on White,'[11] represented the second drawing experiment, the interior of the Reading Room at the National Library of Serbia.[12] The applied drawing methodology was repeated, following the example of the previous project – using four levels of spatial transcription (edges, surfaces, light and shadow). These levels correspond to the four stages of identifying the essential elements of space. While observing the drawing, the most dominant layer is recognised as the one representing the structural elements and the disposition of volumes in space presented with different nuances of drawn planes.

The second notion is the overlapping of two closely related layers – one representing light, and the other representing shades. Their superimposition gives life to the drawing as it seems to document one precise moment in time of the observed interior. Finally, the last layer, playing hide-and-seek with the observer's eye, reveals itself very discreetly, like the author's signature – present but gently hidden. It subtly emphasises sharp edges providing stability to the structural elements holding the interior space. Nevertheless, the theme of the exhibition conditioned the final drawing to be presented as a digital grayscale print, lacking colour (Figure 5, p. 200-201). Therefore, in addition to the link[13] that provided visitors with a virtual experience of entering the drawing, the project was exhibited in the gallery space on a 200x100cm digitally printed poster and a video projection presenting fragments of virtual walks broadcasted in colour and overlapping with the poster (Figure 6.1, Figure 6.2, p. 202).

Repeating the established methodological steps once again, specified the basic features of the drawing, the usability of the hybrid model was confirmed and following observations were noted:

- The conducted drawing procedure focuses more on the development of the specific transcriptive technique than on the analysis of architectural space itself. Whilst the drawing process relies on the procedure, the analysis comes at the end. The drawing process in that sense becomes more artistic and less architectural.

- The three-dimensionality of the drawing and the use of virtual reality creates a twist in the context of image perception. It opens the possibility of viewing the represented space from infinite number of different angles and generates always new images of space, which makes reading itself an architectural experience.

- It can be said that a drawing refers to a specific moment in time in the life of an architectural object, showing it through the lens of the author's observation and virtuosity of drawing.

- Architectural drawing as the final result mostly relies on the traditional drawing techniques, and in that sense, is highly dependent on the author's sharp eye and skilful hand. On the other hand, the computer-aided manipulation generates a multitude of output images as final representations of the selected space. This gesture creates a scale of different levels of abstraction of selected viewpoints - from unrecognisable images composed, it seems, only with a few hand strokes, to detailed, precise documentations contained in several layers of spatial transcription.

Bringing several viewpoints together and comparing them as a set of fractions of one space, the proposed methodology has the potential of upgrading the experience of understanding architectural space with its visual and aesthetic qualities. It can be noticed that digital technologies not only expand the architectural creativity, but they also upgrade the utilisation of traditional drawing techniques, and broaden the presentational practice of displaying the work of drawing through different media.

## 3. CASE STUDY: EXPERIMENT AND RESEARCH IN THE SCOPE OF ARCHITECTURAL EDUCATION

Considering the changing climate of architectural education across the world based on the rise of digital tools, this section encourages further research and implementation of the established hybrid model of drawing within the scope of architectural education. By extending the familiar computational driven researches carried out at the University of Belgrade and presented as part of the publication 'Architectural Education in the Post-digital Age,'[14] it tries to broaden the scope of Research by Design within the field of architectural design, and beyond the Faculty of Architecture in Belgrade. Therefore, the first sub-section explains the extracurricular environment of an international two-week workshop which proved to be a suitable ground for further research of the established drawing methodology. The second sub-section then presents the comparative analyses of selected workshop results and elaborates on its concluding observations.

### 3.1 Augmenting The Methodology

Architectural education primarily implies mastering the skill of thinking about physical space as a mental process, and the skill of representing it in the form of drawing as a practical process. The entire process of architectural education can be considered a particularly experimental procedure of ever-developing the skill of conceptualising physical space and using architectural drawing as a tool for expressing ideas and exploring spatial relationships in the architectural design process. Therefore, the presented workshop is used to survey the established model of architectural drawing in the field of architectural education.

The 'Augmented Experience'[15] is a two-week workshop tutored together with architect and colleague Nikola Milanović at the 2018 European Architecture Students' Assembly RE:EASA 2018 in Rijeka, Croatia.[16] The workshop methodology relied on the above mentioned projects developed during the postgraduate studies. The aim of the workshop was to explore the potential of combining analogue and digital techniques of drawing and the possibilities of using virtual reality infrastructure in architecture, as well as offering the residents of the city of Rijeka a whole new perspective of some of the important and well-known locations in the city focusing mostly on the industrial heritage. The workshop consisted of three parts. The first part referred to the urban and historical context of the city of Rijeka. During the first part, the participants' task was to explore the city's built heritage and to choose the location for their project.

The second part of the workshop focused on exploring and experimenting with drawing techniques, mostly using hand drawing tools such as pens, marker pens, watercolour, ink, crayon, collage, et cetera. This part was conducted as a series of drawing exercises, done individually and in groups, involving discussions on the subject of combining digital and analogue tools in contemporary drawing practice and in the post-production process of manipulating with hand drawings. Drawing exercises included quick small-format drawings done on tracing paper using various techniques that were used to represent the explored sights during the previous part of the workshop (Figure 7.1, Figure 7.2, Figure 7.3, and Figure 7.4, p. 202). These exercises were especially important as they were relaxed from the final outcome and were, therefore, focused solely on the act of drawing and on studying the methodology of transcribing physical space. The third part of the workshop was done individually and it synthesised the previous work resulting in one spherical drawing done by each of the participants. The participants were free to choose techniques for each methodological step of their own preferences. Therefore, the final results varied in presentation and visual language as they were produced using different tools – some were done exclusively by hand using one or several drawing techniques (Figure 8. Figure 9. p. 203); some were combining hand and computer drawing, making an analogue-digital collage (Figure 10. p. 204) ; ultimately some were done solely using the computer (Figure 11, p. 204). One of the main characteristics of the produced results is that they can be presented and exhibited in manifold forms – in situ and online, in real and in virtual space. The final results of the workshop were presented at the workshop site[17] showing drawings done on tracing paper, and online, displaying the digital collage viewable using virtual reality glasses (Figure 12, p. 205). All photospheres were uploaded online and linked together[18] in order to form a virtual walk through nine carefully chosen sites in Rijeka.

### 3.2 On Results: Analysis Before Drawing

The given results varied in terms of students' engagement, skills and affinities. Although the methodology of work was determined and the same for each student, it can undoubtedly be noted that the results displayed an exceptional diversity in individualistic approaches. The following examples were carefully chosen and elaborated based on three criteria – theme and characteristics of the chosen location, technique(s) of drawing and visuality of the drawing.

The first case entitled *Export Drvo* (Figure 8. p. 203) seems to be closest to the former projects described in the previous chapter. Chosen location was the

entering staircase into one of the Export Drvo's halls where the workshop took place. The similarity with the previous works appears in the close relationship between the author and the selected physical space, considering that it was used on a daily basis during the workshop. The urge to choose this kind of space was familiar for the sugested methodology of drawing. Selected drawing techniques were also manual, using hand drawings that are digitally post-produced. The focus of the transcriptive process in this work is on emphasising the structural characteristics of space. Dealing with strong contrasts, the relationship between closed/open and different levels of transparency, distinctly stand out. The clarity of the spatial representation is based on the use of one colour with a profound play of contrast between light/dark (Figure 8. p. 203). What leaves room for unexpected ambiguity is the computational superimposing of hand drawings that create spatial distortions, which, apparently by mistake, reveal the current state of the Export Drvo interior (Figure 8. p. 203).

The second case entitled *Abandoned House* (Figure 9. p. 203) refers, as the title suggests, to the space of an abandoned building. What is interesting in framing the drawing is its position - on the threshold between interior and exterior of the building. This decision consciously sets the task of encoding the relationship between inside/outside, open/close and most importantly, natural/built environment, which are in both cases are aged and neglected. The transcription process is accomplished by computational manipulation of hand drawings with the techniques of digital collaging. Hand drawing is used for an authentic distribution of lines to identify the architectural elements, while a digital collage of lines, planes and hatches is used to show the naturalness of the environment in which this architecture is found (Figure 9. p. 203). The thorough detailing that this drawing embeds, attracts the observer to navigate through the drawing in all directions and through different depths, changing its scale and dimensions of space, thus revealing abstract but imposing representations of the selected coastal surrounding (Figure 9. p. 203). In that sense, the question arises whether this representation is architectural, and if so, is it because of the spatial elements that can be seen in some places of this journey through drawing or because of the seductiveness of spatial depths that are so convincing?

The last selected case entitled *Train Station* (Figure 10. p. 204) deals with the representation of one of the platforms of the train station in Rijeka. In this selected example, unlike all the previous ones, the transcription process is mostly digital. The only analogue step is a line drawing representing structural and spatial elements. The treatment of surfaces is transcribed with the technique of digital collaging, which is characterised by precise fitting into the boundaries

set by the hand drawing (Figure 10. p. 204). The drawing is simple and, at first glance, completely legible. On the second reading, the author's attitude towards the architecture of the chosen space and the desire to communicate that intention with those who are familiar with the selected space is revealed. The decision of the author to play with different levels of transparency in the treatment of architectural elements is quite clear to someone who knows that these giant silos are blocking the vast view to the open sea (Figure 10. p. 204). In this sense, the architectural drawing communicates things above the architecture of the place, and that is the desire for that architecture to become something else.

Given the comparative analysis of the students' projects, the following observations were made:

- The conducted drawing procedures, unlike the one discussed in the previous chapter, focus more on the analysis of architectural space, using drawing as an expressive tool for representing spatial observations. Careful and peculiar treatment and concern for genius loci, together with an equal selection of both the digital and traditional drawing techniques, reveals the analytical approach that this methodology can put forward.
- This particular model of drawing questions the relationship between the author of the drawing, the analysed space and the author's drawing skills.

CONCLUSION

The applied hybrid model of the drawing brings two specific characteristics, one referring to the research, and the other to the presentational attributes of the presented methodology. One part of the methodology relies on the absence of digital technologies in the process of drawing, which therefore emphasises the presence of the author. Traces of manual work embodied in lines and surfaces of the hand drawing suggest to the unavoidable presence of the author which lies in every single stroke of the pen. Unforeseen mistakes made in the transcribing process become uncontrollable but unique expressions, impossible to produce digitally. Withdrawing from the conventional precision still further leads to the uncontrollable aesthetics of the handwritten mistakes rather than computational glitches. Additionally, digital space offers infinite possibilities in perceiving the work of drawing and finally emphasises the presence of the viewer offering him numerous different perspectives. In this way, the precision of drawing distributed with the use of software is avoided, which is bounded

by the excessive limitation and control of each author's specific gesture, always present when using digital tools. However, in the context of its presentation, it offers a myriad of possibilities embodied in different mediums, as well as infinite observing possibilities. In this sense, digital surrounding presenting the final image highlights the presence of the observer by offering him the freedom to find his own vintage point and experience the same image each time differently. In this way, the user is being placed in a partially authorial position as the creator of different, always new, worlds inside the given image.

It is been concluded that digital space offers flexibility in the phase of post-producing the final drawing as it can easily be accommodated to different scale, format and/or media. Finally, the anxiety about the future of traditional drawing techniques in architecture is reduced as the analysed cases underline the hypothesis that the emergence of digital technologies has emphasised and upgraded the old architectural tools, objecting them to constant development. It can also be noted that digital tools have, and still are, expanding the creative potential of architectural drawings as research tools in the process of architectural education. Therefore, the presented hybrid model of drawing offers a vast development potential that is yet to be discovered and explored. The conducted analysis within the scope of architectural education only paves the path to related research by design subjects and encourages the development of similar models of drawing. It is noticed that the established, representationally-transcriptive model of drawing is limited on its' two iterations and needs further application and confirmation within different fields and environments of architectural design. Nevertheless, it is advised to deepen the research carried out within the field of architectural education. As the pedagogical environment offers numerous practical alternatives and easily involves a range of participants from different ages, skills and educational background, it can efficiently provide a variety of output results suitable for further development.

NOTES

1     This methodology will be explained further in this paper.

2     This issue has been the topic of numerous professional discussions organised in the past decade. The thematic issue of the journal Architectural Research Quarterly from 2006 is dedicated to the new use of the traditional medium of architectural drawing. Symposium Is Drawing Dead?, held in 2012 at the Yale University, raised the question of the future of architectural drawings in the age of digital production. The Drawing Futures conference held in 2015 at Bartlett School of Architecture raised the same question, but it also offered answers about the possibilities of new roles and positions of architectural drawing relying on new technologies.

3       The changes that preceded the development of architectural drawing at the beginning of the last century were debated and discussed in relation to the changes that shaped the art and visual culture of the twentieth century, discussed by Mario Carpo in his book *Architecture in the Age of Printing: Orality, Writing, Typography, and Printed Images in the History of Architectural Theory*.

4       Mario Carpo, *The Alphabet and the Algorythm* (MIT Press, 2011).

5       Mario Carpo, *The Second Digital Turn: Design Beyond Intelligence* (Cambridge, Massachussets: The MIT Press, 2017).

6       Leon Battista Alberti, *On the Art of Building in Ten Books* (Cambridge, Mass. [etc.]: MIT Press, 1988).

7       Robin Evans, *Translations from Drawing to Building and Other Essays* (London: Janet Evans and Architectural Association Publications, 2003), 156.

8       Frascari, Marco. 'Splendour and Miseries of Architectural Construction Drawings,' *Interstices: A Journal of Architecture and Related Arts*, Vol. 11, 107-113, 108.

9       Project is available at the following link: https://roundme.com/tour/167963/view/425790/.

10      The Modern in Belgrade (MuBGD) project, established in Belgrade, Serbia in 2018, brings together a group of architects (Iva Bekić, Petar Cigić, Dalia Dukanac, Stefan Đorđević, Irena Gajić, Mirjana Ješić, Hristina Stojanović, Snežana Zlatković) who share a particular interest in architectural illustration, graphic design and fine arts. Together, they launched the MuBGD platform as a means of promotion, but also critical analysis of Belgrade's architectural heritage within the field of visuasl representation.

11      Exhibition 'Black on White' at gallery O3one Art Space, Belgrade, Serbia (29 November-05 December 2019).

12      National Library of Serbia (1966-1973) architect Ivo Kurtović, interior reconstruction by architect Zoran Radojičić.

13      Project is available at the following link: https://roundme.com/tour/523469/view/1734841/.

14      Đorđe Stojanović, 'Intro: Architectural Education in the Post-Digital Age,' *Serbian Architectural Journal* 5 (2), 2013, 90-91.

15      Augmented (adj) - made greater, larger, or more complete.

16      This subject was also elaborated in the paper by Stojanović, Hristina and Nikola. Milanović, 'Recent Transformations of the Drawing into Virtual Space by Using Analogue Techniques,' *21st International Congress of Aesthetics: Possible Worlds of Contemporary Aesthetics: Aesthetics Between History, Geography and Media* : book of abstracts. (University of Belgrade – Faculty of Architecture, Belgrade: 2019), 451.

17      The workshop was held in the Export Drvo Hall in Rijeka, a storage facility for the timber export business.

18      Virtual tour is available at https://roundme.com/tour/295957/view/940380/.

BIBLIOGRAPHY

Bnin-Bninski, Anđelka and Dragišić, Maja. 'Scale on paper between technique and imagination: Example of Constant's drawing hypothesis,' *Serbian Architectural Journal* 8 (3), 2016: 322-339.

Carpo, Mario. *Architecture in the Age of Printing: Orality, Writing, Typography, and Printed Images in the History of Architectural Theory*. Cambridge (Mass.): MIT Press, 2001.

Carpo, Mario. *The Alphabet and the Algorithm*. MIT Press, 2011.

Carpo, Mario. 'The digital: From complexity to simplicity: And back,' *Serbian Architectural Journal* 6 (3), 2014: 256-265.

Carpo, Mario. *The Second Digital Turn: Design beyond Intelligence*. Cambridge, Massachusetts: The MIT Press: 2017.

Stojanović, Đorđe. 'Intro: Architectural Education in the Post-Digital Age,' *Serbian Architectural Journal* Vol. 5 (2), 2013: 90-91.

Evans, Robin. *Translations from Drawing to Building and Other Essays*. London: Janet Evans and Architectural Association Publications, 2003.

Frascari, Marco. 'Splendour and Miseries of Architectural Construction Drawings,' *Interstices: A Journal of Architecture and Related Arts* 11 (2010): 107-113. https://interstices.ac.nz/index.php/Interstices/issue/view/27.

## OTKRIVANJE HIBRIDNOG MODELA ARHITEKTONSKOG CRTEŽA NA POČETKU XXI VEKA
**Hristina Meseldžija**

Stručni, ali i istraživački okvir savremenog arhitektonskog projektovanja predstavlja oblast artikulisanu razvojem informacionih tehnologija. Do sada, ovaj okvir je predstavljao područje najbrže razmene mišljenja i ideja, podvrgnuto raznovrsnim tumačenjima i spekulacijama u različitim fazama procesa arhitektonskog projektovanja – od početnih ideja do finalnih arhitektonskih simulacija i realizacija. Radikalne promene u arhitektonskom razmišljanju direktno su se odrazile na upotrebu i načine razumevanja arhitektonskog crteža u procesu arhitektonskog projektovanja. Štaviše, ova situacija je dovela do radikalnih promena u tradicionalnom procesu projektovanja arhitektonskog prostora. U kontekstu shvatanja odnosa između arhitekte i crteža kao njegovog jedinog autorskog dela, ovaj odnos se uzurpira implementacijom kompjuterskog softvera kao posredničkog alata između njih dvoje. Uvođenje softvera u proces arhitektonskog projektovanja utiče na pojavu oblika arhitektonskog crteža, nudeći nove mogućnosti kao što su direktna, aktuelna i sveprisutna manipulacija, kao i mnoštvo mogućnosti predstavljanja.

Ovaj rad problematizuje poziciju arhitektonskog crteža ispitujući njegove manifestacije na početku dvadeset prvog veka kao posledice paradigmatskih promena koje je donela digitalna revolucija. Arhitektonski crtež na početku veka nestaje u svom tradicionalnom smislu i zamenjuju ga različiti oblici i uloge u procesu arhitektonskog projektovanja. Pošto se sprovedeno istraživanje posmatra prvenstveno kroz disciplinu arhitekture, a bliže, kroz oblast vizuelnih umetnosti, ispitaće ulogu crteža u oblasti arhitektonskog predstavljanja. Pored toga, rezultati istraživanja koji nastaju u vidu hibridnog modela arhitektonskog crteža, biće razmatrani u smislu njegovog kreativnog potencijala i dalje istraživačke primenljivosti u oblasti arhitektonskog obrazovanja.
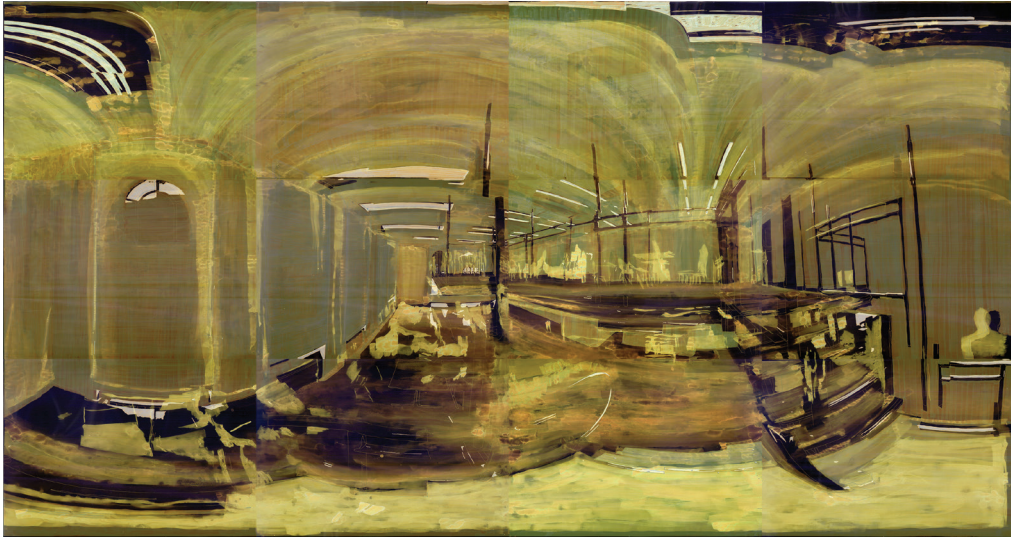
KLJUČNE REČI: ARHITEKTONSKI CRTEŽ, VIZUELNI JEZIK, REPREZENTACIJA, DVADESET PRVI VEK, DIGITALNA PARADIGMA, VIRTUELNA STVARNOST

# DISCOVERING THE HYBRID MODEL OF ARCHITECTURAL DRAWING AT THE BEGINNING OF THE XXI CENTURY
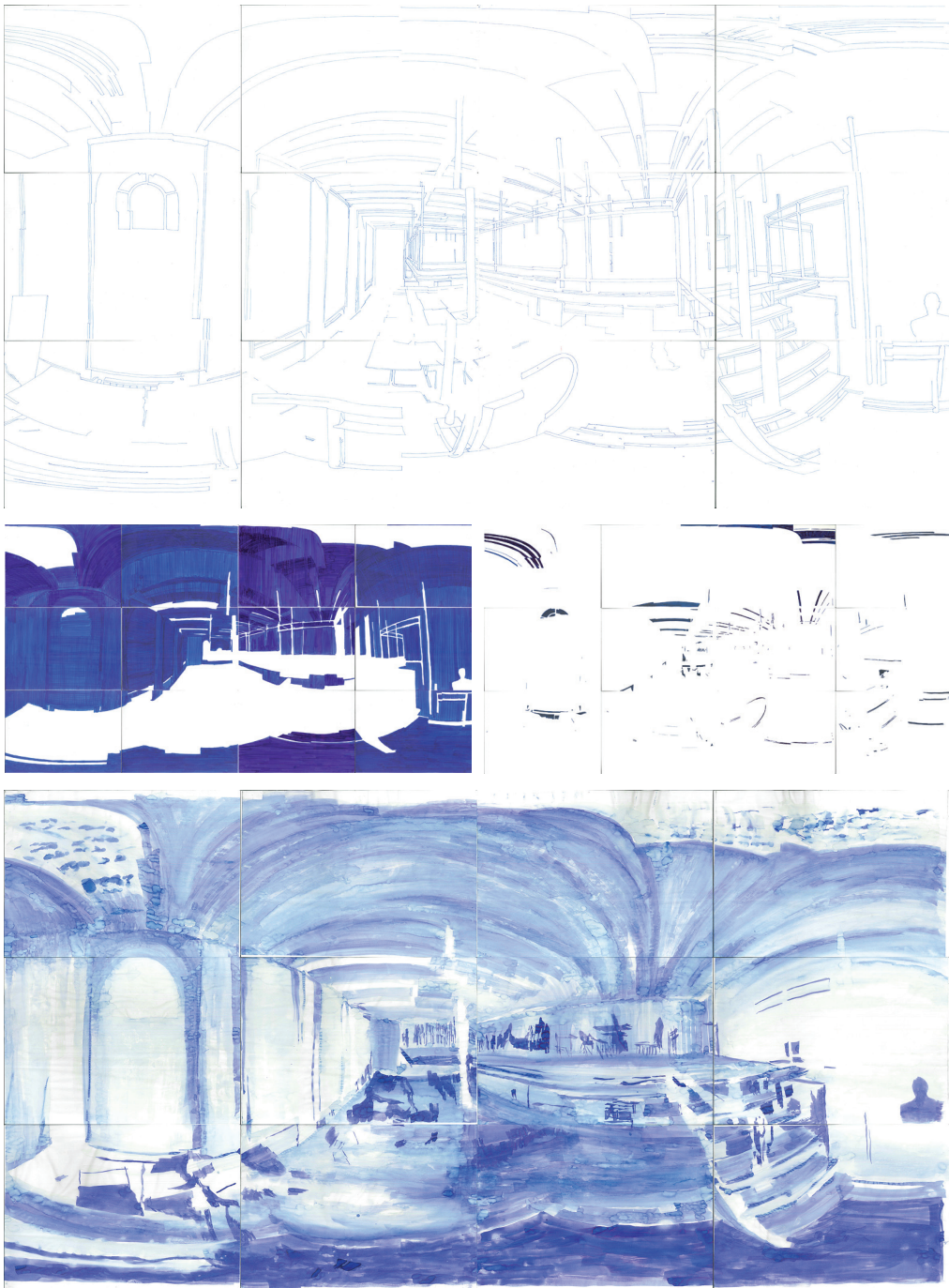
Hristina Meseldžija

University of Belgrade – Faculty of Architecture

hristina.stojanovic@arh.bg.ac.rs
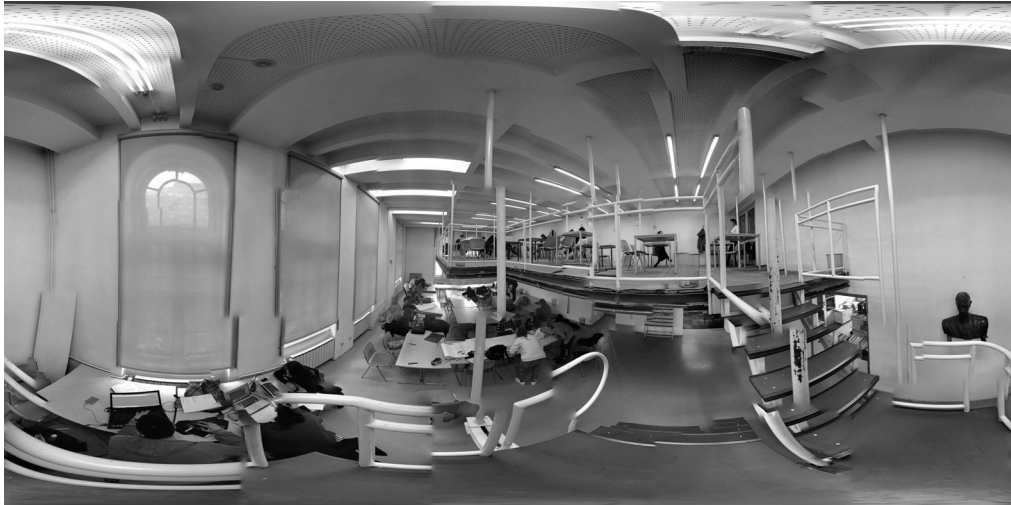
UP: Fig. 1. *Interior of the Reading Room at the Faculty of Architecture University in Belgrade*, Digital collage, 2017, 162x82cm, HS..

DOWN: Fig. 2. *Interior of the Reading Room at the Faculty of Architecture University in Belgrade*, Photo, 2017, 162x82cm, HS.
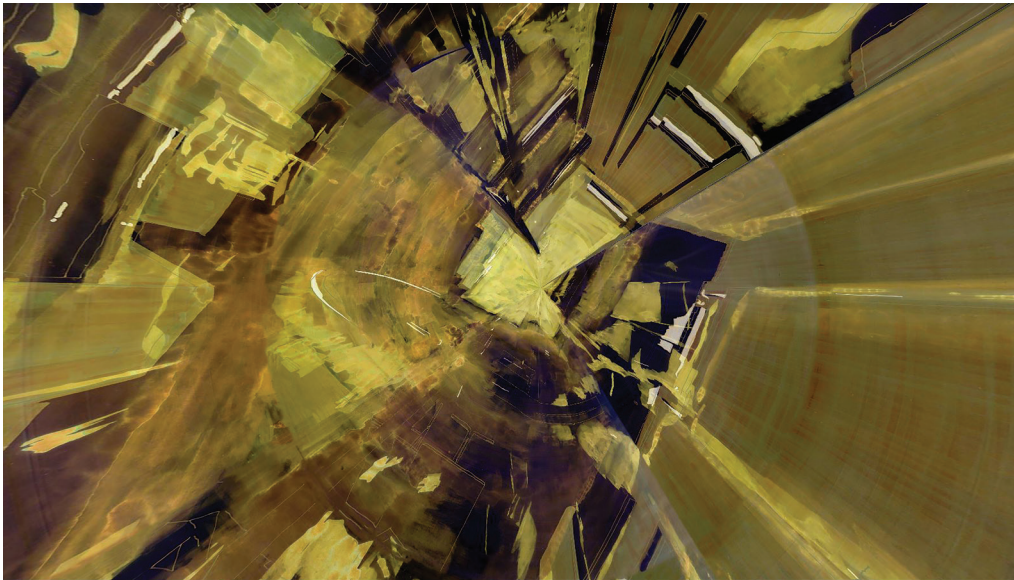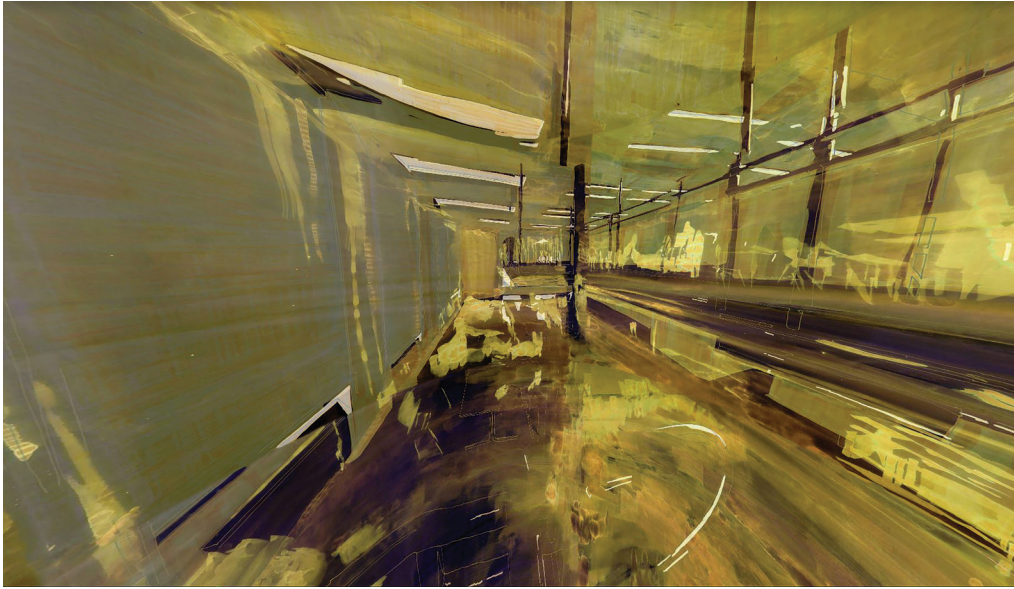
UP: Fig. 3.1. *Interior of the Reading Room at the Faculty of Architecture University in Belgrade* - Edges, Technical pen on tracing paper, 2017, 12 drawings 42x29.7cm, HS.

CENTRE LEFT: Fig. 3.2. *Interior of the Reading Room at the Faculty of Architecture University in Belgrade* - Surfaces, Marker pen on tracing paper, 2017, 12 drawings 42x29.7cm, HS.

CENTRE RIGHT: Fig. 3.3. *Interior of the Reading Room at the Faculty of Architecture University in Belgrade* - Light, Marker pen on tracing paper, 2017, 12 drawings 42x29.7cm, HS.

DOWN: Fig. 3.4. *Interior of the Reading Room at the Faculty of Architecture University in Belgrade* - Shadows, Ink on tracing paper, 2017, 162x82cm, HS.

UP: Fig. 4.1. *Interior of the Reading Room at the Faculty of Architecture University in Belgrade*,
Virtual tour screenshot (Projection: Architectural), 2017, HS.

DOWN: Fig. 4.2. *Interior of the Reading Room at the Faculty of Architecture University in Belgrade*,
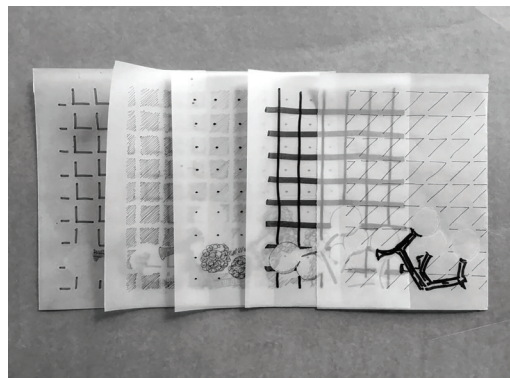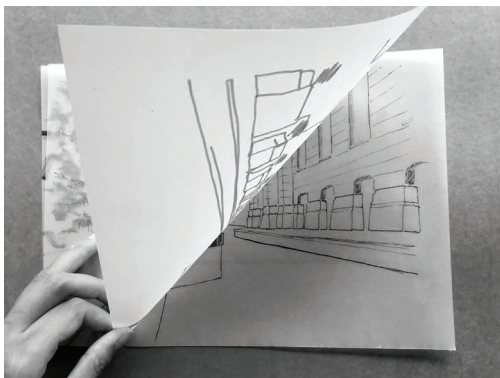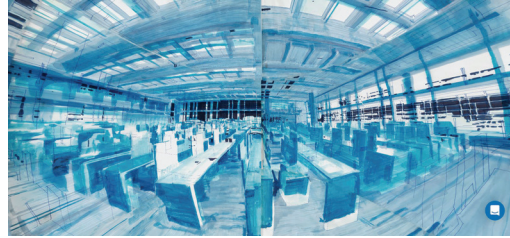Virtual tour screenshot (Projection: Fisheye), 2017, HS.
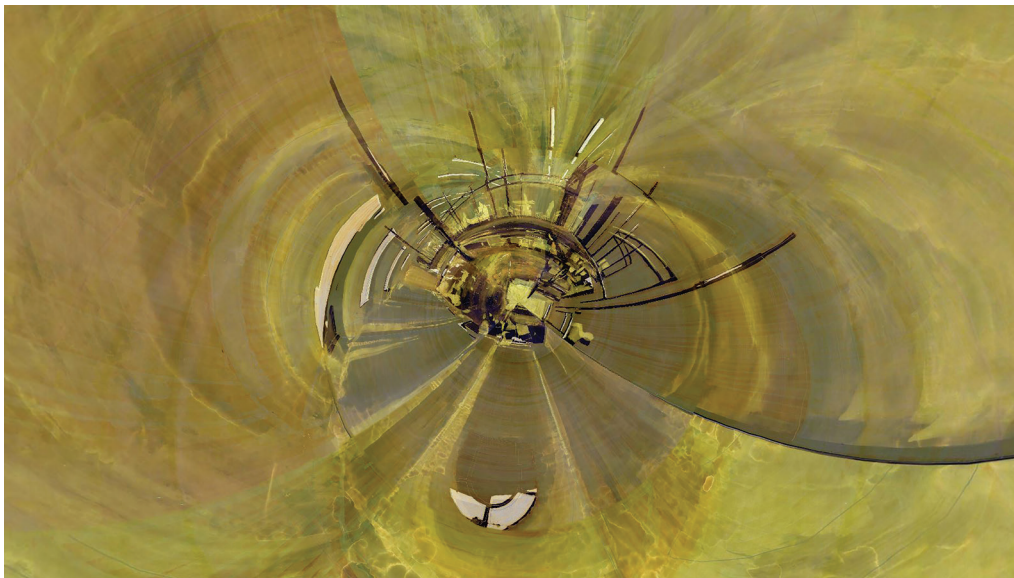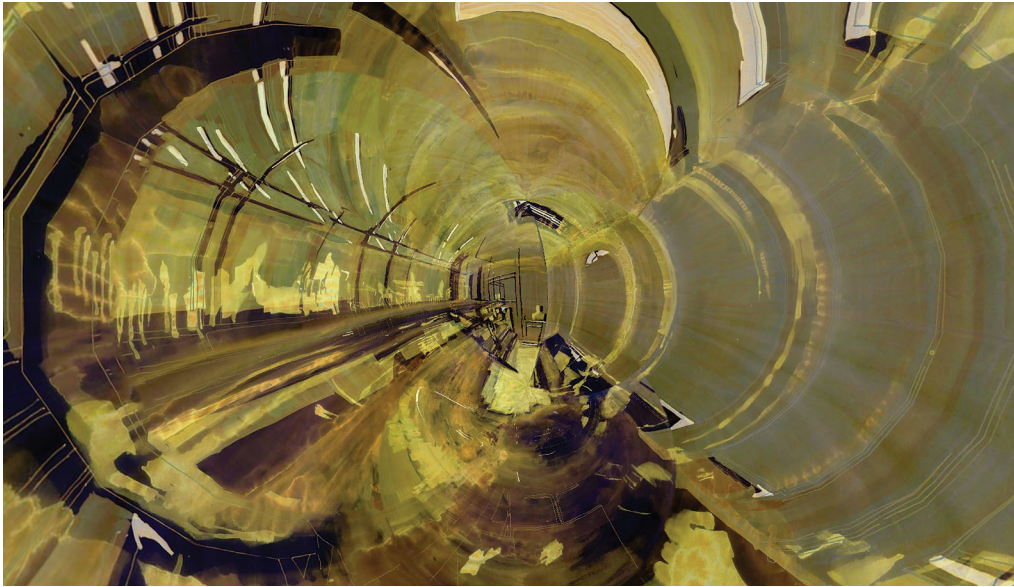
UP: Fig. 4.3. *Interior of the Reading Room at the Faculty of Architecture University in Belgrade*,
Virtual tour screenshot (Projection: Little Planet), 2017, HS

DOWN: Fig. 4.4. *Interior of the Reading Room at the Faculty of Architecture University in Belgrade*,
Virtual tour screenshot (Projection: Stereographic), 2017, HS.

Fig. 5. *Interior of the Reading Room at the National Library of Serbia*, Digital collage, 2019, 200x100cm, HS.
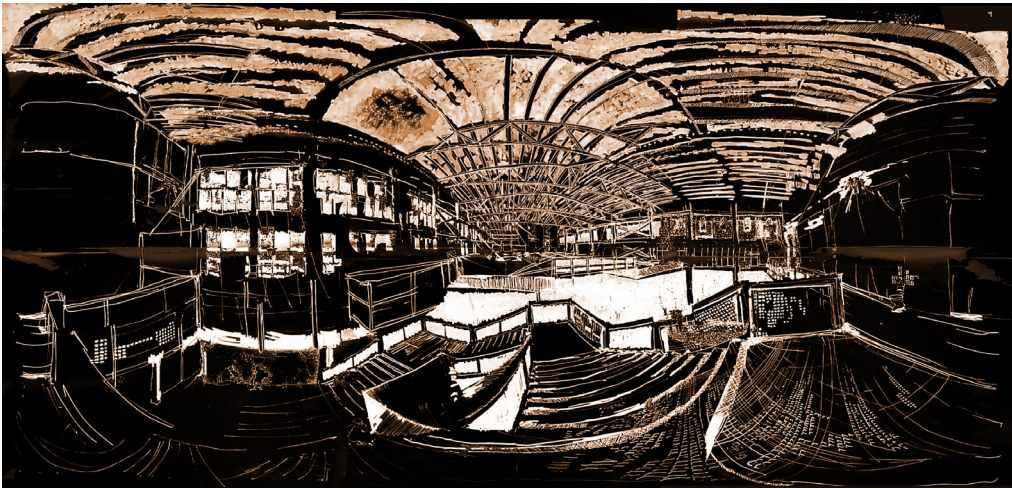
UP LEFT: Fig. 6.1. *Interior of the Reading Room at the National Library of Serbia*, Virtual tour screenshot (Projection: Architectural), 2019, HS.
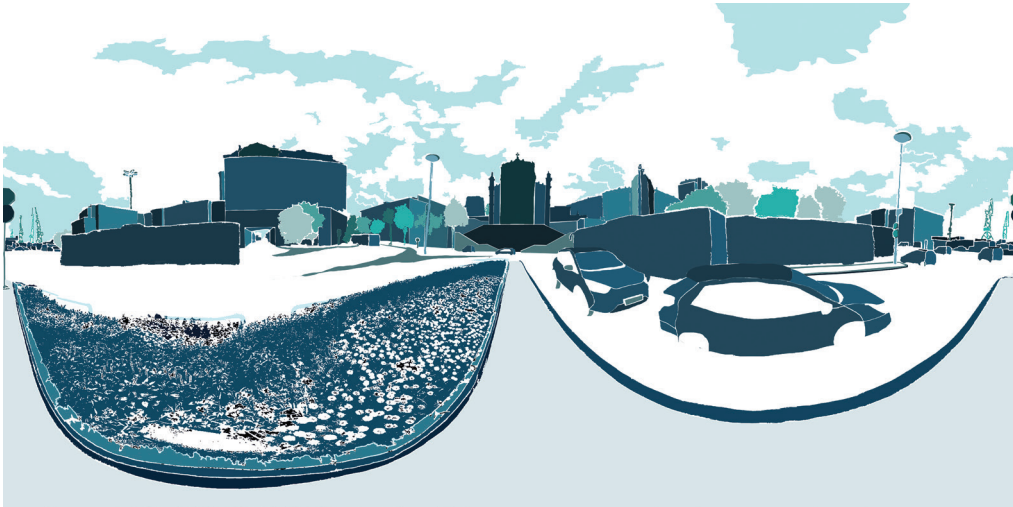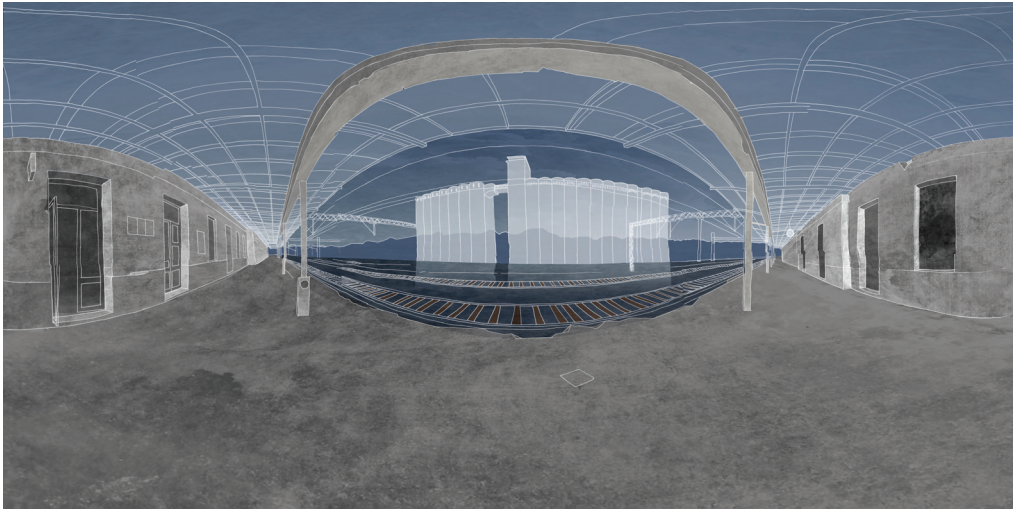
UP RIGHT: Fig. 6.2. *Interior of the Reading Room at the National Library of Serbia*, Video screenshot (Projection: Architectural), 2019, HS.

CENTER/DOWN: Figs. 7.1. – 7.4. Photos by HS.

UP: Fig. 8. Marte Aateigen Marum, *Export Drvo*, Virtual tour screenshot, 2018.

DOWN: Fig. 9. Hilda Uusitalo, *Abandoned House*, Virtual tour screenshot, 2018.

UP: Fig. 10. Natalia Drożdżowska, *Train Station*, Virtual tour screenshot, 2018.

DOWN: Fig. 11. Aniruddh Sharan, *Bus Station, Virtual tour screenshot*, 2018.

Fig. 12. Photo by HS.