volume 13 _2021
Nº _1-2_part 2

S A J

serbian architectural journal

LESSONS FROM EXPERIENCE AND PERSPECTIVES FOR EDUCATION

_2021_1-2_PART_2

Serbian Architectural Journal is published in Serbia by the University of Belgrade - Faculty of Architecture and distributed by the same institution / www.saj-journal.org

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Send editorial correspondence to:
Serbian Architectural Journal
Faculty of Architecture
Bulevar Kralja Aleksandra 73/II
11 000 Belgrade, Serbia

ISSN 1821-3952
e-ISSN 2787-1908

Cover photo:

Living Window: using puppetry to engage with the inner life and experiences of a front room window, 2021
Movie still by Shivani Raju.

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EXECUTIVE EDITOR:
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PUBLISHER:
University of Belgrade - Faculty of Architecture

PROOFREADING:
Iris Arsić, AKADEMIJA OXFORD

CIRCULATION:
100

PRINTING:
DONAT GRAF, Beograd

volume 13 _2021 № _2

ISSN 1821-3952
e-ISSN 2787-1908

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LESSONS FROM EXPERIENCE AND PERSPECTIVES FOR EDUCATION

Three common issues prevail in this publication:

• The digital age and Digital Me, technical innovation and the boundaries between my natural me and Digital Me (artificial)

Innovation is not a novelty or a privilege of the digital age. It has always been present in human efforts to solve problems, better organise the community, improve the quality of life, work more efficiently, etc. The digital age, however, has brought unprecedented and all-encompassing opportunities for innovation in all walks of life. In the digital age, perhaps more than ever before, there is a growing need for a multidisciplinary approach that has resulted in a growing need for an inter-, multi- and trans-disciplinary approach in art, architecture, science and technology to meet the challenges of modern society.

As Lucas Dietrich' preface to 60: Innovators Shaping Our Creative Future states: 'The future of innovation is no longer in the hands of scientists, artists, or designers working on their own in a laboratory, loft or studio… It is a creative, collective, humanistic endeavor that seeks to find new solutions to the problems of our planet and its future.'

More and more we see the blurring of boundaries between art and science, architecture and computer design, physical and virtual spaces and the self, fiction and reality, all due to the development of new media technologies and innovations that introduce us to modern society.

Philosopher Warren Steinkraus identifies artistic innovation types from 'exploring new techniques or materials derived from technology to significant creative progress within tradition.' The importance is that these types or principles of innovation are also applied to other fields, creating new, hybrid or frontier disciplines in science and human sciences.

• Education ranging from Latin ūniversitās to the University of Bologna (Università di Bologna), the topic of distance learning, and rethinking how we teach architecture and urban design

Every era, a new epoch and each generation gives their own responses to the same questions authors are inevitably asked about on how to create architectural and urban design. The global coronavirus pandemic has further pointed to limitations, not only in our understanding of architecture, but also the existing processes of knowledge transfer. As architects and educators, we are confronted with the need to re-conceptualise and test the settings of the theory of architecture, new ways of researching the existing state of location and territory as well as designing architectural objects and urban public spaces. Digital and virtual platforms are used in all spheres of life and social interaction, and this pandemic, with its own specific circumstances, has initiated the use of such platforms in education, developing and using teaching techniques that enable the concept of space to be understood and researched.

New teaching models point to the potential in the use of new tools, but at the same time imply access to the necessary technological equipment that supports and enables such advantages.

• Covid-19 challenges and the Implications of the Pandemic

The aspiration of mankind to bring nature and technology together, as a way to expand human capacity with the help of technology or to blur natural and artificial boundaries, has always been present in times of pandemics. It is manifested in two ways: how we experience ourselves in the physical environment and how we establish communication with other people, and the quality of this communication.

The differences between the physical, digital, real and virtual are constantly evolving, especially in the new dimension of distance, which we are all part of and preoccupied with.

The challenges arising from the pandemic have created a framework for reviewing many areas, such as educational programmes, ways of transferring knowledge, virtual reality and augmented reality, hybrid reality, and other topics such as special engagement of teachers in remote teacher-student interaction, creating virtual classrooms, and the issue of mobility.

Authors who have been asked to present their experiences and whose works are found in this double issue have inadvertently painted a picture of their Digital Me and as students-participants in this process.

They presented the educational programmes they partook in, critically evaluating the success of applied methods, opportunities for improvement, strengths and weaknesses of these methods and techniques. Weaknesses and strengths relate to the medium itself.

It is necessary to make improvements to what we have achieved and not rush back to traditional face-to-face teaching as a better-established model. We need to take advantage of this opportunity to redefine topics, educational programmes, and to continue to use them in a future without Covid-19 that awaits us.

admission date 02 11 2021
approval date 07 12 2021

original research article
UDC 728:37.018.43
316.728

THE BENEFITS OF DISTANT METHODS OF ARCHITECTURAL EDUCATION IN THE POST-COVID AGE: CONFINEMENT AND LIBERATION*

A B S T R A C T

With the digital environment, the capacity to communicate and be connected beyond the narrow economic, political and social dimensions has increased. Are the conditions for closing universities across the world in 2020 delineating the system of architectural education as confinement or liberation? Searching for answers, we take into account not only the conditions currently emerging in the world, but rather emulate the stage of life that reveals the conditions which produce the world. Accordingly, this presentation discusses new educational contexts for the post-Covid age and investigates alternatives to the traditional studio teaching. It provides a theoretical insight into how knowledge is used as an approach to online teaching and what alternative pedagogies are applicable against the backdrop of the escalating large-scale crisis, such as the Covid-19 pandemic. This presentation takes a series of architectural programmes and workshops performed at European universities and across the United States that test alternative educational methods. By examining the relationships in the production and ways of disseminating knowledge across diverse platforms, I hope to discover how the current unstable and unpredictable educational context regenerates virtuality, instrumentalities and intelligences to maintain its vital capacity unaffected. This comprehensive approach will provide new ventures into speculating the spaces of virtualisation, confinement and liberation in the encounter between the real and virtual worlds.

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KEY WORDS

ARCHITECTURAL EDUCATION,
POST-COVID AGE,
KNOWLEDGE,
PEDAGOGIES,
COMMUNICATION,
COLLECTIVITY,
DESIGN CULTURE

INTRODUCTION

We are now in the midst of a global pandemic and our responses to it trigger conditions for reimagining architecture, domesticity, and spaces of public health. In the second year, the systematic thinking has approached the ways in which biopolitics of the pandemics intersect with architecture's ability to foster humanity and well-being. In that regard, the focus is now on the future projections for care, healthcare, co-living, along with exploration concerned with the future of architectural education in the wake of dramatic change – one that has an unprecedented impact on the ways we learn and teach. One year ago, architecture schools and faculties had to embrace teaching in a way that many had previously resisted, even internally scorn, online.[1]

Scanning the contemporary scene between the virtual and the real, and thinking about what kind of hybrid 'infrastructure' might emerge in the post-Covid age, we always keep turning to the standardisation and organisational matters. Their importance is traditionally recognised in the ability to uncover relationships to a large-scale crisis, only now providing the impetus to implement the plans and schemes which had been bubbling up for some time. Prior to the pandemic, the move towards improving educational "infrastructure" has been oriented primarily to the networks of learning spaces. Classroom-centred learning has become challenged by the expansion of access to knowledge and the emergence of learning spaces beyond classrooms, schools, universities and other educational institutions.[2] The social media, for instance, have extended classroom learning by providing opportunities for such activities as collaboration and co-authoring. The question is open regarding how knowledge is produced and disseminated in this context? Based on personal curiosity and experimental endeavours, in combination with freely accessible and mobile technical infrastructure (mobile learning), it is possible to drastically change the nature of knowledge and its dissemination. For example, portable devices ranging from mobile phones, tablet PCs to palmtops have liberated learning from fixed and predetermined locations, changing the nature of knowledge in modern societies.[3] Furthermore, mobile devices enabled learners to access educational resources, connect with others or to create content. Rethinking the contemporary performance of teaching architecture can be observed in regards to the lack of practicability of its contents of teaching, but challenges are also logistical, conceptual, political, and even philosophical.

1. TEACHING EXPERIENCES DURING COVID PANDEMIC

The educational landscape of today's world is undergoing radical transformation with regards to methods, content and spaces of learning. This is true for both schools and higher education. The increased availability and access to diverse sources of knowledge is expanding opportunities for learning, which may be less structured and more innovative, affecting the classroom, pedagogy, teacher authority and learning processes. In the wake of the global scale of meeting between the virtual and the real, we are experiencing a new focal point in the history of learning. Parsing through such unstable and unpredictable educational context, the aim of this research is to demonstrate that the subject of production and transmission of knowledge defies confinement as it morphs across and between media networks, intelligences, logistics and processes. It works to decenter default positions in architectural education.

During the last year, it turned out that the pandemics endowed both a crisis and an opportunity, opening further considerations as to the vital systems of architectural education between confinement and liberation. Experiences are diverse coming from architectural programmes and workshops at European universities and across the United States in online teaching since the Covid-19 outbreak. The Yale University dean, Deborah Berke, has developed a clear strategic approach to architecture pedagogy claiming that educators must teach their students how to create an architecture of the greater good. In Berke's own words, 'We, as architects, must be explicit and insistent on addressing architecture's role in the global pandemic or climate crisis. Some aspects of teaching might help but they are minor.'[4] Berke is interested in how architectural education addresses the real problem that humanity faces, pandemic perceived as a symptom of the global climate crisis: the problem of city in relation to the access to the medical care and infrastructure: and diversity of our profession, and so on. Berke puts emphasis on what we teach rather than how we teach it.

The Dean of University of New Mexico's School of Architecture and Planning (UNMS), Robert Alexander Gonzales, thinks it is time to reflect on our models of teaching as we are becoming, ironically, more connected than ever since the outbreak. This urgency is prompted by the fact that we are, as he claims, 'stepping into another era of connectivity.'[5] He does not consider this new democratic connectivity to be the norm but rather that which affects students and will affect students in different ways in the future. 'We see new ways for students to collaborate across universities (to inhabit and interact), we see new ways for students and faculty to connect, and connectivity with regards to the curricular development (black matters, inequity issues, etc.) that commits to new forms of knowledge and knowledge production (institutions, collectivity,

practice, culture, design).'[6] In regards to teaching models, Gonzales argues that we will see a new faculty connected to multiple universities, and that this will affect teaching and what universities have to offer.

Architectural historian and Professor of the History and Theory of Architecture at the Massachusetts Institute of Technology, Mark Jarzombek, explains that we tend to introduce innovations in the studio before we fully comprehend current constraints. Jarzombek speculates that most architectural education nowadays, generally speaking, is not particularly a world opening: it does not challenge students to see, hear and think the world differently – through a difference.
With her global teaching experience in Asia, Europe and America, professor and architect Nasrin Seraji stands for architectural education that asks 'where, why and for whom'. Seraji thinks that we need to revisit Gian Carlo de Carlo's 'legitimizing architecture' in the 21st century when pandemics are only one in the multitude of other urgent questions, such as climate catastrophes, deforming geographies, etc. Digital fabrication is not ubiquitous in spite of all digital equality hype that we have around us. We cannot simply predict the relationship of labour to fabrication. With all this, Seraji concludes that the curricula of the schools of architecture around the world are long overdue for major redraw. She proposes a new pedagogy based on images – understanding of the world through graphic knowledge. This approach is important in regards to conveying students experience through drawings. On the evaluation of 'assessment versus performance' and 'assessment of performance', Seraji does not see a word performance when educators talk about acquiring knowledge. The word 'performance' immediately shifts the idea of the production of knowledge into something that has value. It is easy to see who has learned what through the production and translation of research into critical work that in turn becomes new knowledge. She is concerned that there is a lot of misconception in terms of what it is that we are learning, and what it is that we are producing as knowledge, and how is that being evaluated. In her own words:

> The studio doesn't have to be a studio. The world is a studio for us. We do not only talk about the spaces that are hit due to the pandemic, because there are other ones that are going to come; we don't even know what is out there for us. That is why we need to consider things inside-out and completely use the capacities that we have: for example, walking as understanding the city and the territory is a very different thing than the slides the student sees in the studio. In that regard, some teaching on Zoom enabled some types of students, and for this reason we need to measure a pulse of different kinds of teaching, and putting them into new types of structures of teaching.[7]

2. THE KNOWLEDGE PRODUCTION

Design studio is conventionally considered to be the arena where subfields converge, overlap, interchange, and integrate in a creative process, setting architectural education framework into the complex teaching-research terrain. As Seraji puts it, 'it is easy to see what is learned through the production and translation of research into critical work that in turn becomes new knowledge.'[8] However, Seraji is concerned that there is a lot of misconception in terms of what it is that we are learning, and what it is that we are producing as knowledge, and how is that being evaluated. So far, the research-based teaching has been successful in improving practice, facilitating knowledge production and prioritising the media and technological context. Drawing from these contexts, this presentation evaluates the knowledge production methods by referring to the institutions, collectivity, the culture of communication and design culture frameworks.

2.1. Institutions

Online teaching is not a new format, but with the pandemics it became a 'global workplace', to use Simon McIntyre's term which was introduced in 2007 to announce a whole new era of online learning approaches. The highly transformative landscape of higher education brought about by the advent of technology and its affordances to offer more personalised learning, calls for an action to effectively integrate technology in course design, and improve students' learning experience. McIntyre's approach is three-fold: he draws upon specific case studies with their different applications for online learning: from the perspective of an educator and a student as well as regarding the materials they produce in the higher education institution. In his observation, we can see how challenges of online teaching are becoming challenges of archiving, towards a complete online access to the teaching materials. McIntyre believes it would be a growing documentation of achievement, and an excellent tool for reflective learning practices, easily allowing students and teachers to look back at previous work, assumptions, discussions and processes that they have archived. From teacher's perspective, this kind of online archive is ideal for any discipline where teachers have an active interest in monitoring and assisting in the process of students' construction of knowledge and abilities.[9] From student's perspective, it affords the opportunity to easily maintain a record of their learning journey, providing them with a means of critical reflection, and giving them an opportunity to engage in peer feedback.[10]

McIntyre also tested the threefold professional development strategies to provide teaching staff with an opportunity to interact, mentor, and share knowledge with one another, alongside experiencing online and blended learning to effectively meet the challenge of improving the digital literacy of teaching staff and enhancing effective online and blended learning opportunities for students. Namely, McIntyre's report on the experience of higher education institution at the University of New South Wales (UNSW Australia) have demonstrated how embarking on the path towards mainstreaming online learning opportunities has challenged the low digital literacy amongst teaching staff. Evident among both developed and developing countries,[11] this is a global trend critical in relation to the students' expectations and their preference for more technology-enhanced learning experiences.

2.2. Collectivity

In the era of connectivity, social networks and social platforms become major venues for the knowledge co-authorship. Diverse social media platforms, for instance, have extended classroom learning by providing opportunities for such activities as collaboration and co-authoring. What happened in reverse is that educators began drawing the principles of *collectivity* from these practices to integrate it into design studios and read an urban milieu based on the collective intelligence. 'In the context in which architecture takes part of globally networked and interdisciplinary modalities of practice, and online communication technologies rapidly evolve […], collaborative processes and traditional boundaries of time and space are challenged,'[12] according to Watson, McIntyre and McArthur. Contrary to Schön's notion of the designer's process being '...an individual's reflective dialogue with their work...' (1985) - communication, leadership in collaboration, and the ability to 'co-create' are widely acknowledged as key assets in the skillset of design professionals working in, 'the new emerging digital paradigm related to art, design, and technology.'[13] For example, COL[14] responded to this paradigm by embracing a collaborative pedagogy in its global, fully online Master's Degree in Cross-Disciplinary Art and Design at UNSW Australia. Whereas potentials are seen in types and levels of engagement in the online environment, deficiency is recognised in the communicative limitations of online technology, and their consequent implication upon collaborative teamwork.[15]

Examples are numerous and most recent include the UCL London experimental research-based teaching approach which insists on the students' preference for more technology-enhanced learning experiences. Instructed by Luke

Caspar Pearson and Sandra Youkhana at the Bartlett School of Architecture, the *Videogame Urbanism* research cluster uses contemporary applications of panoramic imaging in the videogame environments. Their aim is to strengthen the students' collective learning experience while they are playing the game (fig. 1). The studio investigates urbanism and the future of cities through the use of video game technologies, and is highly adapted to the online teaching format. Popular among students as an alternative model in architectural education, their video games pedagogy is becoming recognised for its experiential, experimental and real-time mode, available in-person. Its educational and practical potential is identified in the collective engagement during the game, in real-time communication with the players while imbuing them with their own logics, politics and value systems.[16] The critical moment of this game method is the possibility of experiencing ever more realistic worlds for the student players,

Fig. 1. Lily Liu, Yiming Yang, Yuanyi Zhang, 'Reciprocity', 2018. Digital screenshot drawing from the two-player split screen videogames. Bartlett School of Architecture, UCL © The Bartlett B-Pro Show Book 2018.

which is, in Luke Caspar Pearson's own insight, achieved through 'carefully cultivated virtual spaces.'[17] This panoramic mode of urban investigation offers designers new ways of speculating the city by allowing players to interact and experience their logics through game spaces. However, Pearson reminds us that 'these navigable virtual spaces have limited capacities to mimic the natural 360º vision because represented territories in the virtual space are experienced through the defined edges that one cannot transgress'[18] Although operating at full freedom, the effect of 'invisible wall' prevents a realistic experience characteristic of panoramic illusion.

Another example is Stefan Gruber's recent research-based design exploration at the Carnegie Mellon University. By providing a collective research platform, Gruber investigates alternatives to the traditional studio teaching. His pedagogy is oriented to 'commoning the city' and what impact it can have on the negotiation between top-down planning and bottom-up transformation of cities. It is structured around collective case study research on practices and spaces of *commoning*.[19] The selected method of dissemination-the exhibition - is understood to act as a connector: it enables mutual learning and knowledge exchange. Finally, the production of the exhibition itself presents a huge collaborative endeavour to which many stakeholders contributed. In this way, the exhibition is both the product of the studio research as well as the site and vehicle for new knowledge production. Gruber explains that classes took place in the exhibition during the show in Pittsburgh. On that occasion, students referenced the Atlas and a satellite library on the commons and, in this way, they participated in the co-production of a space that thereafter becomes a site of collaborative learning and exchange, as in a closed positive feedback loop that amplifies itself. This method is instructive in the context of the pandemic teaching as it offers critical grounds to both question and sharpen the agency of architecture, and reflect on alternative and more collaborative modes of design and radical imagination. The educational value created through this *commoning* pedagogy is the awareness and power of the collective intelligence contained in the self-organisation and use of resources against the backdrop of the escalating health crisis.

2.3. The Culture Of Communication

Firstly, we need to reflect on ways of maintaining an alignment between our theoretical and methodological choices to be able to produce and transmit knowledge in the context of complex entanglement between the real and virtual worlds. Moving more intensely towards a screen and a network as part of their daily workflows, educators no longer operate in depth but only through the immanent surface of operations unfolding, the smooth and functional surface of Baudrillardian communication. This presentation draws on the experience from

the collaboration between Media & Interaction Design from ECAL/University of Art and Design Lausanne and Undergraduate Design Minor and Bachelor of Science in Art and Design programs from the MIT Department of Architecture.[20] By using virtual communication as the primary form of human interaction, the joint programme has tested a new educational model for a post-pandemic world. More precisely, the team developed a new digital pedagogy that enables students to create networked physical interfaces with limited material resources and tools while being away and stripped from a traditional in-person studio and workshop settings. During the 2020 spring quarantine, a series of open-source software and hardware tools were developed to allow students to build electronic objects from simple and readily available materials. These objects were then dynamically routed and connected to each other to physically augment video chatting and to allow students to extend their virtual reach into each other's tangible spaces (fig. 2). For the first phase of the project, students had to imagine, design and implement two interfaces, whose design and behaviour allowed and suggested a new form of communication between two people, in two separate places. Notions of remote presence, simultaneous actions, shared experience and telepresence were explored, fundamentally expanding the ways through which we interact and communicate. Nonetheless, these communication devices improved only certain aspects of knowledge production based on logistics, further opening the question of relationships in the knowledge production towards the raise of criticality.

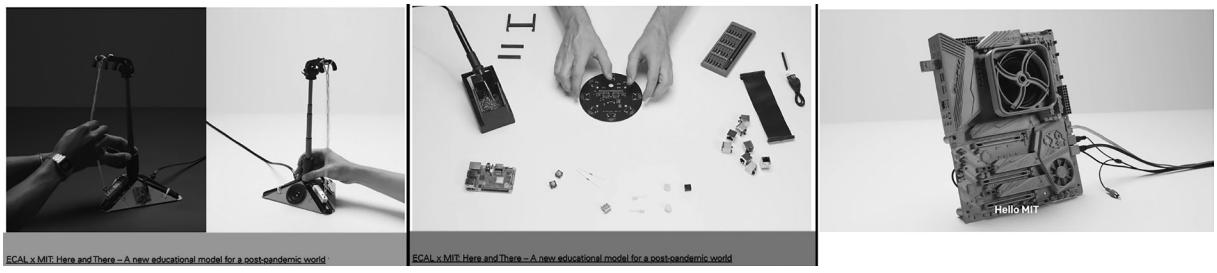

Fig. 2. ECAL x MIT: Here and There – A new educational model for a post-pandemic world, 2020. The collaboration between Media & Interaction Design from ECAL/University of Art and Design Lausanne and Undergraduate Design Minor and Bachelor of Science in Art and Design programs from the MIT Department of Architecture, 2021 © snapshots.

2.4. The Digital Culture

Coming through a hybrid of physical and virtual domains, it seems to me that the future of teaching has never been more closely related to Seraji's proposal of a new pedagogy based on images; or, more precisely, understanding of the world through graphic knowledge. Namely, over the past three decades architectural processes have been drastically reorganised by what historian Jonathan Crary

calls ‘a transformation in the nature of visuality probably more profound than the break that separates medieval imagery from Renaissance perspective.’[21] Architecture’s previously stable graphical conventions have dissolved and been replaced with an ever-expanding repertoire of computational mediums. A range of technical processes extracted from the development in computer graphics testifies a continuity in media practices that have generally been regarded as lying outside the domain of architectural practice. Today, with the arrival of augmented reality environments, representational and design experimentation has expanded the set of techniques to integrate advanced virtual production infrastructure (from the movie render and photo editing applications), but also implemented specific augmented reality techniques to supplement the user’s view with images of virtual objects in a real-time mode. In this way, augmented reality enabled mixing of the real-world physical environments and computer-generated virtual objects, work with dynamic systems, motion and virtual cameras, but also visually indicating the type of materials, lighting, context, and other project elements. In this way, it enhanced users’ perceptions of reality, allowing them to gain a complete and real sense of the objects around them.

Enabling high preciseness and real-time mode of presentation, augmented reality is being widely recognised for extending the current limitations of architectural education to increase the understanding, experiment, ease, stimulate and speed up the learning. By superimposing text, graphics, video, audio and other educational reading materials into one’s real time environments, students become active learners, able to interact with their learning environment. For example, computer generated simulations of historical events allow architecture students to explore and learn the details of each significant area of the event site, and even allow students to virtually see through a building’s walls, its interior objects and layout. In this way, pandemic circumstances and the university lockdown will not prevent students from visiting the site. To the contrary, their virtual visit promises to be interactive and accessible to all kinds of information simultaneously. Furthermore, Augmented Reality has revealed the potential to improve the understanding of the spatial structure of a building. The architecture students who have difficulties understanding the 3-dimensional spatial structure and connections between the construction elements can benefit greatly by the Augmented Reality (fig. 3). Moreover, Augmented Reality can provide a supplementary interface to provide epistemic actions that affect the creative design process. In this context, the real time image is used to offer supplementary information rendered in a multimedia format in a way to enable better user experience in different stages of the process. Therefore, with the help of Augmented Reality technology and the real-time image representation, students can manipulate, examine and control virtual 3-dimensional objects from diverse

angles, in a simple and more intuitive way. These new media practices, in their technique and esthetic aspects, stand as the provocative potential regarding how an architect can communicate preliminary concept ideas, and work interactively to remotely present a project in the real-time mode.

Fig. 3. Using Application Trimble and SiteVision, showing how the application enables a greater context and understanding to projects at 1:1. Screenshot of the Trimble SiteVision Demo © https://sitevision.trimble.com

CONCLUSION

This research has demonstrated that the issue of production and transmission of knowledge defies confinement as it morphs across and between media networks, intelligences, logistics and processes. It advocates for a more deliberate kind of process that build upon, conceptually and materially, the idea of reciprocation between confinement and liberation in architectural education. In the context of collaborative pedagogies, tested for the first time across Australian universities, we have seen how the process of "learning through doing together" has challenged a deeper critical attitude in students, and a reversal of the conventional students' and teachers' roles, providing lessons that need not be restricted to exceptional circumstances. In the context of recent media and technology advancements, while the bodily relationship to the works of architecture is lost in the digital sphere, aspects of the educator's facilitation mediated through the augmented reality environments have become richer and more nuanced. Moreover, the process of guiding conversation through a succession of images and showing juxtapositions that reveal new insights, can give greater context to the architectural work in focus. These changing learning environments seem

to render the students' immediate environment their temporary studio, as they move through the space, museum or a city. Not only do the hierarchies from our physical world cease to exist. Rather, their accumulation within the digital environments has broken down the hierarchies of knowledge and extended the language requirements with the new notions of remote presence, simultaneous actions, shared experience and telepresence, to be able to communicate between different mediums. Consequently, this context embraced new kind of relationships asking for a revision beyond standard architectural practices.

In the context of my global teaching experience and collaboration with diverse universities from almost 25 different countries and five continents, the challenge appeared to be the nature of communication between diverse platforms and inventing a new specially designed for the architects; but also experimenting with improving interface and networking archived materials. During my teaching and supervision of the Master's Taught course, the Anhalt Institute Dessau (Bauhaus) in the past semester, the online teaching format has revealed the dimension of internationality of the students' profiles. Parsing through such an interactive collection of most diverse educational backgrounds, the semester-long diploma project discussions turned out to be an unprecedented accumulation of knowledge, as specifically designed apparatuses for comprehension across cultures. Despite the fact that these students are becoming traveling knowledge transmitters, it seems that the movement and dissemination of the virus annihilates all other movements, including knowledge. Then, it seems that the pandemics endowed a crisis in education, as the recent graduates might not be given the voice upon their return to the home countries after graduation. In other words, instead of acting as apparatuses for thinking through non-hegemonic global exchanges and knowledge production, they are becoming nothing more but a virus circulating in that education system. Aren't these recent graduates now becoming a voice coming from the struggling communities that are still dealing with the anti-knowledge regimes and restricted information delivery? Are they becoming the self-managed resources with an eye towards liberation and social change?

NOTES

N.B. This article was first published at: Facing the future – new challenges: proceedings [9h International Conference] On Architecture, [3-4 December 2021], Belgrade, editor Ružica Bogdanović (Beograd: STRAND - Sustainble Urban Society Association, 2021)

1 Adnan Morshed, Spring Panel Series: Pedagogy (4.12.21): AIA Continuing Education Learning Units, online panel organised by the School of Architecture and Planning - Catholic University of America, Washington, D.C. April 12, 2021. Accessed on April 15, 2021: https://www.facebook.com/141360669223213/videos/1085751208602030

2 V. Hannon, A. Patton, and J. Temperley, Developing an Innovation – Ecosystem for Education (Indianopolis: CISCO, 2011); F. Taddei, Training creative and collaborative knowledge-builders: A major challenge for 21st century education. Report prepared for the OECD on the future of education (Paris: OECD, 2009).

3 C. O'Malley, G. Vavoula, J.P. Glew, J. Taylor, M. Sharples, and P. Lefrere, MOBIlearn WP4-Guidelines for Learning/Teaching/Tutoring in a Mobile Environment (2003). Accessed September 18, 2021. www2.le.ac.uk/Members/gv18/gv-publications

4 Deborah Berke. Presentation given at Pedagogy (4.12.21): AIA Continuing Education Learning Units, online panel organised by the School of Architecture and Planning - Catholic University of America, Washington, D.C., April 12, 2021.

5 Robert Alexander Gonzales. Presentation given at Pedagogy (4.12.21), April 12, 2021.

6 Ibid.

7 Nasrin Seraji, presentation given at Pedagogy (4.12.21), April 12, 2021.

8 Ibid.

9 UNSW | COFA.online "Learning to Teach Online. Case Study: Using ePortfolios as a reflective teaching tool." Featuring: Julie Hughes, University of Wolverhampton, written by Simon McIntyre (Australian Learning & Teaching Council, June 2011), 4. Accessed October 12, 2021. www.online.cofa.unsw.edu.au

10 Ibid., 4.

11 K.S. Rabayah, "A practical ICT for development framework: The ICT centre of excellence", *International Journal of Education and Development using Information and Communication Technology*, vol. 4, issue 4 (2008): 111-126. And see: MK. Kabilan & BL. Rajab, "The utilisation of the Internet by Palestinina English language teachers focusing on uses, practices and barriers and overall contribution to professional development", *International Journal of Education and Development using Information and Communication Technology* (IJEDICT), vol. 6, issue 3 (2010): 56-72.

12 Karin Watson, Simon McIntyre, Ian McArthur, "Trust and Relationship Building: Critical Skills for the Future OF Design Education in Online Contexts," Icograda Education Network Conference. Icograda IDA World design congress, in Beijing, China, 23-24 October 2009.

13 S. DiPaola, D. Dorosh, G. Brandt, Ratava's Line: Emergent Learning and Design Using Collaborative Virtual Worlds (2004). Retrieved February 22, 2004. http://www.digitalspace.com/papers/sig2004-paper-ratava/index.html

14 COFA Online (COL) is responsible for the development and management of a wide range of fully online and blended undergraduate and postgraduate courses in art and design disciplines at the College of Fine Arts, The University of New South Wales, Sydney. COL develops and disseminates online pedagogy and training and in 2007 expanded its offerings to include a fully online Master of Cross-Disciplinary Art and Design program, with students and lecturers participating from around the globe.

15 According the conclusions from the Watson, McIntyre and McArthur's study. Read in: Watson, McIntyre, McArthur, "Trust and Relationship Building" Icograda IDA World design congress in Beijing, China, 23-24 October 2009.

16 Pearson and Youkhana, "Videogame Urbanism: MArch Urban Design RC12," *Alephograph* (2017).

17 Pearson, *Drawing: Research, Theory, Practice* (2017): 23.

18 Ibid., 24.

19 Stefan Gruber, "An Atlas of Commoning – A Travelling Exhibition as Collaborative Platform for Exchange, Mutual Learning and Community Engagement," at the ACSA 109th Annual Meeting: Expanding the View: Prospect(s) for Architectural Education Futures. March 24-26, 2021 | Virtual conference.

20 Initiated in March 2020, in collaboration with Media & Interaction Design from ECAL/University of Art and Design Lausanne and Undergraduate Design Minor and Bachelor of Science in Art and Design programmes from the MIT Department of Architecture, students developed A new educational model for a post-pandemic world. See: ECAL x MIT: Here and There (2020).

21 Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, MA: MIT Press, 1990), 1.

BIBLIOGRAPHY

Berke, Deborah. Presentation given at Pedagogy (4.12.21): AIA Continuing Education Learning Units, April 12. The School of Architecture and Planning - Catholic University of America, Washington, D.C., 2021.

Crary, Jonathan. Techniques of the Observer: On Vision and Modernity in the Nineteenth Century. Cambridge, MA: MIT Press, 1990.

DiPaola, S., Dorosh, D., Brandt, G. "Ratava's Line: Emergent Learning and Design Using Collaborative Virtual Worlds." Retrieved February 22, 2004. http://www.digitalspace.com/papers/sig2004-paper-ratava/index.html

ECAL x MIT: Here and There – A New Educational Model for a Post-pandemic World. Bachelor Media & Interaction Design from ECAL and students from MIT's Undergraduate Design Minor and Bachelor of Science in Art and Design programs, 2020.

Gonzales, Robert Alexander. Presentation given at Pedagogy (4.12.21), April 12, 2021.

Gruber, Stefan. "An Atlas of Commoning – A Travelling Exhibition as Collaborative Platform for Exchange, Mutual Learning and Community Engagement." ACSA 109th Annual Meeting: Expanding the View: Prospect(s) for Architectural Education Futures. March 24-26, 2021 | Virtual conference.

Hannon, V., Patton, A. and Temperley, J. Developing an Innovation – Ecosystem for Education. Indianopolis, CISCO, 2011.

Kabilan, MK. & Rajab BL. "The utilisation of the Internet by Palestinina English language teachers focusing on uses, practices and barriers and overall contribution to professional development." International Journal of Education and Development using Information and Communication Technology (IJEDICT), vol. 6 (3), 2010.

Karin Watson, Simon McIntyre, Ian McArthur. "Trust and Relationship Building: Critical Skills for the Future of Design Education in Online Contexts." In Icograda Education Network Conference 2009. Icograda IDA World design congress, in Beijing, China, 23-24 October, 2009.

McIntyre, Simon. UNSW | COFA.online "Learning to Teach Online. Case Study: Using ePortfolios as a Reflective Teaching Tool." Featuring: Julie Hughes, University of Wolverhampton. Australian Learning & Teaching Council, p. 4, 2011. Accessed October 12, 2021. www.online.cofa.unsw.edu.au

Morshed, Adnan. Spring Panel Series: Pedagogy (4.12.21): AIA Continuing Education Learning Units, April 12. The School of Architecture and Planning - Catholic University of America, Washington, D.C., 2021.

O'Malley, C., Vavoula, G., Glew, J.P., Taylor, J., Sharples, M., and Lefrere, P. MOBllearn WP4-Guidelines for Learning/Teaching/Tutoring in a Mobile Environment, 2003. Accessed September 18, 2021. www2.le.ac.uk/Members/gv18/gv-publications

Pearson, Luke. Drawing: Research, Theory, Practice. Bristol: Intellect, 2017.

Pearson, Luke and Youkhana, Sandra. "Videogame Urbanism: MArch Urban Design RC12." Alephograph, 2017.

Rabayah, K.S. “A practical ICT for development framework: The ICT centre of excellence.” International Journal of Education and Development using Information and Communication Technology, vol. 4 (4), 2008.

Seraji, Nasrin. Presentation given at Pedagogy (4.12.21), April 12, 2021.

Taddei, F. Training creative and collaborative knowledge-builders: A major challenge for 21st century education. Report prepared for the OECD on the future of education. Paris: OECD, 2009.

admission date 15 11 2021
approval date 15 01 2022

review article
UDC 728:37.012/.013(497.7)
316.728:[616.98:578.834(100)

ARCHITECTURAL DESIGN STUDIO COURSES IN AND OUT COVID-19: ADAPTIVE PROCESSES IN ACADEMIC KNOWLEDGE EXCHANGE

A B S T R A C T

This paper elaborates on the work of the Growth 2.0 design studio at the Faculty of Architecture in Skopje that, over the years, has built its own methodology around different modalities of collaborations, prompting immediate and direct exchange of knowledge in the learning process. Restrictions in movement and access to other commodities, caused by the Covid-19 pandemic, have shaken every sphere of society, including education as it was inevitably transferred from the physical classroom into online forms of communication. Such a major shift especially reflects architectural education that basically evolves around the very notion of space, spatial practises and physical encounters.

History has proven that in times of 'crises' (as the pandemic certainly is), new ways of thinking emerge that further instigate novel and innovative acts and deeds. Nevertheless, education being conceived as an act of continuation by sharing and exchanging knowledge, could not withstand a rapid shift without leaving a rupture in the process. Therefore, this paper shows how pedagogy and methodology changed in the Covid-19 era to adapt the particular circumstances of physical distance and isolation in the framework of the design studio, adjusting design tasks and communication tools as new modes of collaboration.

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KEY WORDS

DESIGN STUDIO METHODOLOGY,
COLLABORATIVE LEARNING,
PEDAGOGICAL STEPS,
DESIGN RESEARCH,
DESIGN PROJECT

INTRODUCTION

Architecture as a discipline has particular ways of creating knowledge that emerge out of architectural practice, while as a form of design, practice itself is greatly concerned by the ways this engaged architecture and design knowledge is communicated and disseminated in the process. Despite the interconnections, we point to the distinction between architectural production and the process of creating architecture that constitute architecture as a design project.

While the academic notion of theory and history within architecture and design discourse is mainly based on the description of architecture as a design product, the discourse of the design process, of design itself, seems to be rather missing. As a result, when talking about architectural production, it generally speaks of the multitude and diversity of objects that not necessarily communicate architecture and design as a unique form of knowledge. In that manner, Clive Dilnot raises the question of design knowledge as one that cannot be separated from the contribution that it makes to knowledge in general.[1] For the first argument, he positions design knowledge between science and humanities as it deals both with things and people. In this paper, we would like to bring to the fore the specificity of architecture and design as a form of knowledge that, besides the notion of architectural artefacts, considers the relations between people and objects and between society, culture, and material artefacts. We showcase this through the work of a design studio at the Faculty of Architecture in Skopje. Moreover, Dilnot argues that design knowledge is rather prescriptive than descriptive and therefore needs to position itself between instrumental reason ('theory') and praxis ('doing'). He postulates that for design knowledge to advance, practice itself is not the key, but the single cases of 'a project within practice' that essentially make up practice. This constitutes the discourse of the design process, or what distinguishes the product as 'things made' from 'things in the making', and speaks of projects that need to be conceptualized, as the basis of knowledge central to the act of form-generation that is in the foundation of architecture and design. This has also been of prime concern in the particular design studio methodology that is elaborated later in this paper.

In line with Dilnot's discussion about architecture and design knowledge, Jan Verwijnen[2] interconnects design pedagogy, design thinking and design practice. His personal example of an architect that is actively involved both in the public life and in the academia has influenced greatly the curriculum of the schools where he taught. His persistent explorations in the notion of the concept in design are always centred around the creative innovation derived from architectural

knowledge and the question: How can we produce particular knowledge that is related to the generation of form? Verwijnen has developed a scheme that represents the design process through three crucial steps in processes of form-generation, suggesting that these steps and the jumps between, would be most relevant for architectural research. The first level is the analysis and theory as 'a terrain of cognitive theoretical logic, 'pure' reason, instrumental rationality and determinate judgement'.[3] In current conditions of architecture and urban planning, dominated and represented by flows of information, images, capital, goods and people, influenced by the capacity of new information and communication infrastructures, this level has grown rapidly in importance as it is found in the great amount of data that nowadays any new project needs to deal with. The second level is a conceptual one, 'existing at the edge between immaterial ideas and the world of real objects, between the virtual and the real.'[4] At this level ideas and objects operate via rather diagrammatic images that often involve analogies and association in a particular kind of decision-making as discursive systems of thought that concepts tend to relate to. The third, and the last step of the design project, is the final form, or 'the way things and products present themselves in their material form'[5]. Despite the fact that this has generally been the domain of the categories of style and art history as a form of descriptive knowledge, in the prescriptive manner, the final form is very closely related to the previous steps and finds its strength as a form that is cognitively informed and that is capable to perform, to relate and give meanings to people and the surrounding.

Therefore, the values and the advancement in architectural and design knowledge is not so much to be looked at in design practice, but rather in the design project - what they mean as ideas, as concepts that work through the project's presence in the world. This paper addresses in particular the pedagogy of the Growth 2.0 studio that evolves around the acknowledgement of *the concept* as more important in design than the description of the form of the things.

1. PEDAGOGICAL VALUES OF THE DESIGN STUDIO

Much of the discussion about higher education in recent decades has revolved around the position and the role of university in modern society. Additionally, in the global world where people and information travel wider and faster than ever before, there is an apparent need to rethink the most suitable approaches in architecture education, along with the question of the position of the architect and the possibility of architecture to have a profound impact in the contemporary society. The perpetual technological advances and social changes

make it impossible to grasp a solid ground, or to have a univocal point of view on what is the real impact of architecture and the architect in current global societal structure and what the real role of architectural education is in the fluid system of liberal democracy. Moreover, the world we live in is driven by the economy of new types and forms that never truly succeed to meet the ever-growing demands and ever-changing conditions.

Such great uncertainty and instability call for a shift in priorities within general education, moving away from the imperative of advances in skills towards training openness and readiness to embrace change and novelty. Since information and knowledge are becoming more accessible, it is not a question of reaching information or obtaining a position on certain issue, but concerns making selection of the relevant ones, being able to critically re-think them and to evolve personal creative and innovative contributions. Regardless of the persistent rhetoric of 'the new', and the pressure of producing novelty, it is of a key significance for architecture students and professionals to distinguish the design project from the vast field of design production (design practice). Therefore, it is not so much about the quantity or diversity of knowledge obtained at schools, but rather how to learn in order to be capable to respond to the uncertainty of the forthcoming challenges in architecture.

In that sense, this paper focuses on architectural education at schools, and particularly follows the work of Growth 2.0 studio at the Faculty of Architecture in Skopje, where we see our responsibility as teachers not only to teach students the most advanced skills, but also to trigger their sense of openness and readiness to embrace the novelty and perpetual change in reality while developing meaningful, thoughtful and ethical design projects.

1.1. Learning Through Design In Architectural Design Studio

Teaching and learning in architecture design studio is widely accepted and implemented as the core of architectural pedagogy. As a project-based model in learning architecture, the format of design studio is intended to prepare students for the architectural practice. According to Donald Schön, the pedagogical value of the design studio lies in its capacity to open a window to the professional practice and the process of architectural designing through experiential learning which is considered a unique mode of learning and teaching. It is described as an immersive learning environment where teachers and students are required to make clear to one another 'what it is they do when they design'.[6] Nevertheless, a design studio is not just another simulation of 'the office' space, but a specific

way of thinking and learning that understands design environment both as an office and an agora. The design knowledge, thinking and understanding generated in the design studio and the experience and knowledge that is transferred from practice is essential to the field of architecture. Therefore, what students learn in that process is greatly influenced by how they learn.

In an age where measurement, evaluation and accountability greatly influence education, looking for most suitable ways of teaching and learning, Ronald Barnett argues for a focus on the human, bringing the attention onto the student and consequently the associated question of what then it is to be a teacher in higher education. His proposal to move away from the preoccupation with the epistemological and to consider instead the ontological could mean a turn to an approach in learning and teaching towards certain dispositions rather than merely knowledge and skills. He defines design as a curiosity, a will to explore, engage and imagine, and eventually a will to learn through collaborations.[7]

Another turn in both the practice and learning architecture is the shift from a teacher-centred mode that is associated with traditional master-apprentice model, towards more collaborative approach that also shifts individuality and personal-bias practice towards vivid communication and open criticism among pears. Since design is essentially a collaborative act, it is of significant importance how the architectural and design knowledge is communicated and disseminated among multiple agents involved in the process.

For that reason, a method of collaborative learning is emerging in many schools. It is particularly suitable as an approach in architectural design studio that intends to overcome the problems of the traditional approach in education. Whereas in the traditional approach teachers are the only source of authority and knowledge and students have a rather passive role, collaborative learning is a group learning mode where students are active participants in learning through communication and discussions. The authority and responsibility that were traditionally assigned strictly to the role of the teacher are being transferred to the students by involving them in group-based exercises that address certain concept and topics.

In the case of design studios, such disposition of the roles of students and their interactions results in the change from traditional studio characterised by master-apprentice relations to a collaborative studio, where students become active contributors that discuss their positions and construct their ideas in less hierarchical communication on peer-to-peer basis among all members, students

and teachers. It refers not only to the communication in comprehension of design challenges, but also the communication that leads to conception and articulation of ideas. Therefore, in regard to the fact that architectural design is always a collective act, a collaborative studio is basically presented by collaborative design as another aspect of collaboration that allows students to evolve their ideas by questioning and discussing them with their peers in the same group. Given many difficulties that such discussions may bring, and the possibility that in the clash of ideas not always the best solution wins, one can argue that it is the discussion that has proven to be more important than the result itself.[8] Immediate communication and discussions also stimulate critical thinking as important virtue to involve in a creative and innovative design. This, once again, brings the conception phase to the fore as key attribute of the design project, and substantial stage in the process of generating forms.

1.2. Architectural Design Studio As A Research Laboratory

Whereas architectural design (or design in general) is understood and undertaken as a pedagogical process in the design studio at architectural schools, it does not only refer to the educational frameworks, but it is also very closely associated with the fundamental values of a professional being. The question of architectural knowledge is inevitably related to the question of what architectural research or design research is about? It is not only tied to the scholars (students and teachers), but concerns professionals in practice as well in creating innovative and meaningful work.

The collaborative model in the design studio not only brings together students and teachers as reasonably equal participants, but also brings together their somewhat different professional goals: the design studio is a space where teaching, learning, and researching design, as separate activities, can be done to varying extent, mutually and collaboratively, between students who learn and teachers who do research.

In his seminal work on creating knowledge in design practice, Christopher Frayling differentiates various approaches to design research that we find relevant to the work within design studios at architectural and design schools. He distinguishes three modes of doing research: research ‘through’ design, research ‘into’ design, and research ‘for’ design that alter in the perspective, the purpose and the outcome.

Frayling describes ‘research for art and design’ as ‘gathering of reference materials’, where knowledge is embodied in the artefact as an end-product that communicates in a ‘visual, iconic or imagistic’ sense.[9] Research for design is done by designers and for the purpose of designing, usually outside academia. It is what designers do when they gather information to guide design decisions: knowledge-finding and analyses done to ensure the rightfulness of the final product, i.e., the final form. Since design studio is a transformative process of learning in which students discover their abilities as designers, this category is important to be presented and experienced to certain extent inside the education as well.

According to Frayling, ‘research *into* art and design’ refers ‘historical research’, ‘aesthetic or perceptual research’ as well as ‘research into a variety of theoretical perspectives’ on the practice.[10] It is research ‘about’ design and is usually looked from different perspectives outside the design field (psychology, anthropology, education, philosophy, etc.), where design or architecture, and designers or architects themselves become the subject (rather than the purpose) of research. Bringing different views on the subject, research into design not only informs but creates valuable educational materials and therefore becomes a focus especially for teachers as educators.

As the third in Frayling’s categorisation, ‘research through art and design’ describes design practice as the methodology that creates the knowledge, which is ‘being achieved and communicated through the activities of art, craft or design’.[11] It requires both perspectives: from outside and from inside design, or architecture. This means that a problem is taken outside design while design is used to address the problem. Hereto, architecture and design are taken as particular thinking and a particular knowledge which helps to understand certain issues that exist outside design. It often relates to academic concepts, but it is also done in practice within the commercial world, although using other than academic vocabulary. Frayling gives examples in ‘materials research’, ‘development work’ such as customizing technology, and ‘action research’, where processes of doing and reflecting iterate upon themselves, but in more recent years it became evident in modern product development, such as prototyping or user-studies that are using design and create artefacts, not as a single final form, but as a tool for further learning and creating knowledge. Such laboratories can be found in the structure of universities and the open market sector, but in most of the cases it requires close collaboration between both.

Frayling's approaches inspire interpretations where varying perspectives between the activities of students as learners and teachers as researchers are developed, revealing potential overlapping spaces of learning and research for both students and teachers within the design studio course. In that manner, the Growth 2.0 design studio, conducted with students of the final (fifth) year at the Faculty of Architecture in Skopje, superimposes these lenses of research design, and overlap the practices of teaching and learning with research design, which allows us to reflect on it in the next part of this paper.

2. DESIGN AND RESEARCH IN THE GROWTH 2.0 STUDIO

In addition to the general stances on architectural education, and particularly on the potentials of design studio in architectural schools, we reveal the work of master design studio Growth 2.0 at the Faculty of Architecture in Skopje, established by the authors as a research laboratory, to contribute to the built environment knowledge. It takes a crucial part in the school curriculum, among a large number of subjects and courses that cover a rather vast field of general knowledge, in the final year of studies, prior to the master theses. It is defined as 'integrative design studio' where it is possible to integrate technical skills and theoretical knowledge in a creative way while drawing inspiration from a broad body of already obtained learning experience.

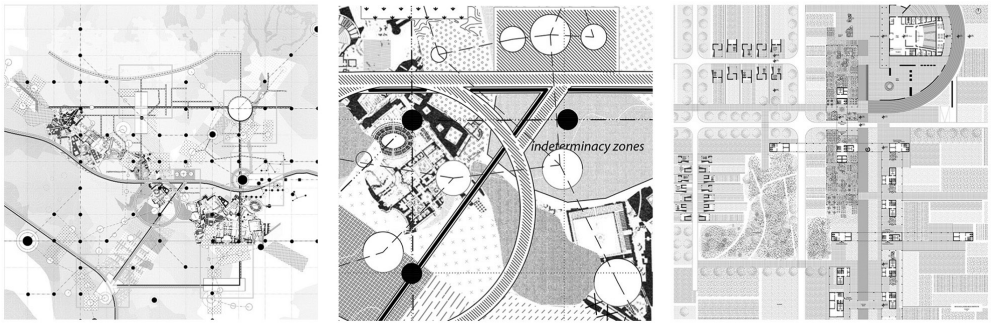
In general, Growth 2.0 investigates transformative specifics of urbanity in the condition of continuous quantitative change. It follows the concept of growth as an inherent and vital feature of every city, and explores its various possibilities in terms of size, volume and density. It refers to not only the built, but also the unbuilt as equally valuable resource for the city, and therefore investigates the possibilities for de-growth as part of conceptual understanding of urban growth. Although studio work evolves around research and design tasks reflecting various topics relevant to contemporary urban environment, growth is being tested through the potential of the collective realm of urbanity in each studio session. It is recognised as a dialectical amalgam capable to bridge public and private interests within metropolitan areas by identifying existing and inventing new social relationships, speculative spatial possibilities, and testing the capacities of the build mass, urban voids, and distributive networks of the city. The work embraces various programmatic constraints from housing and the myth of domestic space to public space and architecture of collective hedonism.[12]

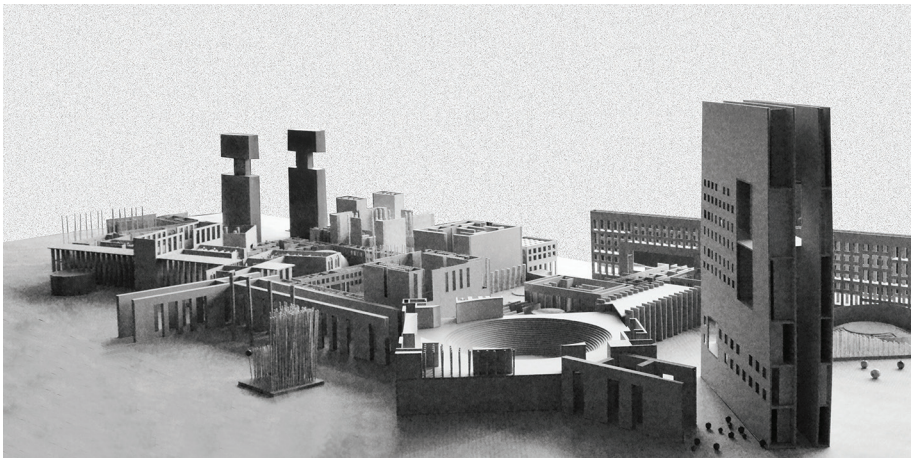
For six years in a row, the Growth 2.0 studio has been using the city of Skopje as a test bed for developing different approaches and projects for city-building, or what we have termed 'architectural urbanism', since it operates on various scales in the architectural analyses and envisions. The outcomes aim to represent the autonomy and the symbolic value of architectural artefact as cultural condenser marking the city-building as metropolitan effect.

2.1. Pedagogical Tools And Methods

Since the studio deals with the realm of 'architectural urbanism', studio projects developed within Growth 2.0 always operate between different scales, aiming to encourage critical use of architecture through polemical exchange, and to produce contextual provocations as a strategy of architectural urbanism, thus capable to communicate the particular architectural knowledge. In that process, different tools and methods are used and developed in order to create contemporary urban narratives. Among many possibilities for employing all kinds of tools available to architecture research and design, the Growth 2.0 studio always insists on the following three: *scale, references*, and *exhibition* as key aspects in all studio sessions up to the present.

Scale is a well-known tool in architecture that allows different optics when addressing various levels engaged in architecture from territorial, through urban and architectural, to the details (Figure 1). The nomination of architectural urbanism requires the involvement of different scales both in analytical and the creative phase of the project. Oscillation between the scale of urbanism and the scale of architecture, going in both directions back and forth during the process of thinking and also in the latter stages of design, becomes a specific method in understanding and developing meaningful architecture for the city. In addition, scale manipulation can be used as a tool that completely changes the way architecture is experienced and the socio-spatial relationships are perceived.[13] Apart from the conventional importance of scale as referential element in built environments, scale also addresses social relations. That means using different scales for understanding the actual condition of a site, where each scale refers to a person that has a relation with that site, or an area of reach that particular amount of people have, which ultimately assigns different meanings and appropriations: from the intimate and individual, through the common and the collective, to the public domain.





UP: Fig. 1. Operating between different scales: territorial, urban and architectural. Segments of student work in Design studio Patterns of Growth: Unnatural Ecologies (2017/2018)..

DOWN: Fig. 2. Analogous city: aggregation of formal analogies of singular projects developed by students in Design studio Patterns of Growth: Residual Form (2016/2017).

References are inevitable source of knowledge and ideas in any design research, and in any design project for that matter. In particular, the informational virtue of architectural reference represents a significant part of the work within the Growth 2.0 studio. The value of references lays its foundational principles in the relational information they establish between the general theme and specifics of the researched subject. They represent the cognitive theoretical level as Verwijnen has described the first step of the design project, based on their ability to bridge the gap between a design task as a starting point in design process and the final stage of the design production. The studio work includes both the directional and the semantic values of references that instigate student's personal ideas. Throughout the process of design in the Growth 2.0 studio, references of various sources are used in different ways and phases, such as, for example: from discursive analyses, thorough models by analogy, to assigning new meanings by re-contextualisation of the findings gathered from the observed referent case.[14] Although architectural references derive their significance in the form of personal understanding being inscribed through their subjective analogical rethinking. In our experience, they also proved themselves as simultaneously generic and therefore represent a communication tool between our own convictions and general circuit of information (Figure 2).

Exhibition is considered an end point and an event of representation that crown a research or design process. Nevertheless, in Growth 2.0 we utilize the relevance of exhibition also in the form of pin-ups, interim reviews and guest critiques as a communication tool among studio members, in the process of learning architecture. All kinds of exhibitions are a vital part of the collective studio effort, and are important segment of the project itself (Figure 3). The final studio exhibition is predetermined as part of the seminal Architectural Design Studio Exhibition (IAS) that the Faculty of Architecture organises each semester exposing the curriculum through the work of all studio units. Studio Growth 2.0 is always presented in the classroom that has accommodated all other modes of the studio work over the semester, transformed once more for the purpose of representation and communication with the others, coming outside the studio group: students, teachers, local citizens, and guests.[15]

In addition to the final exhibition, the extensive content of each of the studio sessions is being reassessed in a printed publication (Figure 4). It reflects not only the results but, more importantly, the whole process of working and learning during a particular studio session. Furthermore, appearing in a series, these publications form a self-reflective and autodidactic archive.

UP: Fig. 3. Exhibition followed by discussion: final presentation of the work of Growth 2.0 design studio: Narratives (2017/2018) at TU Delft..

DOWN: Fig. 4. Archive of knowledge: publications on the work of each studio session of Design studio Patterns of Growth / Growth 2.0 (2014-2022).

2.2. Pedagogical Procedures

Centred around creative thinking, the Growth 2.0 studio is exceptionally focused on the learning methods and the learning environment. Although each year its scope, the scale and the nature of design task are different, the studio methodology is at all times structured around specific pedagogical procedures that are considered essential for developing research-based projects that in turn provide creative and responsive strategies for the city derived from the conceptual and critical thinking.

Growth 2.0 is always organised around different forms of collaborations as methodological and pedagogical tools: collaboration is understood and undertaken both as a mode of working and a mode of learning (Figure 5). The studio intentionally deploys aspects of collaborative learning and working to build a participatory learning environment, where complex issues and problems are understood and solved through different forms of collaborations: among peer-students and professors as well as engaging audience and experts beyond the classroom. As a mode of learning in the design studio, it means working together within a flexible group formed and reformed by students and teachers that participate as partners in the building of knowledge, with an established common goal, and accepting particular responsibilities. For that reason, various forms of presentations are employed in the learning process, where the exchange of knowledge is immediate and direct among all the members and the guests in the studio. As a mode of working, collaborative model creates a sort of community within the classroom where members support each other in their own academic progress. At the same time, the prosperity of the group as a collective depends not as much on the level of skills and knowledge of its individual members as on their right inter-positions, inter-relations, and integrations that makes it capable of conveying grater achievements altogether.

In that manner, the studio tasks are intentionally set to enforce group work that encourages critical thinking and constructive discussions, and consequently, the individual work is always conducted and finally presented as a fragment of the whole – perceiving the studio outcome as a collaborative system of many individual design acts. Another aspect of collaborative learning is cooperation among various parties of complementary participants in the process of learning. In the context of the Growth 2.0 studio it is accomplished through different collaborations with design studios, groups of students, and guest lecturers from other academic environments.

Fig. 5. Collaborative learning and working in Design studio Patterns of Growth: Unnatural Ecologies (2017/2018) and Design studio Patterns of Growth: Narratives (2019/2020)..

The reference of Growth 2.0 as a research laboratory suggests that all members, students and teachers are involved in the design research on different but complementary levels:

1) Since the studio format is defined as a project-based unit, it assumes that the researchers are inside of the research object of design practice, developing knowledge inside of practicing design, as described in Frayling's category of 'research for design'. Understandably, the final products are not artefacts in the material word, but projects for the world that embody the knowledge in architectural practice.

2) Since design is conducted not merely as a final product, but rather as a method, the position of the researcher both inside and outside of the research object, relates the category of 'research through design' that develops knowledge in practice. It is primary teachers' responsibility to address relevant perspectives, while students benefit in obtaining other meanings for their projects. Therefore, ideas, forms and their representation are created to reveal insights about the word that surrounds architecture.

3) Introducing various topics upon studio work allows researchers, mainly teachers, to do their research 'into' design, taking up a position outside of the research object, and gaining knowledge by looking from outside 'into' aspects of design practice that can afterwards be disseminated by publications and texts about the research outside of the design practice (as is the case of this particular paper).

3. DESIGN STUDIO PEDAGOGY REVISED IN COVID-19 REALITY

The particular studio methodology and pedagogy, built and meticulously developed within the Growth 2.0 studio over the years around different modalities of collaborations that prompt immediate and direct exchange of knowledge in the process of learning, has been greatly challenged in the unprecedented Covid-19 situation. In this peculiar time of highly restricted movement and access to many resources in urban life, education has been greatly affected with most of the universities closed, while education processes transfer from the physical classroom into the virtual space of online educational platforms. Forced to migrate to fully digital world due to the pandemic, schools and education experts began to discuss whether online environments are suitable spaces for teaching and learning in general. This question is even more relevant for architectural education that evolves around the notion of space and the place, where people need to establish real connections and interactions in order to communicate and exchange knowledge.

3.1. Studio Theme And Design Task

The priorities brought by Covid-19 and the 'new-normal' mode of distance learning, where students and teachers find themselves physically isolated from one another, each in their own homes, challenges the objectives as well as the way of teaching and learning the design project.

The first challenge that Growth 2.0 faced was deciding on the theme and the most suitable pedagogical steps to guide the design research and project. With the emergence of the pandemic, and especially facing the consequential redefinition of human practices and interactions, many designers, including architectural design studios and workshops, focus on finding new models of urban living, creating new alternatives for the cities. Digital media emanate a vast scope of ideas represented mostly by striking images rendering new post-Covid realities.

Instead, Growth 2.0 focuses on what is already there through reconsidering the dwelling modes, and reconfiguring residential typologies as a form of introspection: deepening the meaning of living space, the habitual environment, and their contemporary urban connotations. Therefore, 2020/2021 studio was themed 'Urban Villa'. Despite many meanings and (mis)usage of the term describing a domain in architectural practice, especially in recent years becoming a catchphrase to communicate forms of living for more commercial

purposes, there is no single definition of what an urban villa is. We choose this topic for two main reasons: first, it is a concept that overcomes the usual residential typologies of architecture as it comprehends the processes of living through spatial and programmatic concerns within the notions of sharing and generosity, and second, the generic understanding of the concept of urban villa makes it suitable to work away from a physical site, which means that can be tested regardless of physical environment. This makes it a Covid-appropriate test bed.

One of the most intriguing urban manifestos of the late 20th century 'The City in the City - Berlin: A Green Urban Archipelago' is the first to introduce a urban villa type in the urban planning concept for the future development of Berlin (Thesis 8).[16] Although the circumstances and the challenges of dwelling in urban environment, described by Ungers, are set in a rather distant context of Berlin almost half a century ago, we can still relate to it today. Positioning the urban villa type between two extreme residential types, the historical villa and the apartment block, which 'offers the advantages of the detached home while avoiding the disadvantages of the apartment block',[17] we find urban villa a substantial alternative for our own urban reality. Faced with further intensified and densified conditions, it becomes critical to rethink former definition regarding the size and programme, according to current urban conditions that we live.

Studio tasks explore the theme of urban villa excluded from any real location site. Instead of contextual readings of an exact site location, the work focus on the autonomy of this typology both as an exclusive formal and spatial composition, and as a programmatic complexity that comprises social and cultural context of today's reality.

3.2. Pedagogical Steps Of The Design Research

In the absence of fieldwork due to the pandemic-related restrictions, hence no site location, the research is predominantly based on references as found in architectural history and theory taken from different ages and different geographies that reveal various aspects of the general understanding of urban villa. In various phases of this studio work, various references are used in various ways for a variety of purposes. As the first step, the exploration in the theme introduces readings that, directly and indirectly, concern the notion of urban villa[18] in order to distillate a repository of key words that refer to the type of urban villa.

These provide the premises of what a new model of urban villa requires, placing greater emphasis on the performative notion of spatial and programmatic, where formal and compositional expression of the built and the unbuilt (architecture and landscape) are directly related to their socio-spatial performance. The second step in the thematic investigations introduces architectural references – a selection of examples, built in different time periods and in different contexts.[19] Through a series of *architectural analyses*, each group of students, working on a single architectural case study, extracts a taxonomy of *typo-morphological patterns*. In the next step, those patterns are recomposed in an *analogous model* that is guided by their own concept of urban villa. The summoned pattern-taxonomy derived from all the reference examples, together with the models by analogy, are once more rethought in the *prototype of urban villa* that has a distinctive formal and performative concept.

These three steps from references, through analyses, to creating new ideas confirm the established pedagogy in the Growth 2.0 design studio, which truly correlates with the key levels of the design project, or the form-generation according to Jan Verwijnen, as already described in this paper. The theoretical/analytical phase is hereby conducted through the readings and reference examples; the conceptual phase is in fact the leap from the ideas found as texts and images towards spatial models, in this case demonstrated through the method of analogy; and later question again the acquisitions of ideas in the production phase, and the development of the graphic representations of various kinds.

The final result of the studio work is presented by nine authentic ideas for urban villa that differ in size and structure, quantity and type of users and programmes, form and performability (Figure 6). The urban villa is considered an autonomous architectural artefact that incorporates cultural and social environment, thus becoming a part of its context. On the other hand, the complexity of the urban villa reflects the notion of urbanity (density, heterogeneity, and multitude), and thus creates an urban condition itself. Such autonomy and independence to some extent within a location does not necessarily mean complete detachment from its surrounding. On the contrary, even though projects are created for a generic location site, each one includes various forms of public or semi-public space as a gesture of generosity (bringing new qualities to the city) and openness (integrating the city and the people).

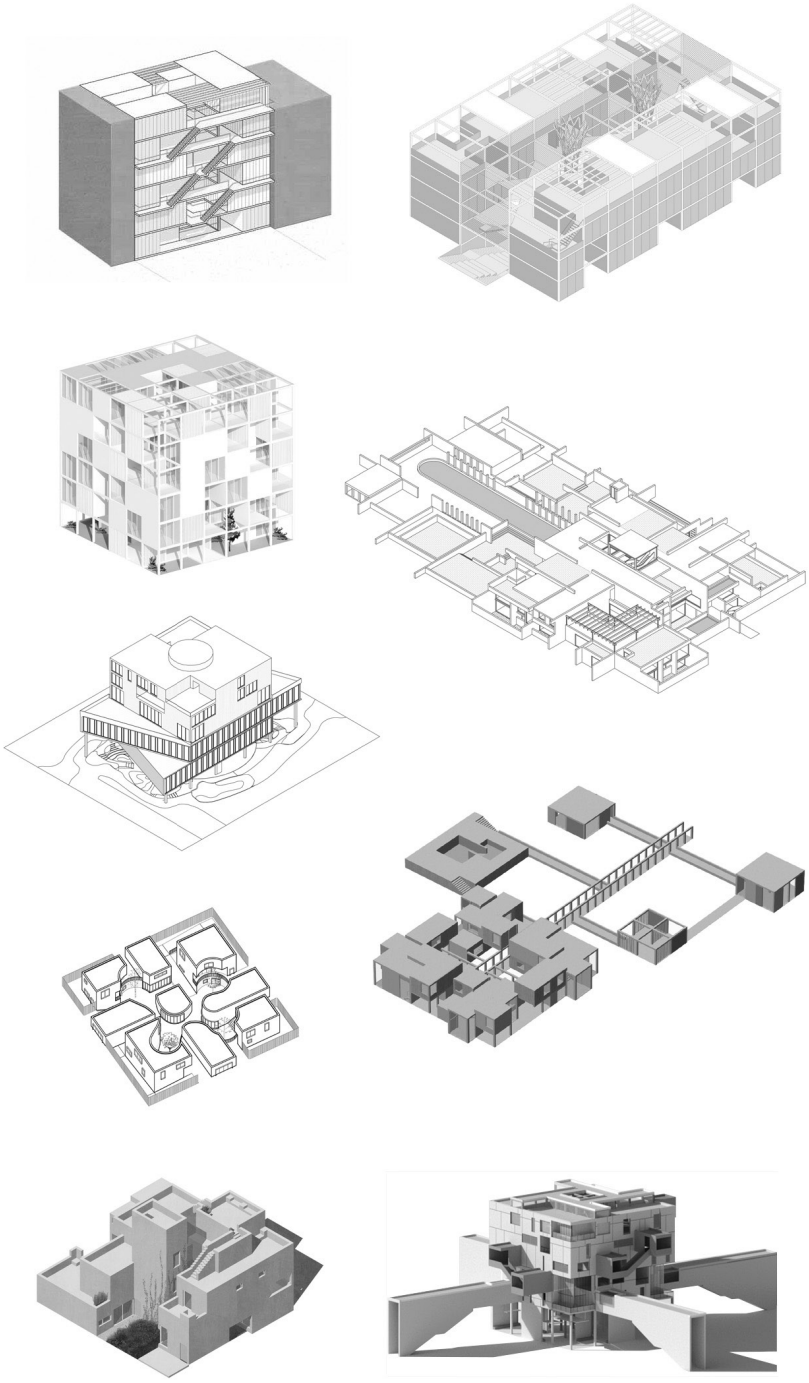


Fig. 6. Students' projects on Urban Villa. The Growth 2.0 design studio: Urban Villa (2020/2021)..

In the effort to perceive the work within the Growth 2.0 studio as a collective act of learning and working, it is of a vital importance to see each of the studio projects as a segment of the whole. This refers not only to the final product – projects for urban villa that share common task and inspiration, but also to the very process of developing those ideas by collaborative work on providing the reference material. Each of the student projects conclude with a set of typo-morhological patterns extracted from their own ideas for urban villa, whereas all nine contributions put together form a much broader and richer repository of typo-morphological patterns (Figure 7). Finding and creating patterns make the use and the value of references ambiguous: they do not only communicate the past, but through their interpretation in the present, they become future archaeology of knowledge.

The final exhibition, which simultaneously presents student projects in an elaborated way as particular ideas and as a fragment of the whole that the studio work itself represents, could also not be held due to pandemic restrictions. Such possibility to reflect on the projects and the design process is left only to printed form as another accustomed form of assembling the knowledge found and generated within the studio work. As all previous printed publications on each of the previous studio sessions, it archives the pedagogy of the studio, where design project is represented by the final product (student projects) and the design research.

As expected, studio's reference to the collaborative mode is highly challenged by the transformation in educational processes due to Covid-19. Nonetheless, the Growth 2.0 studio insists on group work in architectural research and design as a way to make certain tasks more comprehensible through communication and discussion while encouraging critical thinking. For that reason, students are organised in smaller groups of two or three, that could communicate with each other rather easily. Communication between teams (previously done through presentations and workshop-like classes in the classroom, working side by side with lively conversations) are held as online seminars: Each week, a studio day is conducted as a one-day event where each team presents their work via a remote screen sharing, followed by extensive discussions by teachers and other studio participants. That way all students develop their own work simultaneously and are aware of other students' work: they learn from each other, but also inspire and affect each other.

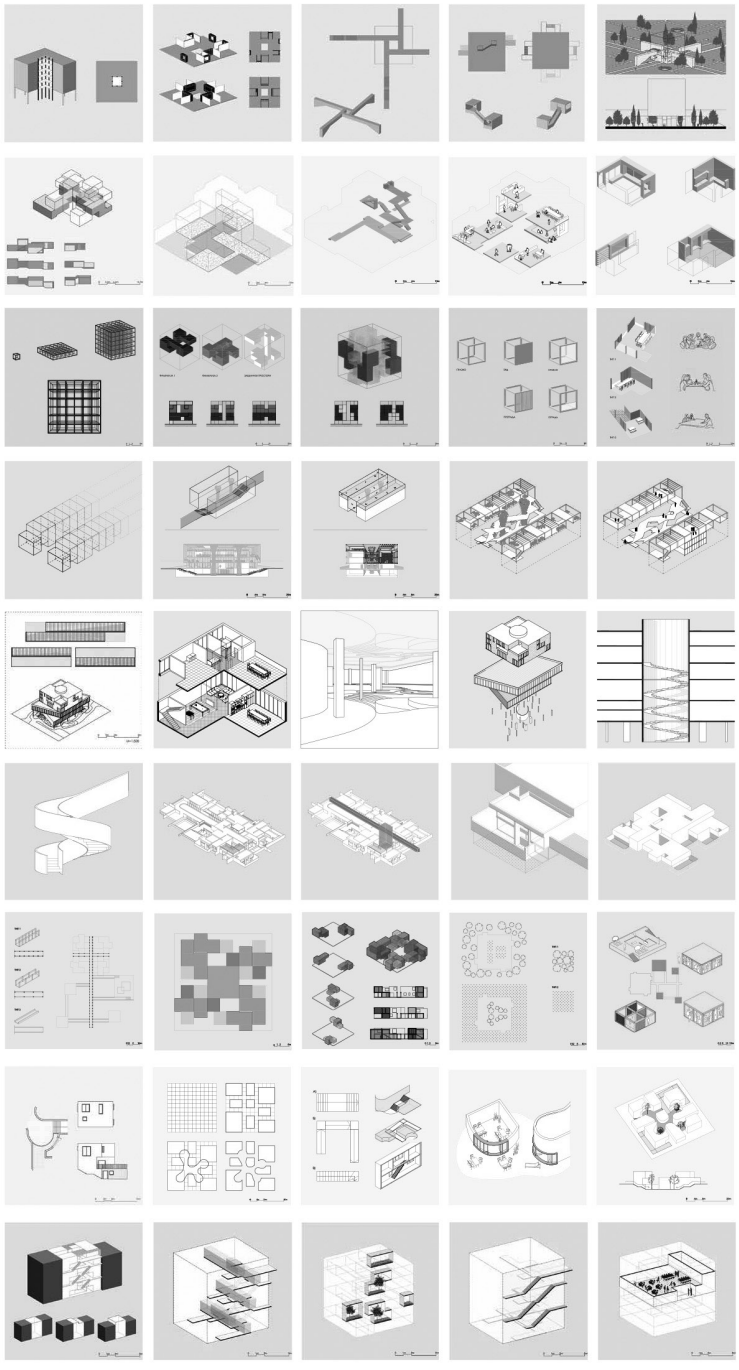


Fig. 7. Repository of typo-morphological patterns of urban villa. Final findings of the Growth 2.0 design studio: Urban Villa (2020/2021)..

The persistence of the collaborative mode in learning and working, despite the constrains forced by the pandemic, guarantees preservation of the studio's position as a research laboratory where students and teachers learn, work, and emanate knowledge and ideas through constant interaction. Therefore, benefits of such intense semester work are multifaceted in terms of the different positions of participants involved and their perspectives. This embraces Christopher Frayling's approaches to design research in various segments of studio work, as introduced previously in this paper: As the core project-based part in the school curriculum, the design studio is inevitably recognised by the end-product communicated by visual representations, and therefore could be described as a 'research for design', providing students a base to deliver novel and meaningful creations. Nevertheless, the complexity of the themes, in this case the notion of urban villa, demands expansion of the domains of interest, going beyond architecture. It puts researchers in position to reflect the topic from other stances (social, economic and ecological aspects) that challenge contemporary urban living, dealing with a variety of theoretical perspectives that require 'research into design' as defined by Frayling. Finally, the methodology of the design studio in developing a design project, as elaborated also in this paper, foremost categorises studio-work as a 'research through design', and the studio-environment as a laboratory that creates particular architectural knowledge to be disseminated in various ways.

In order to become a specific methodology, this studio experience (with all the problems and challenges of online education) is further revised in the next studio session (2021/2022) that is bind to be conducted online, yet on another level. The topic of the current studio session 'Commune - Architecture of the Urban Block' goes beyond the architectural discourse and seeks ways a neighbourhood becomes community. While investigating the many meanings of commune, commons and community, students are encouraged to establish different forms of collaborative working and learning within the studio as a form of community itself. The methodology used for the urban villa theme is currently tested on the scale of the urban block, using the same transformed techniques of distance learning that include intense oral presentations and open discussions, highly systematic algorithm of carefully crafted task-deployments, along with a carefully thought out choice of reference case studies and their specific characteristics in terms of scale, socio-spatial meaning, and performance. This adaptive method once again proves itself fruitful and inspiring for educational purposes, and aims to contribute to general architectural and design knowledge, despite the constraints imposed amid Covid-19 reality.

CONCLUSION

Architecture design studio is the space governed by the academia, where students are being educated and trained for the outside world, the environment, and the culture of architectural office practice. For students, the studio experience is an intensive (self) explorative journey where design skills are developed and passed on, and where students develop their thinking and responsibilities as designers while reflecting upon their skills and the skills of others. Hence the studio's orientation toward the design project as common ground for architects, and designers in general.

This paper intended to point to the importance of research as a key constitute of the design project. Hereto design is identified as research, clearly stating that there is no real design project without research, but a mere production of images, objects, and buildings. The discipline of research has its own wide range of methods that can be creatively used in each case, making its own methodology. The responsibility of the design studio is to instigate an open inquiry, to stimulate creativity, and promote critical thinking through learning-by-doing.

The global Covid-19 crises has profoundly affected every sphere of human life and put in question every aspect of it. In some domains it might be considered a trigger for an urgent and rapid shift. Nevertheless, in architectural education we find it necessary to resist such rhetoric of radical shifts that might cause a rupture in the continuum of knowledge building. Instead, it could be understood as a bifurcation point in architectural knowledge that repositions the priorities. During the inevitable turn of studio work towards on-line-classes, the pedagogy and design methodology of the Growth 2.0 studio have changed to adapt to the particular circumstances of physical distancing and isolation, adjusting design tasks and communication tools as new modes of collaboration in the process of learning and working. This showcases a learning methodology understood and undertaken not as a completely new methodological set and behaviour principles, but rather as a flexible structure based on the adaptive system of pedagogical procedures.

NOTES

1 Clive Dilnot, 'The Science of Uncertainty: The Potential Contribution of Design to Knowledge,' *Proceedings of the Doctoral Education Conference*, Ohio (1998).

2 Jan Verwijnen's unfinished PhD intended to explore the notion of concept in design. Many of his yet not published writings concerning the unique position of architecture and design as knowledge, still very much relevant for architectural discourse and practice today, are published fifteen years after his death in: EHITUSKUNST #60 *Special Issue: Jan Verwijnen*, Estonian Academy of Arts Faculty of Architecture and Urban Planning, Tallinn (2019/2020).

3 Jan Verwijnen, in 'Introduction' by Panu Lehtovuori and Klaske Havik (ed.), EHITUSKUNST #60 *Special Issue: Jan Verwijnen*, Estonian Academy of Arts Faculty of Architecture and Urban Planning, Tallinn (2019/2020), 13-14.

4 Ibid.

5 Ibid.

6 Donald Schön, *The Design Studio. Exploration of its Traditions and Potential*. London: RIBA Publications Limited (1985).

7 Donald Schön, *The Design Studio*, 32.

8 Thomas K. Mc Peak, *Extending the Mission of the Design Studio through Collaborative Engagement* in 'Education for an Open Architecture', Ball State University, College of Architecture and Planning, Conference proceedings (2008). [Online resource: www.irbnet.de/daten/iconda/CIB11017.pdf. Accessed November 2020].

9 Christopher Frayling, *Research in Art and Design*, London: Royal College of Art, Research Papers, Volume 1, Number 1 (1993), 5.

10 Ibid.

11 Ibid.

12 Themes investigated in design studio Growth 2.0 at the Faculty of Architecture Skopje are published in printed editions titled respectively: *Skopje 2014, The Strategy of the Cut-out* (2014/2015), *Microcity* (2015/2016), *Residual Form* (2016/2017), *Unnatural Ecologies* (2017/2018), *Freeingspace* (2018/2019), *Narratives* (2019/2020), *Urban Villa* (2020/2021), *Commune. Architecture of the Urban Block* (2021/2022).

13 One of the most prominent projects that put scale at the fore is the Swiss pavilion at the 2018 Venice Biennale Svizzera 240: House Tour, a project that triggers people's behaviours and perception of space. The project won the Golden Lion award for the best National Pavilion, described by the Biennale organisation as 'a compelling architectural installation that is at once enjoyable while tackling the critical issues of domestic space'. [www.archdaily.com/949884/disrupting-normal-experiences-an-interview-with-the-curators-of-svizzera-240]

14 More on the pedagogy of references as a communication tool in learning architecture in: Marija Mano Velevska, Slobodan Velevski, and Divna Pencic, 'Learning through Collaborations in Architectural Education. Pedagogical and Methodological Aspects in Design Studio Course,' *Proceedings of ON ARCHITECTURE Conference: LEARNING ARCHITECTURE*. Beograd: STRAND (2020), 114-115.

15 More on the pedagogy of exhibiting as a communication tool in learning architecture in: Marija Mano Velevska, Slobodan Velevski and Divna Pencic, 'Learning through Collaborations in Architectural Education. Pedagogical and Methodological Aspects in Design Studio Course,' Proceedings of *ON ARCHITECTURE (same as above) Conference: LEARNING ARCHITECTURE.* Beograd: STRAND (2020), 116-117.

16 *The City in the City - Berlin: A Green Archipelago, a manifesto* (1977) by Oswald Mathias Ungers and Rem Koolhaas with Peter Riemann, Hans Kollhof, and Arthur Ovaska, Edited by Florian Hertweck and Sebastian Marot, U.A.A. Ungers Archive for Architectural Research, Zurich: Lars Muller Publishers (2013).

17 Oswald Mathias Ungers, *The City in the City - Berlin: A Green Urban Archipelago - An urban-planning concept for the future development of Berlin*, edited by F. Hertweck and S. Marot, U.A.A. Ungers. Archive for Architectural Research, Zurich: Lars Muller Publishers (2013), 110.

18 Besides O. M. Ungers as the first and so far the only reliable source dealing the term urban villa, other works were investigated, from a cross-historical review on the type of the villa in: Ackerman, J.S. *The villa. Form and Ideology of Country House*. Princeton University Press, 2nd.Edition, 1993, to its radical interpretations in the concept of commune villa in: Dogma + Realism Working Group. *Communal Villa. Production and Reproduction in Artists' Housing*. Leipzig/Berlin: Spector Books and HKW Haus der Kulturen der Welt, 2015.

19 Architectural references range from the Palladian villa in the country (as in the examples of Villa Emo and Villa Rotonda); through the Modernist model in Muller House, Prague by Adolf Loss; the Postmodern expression as in Studio Passarelli building in via Campania, Rome; the dialectical multiform of O. M. Ungers' projects in Belvederestrasse, Cologne; up to very recent examples from different parts of the world as the villa in Brussels by Office KGDVS, Okurayama Apartments in Yokohama by SANAA, Beaumont building in Lausanne by 2B Architects and building Brunnenstrasse 11 in Berlin by Arno Brandlhuber.

BIBLIOGRAPHY

Barnett, Roland. A will to Learn: Being a Student in an Age of Uncertainty. Buckingham: Open University Press, 2007.

Dilnot, Clive. The Science of Uncertainty: The Potential Contribution of Design to Knowledge. Proceedings of the Doctoral Education Conference, Ohio, 1998. [Retrieved from: www.academia.edu/447813]

EHITUSKUNST #60 Special Issue: Jan Verwijnen. Edited by Panu Lehtovuori and Klaske Havik. Tallinn: Estonian Academy of Arts Faculty of Architecture and Urban Planning, 2019/2020.

Frayling, Christopher. Research in art and design. London: Royal College of Art, Research Papers, Volume 1, Number 1993.

Mano Velevska, Marija, Slobodan Velevski, and Divna Pencic. Learning through Collaborations in Architectural Education. Pedagogical and Methodological Aspects in Design Studio Course. Proceedings of ON ARCHITECTURE Conference: Learning Architecture. Belgrade: STRAND, 2020, 112-121.

Schön, Donald. The Design Studio. Exploration of its Traditions and Potential. London: RIBA Publications Limited, 1985.

Ungers, O. M., Rem Koolhaas, Peter Riemann, Hans Kollhoff, and Arthur Ovaska. The City in the City - Berlin: A Green Archipelago, edited by Florian Hertweck and Sébastien Marot. Zürich: Lars Müller Publishers, 2013.

admission date 15 11 2021
approval date 19 01 2021

review article
UDC 72:331.4
72:37.018.43
316.728:[616.98:578.834(100)

NEW STUDENT TYPOLOGY: STUDENTBOTS? ARCHITECTURE STUDENTS FACING DISRUPTIVE TECHNOLOGIES IN THE PANDEMIC ERA

A B S T R A C T

The coronavirus pandemic and the obligation to be confined to small spaces for the majority of the population left us questioning how to teach the new design rules and communicate spaces without our physical presence. The 21st century student was already heading towards having a "bionic personality" due to new technologies. Simultaneously the classic project design outputs like paper presentations were gaining a high level of abstraction due to the massive data overlap and were demanding new formats for better public interaction. In such a context as confined designers and educators, we have seen a clear opportunity to boost all new digital formats, allowing design decision-making, new interaction platforms, and disruptive visual technologies such as virtual reality (VR) and augmented reality (AR). By applying new teaching tools using VR/AR in different contexts and projects the concept of 'studentbot' will be narrowed down. Through different teaching experiences and project examples, we will evaluate the successes, failures, fields of expansion, and controversies of this new student typology.

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KEY WORDS
STUDENTBOT,
DIGITAL ARCHITECTURE,
VISUAL TECHNOLOGIES,
DISRUPTIVE,
AUGMENTED REALITY,
VIRTUAL REALITY,
OBSERVATION TECHNOLOGIES,
ARCHITECTURE EDUCATION,
PANDEMIC

INTRODUCTION

The pandemic and the obligation to be confined to small spaces for the majority of the population left us questioning how to teach new design rules and communicate spaces without our physical presence. Simultaneously the classic project design outputs like paper presentations were gaining a high level of abstraction due to the massive data overlap and were demanding new formats for better public interaction. In such a context as confined designers and educators, we have seen a clear opportunity to boost all new digital formats, allowing design decision- making, new interaction platforms, and disruptive visual technologies. In this sense, the pandemic seemed to turn us into a certain type of 'astronaut designer' contemplating the universe from our imposed space cabins. In this case, the idea of the creative journey from the cockpit was offered as a possibility to experiment with the new tools of the digital age. Buckminster Fuller's slogan 'We are all astronauts, always we have been,' seems to have come true.[1]

As observers of a journey without movement, we seemed to return to countercultural utopias, where the new technologies of the 1960s offered the possibility of reproducing the depths of the psychedelic transformative journey. The houses, workplaces, and vehicles of the counterculture were equipped with all the available technologies to offer a new description of reality. From a material point of view, this condition could be symmetrical to the one that the pandemic has forced upon designers and students. We have surrounded ourselves with the digital to attend to another new reality, although the starting conditions have differed.

On the other hand, both architects and students were already gaining a 'bionic personality' due to the new available technologies like VR, AR, or digital fabrication. The observation of territory, the analysis, and the management of this data in the presentations for architectural proposals were changing rapidly within this context.

This was the context for the teaching work at the Architectural Association, which has born in a very specific practical and theoretical framework. Although there was already research on virtual reality since the 1990s,[2] the cost of the technology did not allow it to be applied to normal teaching scenarios in an architecture design studio. Only in the 2000s, a few artistic experiences like Char Davis[3] used an immersive virtual reality to simulate spaces with digital natures, summarised in her book 'Immersive Virtual Art and the Essence of Spatiality', thanks to heavy and expensive virtual headsets. In 2011, the first edition of

'Ready Player One'[4] was released, a narration about virtual worlds created by a video game. Thanks to wearable technologies the book described how entering and exiting the virtual narrative, giving us innumerable clues about the near future of first-person navigation through immersive virtual spaces. But it will not be until 2014 where the first possibilities of accessing light and economically viable virtual technology at a global scale arise. This was possible thanks to the Oculus Rift DK2 headset, a version for developers that did not exceed 400 euros. Simultaneously, Samsung mobiles together with cardboard glasses launched by Google allowed more simple immersive virtual experiences. This scenario surely permitted launching one of the first architecture design studios based on VR tools.

Distance learning, presence, disruptive forms of visualisation for territory analysis, communities formed around alternative uses of technology, and virtual user experiences in space were the basis of several observations of the teaching experience at the Architectural Association in the years prior to the pandemic. The same observations have also served as a testing laboratory to assess the creative possibilities of the technological conditions that the pandemic has forced upon us. It has been a way to detect the successes and failures of the students when faced with their new 'bionic personality'. Some of the examples mentioned in this paper describe the starting conditions that were generated during the Architectural Association's courses, allowing us to understand the use of new technologies and the methodology used. The characteristics of what we call a bionic student or *studentbot* will be defined through different arguments, we will be able to understand the successes and possible failures and how these qualities have been integrated during the pandemic.

TECHNOLOGIES OF OBSERVATION

The first example is the course conducted in Río Tinto (Huelva, Andalucía), as the unit was transformed into a certain type of Virtual Tour Operator. As tour operators, students were researching Río Tinto's geographical, social and environmental conditions as well as new trends in tourism, virtual reality, and forms of inhabiting the toxic, including science, art, sci-fi, etc., in order to construct a critical response to both the brief and the site, and to propose a topic and location for their design of a space station for tourists or "Touristic Station". They prepared the virtual description of where, what, and how the settlement could be and what its relationship would be with the toxic that comes from mining activity.

Simultaneously they produced a set of large 360-degree colourful collages with the first spatial proposals of VR landscapes. Our site, the vast open mines of Río Tinto in Andalusia, is one of the world's most radical examples of toxic landscapes, and a perfect ground for testing new forms of tourism. The mines coexist with delicate ecosystems like Doñana National Park and traditional rituals involving colourful religious pilgrimages like romerías. Both contexts, being deeply involved in tourism networks, offered the unit a unique backdrop for observation and research.

In Río Tinto, the students explored new ways of perceiving, inhabiting, and enjoying these synthetic ecosystems. The unit addressed the role of tourism within a polluted environment, and how VR can play a fundamental part in reimagining ways of inhabiting the toxic. 'To observe is not to look, but to look, listen and take notes; isolate, build a laboratory with the view,'[5] wrote the architect Iñaki Ábalos. There are several interesting pieces in architectural history that talk about this condition of observing. The Outlook Tower by Patrick Geddes in the late 19th century is a pure construction elevator around this concept. The tower provides two journeys: the ascending one to connect with the outside world (a panoramic view of Edinburgh) and the descending one, internally, to connect with its broad cultural context (Edinburgh, Scotland, language, Europe, and the world). The observatory connects perception with knowledge, connecting what is out there with our thoughts.

What would the 21st century version of these ancient observatories be like? What kind of new windows will appear on the scene with new digital tools? What new platforms will blend the memory of the physical environment with the associated informational data?

The unit investigated proposals that beside the creation of immersive lobbies for the tourist stations or alternative observatories stemming from iconic references were also inspired by the countercultural techno-settlements and other radical architectures. As a case study of previous precedents of observation, we focused on the House of the Century from Ant Farm.

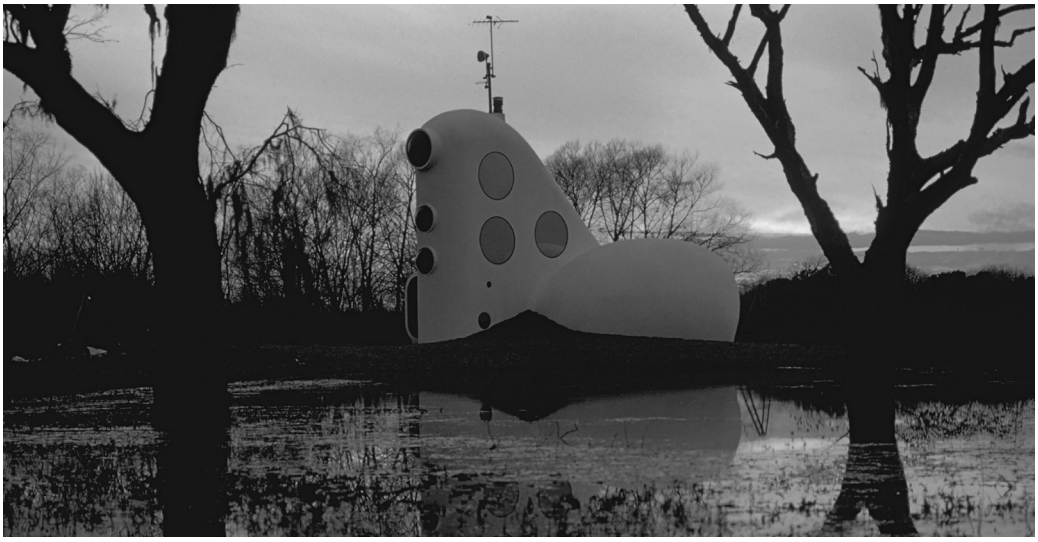
The House of the Century is a housing proposal located by a Jurassic Lake. It is in a somewhat hostile environment, which was deliberately chosen as it seems to simulate an eventual exploration mission to analyse native species, such as crocodiles, armadillos, snakes or frogs. The House of the Century is perceived to have: 'Landed like a strange large lunar module that appears to have been accidentally lost from its nearby NASA base.'[6]

It would perfectly embody that new 'role of housing as a base camp for incursions into the scene of sensations'[7] defined by Sloterdijk, within the housing conditions defined for post-agrarian society. An expectant 'lunar home' before the cascade of expanded sensations that are inherent to the new natural settings chosen by the New Age ideology, in this case, a fluid, viscous and unstable reality.

It was necessary for the unit to offer a detailed description of this house since it constitutes the first clear and 'sedentary' constructed symptom of the nomadic and psychedelic spatial programme. The House of the Century was a concrete snapshot of the electric and mobile guerrilla adventures that we had been enunciating until now. Trying to balance its hard-shell appearance with a streamlined image, both on the outside and inside, this machine seeks to 'represent itself in motion'. The house incorporates all the micro-technologies available at that time: antennas, beacons, adjustable spotlights, sirens, alarm lights, speakers, television, and video systems. We must insist that these micro-technologies have never been considered as a military defence system facing a hostile environment, but rather as a reconnection mechanism with an unknown environment, trying to merge as another living being by that lake and in that extraterrestrial ecosystem (Figure 1).

Continuing with the portrait of this psychedelic machine to the classic domestic programme of the house created by Chip Lord and Doug Michels, other unusual devices are added such as: '… a mobile nutrient servoid, a mobile refrigerator, and a control panel for the mobile media-servoid …,'[8] the control panel is a device to operate five televisions in the house that includes FM/AM radio and a tape recording system. The interest of these additions lies in the fact that we are in front of a real control booth inside a home, also with mobile technology. It was the first time that a house had sought the possibility of monitoring and registering its surroundings quite exhaustively. In addition, Ant Farm included the possibility of combining the recording of its users' lives with the landscape using 'storage and playback equipment for the family media history,'[9] the control cabin would allow us to first store, equalize and sample our memories together with the environment.

The first statement to experience our condition as new technological observers instated by Ant Farm was on the island of Lanzarote. The approach was to photograph the island with 360 cameras giving rise to 360 interactive photographs/collages that could be viewed on Google Cardboard. This can be seen in the collage of the Lanzarote environment proposed by Chak Hin Leung, where in addition to the immersive journey, the floor textures of the chosen landscape were indicated through small windows-tiles (Figure 2).



UP: Fig. 1. The House of the Century, Ant Farm.

CENTRE: Fig. 2. 360-degree Collage Lanzarote Volcano journey, Chak Hin Leung, Intermediate Unit 11. AA.

DOWN: Fig. 3. TVR visualisation of sulphur toxicity, Olivier Jauniaux, Intermediate Unit 11. AA..

In Río Tinto our touristic stations will also operate in the same way as the House of the Century. From a privileged position, strategically located in this particular enclave surrounded by the mines, our stations will observe the toxic landscape, creating new forms of perceiving and inhabiting the mines, going from their radical 3D atmosphere to their virtual immersive version. For instance, Olivier Jauniaux created a sulphur toxicity visualisation through VR to zoom in the microscopic scale, magnifying the perception of the toxic waters of the river (Figure 3).

Our next unit trip was to Portman Bay and observation was tested again, including the toxic and the polluted. The unit once more redefined a new tribe of travellers or explorers. The techno-students' typology set out a group of physical and technological devices for observation. This time the camp operated as a station in the Mars-like environment, as a portable structure equipped with perceptual instruments to experience the outer world from mobile systems to record-like drones, rovers, or submarines, to optical gadgets and filters incorporated in the architectural components. We again used Ant Farm as a reference point, but with their Truckstop Network as a case study, which defined a whole network of 'media eyes' to record the new visions of western America. With such a background, the techno-tourist student, as an astronaut, navigated through heavens, volcanic landscapes, and acidic rivers, adding an augmented perception via virtual technologies. We understood architecture as an opportunity to redefine the typologies of traditional camping associated with unique touristic enclaves, adding qualities and enriching the displaced virtual experience.

The field trip was the moment at which the students confronted the physical experiences in Portman Bay and Murcia. The students documented their site and their immersion again by 360-degree images, videos, and a fieldtrip handbook with sketches of the development of the proposal. They researched Portman Bay's geographical, social and environmental conditions as well as new trends in tourism, immersive technologies like VR and forms of inhabiting the toxic environment.

However, our understanding of the toxic through disruptive technologies was not restricted to visualising landscapes with chemical concentrations, but it also took the complex assemblages of bodies, politics, institutions, infrastructures, and everyday practices that constitute toxic environments into consideration and engaged with them. Through the unit projects, we explored forms of inhabitation through restoration, overlap, protection, copying, or remediation, at the same time redefining what tourism, the toxic and their interrelation could become in the future.

The results by means of the new technologies of observation and digital analysis allowed new forms of simulated presence in the toxic landscapes, the visualizations in 360 degrees improved the communication of the projects from a distance, for example through 360 apps.

VIRTUAL REALITY AND AUGMENTED REALITY

The students used Bill Gates' house as a case study of a station for digital observation and VR/AR in the 21st century. This house can be seen as an updated technological version of the House of the Century from Ant Farm. Situated in the lakes of Washington state, it is simultaneously a kind of expensive first prototype of what our spaces of creation and work have been during the pandemic, some sort of space cabins to work like astronauts.

Although his villa is presented to us at first as the maximum representation of the success of the technocratic system of the American middle bourgeoisie, it is confirmed that there are New Age traces in its conception that would connect us in part with the characters that were in Tarzan in The Media Forest and The Digital Gardener. Patterns are apparently hidden behind the 'great luxury' packaging that corresponds to this type of housing programme.
The home wants to hide and spread out among the mighty wooded wilderness of nearby Seattle. Also, its image of grouping wooden 'huts' in the style (Pacific lodge) of the first settlers of the northern Pacific border seems to seek an idea of disappearance and natural fusion with the environment, without subduing or dominating it. It even vaguely recalls the primitivism of some tribal settlements of their countercultural predecessors. This condition allows us to partially return to the idea that Sloterdijk enunciated, referring to housing as 'a base camp for incursions into the scene of sensations.'[10] But in this case, the base camp does not only refer to its close environment, but it is also not a priority, nor does it have that extra-terrestrial image offered by the lake context of The House of the Century by Ant Farm, because the same spatial and exploratory metaphor of the near environment is no longer being pursued.

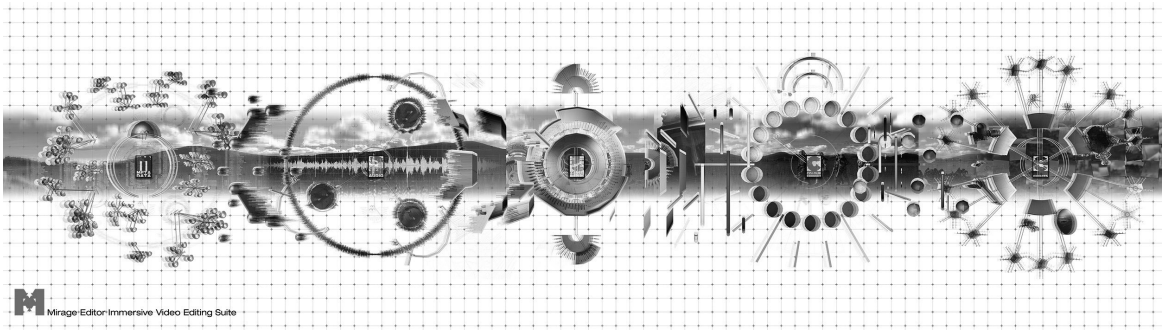
Indeed, the exploratory field is shattered, and it merges from its natural enclave with the flow of information that runs through the world. Bill Gates' housing programme once again has all the technological systems to access the environment; the space that you want to conquer, or that has been partially conquered, is in this case cyberspace.

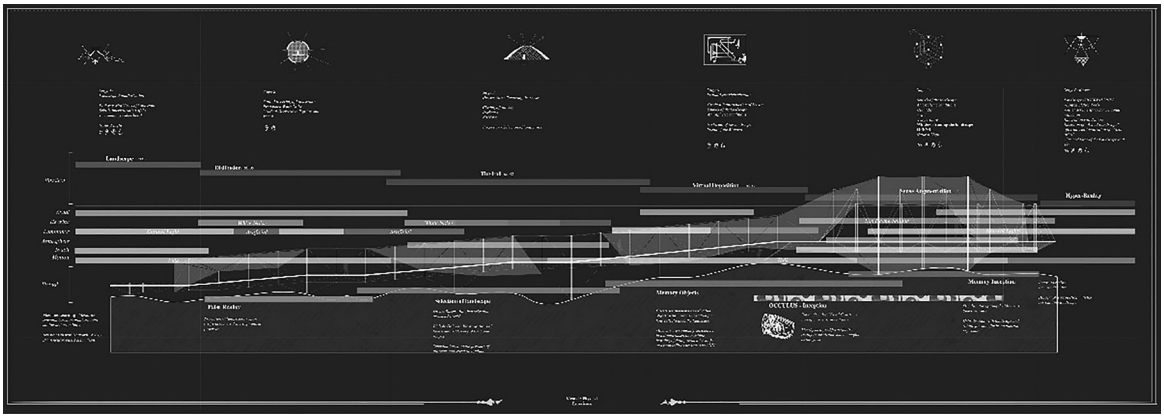
His house confirms that today we spend more time navigating digital spaces than experiencing the real ones. One field after another from music to finance to culture has found its equivalent in the digital world. The libraries that we visit most frequently are not buildings filled with print publications; they are our personal online libraries with an almost infinite capacity for books. Architectural information and spatial typologies have their digital translation but are missing their virtual opportunity. The unit explored this opportunity and was the first at the Architectural Association to introduce VR into the academic curriculum.

VR has the potential to provide spatiality to digital daily experience. When we started using it in 2016, it was expected to be the year of this technology and was described by multiple media as the definitive platform which was going to transform our domestic habits. Big Tech companies such as Facebook, Samsung, Sony, and HTC are heavily investing in this area.

The experience was like if you were placed in the centre of a completely new spatial situation while putting a pair of goggles on. You can look all around, move along the space, interact with your environment that phenomenological sensation of being immersed is defined by VR/AR pioneers in existential terms as ‘presence’. We decided to explore this new type of presence with the students’ design outputs integrating VR/AR with the unit briefs and have been doing so since 2015-16.
The approach was to work with immersive tours to integrate the virtual experience with the new tourist conception of the unit. We were working to offer new programmes for tourist destinations in the Anthropocene context. The studentbot added this tourist perspective to their digital agenda through VR and AR. This was the case of the proposal of an Augmented Reality Landscape editor from Yee Thong Chai, where she designed a real-time interactive device to edit the landscape through body movements using a form of mandala trackers to guide the user in the editing process (Figure 4). Another tool allowing immersive experiences was the virtual customer journey of Elisabeth Hardie. This virtual tour was documented in 2D by a story board of edited images (Figure 5).

This type of tourism with a virtual goal required new forms of visual editing, so during the year the unit became a laboratory of visual exploration, using innovative image protocols to translate the specificities of our site into a broader tourist experience to be shared globally. The third term was dedicated to finalising these formats, understanding the portfolio as a new opportunity to integrate the 3D immersive world with the 2D classic formats. Accompanying the VR devices we simultaneously launched a video version or browsable interface to operate with the final architectural proposals, which could communicate the





UP: Fig. 4. Augmented Reality visualisation of an interactive landscape editor, Yee Thong Chai, Intermediate Unit 11. AA.

CENTER: Fig. 5. Vitual Reality visualisation of an interactive tour, Elisabeth Hardie, Intermediate Unit 11. AA..

DOWN: Fig. 6. Real/Virtual diagram/section of a customer Journey through the building, Jasen Kok, Intermediate Unit 11.AA..

results to a broader audience. As an example of visual exploration we launched the production of diagrams like the one designed by Jasen Kok, where different formats are combined into a single synthetic diagram, the section overlaps with a VR story board and a diagrammatic customer experience journey through the building (Figure 6).

The tension between VR/AR and physical environments was explored, understanding what one can do in relation to the other. How do they expand, complement, put into question, unfold, or intensify each other's capacities? How does VR also enhance the presentation of final results? The students worked in parallel with developing the physical defini¬tion of the new tourist camps and the virtual experience.

STUDENTBOTS AND LIGHT TECHNOLOGY

To apply all the virtual and immersive narratives, it was necessary to explore all devices through body interactions. That is why the design studio sought to use technology with the tribal culture in the Cape Town enclave. The projects spun around this idea of techno-tribalism where bionic culture, in this case, was channelled from the use of light technologies like wearables to nomadic colonisation systems based on electronic music festival culture.
The unit travelled to Cape Town as we considered South Africa to be one of the most appropriate landscapes where this countercultural tech-activism can flourish, but where its tribal roots have long been erased. It is a country where wilderness and urban growth are facing precarious sustainability, where new technologies are implanted faster than physical infrastructure, but it is also a continent with a strong tribal identity that is necessary to inspire visionary settlements that fuse past, present, and future.

Club culture and holistic practices have already served as unusual architectural tools to create alternative environments dedicated to the empowerment of the self. This year, the unit looked at wearable technologies as a growing field to provide students with a whole new set of superpowers. We began by designing jewellery with cosmic sensory effects. These devices amplified the perception and interaction with space and provided their users with a radical communal identity. Like the temporary structures that populate the Nevada desert during the Burning Man Festival, we looked to the sub-Saharan equivalent, Afrika Burn, where tribal pasts and scientific futures are manifested through lightweight constructions. Critiquing the western import of vernacular architecture, we were inspired by the decorative pieces and unique traditions of this context

to create modern equivalents. To design these buildings, the students learned from the most technologically advanced products of contemporary culture: the spaceships of science fiction, magnificent examples of highly operative inhabited environments fully loaded to set up alternative colonies. The spaceships were camps for craft and innovation, spaces to work and exhibit these new traditional-digital hybrids. Together the unit was expanding the body/mind relationship to technology in this wild natural landscape. Part of the success of the proposal was working with the body and wearables in relation to the context. Thanks to this condition and its small scale, the students made a great deal of progress in making project decisions, without the need to be physically in Cape Town. For instance, in the case of Jakob Skote (Figure 7) with his necklace using tribal patterns and Wi-Fi technology, through this device he scaled up the strategy for an urban proposal using tribal pattern fractality.

On building the concept of a studentbot or bionic student, both while teaching in the pandemic and in the courses of the Architectural Association, The Whole Earth Catalogue[11] by Stewart Brand was used as key reference, a perfect example of revolutionary hybridisation of digital technology in relation to nature. The students have been introduced to the New Age technological culture proposed by the S. Brand catalogue and then they have been contextualised in the architectural design culture of the 21st century. In this sense, we have looked at two texts that represent, from our architectural perspective, two relatively analogous ways of redescribing the new students that emerged from the development of the Whole Earth Catalogue statements.

We are referring to that subject that advanced to a form of relationship of a bastard nature, that is, halfway between the tribal survival kit and the latest electrical techniques. The two figures emerging from these texts are Tarzan in the Media Forest by Toyo Ito and the Digital Gardener by Cristina Díaz and Efrén García Grinda. Both characters emerge from an understanding of an expanded nature that is already implicit in their semantic play, as was the case with the Electronic Oasis of Ant Farm. It is precisely this extension that interests us since it is actually the evolution of those simulations of an acidic experience of nature. If we were to make both characters have a conversation, the coincidences would be clear. In both cases the sphere of the natural expands and communicates thanks to the digital, that is, thanks to the scale of the infinitesimal or the data bits that now replace the lysergic acid molecules:

Fig. 7. Fynbos necklace with Wi-Fi jammer. Jakob Skote, Intermediate Unit 11. AA

Tarzan in the Media Forest:

> The inside of a computer naturally is not the inside of me, it is an ambiguous world in which the borders are vague, and I cannot say how far you extend yourself. Time and space within electronic media are notions that are different from those of our daily lives. As we enter this world, a strangely comfortable feeling arises within me.[12]

The Digital Gardener:

> Digital Gardeners, the species breeders of zeros and ones, define their species and work on them through interfaces, in written command line sequences. It works by operating on encoded information packages through a technical language of mediation between the subject and the object.[13]

We will also use this dialogue to obtain some of our own characteristics and thus display all the possible ways of understanding the options for coexistence with these natures. Ito's Tarzan offers us again a smooth and hedonistic look at his relationship with digital nature. We would be closer to a countercultural DNA of

smooth fusion with the environment, in the sense of rocking and navigating the fluid ambiguous territory that both natures create, without bad or good, without any gesture of natural-artificial duality, without a worrying need to create, for example, electronic hypertrophy of large artificial species that break homeostasis with a real nature.

Tarzan in the Media Forest:

> And we contemporaries are provided with two types of body to correspond to these two types of nature. The real body that is connected to the world through the fluids that flow through it and the virtual body that is connected to the world through the flow of electrons.[14]

Next, Toyo Ito introduces an oriental concept of 'Ki' (spirit, energy or breath that runs through the cosmos), and expands on the previous quote in more detail:

> At this extreme, electronic technology begins to emerge and reminds us of the world that we had almost forgotten. The flow of electrons is superimposed on ki and water.[15]

However, the Digital Gardener would pick up that other dimension that recovers the extremely artificial, closer to the climate generated by multimedia happenings. This gardener would be closer to the figure of DJ at a rave party, to the manufacturer of intense artificial atmospheres, to that figure that practices fusion with the environment through bombardment with cathode rays to pulverize the subject in the ether. This dimension would be closer to that evolution from the counterculture towards cyberpunk, that is, a strongly redirected technique to alter a complacent landscape, even if this technology remained hidden, it would be part of a large artificial organism.

The Digital Gardener:

> It would then be possible to work with the intensity of the stimuli, with altered states and different levels of perception. All this at different scales, from microscopic to landscape. (…) We could ask ourselves what would happen if we implanted laws of succession and natural growth into our artificial landscapes in a massive way, as well as geometries and generative laws of artificial contours.[16]

Tarzan in the Media Forest and The Digital Gardener today configure two alternative ways of operating with nature and space from a rereading of the counterculture. Both forms walk on the edge of an architectural reality, and launch messages in the key of technological utopia, 'studentbots' are working now under symmetrical protocols, waiting to design and build alternative realities.

STUDENTBOTS OR HOW THE USE OF DISRUPTIVE TECHNOLOGIES NEEDS A STRONG REALITY

The construction of the idea of the 'studentbot' is very contradictory. In the years before the pandemic, we explored the use of multiple tools that seemed to be able to simulate realities and proposals through heavy digitisation. As we have seen, AR and VR have opened a new variety of graphic means, including ways of improving the traditional architectural outputs by adding new layers of complexity.

However, during the recent pandemic teaching, with the possibility of using the same devices that allowed us to understand the statements proposed a year earlier, the results lacked the expected complexity. Students have not been able to go further than the classic 2D graphic rules. It seems that paper, has simply been replaced by the flat screen, while maintaining the same perceptual functions.
Why have the students in the design studios been unable to incorporate the technologies that were already at their disposal? For example, we have seen that there are already good tools for exploration and digital immersion without the need for our physical presence. Starting from the body and with portable light technologies, we can obtain records of complex realities and transmit them over long distances. But we have been able to verify that it is also necessary for the 'bionic student' to be proactive and use technologies in a purposeful and disruptive way. This condition undoubtedly requires involvement with essential physical energies both in incursions into the contexts of the briefs and sharing the analysis and results with others. That is, technologies, even if they are digital, improve if they are shared in physical spaces, adding a layer that broadens the reality that we perceive, but that never replaces it. Forced by confinement, the substitution of reality has not aroused the curiosity and the use of disruptive digital tools from the student's side.

The examples we have seen from the counterculture demonstrate that it was the period in which the alternative use of technologies, networking or connectivity

were more creative and purposeful, offering a better and healthier version of our relationship with the planet. Catalogues such as Stewart Brand's Whole Earth are an example of the balance between highly technological proposals and the connection with nature or reality. The New Age needed intense personal experiences or 'bites' of new realities to understand the creative power of highly technological tools. This condition and the hijacking of reality to which the pandemic has forced upon us indicate that it is very likely that the best version of the 'studentbot' will not return until we can recover the full experience of nature. In this sense we subscribe to Ito's phrase in relation to the android body:

'It is about generating a space like fluid, in which movements back and forth between fiction and reality occur incessantly.'[17] In the examples that we have been able to explore through the works of the Architectural Association, we believe that the digitisation of the student has a possible future. Immersive territory exploration systems and new AR/VR display formats have resulted in a collection of highly communicative visual documents.

NOTES

1 Buckmister Fuller,*Introduction to Expanded Cinema*; Youngblood, Gene, 16.

2 Ben Delaney, Virtual Reality 1.0 -- The 90's: The Birth of VR, in the Pages of CyberEdge Journal, 2017.

3 Char Davis, Char Davies immersive Virtual Art and the Essence of Spatiality, 2007.

4 Ernest Cline, *Ready Player One*, 2011.

5 Iñaki Ábalos, *Atlas Pintoresco*. Vol. 1: El Observatorio, 5.

6 Germano Celant, *Ant Farm*, Casabella nº 376, April 1973, 29.

7 Peter Sloterdijk, Spheres III, 428.

8 Gilles Deleuze and Felix Guattari, *Mille Plateaux*, 472

9 Felicity Scott, *Ant Farm*, 149

10 Felicity Scott, *Ant Farm*, 149.

11 Stewart Brand, *The Whole Earth Catalogue*, 1968.

12 Toyo Ito (quoting a graphic designer): *Tarzanes en el Bosque de los Medios*, 2G nº2 1997, 130.

13 Cristina Díaz, Cristina and Efrén Gª Grinda, *Atmosfera Material del Jardinero Digital, Verb Natures*, 163.

14 Toyo Ito, *Tarzanes en el Bosque de los Medios*, 2G nº2 1997, 133.

15 Toyo Ito, *Tarzanes en el Bosque de los Medios*, 2G nº2 1997, 134.

16 Cristina Díaz, *Cristina and Efrén Gª Grinda*, Atmosfera Material, 164.

17 Toyo Ito, *La Arquitectura pide un Cuerpo Androide*, in Escritos, 65.

BIBLIOGRAPHY

Ábalos, Iñaki, Atlas Pintoresco. Vol. 1: El Observatorio, Edit. Gustavo Gili, Barcelona 2005.Scott, Felicity. Living Archive 7: Ant Farm, Allegorical Time Warp: The Media Fallout of July 21, 1969. Edit. Actar, Barcelona 2008.

Brand Stewart. The Whole Earth Catalogue. Portola Institute, Inc. 1968.

Davis, Char. Char Davies immersive Virtual Art and the Essence of Spatiality. University of Toronto Press, 2007.

Delaney, Ben. Virtual Reality 1. The 90's: The Birth of VR, in the Pages of Cyber Edge Journal, 2017.

Deleuze, Gilles et Guattari, Félix. Mille Plateaux. Les Éditions de Minuit, Paris 1980.

Díaz, Cristina y García Grinda, Efrén: Atmósfera: Material del Jardinero Digital, página 160 in: Architecture Boogazine nº5: Verb Natures. Actar, Barcelona2006.

Cline, Ernest. Ready Player One. Edit, Nova, 2011.

Ito, Toyo. Tarzanes en el Bosque de los Medios; in 2G nº2. Edit. Gustavo Gili, Barcelona: 1997.

Ito, Toyo. La Cortina del Siglo XXI. Teoría de la Arquitectura Fluida. Octubre 1990, Edited by José Mª Torres Nadal. Toyo Ito: Escritos. Colegio Oficial de Aparejadores y Arquitectos Técnicos, Murcia 2000.

Sloterdijk, Peter. Esferas III. Madrid: Edit. Siruela, 2006.

Youngblood, Gene. Expanded Cinema. P. Dutton & Co., Inc., New York 1970.

admission date 17 11 2021
approval date 15 01 2022

review article
UDC 728:316.728
316.728:[616.98:578.834(100)

SOCIAL, ECONOMIC AND ENVIRONMENTAL IMPACTS OF THE PANDEMIC ON ARCHITECTURE: NEW SPATIAL AND EDUCATIONAL GRAMMARS

A B S T R A C T

We are all online. We rarely leave our homes - only when necessary, even though, at times, the prescribed measures allow us to do so. Our daily routines are embedded in video calls and performed online. Household members are forced to stay together now more than ever, but at the same time, all of them need space to study and work. A sudden transition from classrooms to Zoom rooms is forcing us to rethink the entire educational system: New educational grammar is needed!

The need for additional insulation inside apartments has become a reality. A wardrobe turns into a study, and nature becomes our balcony. How aware are we of the current changes in our living spaces? Can we use architecture to establish a dialogue with contemporary issues and events, and provide critical solutions that would make the spaces we live in better? New spatial grammar is needed!

The Covid-19 pandemic and rapid digitalisation have impacted architecture that has traditionally been a very slow discipline which uses specific tools with manual designing and thinking processes. Architectural education has seen demand-driven changes in the learning process through the years. Following the switch from the system inherited from the socialist period to the Bologna system, the impact of the pandemic has called for the need to conform to changes in teaching methods and understanding of space.

Case Study: Episode: Covid –19 and adaptable living space

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KEY WORDS

PANDEMIC IMPACT,
CONTEXT,
AWARENESS,
NEW EDUCATIONAL GRAMMAR,
NEW SPATIAL GRAMMAR

INTRODUCTION

Faced with the pandemic crisis in early 2020, our lives began to change profoundly. We began to adapt to this global scourge at all levels of our daily lives. On a private level, through various forms of restrictions of movement and indoor socialisation, we have found new ways to use outdoor space. Public spaces became limited to a large group of people. Protection measures used in public spaces include social distancing. Also, our enclosed private space became challenging to use, as entire families are forced to stay together 24/7 during lockdowns. Work has slowly shifted to the virtual realm. Kindergartens, schools, and colleges were transferred online, which has brought many new challenges for families and individuals alike. Private living spaces had to be adapted to carry out all the day-to-day functions within it. An extra corner was sought for isolation from family members, so that everybody could devote themselves in peace to work, lecture, homework, to rest.

For professors and associates at the Faculty of Architecture, University of Sarajevo, it become challenging to transfer design knowledge and experience in projects online, because of the specific nature of how architecture is taught. At the same time, students faced challenges at home with respect to adapting the spaces of coexistence, so that they can balance between work, rest, the satisfaction of all physiological needs, and all that in coordination with family members.

The actual role of architecture in newly established social, economic and environmental setting is huge and that is why a new grammar should be defined for both education and space: (1) the challenges architectural education faced during Covid-19 could set new conceptual pillars of architectural education, methodology and teaching today and in the future; (2) our curriculum could be reinvented for the better (for example, we could turn Covid-19 challenges into potentials in the procedural and substantive aspects of the (studio) work, and identify design challenges in the context of the pandemic in relation to sustainability and progressive design.

The first part of the paper will present the materials and methods applied in teaching and research. The second part of the paper will present the design results which reflect an effective learning environment in the field of architecture, with special emphasis on its implementation in the student projects of designing living spaces in order to set new spatial design grammar.

COVID 19 - WHAT HAPPENED IN REAL LIFE?

With the first lockdown on a global level, the use of indoor spaces became restricted to prevent people from being exposed to Covid-19. Most public spaces closed during these lockdowns, with only medical institutions, grocery shops, and pharmacies allowed to stay open in compliance with the prescribed protection measures. We want to show some examples from different cities around the world to illustrate how people faced the same challenges in organising their day during the pandemic.

The hospitality industry has been heavily impacted by the pandemic. Due to travel restrictions, local resorts became more popular. Contrary to large hotels and densely populated resorts, staying in isolated small units and offering the experience of nature became even more popular. The most logical reason for this is the isolation and distancing that this kind of accommodation offers.[1]

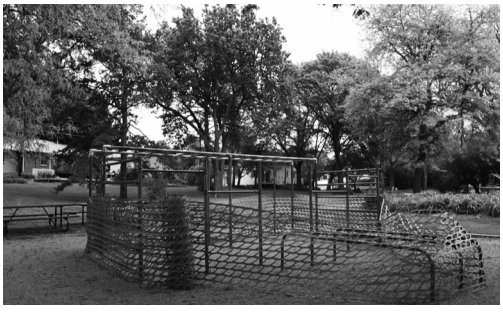
An increasingly popular and accessible modern form of accommodation and experience – glamping - in a research published in February 2021 shows that active leisure travelers reported more post-Covid glamping trip plans (45.9%) than hotel/resort trip plans (24.7%), and active travelers reported plans for more than twice as many post-Covid glamping trips than they took in 2019 (21.4%).[2]

Also, outdoor spaces were set under restrictions to avoid mass gatherings, especially with children's playgrounds, as it was impossible to discipline children and make them follow the rules prescribed during this pandemic.

The shift in the use of places and spaces […] needed to occur.[3] After some weeks of isolation, people either tried to reinvent their open spaces in houses and apartments/homes or to redesign open public spaces to use them in the best way possible in the new reality. Here are some examples of how students, through studio projects at College of Architecture, University of Nebraska, proposed for a park to be redesigned and used.

(ONLINE) ARCHITECTURAL DESIGN EDUCATION AND DIGITAL TECHNOLOGY

The beginning of the summer semester 2019/20 started very cheerfully and with a great sense of curiosity at Faculty of Architecture, University of Sarajevo. The first- and second-year students were looking forward to acquiring new knowledge in our design studio. Our basic design studio is actually their first encounter with a creative thought process related to designing a living space. They start with



UP: Fig. 1. Empty Public Places in the US: Restaurant and Hair Salon..

CENTER: Fig. 2 Glamping After the Coronavirus Pandemic.

DOWN LEFT: Fig. 3. Empty Children's Playgrounds in the US.

DOWN RIGHT: Fig. 4. Proposed Design of Public Open Spaces in the US.

individual units and then, after two years, they move on to designing a residential villa. However, the unexpected global spread of the virus forced us to transfer our classes, which were normally organised in classrooms in groups, to an online platform. The groups remained the same, but getting used to online teaching was something entirely new and unexpected.

We did not expect the situation we faced, so we did not really have time to prepare for the challenges and threats in the educational process, but we did our best. The whole University of Sarajevo had to deal with the transfer to online system of education. According to the information about teaching methods applied at the university, dated December 2020, the majority of faculties used Microsoft Teams (63%), followed by Zoom (40.7%), then BigBlueButton, Google classroom and Moodle-based platforms (22.2%), Skype (18.5%), Jitsi Meets (7.4%) and other (11.1%).[4]

Our faculty/school decided to use Microsoft Teams. Already in the first week online, we organised internal education on how to use a new tool and our IT engineer managed to get the academic license for the Faculty of Architecture. The whole process of adapting to the new tool in teaching and communicating with students and colleagues lasted between one and two months. However, during this process we were not late with the programme set up in our semester schedule at the beginning of the academic year. A new way of working with online platforms forced us to think of how to be more efficient and productive in teaching processes. We combined ex cathedra lectures for all groups of students in order to concentrate on individual work once they developed design projects. The fact is that architecture education is very much hands-on and the outcome largely depends on the mode of personal interactions between teachers and students. But still, teaching innovations and great efforts of teachers to adopt the change were commendable in this very short time.

Though there were a number of challenges, such as working remotely, low bandwidth, IT infrastructure for students who could not afford it, all of which are serious concerns, students coped better than expected. Perhaps that means that this way of teaching is going to be the new normal in the years to come or we will just have to reinvent the pedagogy of design teaching.

Now after more than one and half years of online teaching, our Faculty of Architecture has opted for a hybrid model in 2021/22, so each group of students would combine in-person and online classes. The results of this model of teaching will be seen at the end of semester, but so far, it has required more effort to organise education processes in terms of equipment and people to do the job.

STUDENT'S CREATIVITY AS A RESULT OF PANDEMIC CHALLENGE

The task in our first-year design studio during the first pandemic semester was to design a living space with learning and research rooms, work spaces, dining rooms, etc. Most students did their designs in line with the rules for design and the use of space that we normally teach students. However, some students were open for more challenges to channel their observation of the new life, how their social interactions changed, their experience with new circumstances that had been shaped by the physical environment in which they spent most of their time. Some students' initial responses to designing only their basic living space expanded to more creative ideas! That's why we added an additional design proposal to our normal syllabus that dealt with students' day-to-day reality struck by a rapid change brought by the pandemic.

As their mentors in design processes, we encouraged them to transform their living spaces into a multifunctional space to meet new needs. Their research and creative ideas were also supported and developed through very constructive debates and exchanges that took place online, where students showed maturity in thinking and rethinking space in their presentations. This was a very surprising and positive motivational aspect of the whole process of working and designing with them.

Their work will be shown later in the paper, along with the explanation of the case study itself. We can say with certainty that this way of motivating students to respond to this challenging situation we all found ourselves in, globally, had a healing effect on us in this very depressing period of lockdowns, social isolation and distancing. Reading some surveys and papers from other parts of the world, we can see that students had different reactions. In this year's Architectural Journal (from the UK), a student survey highlights the devastating impact of the pandemic on architecture students, with a record number seeking help for their mental health.[5]

The crisis has seen an unparalleled upheaval on university life. All public events were cancelled, students were holed up in pokey accommodation without the usual access to campus facilities in cities far from home, and the learning was almost entirely virtual. In July 2021, infuriated students tired of watching lectures from their bedrooms, were angered by universities including Kent, Sheffield and Manchester after they announced plans to keep delivering some online lectures – despite Prime Minister Boris Johnson lifting the final restrictions. The data from the research reveals the full extent of the effects on the (mainly) young people caught up in the crisis over the last 15 months.[6]

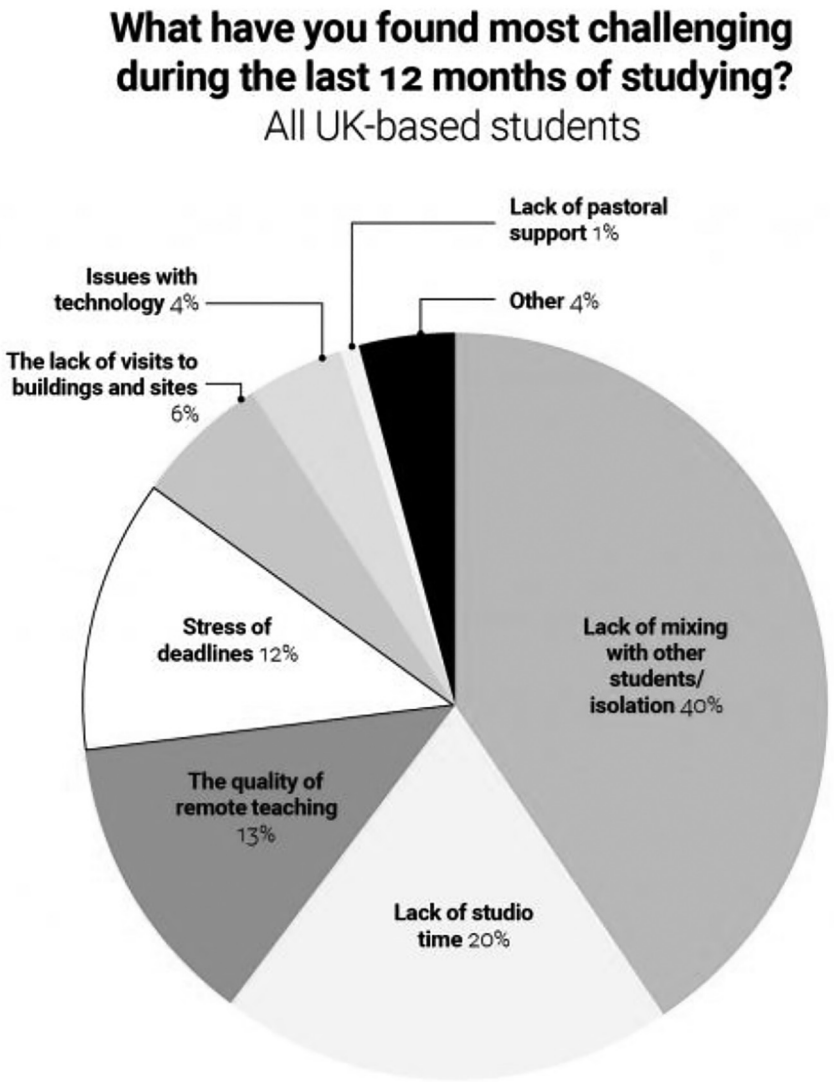


Fig. 5. Students Survey on Online Education During the Pandemic in the UK.

NEW EDUCATIONAL GRAMMAR IN ARCHITECTURE IS A MUST

Considering the experiences in online teaching described above, with some more ambitious students making progress, we have to conclude some facts. Many academicians in architecture education across the globe believe that a multitude of changes to the curriculum should be made, as we must incorporate 'new norms' in designs but, before all, in education. The issue is the same on a global level. Director of School of Architecture, Noida International University in India, says:

> I absolutely agree with the need for new reform in architecture education and change of curriculum. Perhaps this reform of online mode of teaching will accept newer ways of teaching and lectures by Industry experts and professionals across the world to be virtually available in class for students, who are unable to be in universities campus for many practical and logistic reasons.[7]

Truth be told, this combined way of teaching (both online and face-to-face) can improve the curriculum by offering more interesting lectures online from all over the world, while other important design processes can continue to be held in studios at faculties/schools.

In the case of Sarajevo's Faculty of Architecture, the work phase of the first Case Study led to a sudden change whereby students started to use new tools and employed new methods of working. However, one semester was not enough to have clear assessments. Having applied the combined system for three semesters, we can draw some conclusions - complete isolation in the online system leads to inertia due to the lack of socialising. The majority of students are more motivated when we meet once a month at faculty, so they can relate differently to their design projects and instructions from mentors. So now, we face the fundamental challenge for education in architecture – how to relate the current hybrid educational process/model to the current curriculum and architectural practice in the future? Forming a combined studio (online and live) was one of the first solutions we wanted to implement. Starting studios would initiate discussions about studio-based design learning as well as about the development of curricula based on integral design studios aiming at significant innovative frameworks.

In this context, combined design studios may be the newest approach to architectural education at our faculty. The reality of this education system is that every studio has its own integral course. Integral courses give support to design

studios. This support can be either theoretical or practical. The grounds that integral courses lay for studios must be evaluated carefully in order to simplify the existing curriculum to reflect new teaching and learning conditions, and to reduce the number of subjects by offering different studios and combine online and in-person teaching. The other fact is that the combined way of working and teaching compensates in part for limited socialisation, but also facilitates and speeds up the work through intensive live workshops/exercises and discussions. Online learning was made available in many educational institutes in the form or virtual lectures as extracurricular activities. But the online mode of industry-academia connects and improves our curricula. Virtual lectures by global experts should be a part of the core curriculum and accepted as class hours in the future, too. In order for this to happen, competent institutions need to introduce a policy level reform and we can help with our suggestions and experiences!

RE-IMAGINE THE NEW NORMAL IN ARCHITECTURE_MULTICTIONAL LIVING SPACES

In the last two years architectural practices and education have faced numerous challenges, not only because of Covid-19, but also because of social transformation, globalisation, urbanisation, consequent depletion of natural resources, and growing pressure on public services, infrastructure, and housing. The new architectural and urban paradigms require students in higher education to be adequately prepared, informed, and trained to respond to these challenges. After all, the role of architecture is to reflect, design, and manage the built environment in a way that will satisfy the needs of future humanity. The connection between architecture and sustainability is unequivocally important. On this basis, several perspectives on the interrelation between architecture and sustainability have been challenged, including integration of social factors, culture, and technology with architecture,[8] and providing flexibility to adapt to local habits and needs through sustainable design which can be replicated by the needs of local communities and organisations. Several concepts have already been developed to link design and social and environmental changes, hence, strengthen the sustainable dimension of architecture through design of socially responsible spaces, and design for social change,[9] environmentally conscious design,[10] and currently the most important from the pandemic perspective, emergency design and humanitarian architecture.[11]

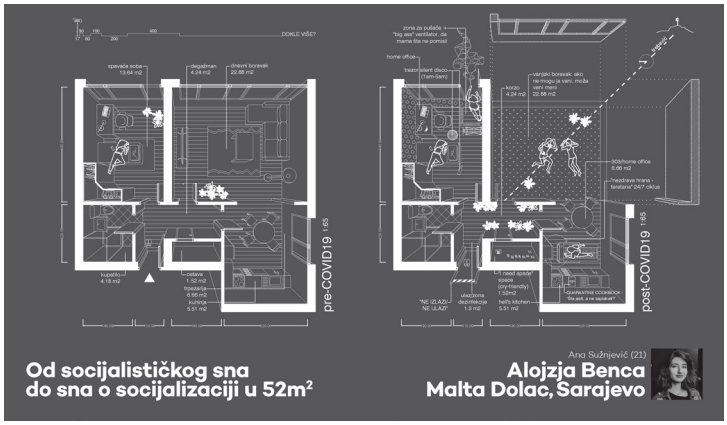
As a response to the above-mentioned challenges, the horizons of research and experimentation in architecture and urbanism are expanding rapidly while destabilising our understanding of the expected impact and consequences on a global scale. When the world is facing a global crisis like Covid-19, it is more important than ever to re-examine existing approaches, not only as mentioned in the first part of the paper, in relation to the architectural education, the content of existing curricula, and learning environments, but professors and students have to be more creative in order to present innovative results for designing living spaces during a pandemic. As we all experienced challenges with living spaces during several lockdowns, we assigned an additional, optional task to our students, encouraging them to unleash their creativity. The results are presented in the following Case Study description.

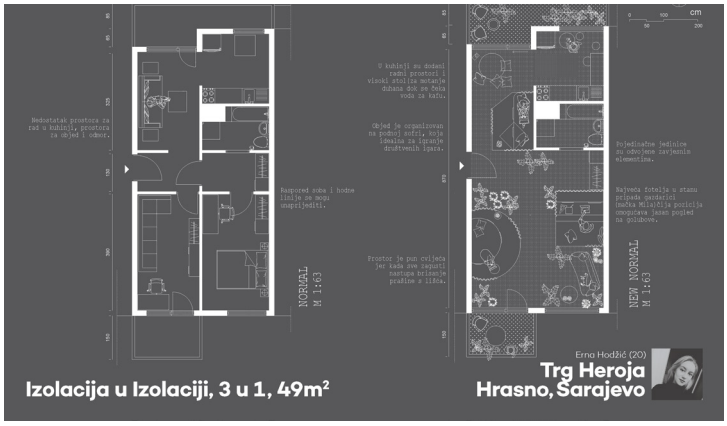
CASE STUDY: ADAPTABLE LIVING SPACES Episode 1: COVID-19

This project was developed by the first- and second-year students of the Faculty of Architecture in Sarajevo, as a part of an optional exercise in classes Design 1, Theory and Methodology of Design and Fundamentals of Design 2, exclusively through online teaching. The task was assigned to around 20 students, not the entire class of around 110 students.

Students were tasked to map the current usage of spaces in their homes, and to explore the possibilities of their own housing in the context of adapting to the global pandemic, which, like many other global events, can potentially affect major changes in everyday life, including living and working. In completely real scenarios on the one hand, but also completely imaginary ones on the other hand, students questioned the themes of flexibility and transformability of the spaces they live in. With modern tools and methods for graphic communication of projects, students added humor that not only made the design process more interesting, but also proved Einstein's assertion that 'imagination is more important than knowledge'.

The first project by our student Ana Sužnjević, titled 'From Socialist Dream to a Dream of Socialisation', is case in point. The apartment she lives in is 52 square metres, with a layout organised as most apartments for a normal family with an entrance hall, one storage room, a bathroom, one bedroom, a kitchen, a dining room and a living room. The apartment does not have a balcony, only windows in all rooms. The orientation is on two sides. Her idea was to transform the bedroom into a home office and a space for 'night life' called Trezor Silent





UP: Fig. 6. Ana Sužnjević: 'From Socialist Dream to a Dream of Socialisation'.

CENTER: Fig. 7. Alem Hasanović: 'Choose Your Champion!'.

DOWN: Fig. 8. Erna Hodžić: 'Isolation within isolation!'.

Disco. She added a quarantine cookbook to be creative with daily meals, and a treadmill to help her lose calories later. She also redesigned the living room and added a walking area she named Corso.

Transforming housing during pandemics, from tiny apartments in collective buildings to spacious floors of individual houses, from a room of 9.78 square metres with 'countless possibilities' to a 150- square-metre apartment is real challenge Student Alem Hasanović transformed his apartment of 80 square metres under the name 'Choose Your Champion'. The building is located in the new neighborhood built after the 90s. His family's apartment consists of an entrance hall, a kitchen with a dining room, a living room, a bathroom and two bedrooms. There is also a balcony. The space his family regularly used before the pandemic changed the purpose. For example, a bedroom was used for working, not sleeping, and now, during the pandemic it was used to sleep all day and all night. The living room, used for watching the TV and relaxing, now became a schooling and working area. But the most transformative space is the balcony that was used as a storage room, and now it became an open space – a garden, the space used for gathering with neighbours.

From Lukavac and Srebrenik to Konjic and Travnik, and from Sarajevo to Zenica, we can see a range of residential area floor plans that do not differ much from the average in Bosnia-Herzegovina. Therefore, we hope that the examples given here can give ideas to many non-professionals on how to transform their spaces into better used ones during isolation. Interesting project in that sense "Isolation within isolation!" was made by our student Erna Hodžić. She lives with her parents in a two-bedroom apartment, at 49 square metres, with a kitchen, a living room and a dining room. The transformation she suggested was to open walls between the bedrooms and the hall, and to make separate isolation spaces with curtains, so that space can be easily transformed again.

Benjamin Bojanic gave a very creative proposal on how to use the 61-square-metre apartment as a space for having physical activity by suggesting a daily walking distance of 400 metres within the apartment. He also recommended additional activities in order to keep the body and mind healthy during lockdown.

That architectural design does not only mean drawing, but incorporates the text that the students formulated during the work process: 'How to place the infinity of the outside world in about 60 square metres of our apartments? Sometimes it is enough just to move a house plant to another place, and for the brave ones - maybe in our projects you will find inspiration for "erasing" the boundaries between your inner and infinite outer space!'

Student Maja Mrnjavac lives alone in the Ciglane settlement in a 44-square-metre apartment. She did not make any radical changes to her space, but only reorganised the furniture. She started using a huge balcony that these apartments in Ciglane have for practising yoga and daily sun salutations. As the orientation of the apartment is towards the south-east, towards Trebevic mountain – the name she gave to the project is dedicated to this main transformation in use.

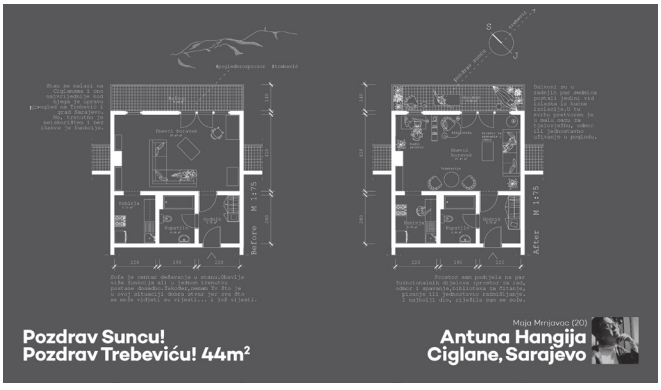
The fact of not knowing how long this pandemic will last motivated Elma Sabić to suggest some construction changes to transform spaces for longer periods of time. She isolated the entrance hall to make it safe place for disinfection, added a space for isolation – if a family member is infected, they can isolate in a separate room. She also created a space for isolated daily activities for those who need to meditate or just do nothing.

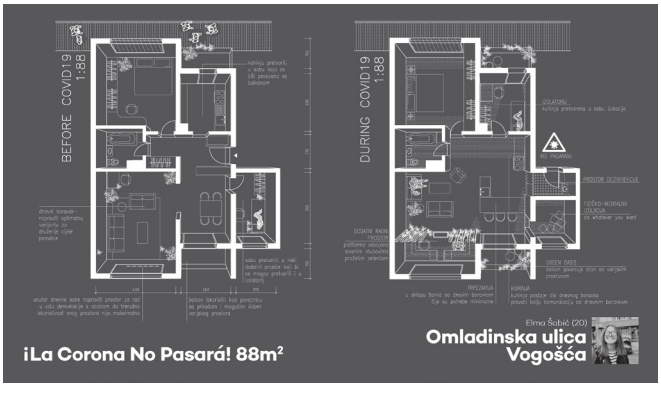
In contemplating the redesigning of space, Emina Tsiligkros considered her student life to be important as well as privacy from parents during Covid-19 isolation. The original apartment has 80 square meters and a possibility to be transformed into two smaller apartments with separate entrances. The intervention was not so complex to implement construction-wise, and the result is rewarding. Emina and her parents have their spaces with all functions for living, are isolated from each other, but also close if they need to be together.

NEW SPATIAL GRAMMAR IS NEEDED

The need for altering space arose as a result of the methodological process during the design studio. Initially, students identified elements of everyday life, needs, and equivalent activities that were difficult to carry out due to the pandemic in their apartments. They then defined spaces in which these activities could take place with the changed conditions. [12] As spatial and programmatic constraints during the pandemic can be potential causes of stress, anti-social behaviour, and endanger psycho-physical health, the aim of the research within this thematic framework was to find alternative solutions to achieve adequate living comfort.

In addition, the changed course of everyday activities required the adaptation of the space to new functions and priorities, examining the potentials of its transformability. The projects explored spatial constellations that enable expected quality of life and the conduct of everyday activities, offering new options for the sustainable use of available spaces and trying to give specific meaning to each project.





UP: Fig. 9 Benjamin Bojanic: '61m2 of Living Space, 400 metres of Running Space'
CENTER UP: Fig. 10. Maja Mrnjavac: 'Sun Salutation! Trebević Salutation
CENTER DOWN: Fig. 11. Elma Sabić: '¡La Corona Non Pasara!'
DOWN: Fig. 12. Emina Tsiligkros: 'Isolation 2-in-1: from parents and from pandemic'

The research of living/housing spaces was the most inspiring and intriguing topic for both students and mentors, as it started rapidly changing in just a couple of months after the Covid-19 pandemic started. The students were inspired by everyday change of their lives and the need to adapt their living spaces to the new conditions. Their apartments needed to replace classrooms and design studios, and they had to rethink how to maintain their peace and privacy among their housemates. The need for additional insulation inside the apartment became a reality. A wardrobe becomes a study, and a balcony goes to nature... Through the entire process of working with students and experiencing life in the past three semesters of schooling, teaching, living, it has become obvious that in the future we will have to think differently when designing our living spaces. The classic categories of housing and work are mixed more than ever and we are aware that we have to use architecture to establish a dialogue with contemporary challenges, events, and provide critical solutions that would make the spaces we live in better.

The designs resulted in a variety of outcomes, perceived as learning potentials and limitations during the pandemic. Following the steps of new online learning methodology, students' creativity goes beyond the existing state of the art by transposing experiences from the online design classes held in the time of the pandemic and experiences of spending entire days in a closed space. We create new spatial grammar together with our students, who are directly involved in the whole process of the research and design.

These results will become a part of our future teachings and they will no doubt shape our students as future architects. The shift in thinking and living has already happened, so it has to be followed by designing the space too.

CONCLUDING REMARKS: NEW LESSONS LEARNED

This paper stresses the importance of building capacities of future professionals in the field of architecture and urbanism to face global challenges. With the aim of illustrating the dual direction of learning in the state of emergency two research questions arise: (1) How can we create a learning environment and teaching methodology in a new pandemic reality? (2) How can we transfer challenges from the Covid-19 context towards creating design solutions for learning and applying the concept of architecture? In order to find answers to the research questions, this paper outlines the potential of the combined, online and live studio as an extra curriculum.

Leading the team in the field of architecture education studio Basic design 1 and 2, we were looking for solutions and designs to overcome the impact of the pandemic through two parallel perspectives: (1) preparing to respond to challenges and threats in educational process, and (2) generating adaptive spatial solutions for life and work during the pandemic. The design research developed during the Covid-19 pandemic indicates that teaching as a profession required to engage its creative skills and critical thinking to reimagine how inspiring students' living spaces should transform and adapt when emergencies arise.

In this sense, (a) the new curricula should be designed to build the capacity of future students and broaden their professional competences and responsibilities, as well as improve their technical, technological, socio-humanistic, and artistic skills to design a built environment sensitive to social and environmental contexts; (b) the new methods of education and training for architects should bring flexibility in the curriculum development to respond to given demands and requirements; and (c) research by online and live design approach should be encouraged to generate critical inquiry through educational process.

The conclusion reviews the online learning potentials and limitations based on an experiential-based learning model. The conclusion summarises the importance of creating new curricula and methodologies that follow the challenges posed by a global crisis.

On the other hand, the speed of a digital society, its shifting economy, and powerful unrestrained media are constantly speeding up the expansion of ideas, thoughts, and omissions. In this deeply divided situation in which architecture has found itself, it is placed right amidst the quick and elusive reality, and the slow and uncertain future. We have to work on changes in certain methods of teaching, learning and implementing architectural design that can be done easily and in the near future.

NOTES

1 Christopher A. Craig and Ismail Karabas, “Glamping after the coronavirus pandemic,” *Tourism and Hospitality Research*, 2021, https://doi.org/10.1177/1467358421993864

2 Ibid.

3 Lloyd “Bud” Shenefelt, 2021. “Peri-COVID Thoughts on Post-COVID Opportunities.” 20XX ARCHITECTURE SYMPOSIUM - Architectural Education & COVID 19. Nebraska: University of Nebraska, College of Architecture.

4 University of Sarajevo, Senat. 2020. Informacija o realizaciji nastave na Univerzitetu u Sarajevo za decembar 2020. godine. Sarajevo: University of Sarajevo.

5 Richard Waite, “‘Lost, lonely and stressed’: how Covid has hit architecture students.” *Architects‘ Journal,* 19 July 2021, https://www.architectsjournal.co.uk/news/lost-lonely-and-stressed-how-covid-has-hit-architecture-students

6 Ibid.

7 Rajendra Kumar, “How will Architecture Education Change in a Post-Pandemic World?,” *Higher Education Digest*, 6 November 2020. https://www.highereducationdigest.com/how-will-architecture-education-change-in-a-post-pandemic-world/.

8 Simon Guy and Graham Farmer, “Reinterpreting sustainable architecture: the place of technology,” *Journal of Architectural Education* 54(3):140 - 148. DOI: 10.1162/10464880152632451

9 Nicos Souleles, “Design for social change and design education: Social challenges versus teacher-centred pedagogies,” *The Design Journal*, 20:sup1, (2017), S927-S936, DOI: 10.1080/14606925.2017.1353037

10 Lisa Domenica Iulo, Christine Gorby, Ute Poerschke, Loukas Nickolas Kalisperis, and Malcom Wollen, “Environmentally conscious design – educating future architects”, *International Journal of Sustainability in Higher Education,* Vol. 14 No. 4, 2013: 434-448. https://doi.org/10.1108/IJSHE-09-2011-0065

11 Andrew Powell, “Educational Possibilities of Humanitarian Architecture,” *Field: A Free Journal for Architecture*, Volume 3, Issue 1, 2009: 113-124.

12 Aleksandra Milovanović, Miloš Kostić, Ana Zorić, Aleksandra Đorđević, Mladen Pešić, Jovana Bugarski , Dejan Todorović, Neda Sokolović, and Andrej Josifovski, “Transferring COVID-19 Challenges into Learning Potentials: Online Workshops in Architectural Education” *Sustainability* 12, no. 17, 2020: 7024. https://doi.org/10.3390/su12177024

BIBLIOGRAPHY

Craig, Christopher A, and Ismail Karabas. 2021. “Glamping after the coronavirus pandemic,” *Tourism and Hospitality Research*, 2021, https://doi.org/10.1177/1467358421993864

Domenica Iulo, Lisa, Christine Gorby, Ute Poerschke, Loukas Nickolas Kalisperis, and Malcom Wollen. 2013. “Environmentally conscious design – educating future architects”, *International Journal of Sustainability in Higher Education,* Vol. 14 No. 4: 434-448. https://doi.org/10.1108/IJSHE-09-2011-0065

Guy, Simon, and Graham Farmer. 2001. “Reinterpreting sustainable architecture: the place of technology,” *Journal of Architectural Education* 54(3):140 - 148. DOI: 10.1162/10464880152632451

Hertzberger, Herman. 2005. *Lessons for Students in Architectue*. Rotterdam: 010 Publishers.

Kumar, Rajendra. 2020. “How will Architecture Education Change in a Post-Pandemic World?,” *Higher Education Digest*, 6 November. https://www.highereducationdigest.com/how-will-architecture-education-change-in-a-post-pandemic-world/.

“‘Lost, lonely and stressed’: how Covid has hit architecture students.” *Architects‘ Journal,* 19 July 2021, https://www.architectsjournal.co.uk/news/lost-lonely-and-stressed-how-covid-has-hit-architecture-students

Milovanović, Aleksandra, Miloš Kostić, Ana Zorić, Aleksandra Đorđević, Mladen Pešić, Jovana Bugarski , Dejan Todorović, Neda Sokolović, and Andrej Josifovski. 2020. 2020. “Transferring COVID-19 Challenges into Learning Potentials: Online Workshops in Architectural Education” *Sustainability* 12, no. 17, 2020: 7024. https://doi.org/10.3390/su12177024

Nicol, David, and Simon Piling. 2000. *Changing Architectural Education; Towards New Profesionalism*. London and New York: Spon Press.

Powell, Andrew. 2009.“Educational Possibilities of Humanitarian Architecture,” *Field: A Free Journal for Architecture*, Volume 3, Issue 1: 113-124.

Salama, M. A. Volume 2 - Issue 1 - March 2008. “ A theory for integrating knowledge in architectural design education .” Archnet-IJAR, International Journal of Architectural Research https://pure.strath.ac.uk.

Shenefelt, Lloyd “Bud”. 2021. “Peri-COVID Thoughts on Post-COVID Opportunities.” 20XX ARCHITECTURE SYMPOSIUM - Architectural Education & COVID 19. Nebraska: University of Nebraska, College of Architecture.

Souleles, Nicos. 2017. “Design for social change and design education: Social challenges versus teacher-centred pedagogies,” The Design Journal, 20:sup1, (2017), S927-S936, DOI: 10.1080/14606925.2017.1353037

Thorne, Martha. 2021. “Can Architecture Education Affect the World?” Oris, 20-21 November: 48-50.

Ugljen-Ademović, Nina Senka Ibrišimbegović, Elša Turkušić Jurić. 2016. “Challenges of integrating achitectural theory in education through site-specific applied practice.” In *Metamorphosis of architectural education in (post)transitional contex*t, 36-44. Sarajevo: Faculty of Architecture, University of Sarajevo, Faculty of Architecture and Fine Art, Norwegian University of Science and Technology.

University of Sarajevo, Senat. 2020. Informacija o realizaciji nastave na Univerzitetu u Sarajevo za decembar 2020. godine. Sarajevo: University of Sarajevo.

Varnelis, Kazys. 1998. “The Education of the Innocent Eye.” (Taylor & Francis, Ltd. on behalf of the Association of Collegiate Schools of Architecture, Inc.) Journal of Architectural Education (1984-) Vol. 51, No. 4 (May, 1998): 212-223.

PREDNOSTI METODE OBRAZOVANJA ARHITEKATA NA DALJINU U ARHITEKTURI U DOBA POSLE KOVIDA: ZATOČENOST I OSLOBOĐENJE*

Katarina Anđelković

Kapacitet komunikacije i povezanosti izvan uskih ekonomskih, političkih i društvenih dimenzija je uvećan sa digitalnim okruženjem. Da li uslovi zatvaranja univerziteta širom sveta 2020. godine oslikavaju sistem obrazovanja arhitekata kao zatočenost ili kao oslobođenje? Tragajući za odgovorima, mi ne samo što spekulišemo o uslovima koji se trenutno pojavljuju u svetu, već pre oponašamo fazu života koja otkriva uslove koji stvaraju svet. U skladu s tim, ova prezentacija razmatra nove obrazovne kontekste za doba posle KOVID-a i istražuje alternative tradicionalnoj studijskoj nastavi. Ona pruža teorijski uvid u to kako se znanje koristi kao pristup onlajn nastavi i koje su alternativne pedagogije primenljive na fonu eskalacije krize velikih razmera, kao što je pandemija KOVID-19. Ova prezentacija obuhvata niz arhitektonskih programa i radionica izvedenih na evropskim univerzitetima i širom Sjedinjenih Država koji testiraju alternativne obrazovne metode. Ispitujući odnose u proizvodnji i načine širenja znanja na različitim platformama, nadam se da ću otkriti kako trenutni nestabilan i nepredvidiv obrazovni kontekst regeneriše virtuelnosti, instrumentalnosti i inteligencije kako bi očuvao svoj vitalni kapacitet. Ovaj sveobuhvatni pristup će obezbediti nove poduhvate u spekulisanju o prostorima virtuelizacije, zatočenosti i oslobođenja u susretu stvarnog i virtuelnog sveta.

KLJUČNE REČI: OBRAZOVANJE ARHITEKATA, DOBA POSLE KOVID-A, ZNANJE, PEDAGOGIJE, KOMUNIKACIJA, KOLEKTIVITET, KULTURA DIZAJNA.

STUDIJSKI KURSEVI ARHITEKTONSKOG PROJEKTOVANJA TOKOM I VAN KOVIDA-19: ADAPTIVNI PROCESI U AKADEMSKOJ RAZMENI ZNANJA

Marija Mano Velevska, Slobodan Velevski

Ovaj rad prati rad projektnog biroa „Rast 2.0“ na Arhitektonskom fakultetu u Skoplju, koji je tokom godina izgradio sopstvenu metodologiju oko različitih modaliteta saradnje, podstičući neposrednu i direktnu razmenu znanja u procesu učenja. Ograničenja u kretanju i pristupu drugim robama, izazvana pandemijom Kovid-19, potresla su sve sfere društva, uključujući i obrazovanje, jer se njegov rad neminovno prenosi iz fizičke učionice u onlajn oblike komunikacije. Takav veliki pomak sa posebno odražava na obrazovanje arhitekata koje se u osnovi razvija oko samog pojma prostora, prostornih praksi i fizičkih susreta.

Istorija je dokazala da se u vremenima „kriza“ (što pandemija svakako jeste), pojavljuju novi načini razmišljanja koji dodatno podstiču nova i inovativna dela i postupke. Ipak, obrazovanje, koje je zamišljeno kao čin nastavljanja deljenjem i razmenom znanja, nije moglo da izdrži brzu promenu bez prekida u procesu. Stoga, ovaj rad pokazuje kako su se pedagogija i metodologija u godini u kojoj se dogodio Kovid-19 menjale samo da bi se prilagodile konkretnim okolnostima fizičke distance i izolacije u okviru projektnog biroa, prilagođavajući projektantske zadatke i komunikacione alate kao nove načine saradnje.

KLJUČNE REČI: METODOLOGIJA PROJEKTNOG BIROA, KOLABORATIVNO UČENJE, PEDAGOŠKI KORACI, DIZAJNERSKO ISTRAŽIVANJE, DIZAJNERSKI PROJEKAT

STUDENTI BOTOVI? STUDENTI ARHITEKTURE SUOČAVAJU SE SA DISRUPTIVNIM TEHNOLOGIJAMA U ERI PANDEMIJE

Manuel Collado Arpia

Kontekst pandemije i obaveza da budemo zatvoreni u malim prostorima za većinu stanovništva doveli su nas do pitanja kako da predajemo o novim pravilima projektovanja i komuniciranja prostora bez fizičkog prisustva. Student 21. veka već je krenuo ka bioničkoj ličnosti zahvaljujući novim dostupnim tehnologijama. Istovremeno, rezultati klasičnog projekta, poput papirnih prezentacija, sticali su visok nivo apstrakcije zbog velikog preklapanja podataka i zahtevali su nove formate za bolju interakciju sa javnošću. U takvom kontekstu ograničenih projektanata i edukatora, videli smo jasnu priliku da unapredimo sve nove digitalne formate koji omogućavaju odlučivanje o projektu, nove platforme interakcije i disruptivne vizuelne tehnologije kao što su VR i AR. Primenom novih nastavnih alata koristeći VR/AR u različitim kontekstima i projektima koncept „studenta bota“ će biti sužen. Kroz različita nastavna iskustva i primere projekata, procenićemo uspehe, neuspehe, polja ekspanzije i kontroverze ove nove tipologije učenika.

KLJUČNE REČI: STUDENT BOT, DIGITALNA ARHITEKTURA, VIZUELNE TEHNOLOGIJE, DISRUPTIVNO, PROŠIRENA STVARNOST, VIRTUELNA STVARNOST, TEHNOLOGIJE POSMATRANJA, ARHITEKTONSKO OBRAZOVANJE, PANDEMIJA

DRUŠTVENI, EKONOMSKI I EKOLOŠKI UTICAJI PANDEMIJE NA ARHITEKTURU: NOVE PROSTORNE I OBRAZOVNE GRAMATIKE

Senka Ibrišimbegović, Nedim Mutevelić

Svi smo na mreži. Retko izlazimo iz svojih domova - samo po potrebi, iako nam to ponekad dozvoljavaju propisane mere. Naše dnevne rutine su ugrađene u video pozive i obavljaju se onlajn. Članovi domaćinstva su prinuđeni da budu zajedno više nego ikada ranije, ali im je, istovremeno, potreban prostor za učenje i rad. Nagli prelazak iz učionica u Zoom sobe primorava nas da preispitamo ceo obrazovni sistem: Potrebna je nova gramatika obrazovanja!

Potreba za dodatnom izolacijom unutar stanova postala je realnost. Orman se pretvara u radnu sobu, a priroda postaje naš balkon. Koliko smo svesni trenutnih promena u našim životnim prostorima? Možemo li pomoću arhitekture uspostaviti dijalog sa savremenim pitanjima i događajima i pružiti kritička rešenja koja bi prostor u kojem živimo učinila boljim? Potrebna je nova gramatika prostora!

Pandemija i brza digitalizacija uticali su na arhitekturu, koja je već bila tradicionalno veoma spora disciplina koja koristi specifične alate manuelnog projektovanja i načina razmišljanja. Obrazovanje arhitekata je tokom godina imalo neprekidan zahtev za promenama u procesu učenja; nakon prelaska sa sistema nasleđenog iz socijalističkog perioda na bolonjski sistem, uticaj koji je izazvao Covid-19 u poslednje vreme podstakao je potrebu da se prilagodi promenama u metodama nastave i razumevanju prostora.

KLJUČNE REČI: UTICAJ PANDEMIJE, KONTEKST, SVEST, NOVA GRAMATIKA OBRAZOVANJA, NOVA GRAMATIKA PROSTORA

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Народна библиотека Србије, Београд

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SAJ : Serbian architectural journal / editor-in-chief Vladan Đokić. - Vol. 1, no. 1 (2009)- . - Belgrade : University of Belgrade, Faculty of Architecture, 2009- (Beograd : Donat Graf). - 27 cm

Tri puta godišnje.
ISSN 1821-3952 = SAJ. Serbian architectural journal
COBISS.SR-ID 172308748

ISSN 1821-3952
9 771821 395002