

**PHENOMENON OF
TRANSPARENCY: CITYSCAPE
TRANSFORMATION MAPPING,
THE CITY OF NEW BELGRADE,
EXPERIMENTS 2 – 4**

FENOMÉN TRANSPARENCIE:
MAPOVANIE TRANSFORMÁCIE
PANORÁMY MESTA, NOVÝ
BELEHRAD, EXPERIMENTY 2 – 4

Author Autor: Snežana Zlatković, 2016

Behind the *Glitch*: Research by Digital Drawing in Contemporary Architecture Education

Poza *Glitch*: Výskum prostredníctvom digitálnej kresby v súčasnom architektonickom vzdelávaní

Marija Milinković, Snežana Zlatković

Cieľom tohto príspevku je preskúmať epistemologický a kreatívny potenciál analytickej kresby v architektúre, nanovo objavený vo veku komputacionálneho a na výskume založeného navrhovania.

Jeho kľúčovým argumentom je úpadok kritického myslenia v súčasnej architektúre, a to ako v akademickom prostredí, tak aj v architektonickej praxi. Vyžaduje si to nové pedagogické stratégie, ktoré by mohli podnietiť jeho citlivé znovuobjavenie a obnovu. Vychádzajúc z predpokladu, že teraz, viac ako kedykoľvek predtým, je potreba kritiky aj so všetkými jej nedostatkami, sa tento výskum zameriava na analytickú kresbu – starý nástroj tvorivého myslenia v umení a architektúre. Zároveň tak vzniká otázka: Aký prínos má súčasná digitálna transformácia techniky kresby ku generovaniu nových spôsobov architektonickej kritickej praxe?

V súčasnej architektúre, ale aj v architektonickom vzdelávaní, zohráva kresba viaceré úlohy a jej hodnotu už podrobne spracovali v mnohých vedeckých výskumoch. Kresba je nielen nástrojom prezentácie architektonických myšlienok a základným pracovným médiom, ale aj spôsobom skúmania a nástrojom schopným generovať jedinečné idey a (trans)disciplinárne poznatky. Kľúčovú úlohu v tomto ohľade zohráva analytická kresba, pedagogický nástroj využívaný v architektúre a umení najmenej posledných sto rokov.

Analytické čítanie pedagogických usmernení a skúseností Wassily Kandinského v rámci jeho Prípravného kurzu na Bauhause položilo základ interpretácie analytickeho kreslenia v súčasnom digitálnom prostredí. To, čo robí tieto idey pre architektonické vzdelávanie a výskum stále relevantnými, je ich dvojitá povaha: predstavujú jednoznačné významy, ktoré obsahujú presné informácie týkajúce sa predmetu analýzy, no zároveň ich možno vnímať ako jedinečné a individuálne vyjadrenie, svojvoľné a vďaka tomu umožňujúce interpretáciu.

Médiom analytickej kresby so záznamovými aj imaginatívnymi kvalitami predstavuje priestor, v ktorom sa vzájomne

prelína výskum a kreatívna interpretácia. Príspevok skúma výsledky a vývoj tejto špecifickej techniky výskumu, ktorá zahŕňa analytické kreslenie na troch úrovniach vzdelávania Fakulty architektúry Univerzity v Belehrade. Bezprostredným predmetom skúmania sú kresby vytvorené v rámci rôznych druhov kurzov: úvodný teoretický kurz bakalárskeho štúdia, navrhovanie v rámci ateliérov magisterského študijného programu a samostatný doktorandský výskum.

Použitá pedagogická metóda aktívneho učenia sa prostredníctvom techniky digitálnej analytickej kresby na samom začiatku architektonického vzdelávania dokázala, že má schopnosť odhaliť (ne)očakávané aspekty architektúry a dokonca nepriamo artikulovať relevantné a nadmieru súčasné otázky týkajúce sa problémov tejto disciplíny. V súvislosti s predmetmi zameranými na navrhovanie a najmä ako súčasť záverečnej magisterskej práce môže digitálna analýza poskytnúť široké spektrum relevantných údajov, pričom analytická kresba môže prezentovať referencie na rôzne fázy práce. Grafický záznam, vytvorený ako súčasť magisterskej práce, poukazuje na skrytý potenciál tohto média poskytnúť bližší pohľad na každodenné skúsenosti.

Príklad výskumnej praxe na úrovni doktorandského štúdia v sebe zahŕňa všetky už špecifikované vlastnosti analytickej kresby a možnosti Kandinského pedagogického nástroja posúva ďalej. *Glitch*, ktorý sa vníma a verejne interpretuje ako úplne nový druh obrazu, ponúka predtým nepredstaviteľnú transformáciu objektu, ktorý však stále odkazuje, hoci veľmi vzdialene, na pôvodný objekt výskumu, moderné mesto Nový Belehrad a jeho súčasný stav.

Pri pohľade zo širšej perspektívy prináša do architektonického výskumu digitalizácia analytickej kresby celý rad alternatívnych spôsobov bádania. Tie môžu viesť k novým úrovniam kritického myslenia v architektúre a pravdepodobne celkovo priniesť vyššie odborné a intelektuálne schopnosti.

Introduction

In the decisive year of 1968, Manfredo Tafuri, one of the most prominent architectural historians and theorists of twentieth century architecture, warns of perils coming from *critical architecture*, that is, an “art that tends to assimilate the instruments proper to analysis”.¹ Tafuri claimed that only historical enquiry can avoid the instrumentalisation of analytical methods and serve as a truly efficient and independent field of critical thinking in architecture. In Tafuri’s evaluation of pedagogical experiments made by Bruno Zevi and his associates in the mid 1960s, the value of ‘critical images’ and ‘critical models’ is labelled as an “amateurish translation of the architectural language into abstract and a-historical sculptural games”.² However, closer reading shows that Tafuri did not fully dismiss these pedagogical methods. Recognizing them as a kind of intentional ‘doubling of the meanings’, or *anamorphoses*, previously theorized by Roland Barthes, he saw their potential in generating new meanings and multiplying the metaphors that a work of art already invokes. The general aim of this paper is to re-examine the epistemological and creative potential of those ‘weak’ critical instruments in architecture, specifically, the potential of architectural analytical drawing, reinvented in the age of computation and research-based design.

During the last twenty, or thirty years, digitalisation of architectural tools has radically changed professional practice. Already in 2010, Marjan Colletti, outlining the previous laps of this underway process, precisely detected the unprecedented moment of architectural design exuberance:

Having overcome the alienation and otherness of the cyber, having mastered the virtual qualities and protocols of the parametric, having achieved the intricacy and elegance of the digital, and having fully embraced the potential of 3D computer software and CAD/CAM technologies, it is now time for architects to show off!³

The results of experimentation with new technologies can now be traced and examined in various disciplinary domains, in architectural research, as well as in design practices. Nevertheless, while architects are getting prepared to accept the new challenge of incorporating the artificial intelligence in their work, old architectural tools seem to be still relevant and continue to develop in fundamentally altered circumstances. As the recent conference on *Drawing Futures* (Bartlett School of Architecture, 2016) distinctly revealed, computation has expanded architectural creativity in unforeseen directions, affecting the medium of architectural drawing to become “abundantly rich, diverse, intensive, critical and serious research domain”.⁴ Diversity of material considered during the conference extended the very notion of architectural drawing and envisioned radical possibilities of its future development.

In the meantime, however, it became clear that this is not only the time for showing off. Curiously enough, the process of computation coincided with decline of critical thinking in architecture, both at university and in design practice. As asserted by Tafuri, the crises do not stream only from the shortcomings of current architectural discourse, nether from the lack of its proper reception, but seem immanent to architecture and art in general.⁵ Furthermore, the recent post-critical debates strived to prove that all strategies and instruments of criticality, including Tafuri’s *storia critica*, became inefficient, inhibiting and thus obsolete, since by the end of the century, criticality itself became the dominant paradigm in architecture.⁶ Starting from the premise that criticality still matters, this article zeroes in on the specific research technique of digital analytical drawing that, empowered by severe critical attitude, might contribute to its delicate re(dis)covery.

The immediate objects of research are the digital drawings generated as a result of students’ work within diverse courses at three levels of education at University of Belgrade – Faculty of Architecture (UB-FA). Being the vast polygon for systematization of disciplinary knowledge and experimentation on its boundaries, this field of enquiry provides the valuable source of knowledge and experience. By focusing on intently selected cases, this paper examines the merits of digitalisation of analytical drawing, as an outstanding tactical and technical device, aiming to indicate the origins and ranges of its explorative and pedagogical potential.

Discovering the Glitch

Among the various new techniques and types of drawings that were discussed at the conference on *Drawing Futures*, the set of graphics presented by Snežana Zlatković lured attention of the professional public by its technical virtuosity and the peculiar working method.⁷ The jury of the subsequent *RIBA Eye Line 2017* drawing competition notably referred to her work as to ‘techno-punk

graphics', that weirdly resemble 'the output of a broken printer'.⁸ Likewise, in front of *Drawing of the Year 2016* Jury Report, Eva Franch i Gilabert posed akin questions on Zlatković's submission: "So, if a glitch has become an image that could have never been produced before (...) here we started to project: is this a section, is this a plan, is it a human plan, is this a horizon, what is happening here?"⁹ Produced as part of Zlatković's PhD research at UB-FA, the set of mixed-media drawings entitled the *Cityscape Transformation Mapping* were explicated by the author as the "study of spatial conflicts" and "a critical tool" aiming to "decode the spatial contradictions".¹⁰

But how can such dense and obfuscating narrative around these images act as mindful instrument of criticality? The first clue to this puzzle might be found in their immediate reception. On different occasions, the drawings were perceived as a 'digital glitch', that is the specific type of image, that "offers resistance to the representational capacities of a drawing".¹¹ The term originates from the digital world, but became increasingly present and extensively described within the art discourse. As Rosa Menkman has shown, "there is more to glitch art, and more at stake, than just design and aesthetics", and that is, in her words, its "inherently critical moment(um)".¹²

The second clue could be found within the figure captions. The subtitle of the drawing series presented at the London conference, *The City of New Belgrade*, suggests that the drawings are not self-referential, as it might seem at the first glance. It unequivocally indicates that, as a counterpoint to the highly abstracted appearance, the immediate object of research through drawing is a concrete place, that is an urban landscape of the specific, socialist, modern city and its subsequent post-modern and post-socialist transformations.¹³ According to these notions, we would argue that *the glitch* might be considered as an extreme and novel type of analytical drawing in architecture. To test this assumption the following survey will specify the basic features of analytical drawings in the historical context, check them in the contemporary academic environment, and finally, summarize the results of the comparative analysis.

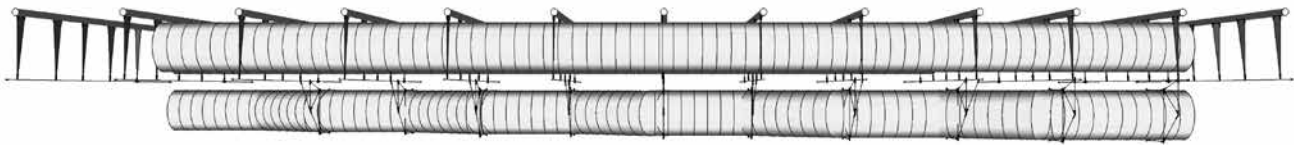
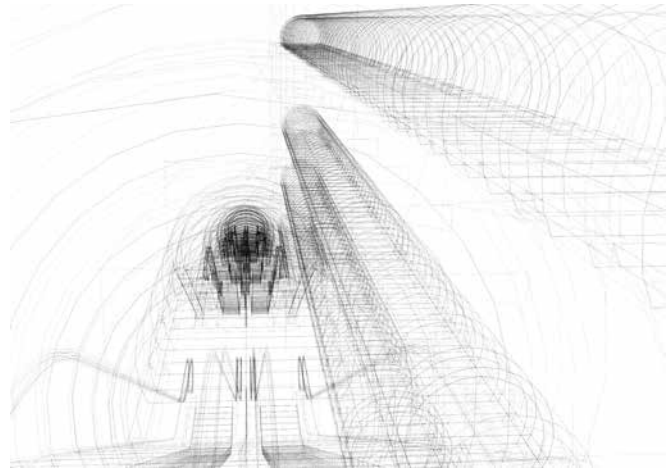
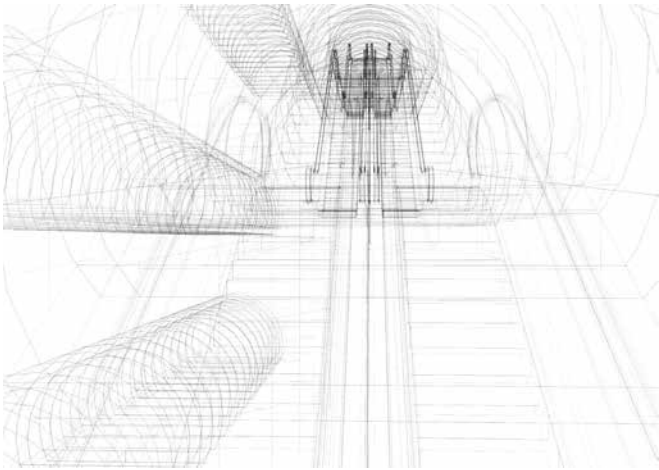
From Basic Course to Drawing Futures: The Historical Precedents

A comprehensive scientific search for employing an analytical drawing in art and architecture could be traced far back in history, but the epistemological brake comes with the famous Basic Course at Bauhaus and Wassily Kandinsky's art pedagogy. The Course was taught at Bauhaus over its 14 years, and according to Katerina Rüedi Ray, became "the school's most truly durable contribution to international art, design and architectural education".¹⁴ Set up as the program of basic instruction for first-semester students (1922 – 1933), the specific concept and methodology of analytical drawing course developed as an empirical exercise, complementary to the theoretical subject Abstract Form Elements. As Clark Poling's investigation shows, it was paradigmatic of Kandinsky's pedagogical approach:

It entailed training the student to see, think logically and execute the work with care. It combined both analytical and synthetic processes, calculation and intuition, especially in the advanced stages. Finally, the skills and principles involved could be utilized in painting and the other arts and presumably in practical design as well.¹⁵

In the Bauhaus journal, Kandinsky described the major outlines of the course as a process in three stages: the simplification, analysis, and transformation of the graphic characteristics presented by the selected motif.¹⁶ Each stage consisted of three subsidiary aspects that corresponded to the concrete working tasks. Thus, students were trained to become aware of energy and order, in Kandinsky's terms, two essential qualities of both art and the objective world. Results showed that connecting the discipline of diagrammatic geometrical drawing with intuitive capacity of students to understand the inner forces of forms, made this exercise exceptionally prolific. An additional important achievement of Kandinsky's innovative classes was a great variety of personal interpretation. Through this course, in Poling's words, "individual perception, intellect and imagination were brought into play",¹⁷ and this playful confluence of skills and knowledge, is what makes this exquisite pedagogical precedent still relevant for contemporary architecture and architectural education.

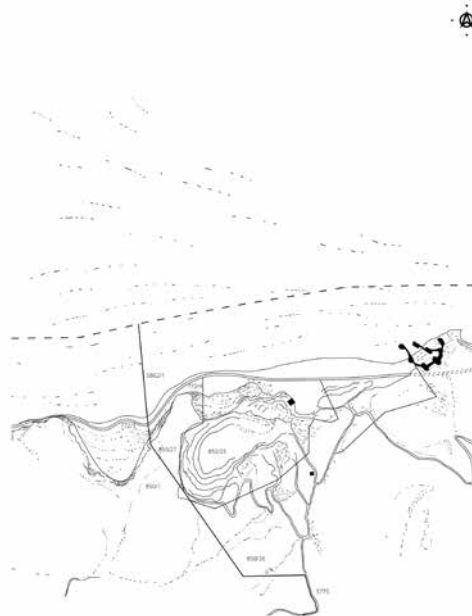
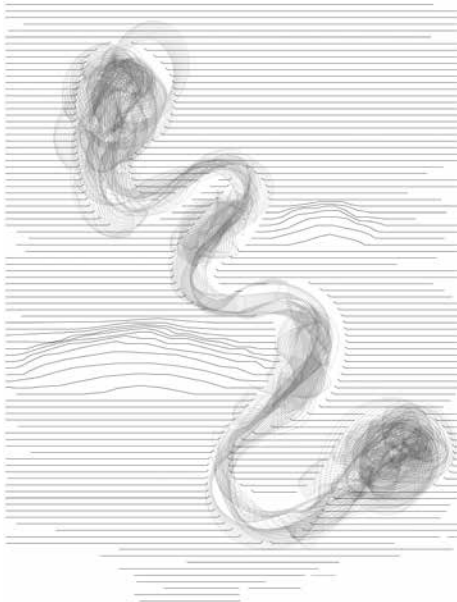
It would be difficult to estimate the subsequent influence of Kandinsky's methodology on early architectural professional training, yet it might be assumed that art schools employed it more systematically. Nevertheless, by the end of the twentieth century, new strategies that relied on the Bauhaus Basic Course evolved through daily practice of teaching design at the Faculty of Architecture at Delft. The book *Design and Analysis* provided students and broader audience with



**CENTRE GEORGE POMPIDOU,
RENZO PIANO AND RICHARD
ROGERS, PARIS, 1971 – 1977**

CENTRE GEORGE POMPIDOU,
RENZO PIANO A RICHARD ROGERS,
PARÍŽ, 1971 – 1977

Author Autor: Ivana Janošev, 2017



**COMMUNITY CENTRE, SANAA
OFFICE, NEW CANAAN,
CONNECTICUT 2013 – 2015**

KOMUNITNÉ CENTRUM,
SANAA OFFICE, NEW CANAAN,
CONNECTICUT 2013 – 2015

Author Autor: Jovan Mladenović, 2017

**FINAL WORK. INSIDE AND OUTSIDE
OF GOLUBAC FORTRESS: THE
STUDY AND THE PROJECT OF
INTERIOR ARCHITECTURE.**

ZÁVEREČNÁ PRÁCA VO VNÚTRI
A VONKU PEVNOSTI GOLUBAC:
ŠTÚDIA A PROJECT INTERIÉROVEJ
ARCHITEKTÚRY.

Authors Autorky: Natalija Radosavljević
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systematized pedagogical experiences that emphasized the role of analysis in diverse phases of the design process and presented it as “a link between design education and research [which] offers countless new points of contact between the two”.¹⁸

The Appendix of the book briefly explains drawing techniques to aid analysis, and three modes of processing a drawing in design analysis are clearly distinguished: *reduction*, *addition*, and *démontage*.¹⁹ It would be significant at this point, to notice that these three modes generally correspond to three stages of analytical drawing of Kandinsky’s course: reduction to simplification, addition to analysis, while the process of *démontage* leads to transformation of the particular object of study. The distinction between the two pedagogical methods thus becomes more evident: the shift from synchronic (successive) stages, to diachronic (optional) modes. One more notion draws our attention: among the fifty-one illustrations of the major drawing techniques appropriate to design analysis, only one is described as ‘meshed drawing’, that is the drawing generated with the aid of computer.²⁰

The huge leap from ‘meshed drawing’ to a large assembly of free-hand, computer-aided and mixed media drawings, was accomplished a decade later, when the same department in Delft published another influential book, entitled *Composing Landscapes*.²¹ It offered a new, expanded scope of architectural (landscape) drawing presentation and systematization, and, when dealing with a large scale, the potential of digital drawings as new exploratory tool became particularly clear. It was not only the obvious shift towards utilizing digital tools that was significant in this edition, but the very understanding of the drawing as the media that connects two apparently divided modes of professional practice: design and analysis. Here, analytical drawing is not observed as pure exercise that laterally contributes to design process, but rather as an equivalent, creative and investigative procedure.

Digital Analytical Drawing as a Cognitive Tool for Active Learning in Contemporary Architecture Education

The distinguished potentials of analytical drawing, that became apparent through the Bauhaus Basic Course, developed further on during the last century through the avantgarde movements, advanced and experimental architectural practices, and notably through architectural pedagogies. From the school reform of 1971, to the implementation of Bologna Process in 2005, Architectural Analysis was the core subject at the first year of studies at UB-FA.²² The subject encompassed both lessons in history and theory of architecture, as well as studio work on small and elementary topics, while freehand drawing played particularly important role of the first year experience.²³ From 2012, as part of the fundamentally altered school curricula, the introductory theoretical course, On Architecture, became the new platform for experimentation with (digital) analytical drawing.

Introductory Theoretical Course: On Architecture

As a small subject (1-3/180 ECTS), envisioned for the first semester of the first year of studies, the course On Architecture had a limited influence on a wide range of contemporary architectural concerns. On the other hand, as the students’ first contact with architectural education, it included dealing with essential questions of the discipline – indeed, the title, seemingly vague, gestures towards a historically famous, ancient treatise of Marcus Vitruvius Pollio, *De Architectura* (1st century BC). In attempt to respond to such a complex task, the lecture-based course was supplemented by exercises of analytical thinking in their simplest and most paradigmatic form. Thus, the small subject got the corresponding small, but important tasks: to demonstrate the interplay of analytical and creative domain of architecture, by utilizing the growing skills in drawing computation.

During the six years of the course implementation, the students’ readiness to explore the specific opportunities of digital media considerably increased. Examined in its simplest form, as the outcome of the first year lecture-based course, the main features and inner ‘force’ of digitalization of analytical drawing became intelligible. If taken with rigour and research passion it may:

- provide deep and precise knowledge on particular spatial phenomena,
- reveal not-so-obvious qualities of architecture and its relationships with environmental and socio-political conditions,
- serve as a medium for testing the transformative potential of the existing.

The following examples illustrate the former findings. Within the exercise entitled *Passing through the passage*, during the year 2016/17, two works should be highlighted for a new kind of mastery in using computer techniques. In the first case, movement through the passage is examined by 3D *Sketch Up* drawings of the renowned tube entrance of the Centre Georges Pompidou (Renzo Piano and Richard Rogers, Paris, 1971 – 1977). Here, the direction and speed of movement through the passage is determined by the specific structure of the tube and technology of escalators. The working drawings explored the quality of this experience, by detecting distinct moments in the movement, and showing structural frames of selected views.

In the questionnaire, that was given to the selected group of students as an extra-curricular activity,²⁴ Ivana Janošev explained the main point of her interest as the close relationship of architecture, advanced technology and experience of movement through space. The last drawing iteration, technically simple but quite unexpected shift to birds-eye perspective, opened a new scope of reading. Thus observed, the system of tubes appeared as an independent structural element that can be imagined and recreated in different space and time. By using the advantage of digital media, the third stage of Kandinsky's drawing methodology, that is the transformation of the graphic characteristics of the analysed space, became graspable by a single click of a mouse.

In the second case, the object of analysis was the Community Center, known as the River Building, designed by SANAA office and built in New Canaan, Connecticut (2013 – 2015). The student work focusses on the quality of movement generated by the river-like shape of the building's plan, that connects diverse spaces by a covered walkway. Understood as the ultimate form of the passage, the whole object is exposed to analysis of the relationship between building shape and presupposed human behaviour. All the elements of the drawing are highly abstracted. The third dimension, that shows the specifics of the surrounding natural slope is presented only by the highly simplified system of isohypses. The structure of the building is also ignored and the main focus placed on the movement itself, that is, on the quality of personal experience.

This type of drawing does not result in precise, rational notions of spatial qualities, but instead activates the imagination and interpretative skills of the author. A unique drawing technique was invented to that end. In the questionnaire, the author of the movement scheme, Jovan Mladenović, described the process as follows: "drawing a ribbon shape, using the Pen Tool; drawing short and thin lines, and copied parallel to one another a lot of times, at a very small distance; grouping lines, with a low opacity (for example 10%); using the Envelope Distort command with the ribbon shape and the grouped lines, so that the lines bend inside the ribbon shape; using the newly formed object as a brush to draw the required paths and thus simulate a flow of energy". Such interpretation is inevitably partial and incomplete, since it ignores differences between simulated and actual behaviour. On the other hand, it has the capacity to pose the questions, such as: how delicate and (un)predictable human behaviour can be, and how does architectural design today relate to this notion?

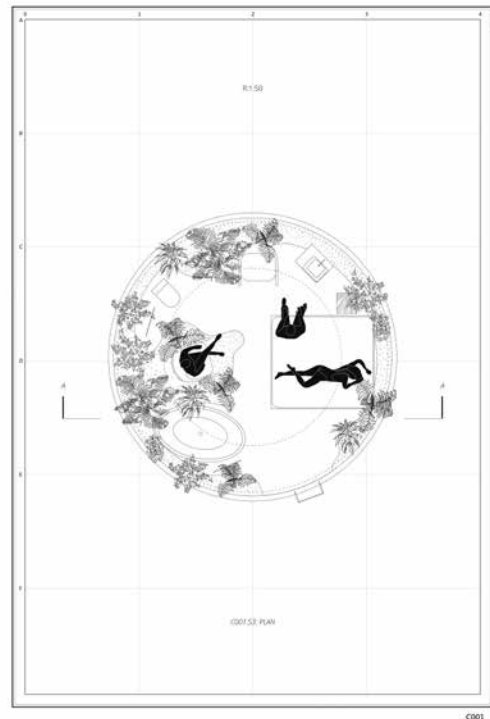
The results of exercise varied in terms of students' engagement and achieved levels of working performance, but continually showed an exceptional diversity of individual approaches. Meaningfully selected objects of study were gradually transformed to digital images, capturing and exposing the intrinsic spatial qualities of analysed architectural phenomena. The most successful final works included activity-based knowledge as well as a degree of proficiency: in all six years, the outstanding examples contained small individual discoveries, the kinds of knowledge that could not be gained at lectures alone or through design exercises.

The small changes in the work pattern in the last year of the course development brought about even more comprehensive results. By broadening the scope of themes that enter the analytical process and by engaging students in their selection and explication, the exercise extended its domain from the core to the margins of the disciplinary field. Beyond the basic skills necessary for knowledge acquisition, the students were not only expected to show abilities to 'describe' or 'explain', but also to reflect upon the given or selected subjects. Even though these reflections were sometimes poorly crafted, and the graphic interpretation remained on the level of Tafuri's 'amateurish translations', the course provided an opportunity to tackle students' willingness for wider and deeper research, within and beyond disciplinary realm.

FINAL WORK. INSIDE AND OUTSIDE OF GOLUBAC FORTRESS: THE STUDY AND THE PROJECT OF INTERIOR ARCHITECTURE. EXCERPTS FROM MASTER'S PROJECTS

ZÁVEREČNÁ PRÁCA VO VNÚTRI A VONKU PEVNOSTI GOLUBAC: ŠTÚDIA A PROJECT INTERIÉROVEJ ARCHITEKTÚRY. VÝŇATKY Z MAGISTERSKÉHO PROJEKTU

Authors Autorky: Natalija Radosavljević and Milica Naumović, 2017

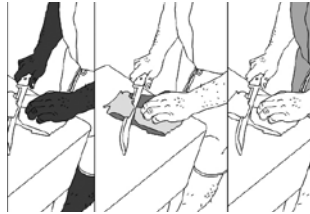


The Master's Thesis and the Final Work

The experiment with broadening the scope of themes has shown that knowledge acquisition, critical analysis and creative interpretation, can be performed simultaneously, with noteworthy results even within basic courses. In terms of inducing critical thinking skills and dispositions at the early stages of architecture education, the lack of disciplinary knowledge posed a firm limit to this goal, suggesting that critical capacities of digital analytical drawing could be developed more effectively at higher levels of studies. The most challenging and the most rewording part of graduate studies in this respect is the Final Work, comprising Master's Thesis, as a distinguished research platform, and Master's Project, as the platform for comprehensive research-based design practice. The following excerpt from a recently completed Final Work of Master Academic Studies of Interior Architecture at UB-FA exemplifies the scope of critical thinking through digital analytical drawing that could be reached at the second level of academic studies.

The thematic framework of the Final Work was *Inside and Outside of Golubac Fortress: The Study and the Project of Interior Architecture*. The ongoing process of reconstruction and revitalization of the medieval city of Golubac, opened up the questions concerning the future purpose of individual spatial micro-entities and the potential of small-scale spatial interventions that would make the reconstruction more tenuous to the specificities of the site and bring it closer to new needs of the contemporary society and the local community. The task of the Final Work was the proposal of an interior design project, which will re-examine the boundaries between the outer and inner space and establish new relationships within the existing spatial and historical context.

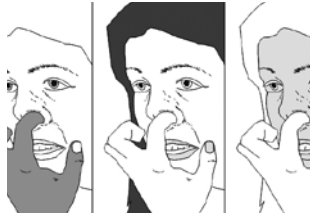
The *Landscape Room* thesis, connects two complementary master projects: *Simulium raptans golubacense*, a stone garden in abandoned quarry on the border of Đerdap National Park, by Milica Naumović, and *Motel 34*, with floating rooms that 'appear' for eleven days a year on the river Danube, along the State Road 34, by Natalija Todorović.²⁵ The starting point of research was the premise that interior space can stimulate exquisite sensations of pleasure: the concept of pleasure is here observed as a trigger for action, rather than physical or intellectual satisfaction. In order to grasp the essence of enjoyment (*plaisir, jouissance*), the program for this master project is narrowed down



ON EVERYTING AND NOVEMBER.
EXCERPT FROM THE BOOKLET

ON EVERYTING AND NOVEMBER.
VÝŇATOK Z KNIHY

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to leisure time, and explored through an exquisite collection of digital drawings. Presented in the form of booklet, peculiarly entitled *47: About Everything, and November*, the drawings depict actions, conditions and elements of everyday life pleasures, in search for contemporary meanings and notions of 'free time'.²⁶ (Fig. 6)

Observed in the light of the previous discussion, this graphic novel, much like Zlatković's PhD research, could be considered as a critical project in its own right. Unlike the previous examples that utilise digital drawing for examination of specific spatial qualities, it recognizes the role of analytical drawing in understanding, evaluating and creating of architectural program. Inspired by surrealists' methods of work, the process of drawing production, as described within the questionnaire, streams from the dialogue between the authors and from the selection of the corresponding photo-material. Image processing includes the production of digital collage, the production of digital drawing over the collage and painting by using *CorelDraw* software tools. Rationally, yet spontaneously constructed critical narrative, through dialogue and productive interaction, forms the basis for the subsequent decision making, and the point of departure for further developing of the master project.²⁷

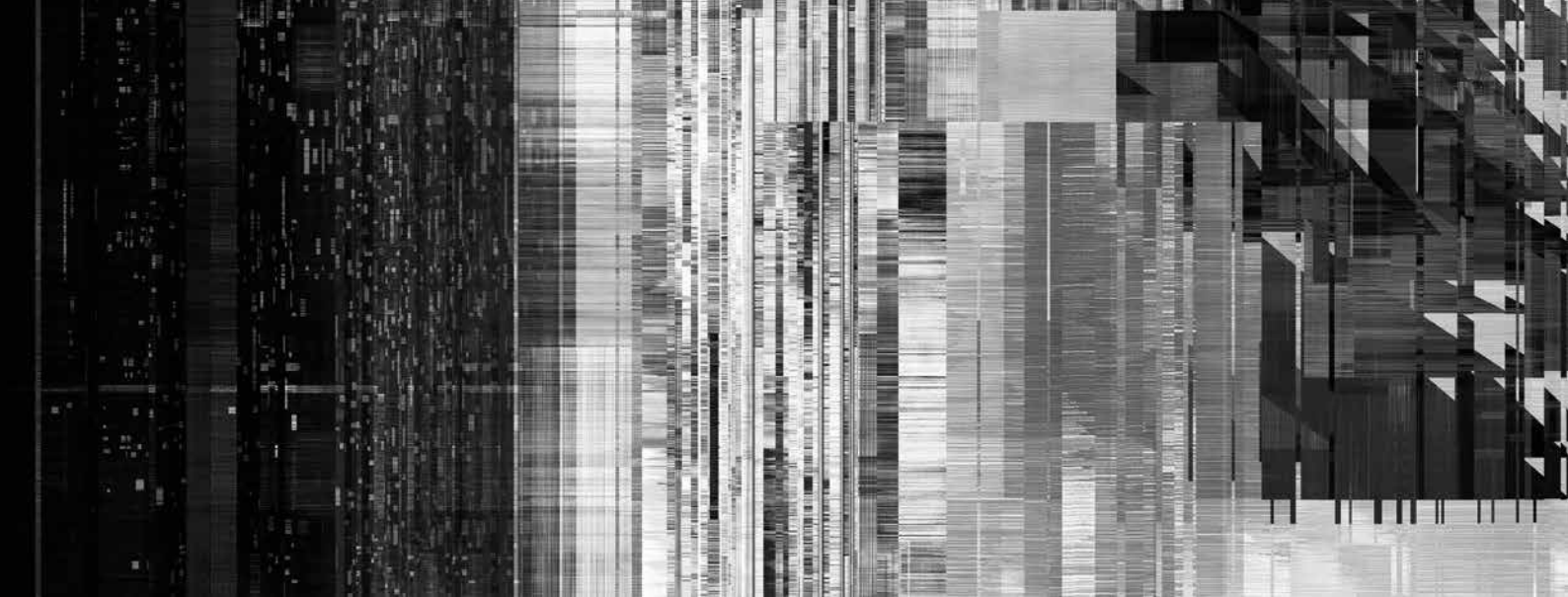
PhD Research by Drawing: Back to the Glitch

In her PhD thesis proposal, Zlatković describes in detail her intentions and methods of drawing production. She notes that unpredictable cityscape transformations can be regarded as a potential source of uncovered new meanings of the built environment. Zlatković's proposal puts the city as a whole to be the focus of architect's attention, posing thus a new theoretical perspective for the city itself. In her words, instability, chaotic appearance and density – all intertwined within the architecture of the contemporary city – are so hasty that such complex phenomena often remain unexplained or rejected as a jumble of diversities.

The author further clarifies the problem of ungraspable spatial transformations with Paul Virilio's argumentation about the (im)material changes of urban structure:

Basically, along with construction techniques, there's always the construction of techniques, that collection of spatial and temporal mutations that is constantly reorganizing both the world of everyday experience and the aesthetic representations of contemporary life. Constructed space, then, is more than simply the concrete and material substance of constructed structures, the permanence of elements and the architectonics of urbanistic details. It also exists as the sudden proliferation and the incessant multiplication of special effects which, along with the consciousness of time and of distances, affect the perception of the environment.²⁸

Zlatković's PhD research²⁹ poses the following questions: Is it possible to comprehend these perplexed spatial situations, and how can the data of the *construction of techniques* be implemented in the future, to potentially reduce further expansions of detected spatial conflicts?



**HABITATION-CITYSCAPE-
TRANSFORMATION, THE CITY OF
NEW BELGRADE (DETAIL)**

BÝVANIE-PANORÁMA MESTA-
TRANSFORMÁCIA, NOVÝ BELEHRAD
(DETAIL)

Author Autor: Snežana Zlatković, 2016

The first part of this experimental process consists of two books of one hundred drawings each, produced at the beginning of PhD studies (2013), with an intention to investigate scales of transparency within the selected photographic samples of the city. By overlapping the atmospheric pink-red-blue drawings of aerial negatives of the countless apartments captured on camera (book I), with monochromatic drawings of the variability and rhythm of static and rigid parts of buildings (book II), the process resulted with first drawn layers of detected cityscape transformations (books III-n). The particular hatch technique, evolved through dozens of Zlatković's experiments with subtle, hand-drawn lines (0.7mm) devised to capture specific changes of transparency. Starting from the *line* as the first drawing element for creating color shifts, and the *hatch* as the second drawing element, this particular methodology established original hand drawings as a resource material for the next phase of research – digital processing of images via a series of computer-aided manipulations.

While analogue drawing techniques challenge the line and refine the methodology with unique traces and unrepeatability of intuitive hand movements, the digitalization of drawings has the potential to upgrade the process of analysing the complex and chaotic network of the cityscape. Computer techniques provide an opportunity to reconceptualise the precarious Kandinski's third phase of transformation, by using software options such as: layer, merge, blur, opacity, gradient, invert, transform, scale, rotate, cut, copy-paste, etc. Zlatković applies these digital tools to the initially produced hand drawings (book-maps), with an intention to “encode new data through drawings”, and to speculate on “what new types of drawing practices will need to be invented to help articulate our digital world”.³⁰ By capturing different types of everyday atmospheres, the drawings start to absorb not just the material form of the building, but the complex processes of the energy exchange. With the use of digital technologies, these drawings seek to capture the moment between ‘the *existing* and the *emerging view*’³¹ of the cityscape transformations, as a relevant sample for analysing and understanding the pace of spatial changes.

This particular method of research by drawing doesn't assume precise number of outputs. The beginning of the encoding process questions the distance of the observer in relation to the cityscape transformations. Drawing experiments aim to link large fragments with the small ones, over a multitude of differences found within the city. Different drawings scales document ‘*serial vision*’³² of micro and macro ambivalence, along with the abstract traces of space.

The proposed drawing layers are directed to the identification of significant historical facts and essential, extractable urban elements, that would lead towards their own decomposition, interpretation, classification and, finally, recomposition. The analysis of the complexity of the cityscape transformations starts from a single recorded photography of the city's fragment. Most of the drawing experiments consist of mapping fragments of the Modern city of New Belgrade that has been overexposed to the uncontrolled flux of spatial transformations over the last few decades. Unplanned spatial conversions resulted with widely varying dissimilar elements of citizens'

individual interventions within the original buildings. The urban structure of the disrupted Modern architecture was rapidly *modified*, showing the remarkable diversity of human lifestyles, that can be perceived as a new kind of active habitat. Shifts between individual and family atmospheres, of each dynamic void of the unnumbered apartments create 'indoor landscapes'.³³ Congested buildings of New Belgrade, architecturally composed as a combination of rigidly repeating closed, static physical structures and pure horizontal *indoor landscapes*, trigger the architect to simultaneously consider different spatial situations. By layering the layered, the proposed methodology encodes the relationship between invisible/visible, present/absent building transformations over time.

Conclusions and Implications

The scope of this paper is to provide evidence to the new type of knowledge and experience brought by digitalisation of research tools in architectural education. The early exercises of digital analytical drawing at the very beginning of the Bachelor studies, revealed the basic features of this research technique, showing that a single drawing, or a consistent drawing procedure, can be a valuable source of inquiry-based knowledge, acquired by research 'on' architecture. In the special cases, it may include interpretative qualities that go beyond knowledge production and open up the basic disciplinary questions or even tickle the transdisciplinary concerns.

At the end of the second level of education, this particular technique becomes the precious tool in design teaching studios and particularly, in setting up the Master's Thesis. As the share of research in the students' project development grows, the Master Course in general becomes more open to both creative and analytical research procedures. The previously discussed example shows inventiveness in utilising digital drawing for an alternative mode of the enquiry, that is complementary to the spatial analysis and questions architectural program. The attention given to the graphic novel, emphasise not only the social aspect of architectural practice, but the most personal one. Situated in the broader context of the diploma project, this set of ad lib drawings perform as a conceptual and tactical detour.

Finally, the case of the postgraduate research through drawing extends the field of work toward the city as a totality and social life as a permanently changing category. It pushes the Kandinski's model to the limit, by avoiding simplification, by understanding of analysis in its most literal meaning, and by using the digital technologies towards the unimaginable transformations of both hidden and well-known. Focused on the spatial conflicts and the complex processes of invisible and immaterial qualities of the cityscape transmutations, it depicts the present reality of the modern city and, at the same time, widely opens the subject of the research for the new readings. The *glitch momentum* thus appears as a part of invoked interpretation, to point out on intrinsic qualities of such work and implications attached to its very genre: glitch drawing carry the voices that do not fail to be heard, they operate outside the cultural and technological flows, and, to conclude with Menkman, "[l]ike the best ideas, glitch practices are dangerous because they generate awareness".³⁴

The mode of criticality in presented cases stretches from implicit and scarcely detected critical valences, via the interactively constructed critical narratives, to the inherent image value. Unlike the avantgarde contestation, that is radical and ignores the present, it appears as an indirect speech: to paraphrase Barthes' remark on Brecht theatre, "it passes through aesthetic relays", avoiding "repetitive, tautological and militant discourse".³⁵ Even though it cannot replace the rigorous discursive analysis, the freedom of digital tools makes this medium a powerful instrument of research, on-, through- and beyond architecture.

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