TU Delft

Delft University of Technology

Architectural Education in Times of Uncertainty

Book of Summaries

Ioannou, O.

Publication date
2023

Document Version
Final published version

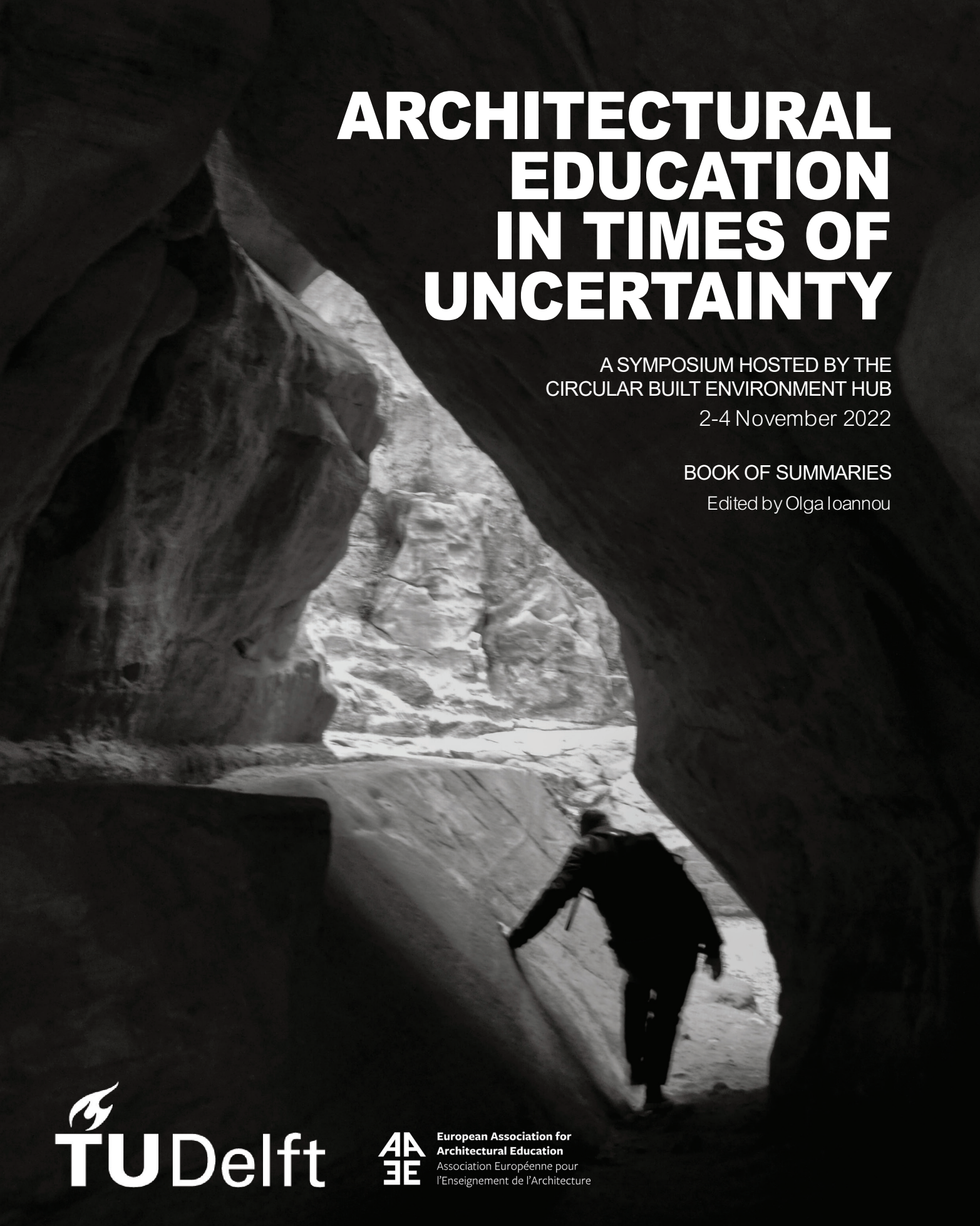
Citation (APA)
Ioannou, O. (Ed.) (2023). *Architectural Education in Times of Uncertainty: Book of Summaries*. BK Books. https://books.bk.tudelft.nl/press/catalog/book/806

Important note
To cite this publication, please use the final published version (if applicable).
Please check the document version above.

Copyright
Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

Takedown policy
Please contact us and provide details if you believe this document breaches copyrights.
We will remove access to the work immediately and investigate your claim.

This work is downloaded from Delft University of Technology.
For technical reasons the number of authors shown on this cover page is limited to a maximum of 10.



ARCHITECTURAL EDUCATION IN TIMES OF UNCERTAINTY

A SYMPOSIUM HOSTED BY THE
CIRCULAR BUILT ENVIRONMENT HUB
2-4 November 2022

BOOK OF SUMMARIES
Edited by Olga Ioannou

TU Delft

European Association for Architectural Education
Association Européenne pour l'Enseignement de l'Architecture

Architectural Education In Times Of Uncertainty

EVENT OVERVIEW

DAY 01 02/11 | Circular Education

10:00 - 11:30	Integration of circularity in architectural education
13:30 - 15:00	New cross-faculty, university-industry, and university-society educational encounters
15:30 - 17:00	Cross-level educational encounters

DAY 02 03/11 | Learning In Uncertainty

10:00 - 11:30	Effective use of technologies
13:30 - 15:00	Innovative pedagogies
15:30 - 17:00	Learning in uncertainty

DAY 03 04/11 | Examples From Practice

09:15 - 12:30	EAAE Workshop Sustainable Development Goals (SDGs) in education & research

CONTENTS

DAY 01

7 Olga Ioannou — **Introduction**

16 Tillmann Klein, Birgül Çolakoğlu, Lisbeth M. Ottosen, Deepika Raghu, Mario Rinke, Leonardo Rosado — **Integration of Circularity in Architectural Education**

24 Remon Rooij, Olaf Oosting, Michiel Susebeek, Hans Wamelink, Emma de Wijs, Indy van de Sande, Helmut Thoele — **New Cross-Faculty, University-Industry, and University-Society Educational Encounters**

30 Thijs Asselbergs, David Peck, Hannah Beljaars-Frederiks, Josef Bischofs, Atze Boerstra — **Cross-Level Educational Encounters**

DAY 02

40 Atefeh Aghaee, Marcus Specht, Serdar Asut, Olga Ioannou — **Effective Use of Technologies**

48 Leo van den Burg, Olga Ioannou, Mia Roth-Čerina, Tom Parker, Angeliki Sioli, Peter van Assche, Jeremy Till — **Innovative Pedagogies**

56 Olga Ioannou, Ronald Barnett, Dave Cormier, Nina Bohm, Talal Akkaoui, Marialena Toliopoulou, Julia Gospondinova, Anna Shishkina, Aafke Simonides, Lotte van der Horst
Learning in Uncertainty

DAY 03

64 Roberto Cavallo, Mia Roth-Čerina, Ilaria Valente, Janna Bystrykh, Matija Pogorilic, Jörg Schröder, Olga Ioannou, Fabiano Lemes de Oliveira, Gerardo Semprebon
EAAE Workshop Sustainable Development Goals (SDGs) in Education & Research

74 Ronald Barnett
Architecture Education - Glimpsing a Post-Human Path Forward

79 **Links to Video Interviews**

80 **Participants**

94 **Colophon**


Architectural Education in Times of Uncertainty
Can we talk about this?

INTRODUCTION

"(T)he dynamics of the global coupled human-environmental system within the dominant culture precludes management for stable, sustainable pathways and promotes instability (…) The transition from unstable dynamics to sustainability is sensitively dependent on the level of participation in and repression of resistance."

Brad Werner, 2012[i]

"We have work to do till the end of time."

Basarab Nicolescu, 2010[ii]

ARCHITECTURAL EDUCATION IN TIMES OF UNCERTAINTY | Architecture and, by extension, architectural education are severely challenged by the scale and magnitude as well as the complexity of current criticalities. The climate breakdown, the loss of biodiversity, and the impending resource depletion call for a radical rethinking of what is inherent to architecture, but also of how architecture relates to the economy, society, and nature. The certainties our profession has long relied upon are becoming less and less convincing. Technology alone seems unable to provide us with credible answers for our troubled present; a new paradigm is still at large, further contributing to an ever-growing sense of instability. What will the future look like? Uncertainty takes over as a condition of being while knowing that any decisions we make will be imperfect, just like our view of the world is imperfect. But should we account for uncertainty as a vulnerability? Or can uncertainty free us at last from our pre-established notions and biases towards the making of a new architecture that is informed by a completely different set of principles and values? How are architectural education and pedagogy then affected by this predicament?

The certainties our profession has long relied upon are becoming less and less convincing. Technology alone seems unable to provide us with credible answers for our troubled present; a new paradigm is still at large, further contributing to an ever-growing sense of instability.

CIRCULARITY AND THE CBE HUB | We at the Circular Built Environment (CBE) Hub strongly believe that academia should provide us with the safe space needed to question the current status quo and create new desirable futures. This is why, for the past five years, CBE Hub members have been exploring non-linear and regenerative approaches for the built environment and the potential of circularity to provide us with new imaginaries. The CBE Hub is strategically situated at the intersection of all Faculty departments and their respective disciplines; together, we can unfold the systemic character of circularity and connect the technical knowledge base produced with businesses,

For the past five years, CBE Hub members have been exploring non-linear and regenerative approaches for the built environment and the potential of circularity to provide us with new imaginaries.

organizations, communities, and individuals alike. This allows us to work with circularity in the space between what is currently possible and an ever-evolving vision for a circular built environment where operational and value systems are inconspicuously intertwined to renegotiate our ways of being and becoming.

CIRCULARITY IN THE A+BE FACULTY EDUCATION AND OUR NEED FOR RELEVANCE | As a result of the proliferating CBE Hub members' ongoing research, educational modules on circularity are continuously being integrated into our school curricula and new online learning offerings are produced in the form of MOOCs, Professional Education courses or continuing adult education programmes and training. A Summer School on Circularity in the Built Environment was inaugurated in 2022 and will be repeated this year. As of late, a Circular Impulse Initiative, a project consisting of actions that support learning about and for circularity for students and educators alike, has also been put into place. Nevertheless, while reflecting upon our programmes and current practices, we feel the constant need to question if we are on the right track: after all, we are trying to teach a concept that in itself is in the making. Are we using the right tools? Are we properly addressing our students' needs? These reflections and questions initiated the idea for this Symposium: we felt it was the right moment to reach out to an extended community of educators, students, and non-academic partners, to listen carefully to their perspectives, and to learn from their experiences. Our question to everyone was fairly simple. All we asked was: *can we talk about this?*

Our question to everyone was fairly simple. All we asked was: can we talk about this? ... And so, we did. And were overwhelmed by the turnout. More than thirty people accepted the invitation to join us.

And so, we did. And were overwhelmed by the turnout. More than thirty people accepted the invitation to join us and contributed to discussions ranging from circularity and its current integration in education (Day 01) all the way to how uncertainty conditions teaching and learning (Day 02). A highly relevant and very welcome collaboration with the European Association for Architectural Education (EAAE) and the association's Education Academy nicely topped our last-day programme, offering an extensive overview of current practices and concrete examples from various EAAE member schools currently working on sustainability and the integration of SDGs in architectural education (Day 03).

This book documents these exchanges. It comprises summaries of all sessions based on audio recordings and the respective transcripts. Our idea was to capture the livelihood of the conversations, consolidate the main points raised, and use this book to invite more people to join us in our efforts to rethink the relevance and values of architectural education.

DAY 01: CIRCULAR EDUCATION | Session one, entitled 'Integration of circularity in architectural education', was dedicated to mapping current approaches at the course and

the curriculum level across a number of architecture schools in Europe and beyond. Schools are now diving into circularity even though most are at the discovery stage, and they recognize the complexity of the task. It is not just that most governments are now pushing for relevant reforms, but circular education needs to build a robust and convincing narrative to resist the phenomena of greenwashing. And more importantly, this circular narrative should be much about social and cultural aspects as it should be about technology. This is why it is important to establish a strong connection with other disciplines within the curricula, experiment with different delivery formats and modes of communication, and keep following up on these concepts until they are fully embedded in our thinking (session one summary, page 16).

Schools are now diving into circularity even though most are at the discovery stage, and they recognize the complexity. of the task.

Session two was entitled 'New cross-faculty, university-industry and university-society educational encounters.' Just like the title suggests, it opened the discussion of circular education to stakeholders from the industry and governance sectors. Interestingly, in full tune with the discussions of the first session, non-academic stakeholders also accentuated the potential of circularity to deliver new shared imaginaries. They also advocated that students should be exposed to 'feel' and 'live' the multiple stakeholder perspectives to become active agents of change. Only sincere curiosity towards others and otherness, they said, can help develop a multi-perspective focus and eventually lead to long-lasting systemic changes. New skills are also needed; architecture pedagogies should mainly stimulate entrepreneurial attitudes and leadership (session two summary, page 24).

Students should be exposed to 'feel' and 'live' the multiple stakeholder perspectives to become active agents of change.

Session three, entitled 'Cross-level educational encounters', addressed cross-level collaborations between educational institutions related to the built environment that are focused on different types of knowing. Panelists in this session also recognized the need for acquiring new skills (or energies) and learning how to listen; for example, to tackle the complexity of the issues at hand, even if that means becoming more experimental or radical. This translates into engaging students with stakeholders that would traditionally not be consulted but also teaching them how to think critically, how to slow down, and even how to say no. But they all also acknowledged that we are still far from coming up with a convincing way to do this (session three, summary, page 30).

DAY 02: LEARNING IN UNCERTAINTY | Session four on 'Effective use of technologies' revolved around the opportunities and challenges of the use of digital technologies for learning and, in particular, the use of technology in blended learning, creating immersive learning experiences with the help of virtual reality, enhancing learning using metadata as well as experimenting with the more radical transformative blending. Pervasive or subtle, digital learning technologies have great potential to assign learners more agency in their learning. Our recent

Pervasive or subtle, digital learning technologies have great potential to assign learners more agency in their learning.

New pedagogies should encourage students to question current practices and to create new axioms, new paradigms.

experience with Covid expedited their integration into education during lockdowns, but their use should not be restricted to such extreme conditions; rather, everybody in the audience and the panel agreed we need to acknowledge their creative potential in live courses and strategically integrate them in our courses (session four, summary, page 40).

Session five on 'Innovative pedagogies' focused on innovative pedagogies and the challenges any crisis brings forward and the reflexes we need to develop as a consequence: accepting failure and experimentation but also thinking out of the box by engaging in live projects or using language to help students develop new atmospheres and imaginaries. New pedagogies, argued our guests, should encourage students to question current practices and to create new axioms, new paradigms. They should also allow students to re-prioritize the role of architecture in the face of current emergencies and redefine the values our profession should abide by (session five summary, page 48).

Session six, entitled 'Learning in uncertainty', followed up on how complexity and—as a direct implication of complexity—uncertainty affect architecture and architectural pedagogy processes and outcomes. The panel consisted of students as well as a number of selected guests from the learning sciences. Educating for unknown situations challenges traditional structures and formats, and instead of focusing solely on content, communicating the passion and the love for knowledge becomes more important than the content itself. Uncertainty requires educators to be open to new ideas and ways of doing things, but they are also granted the right to not always know the correct answer. This is why it is time to acknowledge the value of the process as well as the final outcome of a process and reward students' work even if they are not directly solving problems. Including uncertainty in education can ultimately induce a certain hopefulness for the future and a desire to work for a better world (session six summary, page 56).

Including uncertainty in education can ultimately induce a certain hopefulness for the future and a desire to work for a better world.

DAY 03: EXAMPLES FROM PRACTICE | The EAAE workshop in Delft brought forward and discussed intentions, concepts, and positions about SDGs in architectural education and research, interlinking to conditions, circumstances, and challenges institutions face. The preliminary results of the EAAE and UIA survey on integrating SDGs in architectural education were presented, showcasing how each member school is currently planning their education around them. All recent TU Delft initiatives were also presented in full. In addition, a series of guests from EAAE member schools shared their experiences with concrete examples from their schools' design studios, gradually revealing a large mosaic of varied educational approaches: from the more radical, regenerative, and nature-based design approaches to renegotiating architectural values and the role of the architect, all the way to developing new policies. Equally rich

were the pedagogical approaches presented, highlighting the need for cross-disciplinary collaborations, participatory design, and inclusion. But panellists also stressed the need to strengthen the role of research and the quest for novel, transdisciplinary learning between not just architecture and science but also architecture and art.

EPILOGUE | If indeed sustainability requires increased participation and resistance, to use Werner's words, this Symposium demonstrated a strong commitment to both. It brought forward a multitude of insights on issues related to what we do, how we do it, and what the impact we want to make is. At first glance, the current landscape of educational approaches may seem vast and fragmented; however, the sense of purpose and the quest for meaning persist despite the uncertainty. The high level of engagement of all participants and the heated discussions revealed as much.

This Symposium helped us realize that we have much more in common than we may think. The challenge now is bringing the individual threads together. This is the time for collective reflection and collective action. And right following this event, thanks to our guests, we feel like a community is building up. This Symposium, this book, they are just the beginning; and yes, apparently, we do have work to do till the end of time. But we still have two major things going for us: our love for educating and our hope for a better world.

We would like to express our gratitude to everyone who joined us and to the EAAE for accepting our invitation to collaborate. Special thanks to everyone who helped organize and deliver the Symposium and this book. And last but not least, many thanks to the members of the CBE Hub and especially to Tillmann Klein, the Hub's initiator and helmsman, for supporting this initiative.

On behalf of the organizing committee,
Olga Ioannou

---

i Rohm, J, (2012, December 9). AGU Scientist Asks, 'Is Earth F**ked?' Surprising Answer: Resistance is NOT Futile! Think Progress. https://archive.thinkprogress.org/agu-scientist-asks-is-earth-f-ked-surprising-answer-resistance-is-not-futile-eaf54f9cf88f/

ii Nicolescu, B., 2010. Methodology of transdisciplinarity – Levels Of Reality, Logic Of The Included Middle And Complexity. In Transdisciplinary Journal of Engineering & Science Vol: 1, No:1, (December, 2010), pp.19-38



DAY 1
CIRCULAR EDUCATION

This first part of the symposium focused on the current status quo in circular education. In particular, it was split into three sessions: the first was dedicated to mapping current approaches at course and at curriculum level. The second session investigated cross disciplinary collaboration practices amongst TU Delft faculties: is it possible to reestablish connections between different types of knowledge towards a more inclusive, integrative learning approach? How open are we to the otherness? Finally, the last session addressed cross-level collaborations between educational institutions: how can circular education be enhanced by combining different types of skills? Can people with different ways of knowing and different toolkits develop ways of working together and learn from one another?



Integration of Circularity in Architectural Education

MODERATOR

Tillmann Klein	*TU Delft, Netherlands*

PANELISTS

Birgül Çolakoğlu	*ITU, Turkey*
Lisbeth M. Ottosen	*DTU, Denmark*
Deepika Raghu	*ETH, Switzerland*
Mario Rinke	*University of Antwerp, Belgium*
Leonardo Rosado	*Chalmers University of Technology, Sweden*

"Circularity is as much about social and cultural aspects as it is about technology."

- Birgül Çolakoğlu

The presentations of this session helped map some of the current educational initiatives regarding circularity in a number of architecture schools. Even though current implementation across educational programs appears to be slow with most schools being still in a discovery phase, these initiatives attest to the growing relevance of circularity in the built environment sciences education. The discussion that followed revolved around the drivers of change in circular education, mainly how ongoing research is channeled into it and the type of pedagogies that are necessary to realize these goals. The session also helped identify a number of barriers towards a circular education.

SHARING EXPERIENCES

THE ITU EXPERIENCE
BIRGÜL ÇOLAKOĞLU

At ITU there has already been a tendency to question the current status quo of architectural education and its capacity to address 21st-century challenges. One of the things they felt was missing in their education was systemic thinking and also helping students set priorities in their design thinking. She now runs a three-semester MArch program on circularity (with no thesis) for approximately 25 students and with two studios, one (fall studio) looking at the urban scale and another (spring studio) focusing on the architectural/building scale. During the fall semester, students analyze a city or location at an urban scale and based on that analysis they

develop circular scenarios for that context. For their spring studio, they choose a strategy and then identify an architectural problem within the urban scale that they tackle during the second half of the program. Students are asked to develop a systematic approach by also exploring circular culture, and the impact of circularity on the social domain. Based on her experience so far, students are facing some difficulty with the format because they are required to do a lot of research and participate in a lot of discussions where they were required to articulate their own position on things. They were also unfamiliar with circularity and CE.

THE DTU EXPERIENCE

LISBETH M. OTTOSEN

Lisbeth is teaching at the Department of Environmental and Resource Engineering that has just been established at DTU with a focus on developing new environmentally friendly and sustainable technologies, methods and solutions. And she is teaching in a recently developed life-long MSc on Sustainable Construction which kicked off in 2023. It is a program of 60 ECTS built in a modular fashion and open to people from the industry who have at least two years of experience since their master. It consists of four modules spread over two years; sustainability in practice, theory (concepts and methods), sustainability in construction management and a master thesis. It is also possible to enroll in only one of the modules. In these courses participants are expected to use their real-life experiences to inform their course work. Pedagogically, the program also relies on self-study.

"Even if you don't jump on the train of circularity, you need to know about it anyway."

- Lisbeth M. Ottosen

Lisbeth is also developing a course on circular construction for the MSc education providing participants with the basic competences needed for transitioning to a circular construction sector. Its main aim is to explain the terminology and the key circular principles and to discuss new constructions or renovations based on circular mindsets. Confronted with the lack of clear definitions, the course will consist of different contributions that try to shed light on the various principles and concepts. Furthermore, the course will experiment with different learning modalities: lectures but also podcasts, readers and also short video segments with experts from the industry.

THE ETH CIRCULAR ENGINEERING FOR ARCHITECTURE LAB

DEEPIKA RAGHU

The lab bridges a great variety of disciplines from environmental engineers, designers, architects, and civil engineers. Its focus lies on digitalization and circularity, and therefore on ways that

"There is a big momentum as governments push for reform and within a few years we will see more circular industrial processes emerging."

-Deepika Raghu

digital technologies can help enable circularity along five lines. Firstly, working collectively with different companies they collect data on existing buildings and the materials embedded in them via open access non-proprietary datasets, and delve into the possibilities of creating open repositories. Secondly, they look at different digital technologies to scan buildings. Thirdly, they engage students in on-site disassembly projects. Fourthly, they look into ways of creating QR codes that connect materials to a database, to increase transparency and make materials accessible to everyone. And lastly, they work with computational algorithms to design with available material stock. This approach is informed by a pedagogy that marks a departure from compliance-based pedagogies to engagement-based ones. This helps students understand the value of what they are doing. By doing so the group embraces the messiness of CE and comes to terms with the limitations and the complexity of the task. Furthermore, they provide students with skills that are needed today and will probably continue to be relevant in the immediate future, while also acknowledging educators' own learning trajectories along these lines.

THE EXPERIENCE OF THE UNIVERSITY OF ANTWERP SCHOOL OF ARCHITECTURE

MARIO RINKE

At The University of Antwerp School of Architecture, a new curriculum has been developed to be implemented in late 2023. As circularity appears to be much more embedded in technical courses rather than those of history or theory. Design studios are currently encouraged to rethink their narrative as well, but that is still a work in progress. A series of different assignments in many courses challenge students to think in circular strategies; these come with specific spatial constraints or materials' size and weight limitations.

A parallel project is also running through an Erasmus+ initiative called *Crafting Circularity-Rethinking Sustainable Design and Construction in Architecture Through Reusability*. The project consists of design and build workshops aimed at the reuse of available building components. In a recent workshop in Aalborg students were provided with material leftovers and they designed a temporary pavilion. The pavilion was constructed and subsequently demounted in two days and all materials were returned to their owners. The group is also focused on existing abandoned concrete structures; they refer to them as intelligent ruins. These are to be used as a starting point, or a point of becoming of the plot they are located in, where softer layers can be applied to develop architectures within the structures. This is also what makes this learning experience so rich; an interest in different notions of circularity.

"We have to make students aware of who they are and where they are. Can they become agents of change?"

- Mario Rinke

THE CHALMERS UNIVERSITY EXPERIENCE
LEONARDO ROSADO

At Chalmers University there is currently an update of the course contents and the BSc program, also driven by an increasing demand on behalf of the students. However, this transition needs to follow certain principles. Firstly, it needs to introduce systems thinking, and by that the responsibility of gathering necessary information for making changes. Our focus needs to transcend individual goals (ie carbon emission decrease) towards a more holistic way of understanding the implications of our actions. Furthermore, it needs to challenge the role of engineers in assisting in decision-making processes. Education needs to help them expand to areas beyond the strict confines of the engineering knowledge domain, especially in light of the uncertainty of not knowing who owns the challenge or who is responsible for providing the answers. Moreover, education needs to opt for a quantification-based knowledge: we need to quantify the flows and stocks of resources we use, and we need to connect these with our environmental impacts. For that, we need to start comparing things to one another, and reflect on the opposition of forces within our systems, and what we can do about this. The Urban Metabolism course at Chalmers is providing education informed by ongoing research and therefore advancing and mutating each year, providing students with new skills in this domain of Sustainable Systems thinking.

"We have to get more practical and dive into the concept to continue to learn."

- Leonardo Rosado

MAIN TAKEAWAYS

01 Most schools are still in the discovery phase. We are still competing for space in the curricula, and it requires a lot of time to develop teaching materials.

02 There are some things everyone is certain about but at the same time, there are still a lot of uncertainties. Nevertheless, circularity is here to stay and for that it requires a robust implementation in the curricula. Not everybody has to endorse it, but everybody needs to know about it. And we have to convince those resisting the idea. Otherwise, we risk falling prey to greenwashing or to false implementation, because everyone is talking about it, but nobody really understands it.

03 We are trying to revive historical practices that were somehow lost in the way of progress.

04 Circularity as an organizing principle has the capacity to challenge architectural production: we are now building for 60 years. However, with a circular mindset and with new material technologies buildings can be conceptualized as ever changing and re-occupied over many generations.

05 Patterns of communication really matter and although the social aspect is very contextual, we can learn from different examples.

06 The construction industry is still driven by classical linear profit structures, and we need to turn towards circular business model approaches. It is important to also integrate these into our curricula to make sure the challenges of implementation of new circular design are well understood.

07 One of the main issues we are now facing is overemphasizing the technical aspects of circularity as the expense of its social and cultural ones. Changing mindsets is immensely important. As well as figuring out who we are in this transition.

08 Modular, adaptable curricula that balance design and technology are a nice way to look at this in the future. But also in terms of social sustainability, because we are preparing students for uncertainty, and they need to have an attitude which allows them to deal with that.

09 We need to have more collaboration within a curriculum, bringing colleagues and different forms of thinking together. We also need to persevere; not a single contribution on sustainability can make a difference; we need to follow up again and again until these concepts become embedded in student thinking. Lastly, we need to share our pedagogical experiences and also understand the context in which that pedagogical experience works.


LOOP
Can you navigate tomorrow's resource challenges?
ZERO WASTE SCOTLAND
vito
RISK RACE
3-6 PLAYERS OR TEAMS
16+
150 MINUTES


SPA
SPA



New Cross-Faculty, University-Industry, and University-Society Educational Encounters

MODERATOR

Remon Rooij	*TU Delft*

PANELISTS

Olaf Oosting	*Valstar Simonis*
Michiel Susebeek	*Saint-Gobain*
Hans Wamelink	*BK Launch, Faculty of Architecture, TU Delft*
Emma de Wijs	*Municipality of the Hague*
Indy van de Sande	*Ministry of Infrastructure and Water Management*
Helmut Thoele	*Province Zuid Holland*

The objective of this panel discussion was to explore new directions for cross-faculty, university-industry, and university-society educational encounters and cooperation. Delft aims to offer more inter- and transdisciplinary* learning environments that focus on urgent and complex societal challenges. Transitioning towards circular buildings, a circular built environment, circular cities and regions, and a circular building industry are such new challenges. Circularity not only requires new ways of educating young professionals, but also new kinds of professional attitudes and behaviors in practice and industry. The main messages from the discussion are organized here in three subsections: [i] students being agents of change for a circular built environment, [ii] cooperation strategies for stimulating (knowledge on) the transitions towards a circular built environment, and [iii] educational changes for stimulating teaching and learning on transition strategies towards a circular built environment.

STUDENTS AS AGENTS OF CHANGE

Young professionals can be pivotal agents of change as they are the ones that like to take up a challenge, have the ambition to have a positive impact in society, and can use their entrance in the field to break through the rusted and unsustainable patterns of our (traditions in) professional practice. With the right mindset,

* Interdisciplinary education refers to a learning environment where students (and teaching staff) from different disciplines not only interact, but also together aim to integrate expertise in terms of (re)defining challenges and developing solutions with potential societal impact. Transdisciplinarity in education refers to a learning environment where students (and teaching staff) additionally also cooperate and co-create with various, other kinds of stakeholders from society, such as industry, governmental bodies, and civil society.

attitude, and skills early in their professional lives, they can grow to become impactful leaders and visionaries of change. For this:

01 They should be educated on how to change responsibly and entrepreneurially.

02 They should be educated that change and transition are not only technical and/or spatial challenges, but also social, economic, and political ones.

03 They should be educated that cooperation is necessary and that different roles and expertise are not 'nice to haves,' but 'need to haves'.

04 They should be educated on how to take others with you in processes of change. Vision and strategy-making are the cornerstones of good leadership. People need the imagining and visualization of desirable, possible futures that stir the blood. And at the same time, concrete actions and governance approaches pave the road of change.

To keep the wheel of transition rolling, curiosity and spirit need to be stimulated all the time in change teams. Good transition thinkers focus on history, present, and future simultaneously as all of those timeline's matter in understanding the meaning of (proposed) change. And young professionals should realize that in complex, uncertain contexts everybody – also the so-called 'seniors' and 'experts' – are learners, as the circularity transition is a new field of practice for everyone. It is they who can learn and adapt fastest who will have the most success and impact.

Young professionals should realize that in complex, uncertain contexts everybody - also the so-called 'seniors' and 'experts' - are learners, as the circularity transition is a new field of practice for everyone.

COOPERATION STRATEGIES

An important condition for successful cooperation among stakeholders is sincere curiosity towards others, i.e., those other stakeholders in the transition process. Co-operation is catalyzed by co-creating shared imaginaries for a circular future: shared ideas about circular value systems. Therefore, we should teach students about this by connecting them to those various stakeholders via their involvement in societal debates, vision and strategy-making processes in practice, and political decision-making. Let the students 'feel' and 'live' the other perspectives. Students will automatically better learn to listen (they will get 'larger ears, smaller mouths') and better appreciate other disciplines, values, worldviews, methods, and approaches. Practitioners and academics can help students to share with them not only their expertise but also their network.

Connecting the needs of multiple stakeholders successfully is very challenging, but valuable as it helps to:

01 Develop a multi-perspective focus by creating communities of practice (e.g., policy makers, investors, owners, municipalities, designers, builders, suppliers, users) with an integral approach toward a certain (sub)segment.

02 Stimulate integral awareness by creating 'maps' or 'infographics' to get an overview of various, relevant aspects and to unravel the complex puzzles.

03 Use parametric tools by creating digital parametric design environments in which the different needs of stakeholders and other kinds of available project data can be made explicit. Conflicts can be traced; optimizations can be done iteratively.

Long-term cooperation among stakeholders is sustained by creating ecosystems that engage and enable them and in which capacity building (i.e., learning by doing and reflection) is key. Sharing expertise should be the social norm in such an ecosystem. This emphasizes the importance of open data approaches (FAIR data - Findable, Accessible, Interoperable, Reusable) and communicating, sharing, and discussing both practical and scientific knowledge (science communication).

Educating our next generation of professionals with a (more) entrepreneurial, responsible, cooperative, and long-term oriented attitude might be one of the answers.

But transitions don't come easy. Very often, stakeholders are happy with starting up cooperation and realizing the first idea(s): the low-hanging fruit. But in the long run, change is tough. Radical system changes are not easily done. Existing, larger organizations very often seem to lack the capacity, resilience, and eagerness for those more radical changes as they can be too risky for themselves as a company. Feasibility questions come in many forms: technical, spatial, economic, financial, social, cultural, political…all of them can individually frustrate transition. So, how to keep the momentum going? Educating our next generation of professionals with a (more) entrepreneurial, responsible, cooperative, and long-term oriented attitude might be one of the answers.

EDUCATIONAL CHANGES

One of the key messages here is to trust the students and teaching staff. Give them room and learning environments to experiment freely and safely. Student-centered education also means to involve students in the instructional design (process) of a course and/or classroom, perhaps even the curriculum. But it also means changing roles for the educators; from (only being) experts and assessors toward (also being) coaches, feedback givers, facilitators, critical friends, co-creators, etc.

Architecture pedagogies should stimulate entrepreneurial attitudes and behavior. Someone is ‘entrepreneurial’ when that person acts upon opportunities and ideas and transforms them into value for others. The value that is created can be manyfold: spatial, technical, financial, cultural, or social. All of this can take place in the private sector, public sector, civil society, and in any mix. It thus welcomes several types of entrepreneurship, including intrapreneurship, social entrepreneurship, environmental entrepreneurship, and techno/digital entrepreneurship, and not necessarily (only) via building a company.

We also see a lot of value in serious gaming as a learning and teaching approach. Students should be put with their feet in the mud, that is in (simulated) practice, but not always and not all the time. There is the ‘danger’ of too much reality in a course for students which might only freeze them into today’s reality and conditions. And tomorrow (for which we educate them in particular) is not today...

MAIN TAKEAWAYS

Four messages here to conclude.

01 Teach students and make them fully understand the notions of societal complexity and uncertainty, and the multidimensional characteristics of complex systems (technical, spatial, social, political, legal). Systems thinking skills are a must, but an important lesson and advice is to learn to prioritize. Students should not want to solve everything at once. It is also allowed (and most of the time a necessity) to focus and choose one essential challenge at a time.

02 Teach students that transitions within complex systems are also social transitions. Entrepreneurial mindsets and value creation are key.

03 Never lose touch with your (disciplinary) home base, that is (for the field of architecture, urbanism & building sciences) the spatial integration and designerly modes of thinking and working.

04 So, should we educate our students to become ‘problem solvers’ or ‘designers of shared circularity values and imaginaries’? BOTH, we think.


SPA
REINE
TU Delft



Cross-Level Educational Encounters

MODERATOR

Thijs Asselbergs	*TU Delft*

PANELISTS

David Peck	*TU Delft*
Hannah Beljaars-Frederiks	*Hogeschool Rotterdam*
Josef Bischofs	*Academy of Architecture Maastricht*
Atze Boerstra	*TU Delft*

This session focused on how higher education institutions in the Netherlands related to the built environment are currently addressing the uncertainties of the transition towards a circular built environment. Is there a strong connection between architecture (Bouwkunst) and building technology (Bouwkunde)? The starting point of the discussion was set around the current criticalities and how the different institutions represented at the table build their curricula around them. But it soon progressed into a more in-depth reflection on the efficiency of the current curricula in supporting new learners in becoming active agents of change. In this context, the second half of the discussion revolved mainly around recognizing the shortcomings of our current curricula and pedagogies, and also our own precarious position as educators. As the conversation unfolded, panelists started to jointly articulate a series of emergent themes that could be the drivers of change for the future of architectural education. Text sub-sections follow the conversation flow, while summarizing the key points exchanged, but also integrate valuable input from the audience.

THE FUTURE THAT IS NOW

The timing of this conversation is critical. Because we are at a moment in time when there is not enough time to come back from our business-as-usual material consumption patterns. Besides time, many materials are now being considered critical, and supply of resources cannot meet the needs of the transition to a circular built





environment. The very technologies circularity depends on, are in turn dependent on materials whose supply is not guaranteed. And although there exist circular strategies like service-life extension and recycling, these can only be put in place after the infrastructure has been set and the product has been deployed, used, and retrieved. Ultimately, now our plans for circularity require more mining than ever.

CURRENT STATE OF AFFAIRS FOR THE DIFFERENT LEVELS OF EDUCATION IN THE NETHERLANDS

THE HBO ROTTERDAM EXPERIENCE

HANNAH BELJAARS-FREDERIKS

HBO Rotterdam has set in motion a curriculum that not only tries to bring students from different disciplines together by creating various possibilities of collaboration, but it also frequently engages students to work directly with companies. Value is to be found in working with practice and collaborating across a number of individuals with different expertise. However, this is not happening enough. Plus, technical schools like HBO do not possess abstract knowledge and at times lack theorizing.

THE ACADEMY OF ARCHITECTURE MAASTRICHT EXPERIENCE

JOSEF BISCHOFS

The school offers a unique educational setting because it bridges science with arts and the social disciplines. Its focus lies in the notions of place and sustainability, but through a critical standpoint that requires the embodiment of social functions besides spatial objectives. Value is to be found in critical thinking and critical building: these are the two most important notions for future practitioners in order to oppose the established ethics and practices of the market. Students need to think as far back as whether they need a certain product in the first place, even if that product fulfils circular/sustainable criteria. However, this is not stated or pursued as boldly as it should be.

THE BK TU DELFT EXPERIENCE

ATZE BOERSTRA

BK's BSc and MSc education has an invested interest in teaching students how to opt for sustainability. We systematically ask our students to make low energy buildings, and in some cases, we even go as far as to ask them to consider banning installations completely. However, buildings also need to fulfil certain performance criteria that still need a lot of heavy service infrastructure. Creating sustainable buildings is closely

connected to service systems: these systems are in turn largely reliant on critical materials, and they can be energy consuming. Therefore, despite our good intentions, there is an inherent conflict in our approach, one that perhaps weakens our capacity to bring across a convincing narrative. Students receive different information from us, and they are lacking the ability to contextualize this information and thus, they fall back to asking for ready-made solutions. To make matters worse, today's graduates will be working with people that are 20-30 years older and developers who will still be looking at everything as 'business as usual'. We have still not reached a point where we could be helping students develop the skills necessary for tackling the complexity of the issues at hand as they will be required to tackle far more complex issues than the generation before them.

DEVELOPING AWARENESS BY ACKNOWLEDGING OUR SHORTCOMINGS

During the discussion, a lot of points were raised regarding the weaknesses of our current practices:

01 We have not learned from the past and we are still behaving as if we have time. We need to start being relevant to times.

02 We have traditionally looked at technology as a means for overcoming the crisis, but the response to the crisis cannot only be technological.

03 We need to acknowledge the situatedness of architecture and its connection to place. I that regard, we must avoid the problem-solution binary or abstract generalizations and contextualize knowledge making within specific examples.

04 We are not currently educating our students to reduce consumption.

05 We have for too long been thinking about the crisis in silos. We now need to increase communication between us architects and engineers, but also with scientists and the greater public. This discussion should not be consumed within academia, but it needs to be carried out with a greater number of people. It is still unknown where the peer pressure is going to come from: it most probably will come from the market. But perhaps the new radical is doing it together and perhaps also with partners we wouldn't normally do it with and we need to prepare our students for this.

06 We are still struggling with data availability but also with data accuracy. Making informed decisions requires numbers and data for being able to compare (i.e., performance of materials or systems). However, there is either too little data, or plenty of data

but with a high percentage of uncertainty to this data accuracy. Science has not yet been able to provide us with any certainty on this. And there is also a lot of indeterminacy originating in our incapacity to define to what degree existing data should inform our decision-making processes.

EMERGENT THEMES FOR FUTURE EDUCATION

Based on the aforementioned exchanges, a series of suggestions were made:

01 A non-circular, non-sustainable education must not be an option.

02 It becomes increasingly more important to teach students when to say no and when to slow down. This means teaching while also raising awareness about one's responsibilities. The moto should be "I cannot change the world, but I can make it my work as best as I can for that place in time."

03 It also would be interesting to challenge students to think about polluting materials and buildings as the balancing act between architecture and engineering. Or even better, ask them to design with 20-25% less. Or go as far back as to ask them to redistribute existing space. Can we go as far as educating our students to deny designing anew?

04 Changes could/should be happening as soon as day one in their studies to set the scene.

05 In that regard, education needs to allow for more experimentation: direct contact with companies in a more consistent systematic way, but also with other stakeholders.

06 Use peer pressure to make the change.

07 Articulate everything we know in a way that is clear to many.

08 Train architects to "have bigger ears", be more attentive to what is happening; to relate what we know to what is happening around us.

09 Train students to be critical and convincing.

10 Decision making is not just about numbers, it is about acting responsibly while knowing the numbers. So, ethics and technology, ethics and design should be a crucial element of any program. What people do with the information should not be up to them. They need to take position and argue for that position.

11 Evaluation of students and student work needs to transcend from skills to energies.




SPA
ECOLOGIT
TU Delft



DAY 2

LEARNING IN UNCERTAINTY

The second part of the symposium focused on learning and pedagogy. Three sessions explored different aspects, starting with the way technology changes the educational process and its capacity to redistribute agency across educators and learners. The second session focused on innovative pedagogies and new ways of knowing. Finally, the third session was dedicated to discussing how learning has been affected by our increasing sense of uncertainty in conditions of (super)complexity.



Effective Use of Technologies

MODERATOR

Atefeh Aghaee	*Learning Developer, TU Delft*

PANELISTS

Marcus Specht	*Professor for Digital Education, TU Delft*
Serdar Asut	*Assistant Professor Design Informatics, TU Delft*
Olga Ioannou	*Assistant Professor, TU Delft*

For this session, tutors from the Faculty of Architecture and the Built Environment at TU Delft were invited to discuss the opportunities and challenges presented by technology in their education. During the last two years the COVID-19 pandemic made us switch to fully online education; so, what happens now that we are back? What are the lessons learned? Is there anything we would like to keep? In the beginning of the session, attendees were kindly asked to identify what the technologies they currently use are; if they consider them effective; what their struggles are and how they think technology has affected their teaching overall. During the second half of the session, the panelists presented a selected number of examples of technology applications in design education and discussed their pros and cons. Here is the summary of the key points exchanged during the discussion across the four topics presented by the panelists.

BLENDED LEARNING AND THE USE OF TECHNOLOGY IN EDUCATION

ATEFEH AGHAEE

THE PERVASIVENESS OF NEW DIGITAL MEDIA | The number of tools is growing and that can be very challenging; teachers have admitted to not always being up-to-date or to not having the time to experiment with new tools. However, they see clear advantages in using digital media, especially for certain activities which are very hard to realize with analogue media. Interestingly, there have been cases where digital/online tools that were used during corona, are still being used in physical settings as a parallel learning space.

STUDENTS | The teachers' impression is that students seem to always be more in tune with new software and the online tools available. In that regard, integrating digital/online learning in a course is less intimidating for them. There is also a great opportunity for collaboration between students when it comes to training for digital/online tools.

UNDERSTANDING POSSIBILITIES | There is a delicate line to be drawn between technology-driving-pedagogy and pedagogy-driving-technology. Each mode of Blended Learning -enabling, enhancing, and transformative- alludes to a different pedagogy; hence, it is important to know what possibilities are at hand and what their repercussions are.

SERENDIPITY | New concepts have emerged over the past two years; for instance, the nature of studio content has changed because of technology. New digital tools and media have enhanced creativity and opened up new possibilities for exploring and collaborating; site visits became a lot more speculative and new levels of spatial inspiration appeared that were not available or possible in the analogue discussion. Digital tools can't fully replace the hands-on experience, but they can raise the level of engagement of more students.

UNDERSTANDING LIMITATIONS | Even though digital technology has been a big advantage in many areas in education, there are times when digital media alone does not suffice. For instance, it has been very difficult to introduce students into first year education and to recreate the atmosphere of the design studio online. Project development can also be more challenging.

CRITICAL POINT OF VIEW IS NEEDED | Teachers have to be critical because the industry at this moment offers a lot of tools (e.g., VR glasses and the 3D experience they provide). As design educators, it is a big part of our role to regulate the role of non-designers in design education and the agency we give to industry in providing our education.

"Why do we want to blend? Because it gives us the possibility of having deeper and more relevant discussions. There will be more student engagements, blending gives voice to students."

- Atefeh Aghaee

CREATING IMMERSIVE LEARNING ENVIRONMENTS BY USING VIRTUAL REALITY

SERDAR ASUT

In design education, we not only communicate through audiovisual information or textual information, but we often actually need to build things together with our students. And for that we use tools and physical materials. But how can we do this if we teach online? How can we create a space for seamless interaction between people and things?

"Our imagination is a bit ahead of the technology right now. Whereas two years ago we only used what was available, we can now as educators put down our demands, our requirements to develop new technology we need for the pedagogy we desire."

- Serdar Asut

OVERCOMING SPACE LIMITATIONS FOR TEACHING ROBOTICS | For the *Design Informatics Technoledge* course, here at TU Delft, a robotic arm is being used to design and build architectural objects. This is quite challenging to learn especially when it comes to managing the robotic arm itself. In order to operate a device like this, you have to walk around it, you have to look from above, from below, you have to touch it. During Corona, we relied on digital software to help students simulate the operating experience. However, this alone cannot reproduce the actual experience of using the robotic arm in its entirety. Plus, even in more normal times, the number of lab hours is anyhow limited and thus not all students can have proper training. This limitation led to the conceptualization of an immersive learning environment, a hybrid workspace that allows the possibility of combining virtual reality, augmented reality, and human robot interaction technologies. And an interdisciplinary project was born out of this thought in collaboration with the VR Lab of the Faculty the A+BE Study Group of the Architecture Department and the Human Robot Interaction group in the 3ME.

PEDAGOGY CHANGING | Robotic applications are proliferating in all fields, including architecture, including the construction industry, and more robots are now working in the construction side to build architectural components. Students need to learn how to program and operate the robots to make buildings, or parts. There is an added benefit to this that transcends simply using a machine for building; one learns to also collaborate with this machine during the design process. This is also why in the case of this Technoledge course, the idea has been to not only develop a platform that allows us to simulate the exact operating experience, but to rethink the pedagogy. Because ultimately, experiments like this one pave the way for computer – human collaboration. And that is the most interesting twist; whereas two years ago we only used what was available, we can now as educators put down our demands, our requirements to develop new technology we need for the pedagogy we desire.

ENHANCING LEARNING: DIGITALIZATION IN EDUCATION

MARCUS SPECHT

Digitalization in education currently manifests in different ways. One is datafication, thus making things we do become traceable. For instance, there is a tool that makes sketching traceable so that afterwards others can follow that trace and get data about the processes of creation. The other is virtualization. Even if we don't use VR for teaching specific skills, we still prepare the students that enter the job market; those that have already seen and worked with a VR headset have a nice head start in being familiar with this technology and are aware of its potentials. The third is enhanced learning. Although learning

management systems were introduced around 2000 and were basically a very effective machine for distributing learning materials, we now need to develop these tools further and learn how we can make these learning and teaching processes better. Understanding the effects on a cognitive level can help in gaining insight on the students' learning process, e.g., how they can learn faster, reach deeper understanding, and enrich their learning experience socially.

THE VALUE OF METADATA | Design education often uses the study of precedents. But so far, existing databases have not offered the possibility to cross reference one another. For the MACE project (Metadata for Architectural Content in Europe) the content of 27 distinct databases was analyzed and metadata added to it. The more categories, the more flexibility there is to create different taxonomies out of this content, and to make different classifications.

PERSONALIZED PATHS OF LEARNING | The Faculty of Electrical Engineering Mathematics & Computer Science developed a project to provide personalized learning paths to students. Using all the learning content, the system can build a trajectory which allows students to follow different paths. This way they do not follow one linear structure, but could have different access to the learning materials, and then receive feedback on how much they still need to complete, or how far they are in the course.

"We are at a point where we need to think in interdisciplinary terms; instructional design, psychology, human learning yes, but also how technology can help people learn things differently, more efficiently or deeper."

- Marcus Specht

TRANSFORMATIVE BLENDING FOR LEARNING IN CONDITIONS OF COMPLEXITY

OLGA IOANNOU

LET'S GET MESSY | The problems architecture is currently dealing with, like climate of resource depletion, are very complex (or ill-defined); either the information about it is confusing, or there might be conflicting values amongst stakeholders, making decision making very hard. Complexity in architectural education is usually tackled through abstraction so that it becomes understandable and manageable. But, what if instead of trying to control complexity we simply accepted it? What if we also accepted learning to be messy and chaotic? What would become then of educators? What would courses look like?

KNOWLEDGE AS DECISION-MAKING | The more contemporary theories of learning are looking at the ways learning is conditioned by uncertainty and how that challenges teaching formats. Interestingly, they consider knowledge to come from decision-making and that is why they allocate value to enabling students to make their own connections.

"Academia should consider models of courses or new learning formats within existing courses where students' agency in the learning is significantly increased."

- Olga Ioannou

THE POWER OF TRANSFORMATIVE BLENDING | Blending in its most radical, transformative version allows for this openness because it offers the possibility for a more distributed way of learning between different media and individuals with diverse perspectives, where multiple forms of knowledge are possible. Transformative blending brings together different learning spaces physical and virtual; content can come from multiple, even contradicting, sources. In transformative blending, knowledge is not a predetermined entity, something to be transferred from the educator towards the learner; rather, it is born out of their continuous exchange, a meaning making process that is conditioned by their co-existence in the learning space and therefore spontaneous and unpredictable.

NEW ROLES | In this regard, the tutor becomes the curriculum by opening up to these different types of content and modes of delivery, without necessarily prioritizing any of them. Here it is the students who would make their own priorities and their own learning paths; they would choose how to connect to the different modes of this network -if at all- and make their own meaning out of it according to their own background knowledge and fascinations.

THE CHALLENGES OF THE TRANSFORMATIVE BLEND | Transformative blending requires that students have high intrinsic motivation as well as a sense of autonomy to be able to find their direction and focus. Since the learning objectives are set by students themselves, assessment can be tricky. Educators are also required to adapt to the dynamics of each cohort and to help them weave and navigate their own web of connections.







Innovative Pedagogies

MODERATORS

Leo van den Burg	*BSc Faculty Coordinator, TU Delft*
Olga Ioannou	*Assistant Professor, TU Delft*

PANELISTS

Mia Roth-Čerina	*Associate Professor, University of Zagreb*
Tom Parker	*Co-coordinator Sustainable-Sustainable Architecture, Critical Concrete*
Angeliki Sioli	*Assistant Professor, TU Delft*
Peter van Assche	*Architect & Professor Academy of Architecture, Amsterdam University of the Arts*
Jeremy Till	*Architect, writer and educator*

"We are at a turning point for education: we need to teach agency and ethics more. And not explicitly, but embedded into every single aspect of teaching and research."

- Mia Roth-Čerina

This session focused on the current pedagogical challenges of architectural education. Each speaker discussed their own individual approach(es) and teaching experiences, while Mia in particular, presented the collective views of EAAE and more specifically the position of EAAE's Education Academy. As the following text illustrates, despite the speakers' diverse standpoints and interpretations of the current criticalities of architecture and the production of space, they all agreed on the impending need of change, or a new axioma, as they called it. One that would bring forward a new understanding for space production and with it, augmented responsibility for the architects and a new value system within academia.

EDUCATION FOR AGENCY
MIA ROTH-ČERINA

Education Academy advocates that architectural education must create professionals capable of responding to emergent needs. And in that sense, we need to embed crisis into teaching because that is what prompts change. For this, we need to train graduates that are able to transpose complexity into a spatial concept and who can critically reflect upon local, regional, and global value systems of spatial production. Education is about promoting student agency, embedded into all facets of the content that we teach. This requires new platforms and a less skills-oriented but softer skill-oriented curriculum, allowing for failure and experimentation while fostering critical thinking and creativity. And also building resilience -not through replicating or reinforcing the power system around which architectural

education is structured, - but instead through adaptation and care.

PARTICIPATORY DESIGN AS A MEANS OF UNDERSTANDING THE REAL PERSPECTIVE
TOM PARKER

Critical Concrete as an NGO researches sustainable urban architectural design strategies where students, the local community and experts engage in a collaborative design and building process. In our pedagogy, a balance is sought between a very hands-on approach and theory. It is a hybrid approach in which desk work is combined with short but intensive periods on site. Even though it is not always easy to achieve meaningful participatory design, the panel agreed in the discussion that this can offer solutions that one could never find by academic 'mind-bending' only.

"By breaking that imaginary and going into reality and working on something that's real with the perspective of design and learning in education, is infinitely more fruitful and rewarding than when you only engage with the imagined."

- Tom Parker

LANGUAGE AS A KEY TO UNLOCKING IMAGINATION
ANGELIKI SIOLI

University students often come from very diverse educational and cultural backgrounds, which can result in considerable difficulty in creating strong class dynamics and fostering collaboration. However, we all have the capacity to recognize and sense atmospheres regardless of our background or education and we all can also express ourselves through language (written or oral). The 'Space of Words' design studio was based on the above two capacities that beginning master students have in common. The studio engages language as a tool of both representation and design in order to build (through models and 1:1 scale structures) domestic atmospheres in place. English (the official language of the TU Delft master program) and the various mother languages of the students offer fascinating possibilities for imagination in architectural design allowing the students to explore their narrative and literary imagination.

"We need to break down completely unnecessary, completely redundant boundaries between research and practice."

- Angeliki Sioli

LISTEN TO ME, BUT NEVER DO AS I SAY
PETER VAN ASSCHE

From an architect, educator but also a mathematician's perspective, Peter argued that since architects have 'messed up big time', we need to find new logics in design and education. Even axioms can change, and architecture axioms are changing today. What we thought of energy or materials five years ago differs enormously from what we may think of them today. Today for example, material flows have a past, a present and a future, and this signifies already a radical change. Including more aspects of materials' life in education might lead to a new architectural vocabulary, typologies, and expressions. Objects of the future will be radically different than the objects that we have today. And this notion of radical difference comes from the fact that we use a different axioma.

"Architecture is a beautiful profession, but it's not innocent so, it needs to have an agenda. Young architects need to take a stand and define their agenda."

- Peter van Assche

"Climate breakdown is necessarily accompanied by an architectural breakdown."

- Jeremy Till

ARCHITECTURE IS CLIMATE
JEREMY TILL

Architect, educator, and writer Jeremy Till presented climate breakdown as a fatal threat to architecture of 'the modern project'. The idea of architects solving the problem of climate emergency through buildings first and foremost implies that architecture can act as some kind of fix; second to that, emergency is considered in a timeless state where what happened before or what will happen after seem to be irrelevant; finally, it reduces architecture to a mere technical instrument. The question, says Jeremy, needs to be reversed: What does the climate breakdown do to architecture? Only in this way can we situate climate as the position within which architecture should be situated and understood but also, bring architecture into the context of systemic changes that climate breakdown calls for. This requires a complete reset of architectural values, as well as those in architectural education. But most of all, it requires that we accept architecture's vulnerability in the face of crisis, and we forever deny the absurd notion that architecture stands as an autonomous system lifted out of the forces of society.

MAIN TAKEAWAYS

The ensuing discussion can be summarized as follows:

01 Current climate and social emergencies challenge the nature of the architectural profession severely.

02 This requires a different approach to architectural education, in which we acknowledge that architectural objects still need to be produced but based on a new set of axioms.

03 This is fundamentally changing the value systems within academia whereas perhaps the most difficult barrier to break will be to move from the object-oriented education.

04 This is not about leaving architecture in the sense of spatial production or spatial consequence; it's just about what we understand this process itself to be and what its responsibility is.

05 A starting point for any design is the question of why something should come into existence in the first place. Hence, the norm is still the object, but we should be looking at the conditions which have constituted climate breakdown instead.

06 Students are brilliant at thinking beyond the building. That understanding doesn't have to be played out through product developing: it can be played out in the production of a timetable

to use urban space in a certain way, it can be played out in the design of a new waste stream system etc.

07 For this, we have to un-learn and breakdown traditional concepts of architecture, also in bachelor's education, where these concepts may be most implicit.

08 However difficult, it was agreed, this is a necessary step towards an education in which there is more room for soft skills and the idea of working through failure. In this education, boundaries between research and design are done away with, resulting in more room for hands-on experiments in real life situations.

09 Research is ever-expanding (just like the role of the architect is ever-expanding) and can be done by doing, by designing, by testing and by prototyping incorporating the ethos of much more specific and contextual terms like situatedness.


SPA


TUDelft





Learning in Uncertainty

MODERATOR

Olga Ioannou	*Assistant Professor, TU Delft*

PANELISTS

Ronald Barnett	*Professor Emeritus University of London*
Dave Cormier	*Digital Learning Specialist, University of Windsor*
Nina Bohm	*PhD Researcher MBE, TU Delft*

STUDENTS

Talal Akkaoui	*BOUT*
Marialena Toliopoulou	*BOUT*
Julia Gospondinova	*BOUT*
Anna Shishkina	*FSC*
Aafke Simonides	*Stylos*
Lotte van der Horst	*Stylos*

This session focused on how our learning is influenced by extreme complexity (or super-complexity in Ron Barnett's words) and how meaning-making processes are negotiated in an increasing sense of uncertainty. The following text summarizes the key points raised in the discussion, and further illustrates how educators and students perceive their being and becoming in conditions of uncertainty.

FRAMING THE SESSION | Architecture is pre-eminently an open profession in that it inherently involves open-ended responses to situations, both in architectural processes and in architectural outcomes and in value options. This context compounds complexities that are characteristic of professional life and poses particular issues for architecture higher education, not only of the curriculum but also of pedagogical processes. Just as architectural processes pose their problems alongside the resultant outcome in architectural practices (which voices should be heeded? With which parties are connections to be made and conversations developed? Against the horizon of which values? And just how are civic and cross-profession tensions to be negotiated?), so do pedagogical processes pose their own problems (as to the pedagogical relationship between teacher and student, as to the relative significance between problem identification and problem solutions, and as to the design of learning situations so that they have in them large elements of openness).

THE PREDICAMENT OF SUPER-COMPLEXITY AND THE RISE OF UNCERTAINTY | We are facing many complex situations in the world as we

move through it and that is expressed by how systems around us interact often causing instability. Not all of these problems can be mitigated, let alone resolved. However, several could be managed and softened. Super-complexity is quite the reverse perspective; it refers to problems that are ever-expanding and get even more out of control and this means real problems for organizations and leadership. Whereas in the first case management may be able to mitigate the more disconcerting aspects of complex situations, for super-complex issues what is needed is a leadership that enables a collective discernment of values and aspirations that the systems might be based on. There is a nice set of juxtapositions here: complexity and super-complexity on one hand, management, and leadership on the other. One could think for example of higher education; it is one thing to run study programs and another to conceptualize what values they should be based on. Super-complexity is where uncertainty is mainly situated; how can we plan around what is unresolvable to us?

CURRENT EDUCATION IS ILL-EQUIPPED FOR ADDRESSING BOTH THE UNCERTAINTY POSED BY THE COMPLEXITY AND THE CONTESTABILITY POSED BY SUPER-COMPLEXITY. | In the past, the extent of information exchanged in the classroom was limited across the information brought in by the faculty member, the students, and books. And then we have this very clean idea about how education works: that you put something in that start and then you know what students have to go through and then they end up in the end attaining the competences specified in the list of learning outcomes. But the whole messiness both of complexity and of super-complexity makes that idea problematic. Knowledge is not measurable; flexibility in the face of uncertainty is not easily assessable and finally, creativity is not a counted noun, and nobody can say how many creativities you have. So, then we end up measuring content and we feed our addiction to assessment and the imaginary of evidence-based, learning outcomes education, the idea that somehow the things that happen in our mind are measurable in a way that everybody can see them.

THE CALL OF 21ST CENTURY IS "I DON'T KNOW HOW TO FIND THAT ANSWER" | Embracing uncertainty in teaching breaks away from these prescribed notions of how education should work. Uncertainty requires a certain openness for allowing anything to come into the pot, new ideas, new frameworks, new ways of doing things, new ventures to allow for learning that are appropriate to the world in which we are living, all of which are not necessarily measurable or even identifiable. Part of it is also allowing teachers the right to not always know the answer to a

question. Uncertainty allows curiosity and it allows agency. And therefore, we need to start building a new approach by creating environments in which these things can emerge. A very strong educators' dilemma is to be found at this delicate point where, on the one hand, educators try to hold on to a system with which they are familiar, while, on the other hand, they need to be able to criticize their practices and go beyond the ordinary if they are ever going to educate for unknown situations, for irresolvable conflicts and for products, services and even value-orientation the thing they don't know that the world needs yet.

The structure and content of traditional educational formats is thus severely challenged and so are we as educators; because the thing that we need to be able to do now is sift through a multiplicity of things. That's less about having someone to define and refine knowledge so you can accept it, but rather teach you how to give the incoherent some kind of coherence. And for that we also need to be able to work together with others because the days of one person being able to figure out a problem are mostly gone, and the capacity of individuals to sort things of less value. Co-creation and participation are essential. And then educators have to orchestrate spaces of openness or open learning to encourage conversations. That is the beauty and magic of academia; being around people with incredible insights. This is exactly where networks become important not only for knowledge creation but also in doing things together with others.

WHAT DO WE NEED TO TEACH FOR LEADERSHIP?| Educators need to be able to communicate their love and their passion for the knowledge domain they are teaching. That is why it becomes important how a teacher makes a class fun. This is now in the hidden curriculum of a course, but it should become more visible and explicit in course descriptions. After any course, no one will remember anything their professor said. However, they are going to remember how they said it, they will remember the feeling they have about it and the passion that they had or didn't have for it. Those are the things we carry with us, and also the way that someone confronts a challenge: their willingness to be wrong in front of you, their willingness to show you how they think.

THOUGHTS ON ASSESSMENT

RESULT, PROCESS OR BOTH? | Today architects are mainly judged upon the result. By extension, student grading in architectural education originates in the learning objectives of a course. In turn, the final grading obscures the

process of learning; what tools did the students use and what were the lessons learned? Grading systems disregard how students engage with various tools to address uncertainty as well as the decisions they made that led them to their final project. A distinction between problem-solving and problematizing might be helpful: whereas the first implies that there is an answer, the latter is contextual and situated and it accepts continuous uncertainty.

WHAT IS BEAUTY? | Grading is also shadowed by subjective notions of beauty and aesthetics. Luckily, there are movements that are driven by students, for reform of working practices and educational practices. As a result, many institutions, however reluctantly, are taking up these uncomfortable conversations.

INDIVIDUAL OR GROUP ASSESSMENTS? | Another issue with grades is they are individual and reflect that student projects are characteristically individual. This sheer fact contradicts the need to work in groups and the fact that in their professional lives people will need to be able to work together to tackle complex problems and to conduct themselves in multi-professional situations with hitherto unknown colleagues. Collaboration is not just a skill but is a disposition that is currently downplayed.

THE VALUE OF UNCERTAINTY IS THAT IT CAN INDUCE A HOPEFULNESS FOR THE FUTURE AND A DESIRE TO WORK FOR A BETTER WORLD | Including uncertainty into the way we teach is a way of bringing hope back into the process; it is important to acknowledge as educators that what our students are doing is valuable even if it is not solving problems. Hope is an important issue for our cultures: we now know more about everything than we ever have but if we keep looking at our problems through the lens of solving problems, we will only increase our sense of impotence. This is why it is critical to give ourselves a little bit of room and to find a place for that human side of us to continue to work collectively on the problems -both practical and in our thoughts and values- that we have.


TU Delft




BK Education in circularity | Creating a shared understanding: the "Scales to Aspects" Model

DAY 3
EXAMPLES FROM PRACTICE

Throughout the past year, the EAAE has been running a series of SDGs workshops linking the EAAE Education Academy & the EAAE Research Academy with the EAAE Conservation Network. Refreshing the discussions about the SDGs in education and research, and also concerning the New European Bauhaus initiative, the SDGs workshop series has been helping to map and exchange best practices among various EAAE member schools. The aim of this workshop in Delft was to bring forward and discuss intentions, concepts, and positions about SDGs in architectural education and research, interlinking to conditions, circumstances, and challenges faced by institutions.



Eaae Workshop Sustainable Development Goals (SDGs) in Education & Research

MODERATORS

Roberto Cavallo	*Faculty of Architecture & the Built Environment, TU Delft*
Mia Roth-Čerina	*Faculty of Architecture, University of Zagreb*
Ilaria Valente	*Department of Architecture and Urban Studies, Politecnico di Milano*

PANELISTS

Janna Bystrykh	*Academy of Architecture, Amsterdam University of the Arts*
Matija Pogorilic	*Faculty of Architecture, University of Zagreb*
Jörg Schröder	*Leibniz Universität Hannover*
Olga Ioannou	*Faculty of Architecture & the Built Environment, TU Delft*
Fabiano Lemes de Oliveira	*Department of Architecture and Urban Studies, Politecnico di Milano*
Gerardo Semprebon	*Department of Architecture and Urban Studies, Politecnico di Milano*

The workshop departed from the necessity of providing an overview and exchanging best practices about Sustainable Development Goals (SDGs) in education & research. Through the Education Academy, Research Academy and Conservation Network, in the past 18 months the EAAE has been running a series of events and workshops bringing about several aspects and perspectives regarding the connection of education and research to the SDGs (see: https://www.eaae.be/event/workshop-series-on-sdgs/). In addition, and next to the EAAE SDGs Series, the EAAE initiated a systematic involvement with the New European Bauhaus (NEB), challenging the cross-connection of sustainability, inclusion, and aesthetics with particular emphasis on architecture and 'design-driven' concerns. The main backbone of this event was the presentations of best practices brought in by colleagues from EAAE member schools.

The variety of experiences and themes served as a fertile ground for very lively discussions among the online and in-presence participants.

EAAE SDGs INITIATIVES ON THE FLY

Getting back to the questions enclosed in the EAAE Education Academy position paper 2018, we tried to actualize the principles and practices of architectural education and update them to contemporary concerns. The topics of circularity and SDGs in relation to the responsibilities and the goals of architectural education were

also addressed in the first EAAE Deans summit, organized by the Oslo School of Architecture and Design in April 2021, and culminated in a pledge for climate crisis and a sustainable future. Many schools of architecture and members of the EAAE signed a common document recognizing climate emergencies as a significant issue within our lifetimes and committed to focus their curricula on these concerns. This prompted a series of activities somewhat aligned also with research done on how architecture responds to the 17 SDGs of the United Nations. Various best practices across the globe elaborated on examples of which realizations, projects, or activities, directly relate to one of the SDGs. These topics were brought together within the New European Bauhaus initiative, which then prompted several alliances happening immediately afterward, such as NEBC (New European Bauhaus Collective) or the New European Bauhaus go South, the latter trying to adopt the new European policies to specific geographic contexts. Therefore, a very enthusiastic series of online events of conferences started which looked at how climate emergencies and New European Bauhaus policies, or pillars, could be specifically tailored to a specific context, geographic, cultural, and so forth. And, moving away from the previous one-size-fits-all policies, the focus shifted to direct relations or implementations within these contexts, and to what this would mean for architectural education. These all can be found on the NEB Go South website, as well as its YouTube channel. Several topics were addressed, such as the notion of the collective, the co-design aspect of contemporary architectural practice, the specific cultural contexts and how they trigger coming together, and inclusivity, the meaning of green infrastructure, the topic of active reuse and reprogramming, co-creating, and connecting in education, and finally instigation of student agency and how this could be done.

All these activities are aligned around the recognition that several SDGs are directly related to the built environment, and that architecture holds a great responsibility in redefining its scope of action and expanding its response to nowadays complex challenges. In this framework, the EAAE decided to work in parallel with the UIA (International Union of Architects) paving the ground for a survey that the EAAE conducted which sought to map how SDGs were implemented in schools and look at best practices. The survey consists of three parts. The first is about the institutions' policies, the second concerns education and research, and the third part is devoted to the collection of best practices. Some rating systems - e.g., the university rankings - consider the used application of SDGs as a parameter of evaluation. Up to now, the survey points out that the majority of experiences related to the SDGs are in education, in most cases design studios and then other types of courses. Some schools, like the Academy of Architecture of Copenhagen, considered thoroughly the use of the SDGs

as tools for reshaping education. Other universities, such as Politecnico di Milano, approached the SDGs from the policy perspective, encouraging and mapping courses that incorporate SDGs issues in their teaching programs.

FIRST SESSION

This session involved presentations by a Master student from the University of Zagreb, the Architecture program leader at the Academy of Architecture, University of Arts, Amsterdam, and the Dean of Research at the Faculty of Architecture and Landscape at the Leibniz Universität Hannover.

FACULTY OF ARCHITECTURE, UNIVERSITY OF ZAGREB
MATIJA POGORILIC

Matija is a student from the University of Zagreb, presenting the master studio KM3 mentored by Idis Turato. The studio evolved from the writings of Bruno Latour and the 'Critical Zones' exhibition he did with Peter Weibel, continuing an interpretation through an educational format speculating on architects' positions and current roles. Taking place in the Richter gallery of the Museum of Modern Art, students conducted research that led them to choose 10 zones that they then used as polygons for testing ideas, and through architectural storytelling and interdisciplinary dialogue addressed global change, the Anthropocene, and the most fragile layer of Earth as well as architecture's role in it. Together they created a speculative map where they put all their locations next to one another, making them form a symbiotic relationship with one another and also trying to overlay multiple systems. These systems created one bigger structure that can be used as a discussion point for how to reassess architecture, intrinsically linked to creating objects, hardly creating a difference on a planetary scale. Considering all factors in the area, whether passive or active, they tried to consider every living and non-living part of nature. How the work was explained and exhibited in the gallery space it took place in during the semester was of equal importance – instead of communicating with plans, an immersive exhibit enabled one to go in and talk about experiences, positions, and vectors in space.

ACADEMY OF ARCHITECTURE, AMSTERDAM UNIVERSITY OF THE ARTS
JANNA BYSTRYKH

Janna is head of architecture at the Academy of Architecture, University of Arts, Amsterdam, and spoke also on behalf of Markus Appenzeller, head of urbanism, Joost Emmerik, head of landscape, and head of the school Madeleine Maaskant. She provided a glimpse of a position statement they are working on,

formulating the direction they want the school to go and relating to other agencies, and organizations. In addition to that, they are creating an architecture curriculum focused on climate emergencies and the environment. The questions this curriculum asks are – how does architecture become regenerative, moving away from growth indicators toward other values, integrating a planetary community perspective into the educational system. Several examples illustrated how this content shift is placed. Some stressed particularly the research phase, dealing with an emphasis on documenting the environment, researching the site and its materials, to discuss reducing waste, rehabilitation of space, and found materials. Others dealt with climactic design or redefining the most intimate spaces and transforming them into vehicles of agency. Topics evolving from policies addressing our shared planet invite a transdisciplinary dialogue, and examples of both scientific and artistic contributions from other experts were also mentioned. This approach tries to create synergies, establishing conversations with students about what their roles will be. The presentation opened a discussion on what we consider our environment to be, on the hidden school question and a different way of thinking and doing without needing to label it. A point on how SDGs do not address de-growth was also made, and what the role of the architect is in that context.

LEIBNIZ UNIVERSITÄT HANNOVER
JÖRG SCHRÖDER

Jörg is the dean of research from the Faculty of Architecture and Landscape at the Leibniz Universität Hannover, and presented the book ‘Circular Design, Towards Regenerative Territories’. It explores paradigms and strategies for our discipline and transversal approaches in formulating objectives for implementing and evaluating SDGs. The research around this volume was related to a previous Creative Europe project dealing with food waste and the gas impact of the food sector, looking at the approach to food cycles as a lens and accelerator for urban change. Following a deeper understanding of what is understood as regenerative, the team defined a scope that does not only include material flows, but also immaterial flows that are linked to social, economic, and cultural aspects, and also to research. This is also about territorial innovation: the link between economic and social change; communities that act in transformative ways. In dealing with uncertainties, design thinking has become very popular, as it is experimental, adaptive, and especially disruptive. Producing solutions for our situations of uncertainty and the specific consideration regarding circular design, it is not only important to stop linear resource consumption and consider circular systems of materiality, but also circular systems of design. This includes all sorts of stakeholder and citizen knowledge and participation directly in the design process as iterative processes. We shouldn’t regard design only as inventing, but also design as making, thus including

theories of reuse, social feedback, livability, social inclusion, and improved resilience. The discussion further opened the question of mirroring education and research, particularly at the master level, and testing content through student feedback and reflection, which is in turn again embedded in research.

SECOND SESSION

The session compared programs, examples and experiences carried out at TU Delft and Politecnico di Milano.

DEPARTMENT OF ARCHITECTURAL ENGINEERING + TECHNOLOGY - CIRCULAR BUILT ENVIRONMENT HUB (CBE), FACULTY OF ARCHITECTURE & THE BUILT ENVIRONMENT

OLGA IOANNOU

The Faculty of Architecture and the Built Environment at TU Delft has acknowledged circularity as one of the six themes that drive its education. At the moment, this goal is largely supported by the Circular Built Environment (CBE) Hub and the Circular Impulse Initiative (CII).

THE CBE HUB | The CBE Hub comprises of over 70 staff members of the faculty and is led by Professor Tillmann Klein. The group has an extensive research portfolio from Horizon projects to other European and non-European projects and uses its members' input knowledge to provide education with tools and methods and to create a shared understanding of circularity amongst the faculty's staff members. A working group of the Hub carried out the "Definitions and philosophy workshops", a series of brainstorming meetings about the scales and aspects circularity is currently encountered in. One of the primary goals of this working group has been to define what a circular built environment is and to identify how circularity manifests specifically in the built environment. These discussions have led to the 'Scales to Aspects' model that tries to capture the complexity of circularity and to aid in identifying future research themes.

Parallel to this, the steering committee of the CBE Hub has mapped BSc and MSc courses that have already incorporated modules on circularity or have a potential of doing so in the future, with the goal of planning a seamless integration. The strategic aim is not to introduce new courses on circularity but to integrate it into the existing curriculum organically. For that reason, the Hub also developed the Circular Learning Objectives (CLO) list to define ways of achieving that integration, while a position paper on education that has recently been published

explains the rationale behind all aforementioned decisions, and our overall strategy towards a circular education.

The CBE Hub as a group is currently also responsible for a wide series of life-long learning offerings: a series of MOOCs has been implemented since 2018 -the MOOC 'Circular economy for the sustainable built environment' has been one of the most successful of these offerings, with more than 15,000 viewers worldwide. A series of professional education courses at different scales is also available, as well as training directly addressed to industry. Since 2022, we also established a Summer School on Circularity in the Built Environment.

THE CIRCULAR IMPULSE INITIATIVE | The second pillar of circular education at BK is the Circular Impulse Initiative. The group is currently involved in three actions: the first is the Circular Design Atlas, a database of different case study examples on how circularity appears in the built environment across the six scales and is currently coordinated by Mo Smit. A second stream of activities addresses BSc needs specifically and helps develop circular events for the bachelor students, where students can visit specific construction sites, have workshops, meet with professionals from the field, and share their experiences with them. This is run by Mariette Overschie. And lastly, two new learning environments have been implemented as well: 'Circularity for Educators' and 'Educators for Circularity'. The first environment is a digital platform that consists of a series of learning resources in the form of videos, readers, and pedagogical aids. These resources relate circularity with the current architectural discourse, they explore the relationship of circularity to systems thinking, complexity theory, the relation of sustainability to circularity, and the food-energy-water nexus. In addition, they provide a series of definitions about what circularity is and a basic understanding of materials and design. All resources are shared openly with all educators and whoever is interested in circularity. The second environment, 'Educators for Circularity', is again a digital platform that complements the first. Through this platform, we want to receive feedback from educators and interested parties through a number of discussions. The people who have contributed to the content on the first platform use this second one to initiate conversations with a wider audience.

DEPARTMENT OF ARCHITECTURE & URBAN STUDIES, POLITECNICO DI MILANO - URBAN AND ENVIRONMENTAL DESIGN STUDIO

FABIANO LEMES DE OLIVEIRA

The case shown is a studio in the Master Sustainable Architecture and Landscape Design at Piacenza Campus. The

focus is on how SDGs thinking is embedded into the curriculum. This experience has been taking place in different iterations for the past three years. It is a 10 ECTS interdisciplinary studio, 6 ECTS for the contents in Urban Planning, Urban Design, and Landscape Architecture, and 4 ECTS for Agronomy and Food Sciences, mainly devoted to ecological thinking. The premise is the question of climate change and how to plan a design for more human life.

The course holds two phases in which SDGs appear differently. Firstly, the students develop the analytical phase and the definition of the green infrastructure plan at the broader, territorial scale. Students must look at policy documents and do a systemic analysis of the assets given to them, looking at how the ecological systems are or are not working well. Then they must think about the relationships between SDGs and local challenges. Afterward, they develop a strategic infrastructure proposal and select a site for phase two, going down to the scale of urban design.

The SDGs are a part of the program as learning outcomes through a marking criteria matrix. At the beginning of the course, a survey was carried out about what they knew about the SDGs, and it was close to zero. SDGs can be generic and up for students to throw to all the different targets and indicators. Hence, the teaching staff suggested a summary of the more relevant targets to the studio design approach, and then each group of students must choose at least three SDGs to focus on.

The idea is to avoid concentrating on the 11th Goal only and to understand the interrelations between the various SDGs. Targets need to be identified to find ways to translate the SDGs into local challenges. Then they had to define what nature-based solutions could be implemented to strengthen their ecosystem services, which would eventually also address the SDGs.

DEPARTMENT OF ARCHITECTURE & URBAN STUDIES, POLITECNICO DI MILANO - THEMATIC STUDIO

GERARDO SEMPREBON

The topic is how SDGs have influenced the design process in a multidisciplinary studio (Master of Architecture and Urban Design, 2nd year, 14 Ects, with professors Fabiano Lemes de Oliveira - Urban Design, and Alberta Cazzani - Conservation and Restoration).

The main goal of this studio is to explore new urban relationships using the *Naviglio della Martesana*, an artificial canal and a prominent historical artifact, part of a network of artificial

canals that connects the city of Milan with the water system of the Lombardy rivers. The artificial channel is the means for exploring the condition of urbanity, peri-urbanity, ruralness and naturalness/wilderness that appear in such a layered territory. The studio envisages 3 phases. The first consists of reading the context and is finalized to find out the site they will focus on in the subsequent two phases, devoted to designing, from the masterplan to the architectural scale. The second phase is required to have some interferences with the SDGs to corroborate their design brief. The students select the SDGs and try implementing them in specific spots. They use SDGs as a reference point to organize the open space system that will perform as a kind of system for biodiversity to have corridors. For example, the students choose to design a new hybrid system of Urban housing and Urban micro-scale farming to promote community cohesiveness, addressing social and pedagogic goals. Another group was interested in using SDGs to point out ecological corridors. Nine groups developed the projects, and the result allows us to compare different approaches to how SDGs have been used to define design briefs. SDGs have been a valuable tool in connecting global problems and global issues to localized actions and proposals for specific sites. scale farming to promote community cohesiveness, addressing social and pedagogic goals. Another group was interested in using SDGs to point out ecological corridors. Nine groups developed the projects, and the result allows us to compare different approaches to how SDGs have been used to define design briefs. SDGs have been a valuable tool in connecting global problems and global issues to localized actions and proposals for specific sites.





Architecture Education - Glimpsing a Post-Human Path Forward

Ronald Barnett
Professor Emeritus of Higher Education UCL

Architecture is pre-eminently an open profession in that it inherently involves open-ended responses to situations, both in architectural processes and in outcomes and in value options. This complicated context compounds complexities that are characteristic of professional life and poses particular issues for architecture higher education, not only of the curriculum but also of pedagogical processes.

Architectural practices pose starkly problems of process and product and of the relationship between these two aspects of architecture. In relation to architectural practices, with which parties are connections to be made and conversations developed? Against the horizon of which values? And just how are civic and cross-profession tensions to be negotiated?

These two domains – process and product – run into each other but with the character of a never-ending Moebius strip. The structure, character and values entering into the process, frame and limit the emergent entity: in determining the spaces, shapes and materials, which considerations enter into the thinking, imagining and conjectural processes? Given these processes and practices, what kinds of entity is likely to result? Ultimately, the entity – the building, the configuration, the arrangement of spaces – reflects the network of interactions and processes behind it and points to options of process and product in front of it.

There are complicated matters of networks and relationality here. Towards which communities

is the architectural practice oriented? Which voices are most heeded? Who, ultimately, constitutes the 'consumer', those who will live and work in a building or those in the community whose lives might be profoundly – materially, aesthetically, ecologically – affected by it? (To put the matter formally, what are the components of the assemblage here and what are their relationships?)

And there are complex matters of complexity! Complexity refers to the range, volume and changing nature of the systems and entities – material, organizational, informational – with which an architectural process has to engage and to accommodate. The movement and the excesses in these systems can cause system (human, group, and practice) stress and overload.

However, alongside this complexity sits super-complexity, which is exhibited in the question 'What is an architect?, which these days is utterly open-ended and yields no consensus by way of an answer. To the contrary, the more that question is posed, the more the interpretations increase.

[An architect is a fabricator of the material environment, is an artistic creator of imaginative spaces for living, is a conserver of the resources of the Earth, is a solver of spatial problems in the interests of clients, is a manipulator of the physical environment for spatial capitalism (consider the ways in which many apparently public buildings and spaces turn out to be privately owned with rules and sanctions even as to who is entitled to use them).]

Given these multiple and problematic aspects of architectural practice, so architecture education generates parallel but also additional challenges, in relation both to the curriculum and to pedagogical processes and to their inter-relationships.

In relation to the curriculum (given the above analysis), how wide should it be? To what extent should matters of civic society, public good, ethics, ecology, professional life and inter-professional life, democracy, and urban life as well as information on the distribution of wealth come into play, not to mention the perspectives of history, cultural anthropology, aesthetics and so forth? But, more especially, might there be overarching themes drawn from the wider world – e.g., of ecology, citizenship, public good, wellbeing – that might serve to steer thinking and ideas (and transcend disciplines, i.e., be 'transdisciplinary'?

In relation to the pedagogical process, how might the pedagogical relationship between teacher and taught be construed? What might be the relative significance between problem identification

and problem solutions? And just how might the learning process become one of transdisciplinarity?

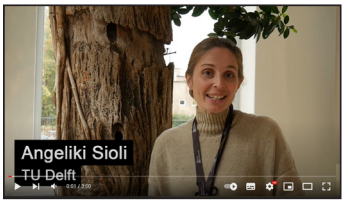
In the context of these considerations, and fundamental to the pedagogical process, architecture education should strive in the direction of open learning situations, openness being itself interpreted openly, to include intellectual, professional, pedagogical and value openness. This entails students being faced with increasing responsibility towards their own learning and thought processes.

Not least in the wake of architectural catastrophes that we have seen across the world, the matter of criticality HAS to be central to architecture education, so students have to be exposed to multiple and conflicted frameworks through which they can interrogate and critique – and, when necessary, take up the cudgels against - their own profession. This itself calls for transdisciplinarity in the curriculum and open learning situations in the pedagogical relationship, but it calls, too, for virtues of courage, political nous, persistence, and carefulness and ultimately of wisdom, of a preparedness to act against the widest horizons in the interests of the good of humanity and this Earth. It would be a post-human architecture education.

31.01.2023
R.A.B.

LINKS TO VIDEO INTERVIEWS

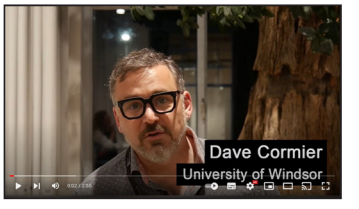
Short interviews from the event can be found on the BKTUDelft youtube page.



Angeliki Sioli
https://youtu.be/HG0iuz4-XLQ



Atefeh Aghaee
https://youtu.be/aW8PP2TL4vU



Dave Cormier
https://youtu.be/uf4ukZ_HsjI



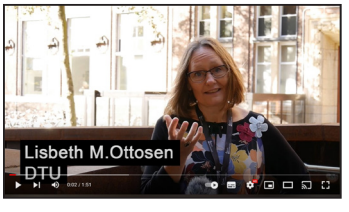
Emma de Wijs
https://youtu.be/Y0xjugxL6x0



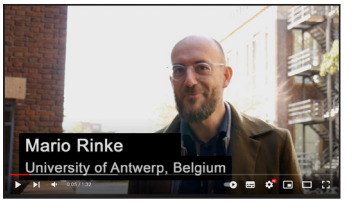
Hannah Beljaars-Frederiks
https://youtu.be/sAJsHBbTrpw



Josef Bischofs
https://youtu.be/tFxZC-TFsPY



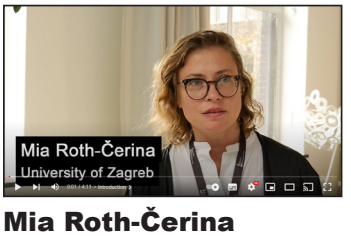
Lisbeth M. Ottosen
https://youtu.be/H8SgSEAqbAk



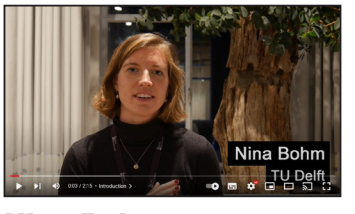
Mario Rinke
https://youtu.be/M7WCWyCX-TAv



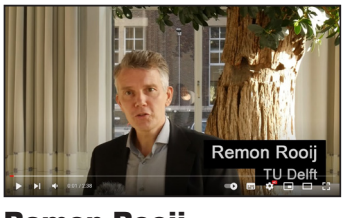
Marcus Specht
https://youtu.be/cZ92Zfsvob4



Mia Roth-Čerina
https://youtu.be/soDVdXKCR68



Nina Bohm
https://youtu.be/i-OBHFx23rk



Remon Rooij
https://youtu.be/Byn-mfpX0GU

PARTICIPANTS



Angeliki Sioli

Angeliki Sioli, PhD is an Assistant Professor at the Department of Architecture, TU Delft. In 2021 she was awarded the Comenius Teaching Fellowship by the Dutch Ministry of Education, Culture and Science. Her research seeks connections between architecture and literature focusing on aspects of atmospheres and embodied perception of place. She has edited the collected volumes *The Sound of Architecture: Acoustic Atmospheres in Place* (Leuven University Press, 2022) and *Reading Architecture: Literary Imagination and Architectural Experience* (Routledge, 2018). Before joining TU Delft, Sioli taught both undergraduate and graduate courses at McGill University, in Canada; Tec de Monterrey, in Mexico; and Louisiana State University in the US.



Atefeh Aghaee

Atefeh Aghaee is a Learning Developer at the Faculty of Architecture and the Built Environment at TU Delft. With a background in education, she helps teachers at the faculty to rethink the design of their courses and innovate in their teaching. Atefeh also advises on online/blended learning and supports teachers with the integration of digital media and content in education design, to enhance the learning experience of students. She has extensive experience with innovation in higher education and previously worked as a teacher and curriculum designer at the University of Helsinki as well as Aalto University.



Atze Boerstra

Atze Boerstra is Professor of Building Services Innovation at the TU Delft Faculty of Architecture. Since 1996, he has been director of the research and consultancy bureau BBA Binnenmilieu, an engineering firm in The Hague, specialized in indoor air quality and thermal comfort and their effects on humans. Atze is also a partner at DGMR, the parent company of bba. He is a member of the scientific advisory committee of CSTB Paris / the Observatoire de la qualité de l'air intérieur (OQAI) and as a TU Delft representative is a member of the Impuls knowledge group of the TVVL (Platform for People and Technology).



Birgül Çolakoğlu

Birgul Çolakoglu earned her PhD in Design and Computation from MIT in 2000 and worked there as a postdoctoral researcher in 2001. From 2001 to 2015, she worked at Yıldız Technical University, where she established and led the Computational Design Graduate Program from 2008 to 2015. She was also the head of the ITU Architecture Department from 2018 to 2021. In 2020, she established the Circularity in Built Environment Research group at ITU and serves as its director. Currently, she is a professor in the Architectural Design and Computing Program at Istanbul Technical University, where she conducts research on computational design education, circular design, and digital design technologies. Additionally, she is a member of eCAADe and served as its president from 2018 to 2020.



Dave Cormier

Dave Cormier does digital learning strategy and special projects at the University of Windsor's Office of Open Learning. He is currently working on a multi-year long project thinking about how we can adapt our education practices to help learners prepare for uncertainty, and completing a book about learning in an age of uncertainty with Johns Hopkins University Press. His other research interests circulate around how our educational systems, our teaching practices, and our concepts of learning can be social processes where the community is actually the curriculum. His work can be found at http://davecormier.com.



David Peck

Associate Professor, David Peck, researches and teaches in the field of circular design - remanufacturing and critical materials, based in the faculty of Architecture and the Built Environment. He is a founding member of the Circular Built Environment Hub there. He is also Honorary Associate Professor with University College London – The Bartlett and an adjunct Professor at MIP Politecnico di Milano, Graduate School of Business. David sits on the executive board of KIC EIT Raw Materials and is TU Delft representative for the EU KIC EIT Raw Materials and represents the university in the programme, along with projects in EU KIC EIT Manufacturing. He leads a number of projects in this important programme that has a focus on critical materials and circular economy, in particular Remanufacturing.



Deepika Raghu

Deepika Raghu is a PhD candidate in the Circular Engineering for Architecture lab at ETH Zurich. Her research focuses on digitalization of existing buildings to enable the reuse of materials. She is currently exploring the notion of a circular city with various stakeholders in the construction value chain. Deepika works with big data, remote sensing and computer vision to arrive at solutions for revaluing materials from existing buildings for future use. She observes different contextual paradigms in the realm of circularity for the built environment in both developed and developing nations. Her interests lie at the intersection of architecture, technology, and innovation to help transition towards a circular economy.



Emma de Wijs

Emma de Wijs works as policy advisor on urban- and regional planning at the City of The Hague. In team City and Metropole at the Department of Urban Development, she is experienced with working on multi-level scales. Her main work area is providing spatial analysis of a new program for urban developments on the local level. In this context, she has looked into the progress of a circular area development in the Binckhorst The Hague. Emma is working on a European project for the Circular Economy within the cross-border cooperation of the 'Eurodelta'.



Fabiano Lemes de Oliveria

Fabiano Lemes de Oliveira is an Associate Professor in Urbanism at the Department of Architecture and Urban Studies (DAStU) at Politecnico di Milano, Italy. His research areas include nature-based solutions in urban planning, green urbanism, sustainable and resilient cities and planning models aimed at balancing urbanisation with nature. He is the author of *Green Wedge Urbanism: History, Theory and Contemporary Practice* (Bloomsbury, 2017), and co-editor of the books *Nature-based solutions for sustainable urban planning* (Springer, 2022), *Re-imagining Resilient Productive Landscapes* (2022) and *Planning Cities with Nature: Theories, Strategies and Methods* (2019).



Gerardo Semprebon

Gerardo Semprebon, PhD architect, is Assistant Professor in architectural and urban composition at the Department of Architecture and Urban Studies (DAStU) of the Politecnico di Milano. He obtained two Ph.D. titles, one at the Shanghai Jiao Tong University (China) and one at the Politecnico di Milano. In 2029, he has been a visiting scholar at the Beijing University of Civil Engineering and Architecture (BUCEA). The core topic of his research covers rural-urban transitions in complex settlement systems, with specific focuses on Chinese and Italian territories.



Hannah Beljaars-Frederiks

Hannah Beljaars-Frederiks is a senior lecturer in Architectural Engineering (Rotterdam University of Applied Sciences) and independent architect. She always has one eye trained on the future and the other on today's challenges. She believes that for future-oriented buildings, it is very important that more multidisciplinary work is done on buildings. That we think in advance about possible changes in use, efficient use of materials, how it can be built smart and how the building can be climate adaptive. She thinks that architecture should reinvent itself as an innovative discipline, striving for resilient solutions and searching for new potential.



Hans Wamelink

Hans Wamelink studied Civil Engineering at the Faculty of Civil Engineering and Geosciences (CEG), obtaining his doctorate in 1993 with research into production control in the construction industry. He then spent more than a decade as a researcher and assistant professor at the Faculty of Technology Management in Eindhoven. In 2006, he returned to TU Delft to become Professor of Construction Management & Entrepreneurship. Alongside his research, Wamelink has plenty of practical construction experience. He founded Infocus, a construction management and consultancy business, and spent twenty years as the director. After that, he was a senior consultant at Royal HaskoningDHV. Recently Hans initiated BK-Launch, the platform for innovation and encouragement of entrepreneurship at the faculty of Architecture and the Built Environment.



Helmut Thöle

Helmut Thöle is an urban designer and regional planner who works as a strategic advisor on spatial policies for the Province of South Holland. His focus is on strategies for the spatial and economic development. He combines this with the implementation of databased spatial exploration and ‘design by research’ into the planning tools and instruments of South-Holland. Helmut has teaching experience at universities and academies. Special interest is in the impact - and quality - of spatial interventions and the underlying decision-making processes.



Ilaria Valente

Ilaria Valente, architect, is a Full Professor of Architectural and Urban Design at the Department of Architecture and Urban Studies (DAStU), Politecnico di Milano, where she was the Dean of the School of Architecture and Society (2012-2015) and the School of Architecture Urban Planning Construction Engineering (2016-2021). Between 2020-2021, she has been the President of the Conferenza Universitaria Italiana di Architettura. Since 2017, she is the Vice-President of the European Association for Architectural Education – EAAE. Her research is devoted to theory, tools, and design methods, with particular attention to the architecture of open and public spaces, urban morphology, architectural typology, and infrastructures in contemporary territories. Architectural and urban regeneration in the marginal fabrics and fragile territories are the focus of her research in recent years.



Indy van de Sande

Indy van de Sande is a policy officer for circular economy in education at the department Sustainable Environment and the Circular Economy at the Ministry of Infrastructure and Water management. Education has a key role in achieving a circular economy; teaching students and professionals how to think and act circularly and learning new skills. Indy focuses on how to implement the circular economy in an integrated way within all levels of education. Indy has a master’s degree in Sustainable Development Earth System Governance.



Janna Bystrykh

Janna Bystrykh is Head of the Master's Programme in Architecture, at the Amsterdam Academy of Architecture, where she is also leading the development of a Climate focused curriculum for architecture. Janna's professional experience extends to design and implementation of complex urban projects, museum transformations, experimental educational efforts, and more recently installations on the transformations of rural and natural landscapes. In 2019, she founded BYSTRYKH, a design and research agency for the natural and built environment, based in Rotterdam. Janna has also practiced at KCAP and was an associate at OMA*AMO.



Jeremy Till

Jeremy Till is an architect, educator and writer. As an architect, he worked with Sarah Wigglesworth Architects on their pioneering building, 9 Stock Orchard Street, which is seen as an innovator in climate-informed design. As an educator, Till was Head of Central Saint Martins, Pro Vice-Chancellor at the University of Arts London from 2012-22. He is now Professor of Architecture at the University. As a writer, Till's extensive work includes the books *Flexible Housing*, *Architecture Depends* and *Spatial Agency*, all three of which won the RIBA President's Award for Research. His most recent research project, *Architecture after Architecture*, investigates the future of spatial practice in the face of climate breakdown.



Jörg Schröder

Jörg Schröder is full professor and Chair for Territorial Design and Urban Planning of Leibniz University Hannover and Dean for Research of the Faculty of Architecture and Landscape. As architect and urban planner he graduated Technische Universität München and has been assistant professor at TUM. His research is on urbanism and architecture for sustainable transition and territorial innovation, with a focus on design research, emerging creative habitats, and circular dynamics. R&D projects include Regiobranding (BMBF), Cosmopolitan Habitat (DAAD), Creative Food Cycles (EU Creative Europe Programme). His latest book *Circular Design* (2023) is published with Jovis.



Josef Bischofs

Josef Bischofs studied 'Gestaltung' in Aachen/Germany before he graduated cum laude at the Academy of Arts in Maastricht/ Netherlands. His attitude towards architecture at the beginning of his career was influenced by his working experience at Ortner & Ortner Baukunst Gmbh in Vienna/Austria. In 1995 he founded *Trans Form Architecten Maastricht*, a partnership for architectural design. He has been educating fields on the architectural space since 2000 in various institutions and is head of the Academy of Architecture Maastricht. Next to his work as an educator he is currently working on various projects under the name 'morfeos', a platform / co-laboratory for research, design and origination on topics of architectural conditions.



Leo van den Burg

Leo van den Burg is a teacher of Urban Design, section leader of the Urban Design section at TU Delft and Faculty coordinator of bachelor's education. He is an architect by training, an urbanist by practice, and a teacher by vocation. His ambition is to forge a strong link between research, education and the dissemination of the many and diverse qualities and projects within the section. Leo has produced and edited exhibitions and catalogues on urban design practice in the Netherlands and cultural history and urban design. His articles have been published in OverHolland magazine and KNOB bulletin. The MOOC Dutch Urbanism: design for the Public Good which he produced has had 10k+ participants and continues as a self-paced MOOC.



Leonardo Rosado

Leonardo Rosado is an Associate Professor at the Architecture and Civil Engineering department at Chalmers University of Technology. Fifteen years of experience in Industrial Ecology, in particular the Urban Metabolism and Circular Economy fields, using holistic approaches to develop methods to study resource flows and stocks of cities and regions. The research and education are focused on a proper description of the metabolism of cities and regions, while understanding the main causes of environmental impacts and support the design of circular economy strategies that can minimize impacts in various dimensions. He has co-developed the Urban Metabolism course in 2012.



Lisbeth M. Ottosen

Lisbeth M. Ottosen is a Professor at the Department of Environmental and Resource Engineering at the Technical University of Denmark. She is heading the Section for Construction Materials and Durability and has a strong research focus on the circular economy in the construction sector. She is currently leading research projects on the documentation of technical properties of structural building components related to the reuse and recovery of new resources from today's residual fractions. She is engaged in standardization as convener for the CEN/TC350 work "Circular economy in the construction sector - Terminology, principles, and framework for implementation".



Marcus Specht

Marcus Specht is Professor for Digital Education at the Technical University of Delft and Director of the Leiden-Delft-Erasmus Center for Education and Learning. He received his Diploma in Psychology in 1995 and a Dissertation from the University of Trier in 1998 on adaptive information technology. From 2001 he headed the department "Mobile Knowledge" at the Fraunhofer Institute for Applied Information Technology (FIT). From 2005 to 2018 he was Professor for Learning Technologies at the Open Universiteit Nederland and head of the Learning Innovation Lab. His research focus is on Computational Thinking, Learning Analytics, AI in Education, and Virtual and Augmented Reality for Education. Prof. Specht is an Apple Distinguished Educator and was President (2013-2015) of the International Association of Mobile Learning. He currently is president of EATEL.



Mario Rinke

Mario Rinke is a professor at the University of Antwerp where he researches and teaches structural and constructional aspects of architecture. He is particularly interested in adaptability concepts and applies reuse strategies in practical design and build workshops. Trained as a structural engineer, he has worked for offices in London and Zurich. He received his PhD from ETH Zurich in 2013 and was a lecturer at ETH Zurich and HS Lucerne, as well as a visiting professor at Tor Vergata University in Rome. Mario is a founding member of the International Association for Structures and Architecture (IASA).



Matija Pogorilic

Matija Pogorili is an architect from Zagreb, Croatia, who completed his bachelor and master thesis at the Faculty of Architecture, University of Zagreb in February 2023. He worked as a student - teaching assistant at the “KM3” studio workshop led by professor Idis Turato, which is a part of a master study program focused on Post Anthropocene architecture as a discipline dedicated to the Planet as a whole, one which supported by diagrammatical thinking mediates and manages protocols but also strategizes and situates hyper-complexity.



Mia Roth-Čerina

Mia Roth-Čerina, PhD, is an architect and professor at the Department of Architectural Design at the Faculty of Architecture, University of Zagreb. Her interests in practice, teaching and research intersect and focus on educational spaces and exploring new modalities in architectural education. From 2010 to 2017 she has served as the Croatian delegate of the international UIA working group Architecture & Children and has been elected as council member of the European Association of Architectural Education in 2018. She is currently the Vice-dean of international relations and art at her faculty. She has participated in numerous research platforms linking contemporary policies and global concerns to architectural education, the current one being ‘Architecture’s Afterlife: The multisector impact of an architectural qualification’.



Michiel Susebeek

Michiel Susebeek is Solution Manager for Saint-Gobain Projects in the Benelux. He develops integral approaches for better buildings in practice. Focusing on segments like schools or housing renovation. With the integral approach he connects all stakeholder needs with innovative solutions and new project strategies. For better performance on human wellbeing, energy and material use, Total Cost of Ownership or efficient construction processes. This requires constant pioneering in themes like: open collaboration, parametric design, modular building systems or new roles in the building sector. He previously worked for 7 years at consultancy firm Deerns and graduated in parametric design at TU Delft. He also gives guest lectures ‘Climate Design’ at TU Delft and ‘Circulair Building’ at the Real Estate Business School.



Nina Bohm

Nina Bohm is a PhD candidate under the wings of the 4TU Centre for Engineering Education. In her research, she investigates the way engineering students learn to deal with uncertainty in transdisciplinary education, such as living labs. Previously, Nina worked as an education coordinator at AMS Institute, where she developed living labs in the joint degree master program MSc MADE. Nina holds two Masters of Science degrees from the TU Delft - one in Urbanism and one in Science Communication. Also in her PhD, she likes to work on the intersection of those two scientific fields.



Olaf Oosting

Olaf Oosting is Managing Director and Senior Advisor Sustainability and Circularity at Valstar Simonis, a MEP consultancy and engineering firm. Olaf holds a BSc in Civil Engineering and MSc in Real Estate. After his studies he started working on the energy transition as project developer in large energy projects. Since 2015 he focuses on circularity in the field of Building Services. As a board member of TVVL, an independent association which has an extensive range of training opportunities for professionals in the technology industry, he was part of the Organizing and Scientific Committee of CLIMA 2022. This scientific congress was organized together with the Technical Universities of Delft and Eindhoven.



Olga Ioannou

Olga Ioannou is Assistant Professor at the Department of Architectural Engineering and Technology of TU Delft. She works for the chair of Building Product Innovation. She is in the steering committee of the Circular Built Environment Hub at TU Delft and a member of the Architectural Facades & Products (AF+P) group. Her expertise lies in architectural education, network learning and knowledge creation within the extended communities of knowledge. This is why she is now actively involved in developing programs for integrating circularity in the A+BE faculty curricula across all departments and levels of education.



Peter van Assche

Peter van Assche is founding principal of bureau SLA, an Amsterdam-based firm focused on the necessity of transitioning to a circular economy through design. Peter is also professor of Architecture and Circular Thinking at the Academy of Architecture Amsterdam. In 2022 he is visiting professor at the Karlsruhe Institute of Technology. He was visiting professor in Erfurt (DE) and at Cornell University (NY).

Remon Rooij



Remon Rooij is an Associate Professor at the Department of Urbanism and the scientific director of the 4TU Centre for Engineering Education, the national platform in the Netherlands that promotes innovation and pedagogical research in engineering education. Remon is a passionate lecturer, coach, course and curriculum designer, education innovator, and researcher in engineering education. Remon has over 25 years of experience in teaching and coordinating a large variety of urban design and planning courses and programs within the faculty of Architecture & the Built Environment. He is particularly interested in engaging engineering pedagogies that stimulate the intrinsic motivation and responsibility of students (such as design education, CBL, and inter- and transdisciplinary learning environments) and the kind of academic and professional skills that come with these.

Roberto Cavallo



Roberto Cavallo is an architect, associate professor, chair of Architectural Design Crossovers and head of the section Theory & Territories, Department of Architecture at TU Delft. Between 2014-2019 he has been the faculty director of education. Founding member of ARENA research network, he is currently a council member of the EAAE, the European Association Architectural Education. He is a frontrunner of the initiative design driven research CA2RE and project partner of the Horizon project digiNEB, Digital Solutions for the New European Bauhaus. His expertise involves interdisciplinary & multiscale approach in architecture and urban design, design-driven research, and experimental pedagogies. He has extensive experience in workshops, symposia, conferences, exhibitions, keynote lectures and as a scientific committee member in international academic and professional events. Since 2013 he collaborates with the European Commission as a built environment advisor.



Ronald Barnett

Ronald Barnett is Emeritus Professor of Higher Education at University College London IOE, where he was a Dean & Pro-Director. He has received an Honorary Doctorate and an earned higher doctorate. He was Chair of the Society for Research into Higher Education, was awarded the inaugural prize by the EAIR for his 'outstanding contribution to Higher Education Research, Policy and Practice' and is President of the (new) Philosophy and Theory of Higher Education Society. He has published 35+ books and hundreds of papers, given 150 keynote talks, been cited 25,000+ times and described as 'the master scholar of the university'.



Serdar Asut

Serdar Asut is an architect with a PhD degree in Informatics on Human-Robot Interaction in Design. His teaching and research activities at TU Delft focus mainly on design thinking through digital technologies. He is currently leading a research project called HANDZONe, which aims to enable hands-on learning activities on designing and making with robots through a virtual reality platform.



Thijs Asselbergs

Thijs Asselbergs is Professor of Architectural Engineering at the TU Delft Faculty of Architecture. He is an architect and engineer known for his contributions to architectural policy, urban planning, and technological innovations in architecture. He founded Thijs Asselbergs Architectuurcentrale and has received national and international awards for his projects. Asselbergs served as city architect of Haarlem from 1990 to 1994, presented an architectural memorandum for Haarlem, and has been a professor of Architectural Engineering since 2008. He was also one of the founders of the design magazine Items and has taught at various schools and institutes.



Tom Parker

Tom Parker is the co-coordinator of the Sustainable-Sustainable Architecture (SSA) Post-graduation offered jointly by Critical Concrete and Escola Superior Artística do Porto (ESAP). This one-year programme uses a hybrid approach of remote, online learning and intensive, practical workshops. Tom holds an MEng in Architecture and Environmental Design from the University of Nottingham and a MArch in Architecture from the University of Sheffield. He previously worked in London for EPR on large scale residential projects and Levitate, a smaller firm, focused on single-family housing and renovations. At Critical Concrete he helped launch their online learning platform, Critico, and establish the commercial arm of the organisation, Critical Studio. As co-coordinator of the SSA he has supported programme development and instructor recruitment, and managed multiple practical workshops in Porto and Northern Portugal.



Tillmann Klein

Tillmann Klein is Professor of Building Product Innovation at the TU Delft Faculty of Architecture and the Built Environment. Here, he headed the Facade Research Group from 2005 to 2018, alongside which he was also director of the facade consulting office Imagine Envelope b.v. in The Hague from 2008 to 2016. He was also a guest professor at the Technical University of Munich from 2015 to 2018. Klein organises the international facade conference series “The Future Envelope” at TU Delft and is editor in chief of the scientific open access “Journal of Facade Design and Engineering”.

COLOPHON // THANK YOU

We would like to express our gratitude to everyone who joined us and to the EAAE for accepting our invitation to collaborate. Special thanks to everyone who helped organize and deliver the Symposium and this book. And last but not least, many thanks to the members of the CBE Hub and especially to Tillmann Klein, the Hub's initiator and helmsman, for supporting this initiative.

organizers

Olga Ioannou
Tillmann Klein
Nicolet Mansveld-Olsthoorn
Roberto Cavallo
Leo van den Burg

credits

cover image	Kim Sinnige
images	Marcel Bilow
video interviews	Marcel Bilow

layout

Kim Sinnige

publishing

ISBN 9-789463-667050
Faculty of the Built Environment, TU Delft
Gebouw 8
Julianalaan 134
2628 BL Delft
Tel: +31 (0)15 27 89805

contact

Circular Built Environment Hub
CircularBE-bk@tudelft.nl


9 789463 667050