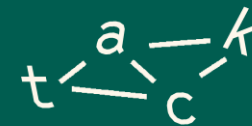


Unveiling Embodied Tacit Knowledge through the Act of Drawing

Teaching Module 6



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Communities of Tacit Knowledge
Architecture and its Ways of Knowing

Module Aims

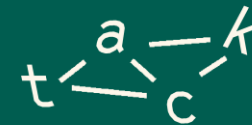
The goal of this module is to understand architecture as an extended spatial practice that includes time-based methods from user-experience design and the performing arts, such as theatre and dance. Building upon the theory of tacit knowledge, understood here as an embodied, embedded, enactive, and extended practice, the complexities of architectural design processes are examined to:

- understand how tacit knowledge is practiced and transferred through the act of drawing.
- frame virtual technologies as an embodied tool to explore the design and construction of spatial environments in real-time and -scale.
- apply these theoretical conceptions of tacit knowledge in a series of VR workshops and expand upon the existing understanding of the tool through the collaborative online platform XR Atlas.

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Architecture and its Ways of Knowing

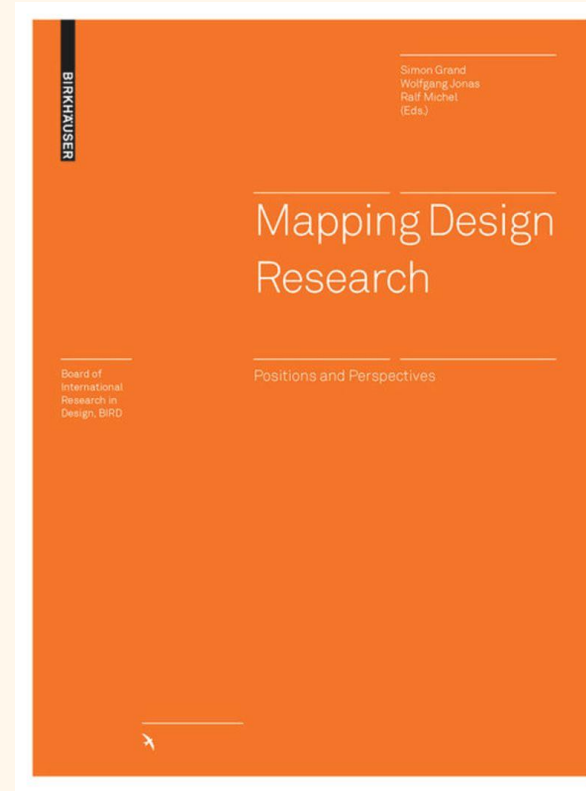
Practise-based Knowledge

Practice-based and design-based research in architecture challenges traditional notions of inquiry by highlighting the importance of design as a tool for investigating and understanding the complexities of designing, planning, and constructing architecture.

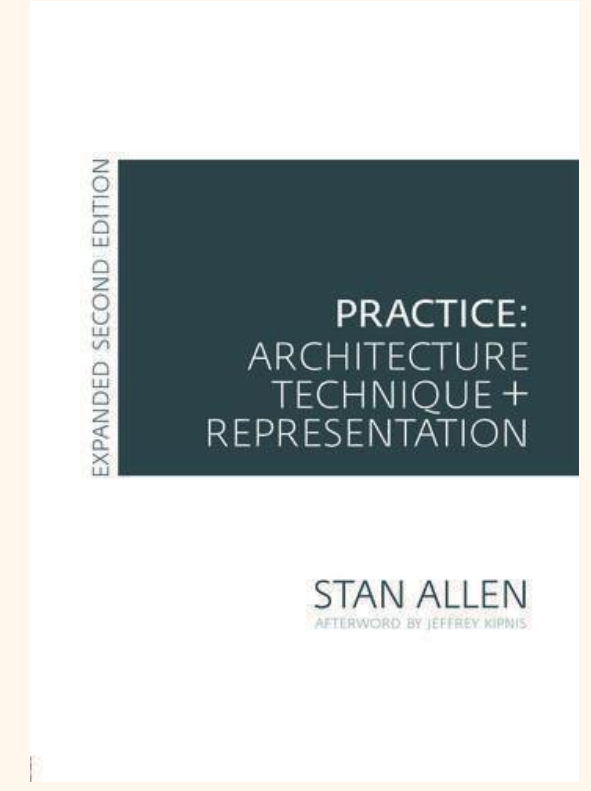
”We can observe that design researchers increasingly search for practical approaches to the research of design processes. As a result, there is less consideration of the “rational” aspects of design than of the “creative,” “intuitive,” and “tacit” aspects, along with the alleged design-specific manner of knowledge production.”

Mareis, C. (2012). The epistemology of the unspoken: On the concept of tacit knowledge in contemporary design research. *Design Issues*, 28(2), p. 63.

Stan Allen argues that architectural concepts are not borrowed from other fields, but rather arise through the materials and techniques employed in architectural practice. He draws upon his personal experience as a practicing architect to examine how the tools at the architect's disposal impact the design and construction of buildings.



Grand, Simon and Jonas, Wolfgang. *Mapping Design Research: Positions and Perspectives*, Birkhäuser, 2012.

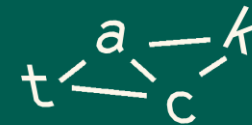


Allen, S. *Practice: architecture, technique and representation*. Routledge, 2012.

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Communities of Tacit Knowledge
Architecture and its Ways of Knowing

The Act of Drawing

“What connects thinking to imagination, imagination to drawing, drawing to building, and buildings to our eyes is projection in one guise or another, or processes that we have chosen to model on projection.”

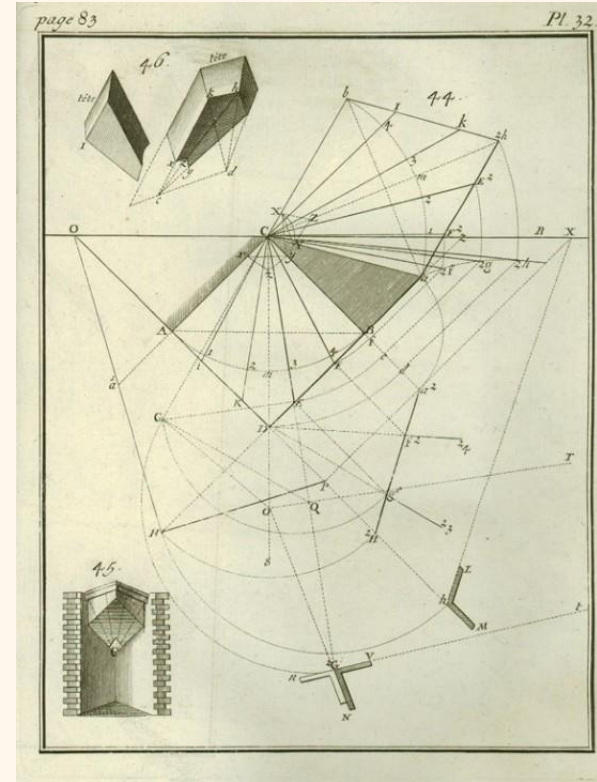
Robin Evans, *The Projective Cast* architecture and its three geometries. MIT press, 1995, p. xxxi.

“Drawing and talking are parallel ways of designing and together makeup what I will call the language of designing. The verbal and non-verbal dimensions are closely connected. (...) The language of designing is a language for doing architecture, a language game which (X) models for (Y).”

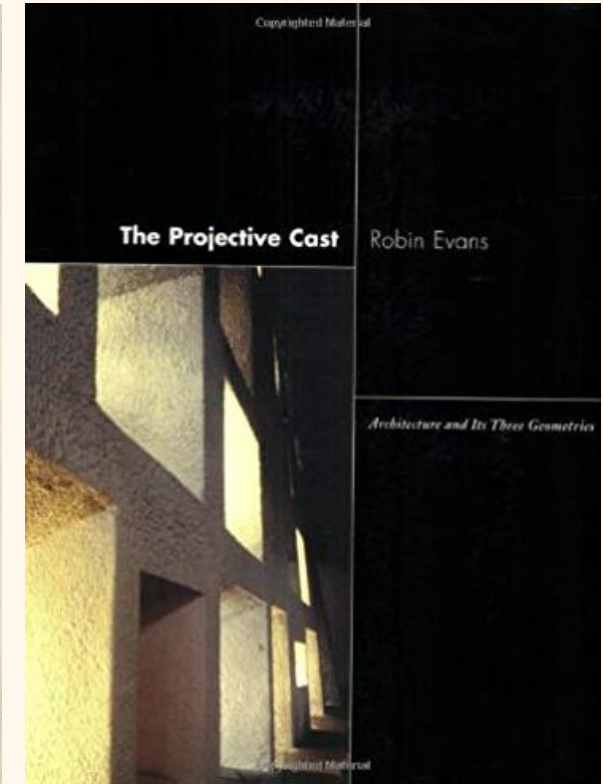
Donald A. Schön, *The Reflective Practitioner: How Professionals Think in Action*, Routledge, 1992, p. 80.

Further Readings:

- Robbins, E. (1994). *Why Architects Draw*. MIT Press.
- Evans, R. (1997). *Translations from Drawing to Building*.
- Leatherbarrow, D. (2001). *Architecture is its own Discipline*. The discipline of architecture, 83-102.
- Vesely, D. (2005). *Architecture in the Age of Divided Representation: The Question of Creativity in the Shadow of Production*.
- Hill, J. (2003). *Actions of architecture: architects and creative users*. Routledge.



Frézier, Amédée François. *La theorie et la pratique de la coupe des pierres et des bois, pour la construction des voutes et autres parties des bâtimens civils & militaires, ou Traité de stereotomie a l'usage de l'architecture*. Vol. 2. Doulsseker, 1738.

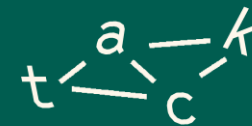


Evans, Robin. *The projective cast: architecture and its three geometries*. MIT press, 1995.

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Drawing as Performance

“Nicht nur das gezeichnete, sondern vorallem der festgehaltene Akt des Zeichnens spricht direkt an. Diese Differenz ist wesentlich. (...) Die Konzeptskizze spricht das Gegenüber direkt an. Die Skizze hat eine Gerichtetheit an ein Publikum, an ein Live-Publikum, ebenso wie ein Publikum von Leserinnen und Leser einer Publikation. Die Skizze stellt mit den Mitteln des Entwerferischen und des Zeichnerischen die Artikulation des Vorgangs der Adressierung dar.”

Krasny, E. “Entwurfsbasiert” In: Schnell, A., Sommeregger, E., & Indrist, W. (Eds.). (2017). *Entwerfen erforschen: Der "performative turn" im Architekturstudium*. Birkhäuser, p. 81.

“Le Corbusier employed a drawing and sketching style that brings to mind comic strips; the students Desislava Petkova and Paula Strunden compellingly re-enacted its communicative functions in a series of frames. In the process, Le Corbusier, the otherwise impenetrable seeming, art-world personage, became recognizable to the students as someone who takes parallel action: posing questions, reflecting, and operative. And it became apparent that the drawing itself (a famous sketch from “La ville radieuse”) was something that had been made.”

Schnell, A. In: Schrijver, L. (2021). *The Tacit Dimension: Architecture Knowledge and Scientific Research*. Leuven University Press. p. 15

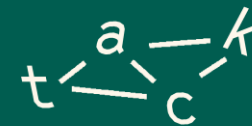


Desislava Petkova and Paula Strunden reenact Le Corbusier's sketch from La ville radieuse. HTC-Studio 'Building the Design' (Photo Angelika Schnell, Eva Sommeregger, Waltraud Indrist).

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Architecture and its Ways of Knowing

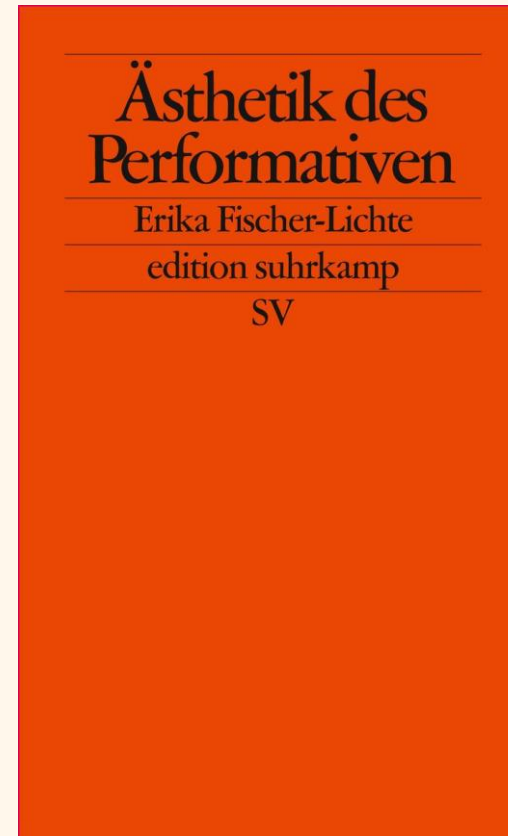
The Performative Turn

“The performative turn has called attention to the expressive dimension of both actions and action-based events, including staged social culture. It focuses not on the cultural contexts of meaning or the idea of “culture as text” but on the practical dimension of the generation of cultural meanings and experiences. It seeks to understand the generative and transformative aspects of culture on the basis of events, practices, material embodiments and media forms. “

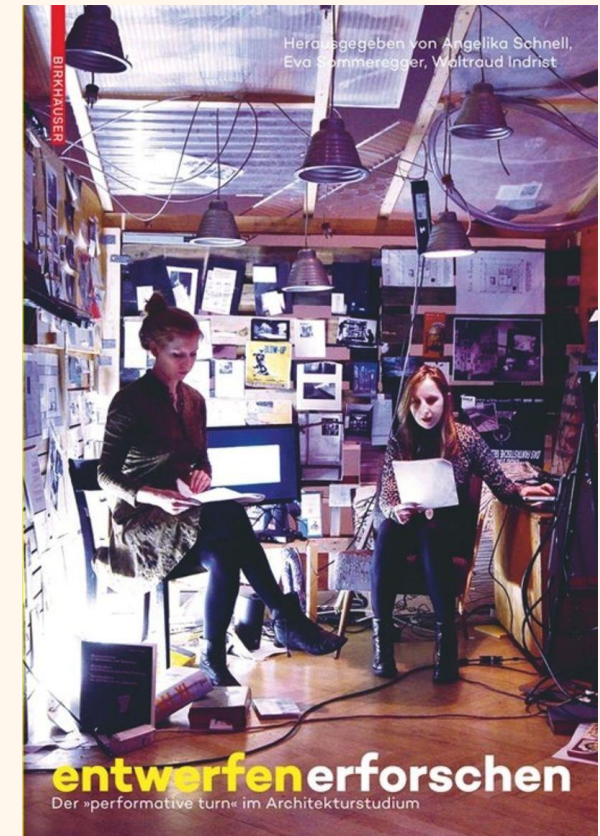
Fischer-Lichte, E. (2008). The transformative power of performance: a new aesthetics. Routledge, p. 17.

The design "seen as a model of action, consists of a time direction external to the design (...) and an internal time direction, which refers to the process of the design itself. (...) It bears witness to what it makes visible. It is self-referential, and performs the contents of which it speaks itself. It is 'performative'.”

Translated by the author, Schnell, A., Introduction In: Schnell, A., Sommeregger, E., & Indrist, W. (Eds.). (2017). *Entwerfen erforschen: Der" performative turn" im Architekturstudium*. Birkhäuser, p. 14.



Fischer-Lichte, E. (2012). *Ästhetik des Performativen*. Suhrkamp Verlag.

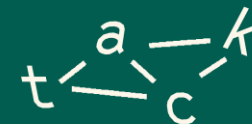


Schnell, A., Sommeregger, E., & Indrist, W. (Eds.). (2017). *Entwerfen erforschen: Der" performative turn" im Architekturstudium*. Birkhäuser.

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Communities of Tacit Knowledge
Architecture and its Ways of Knowing

Embodied Tacit Knowledge

What is embodied cognition?

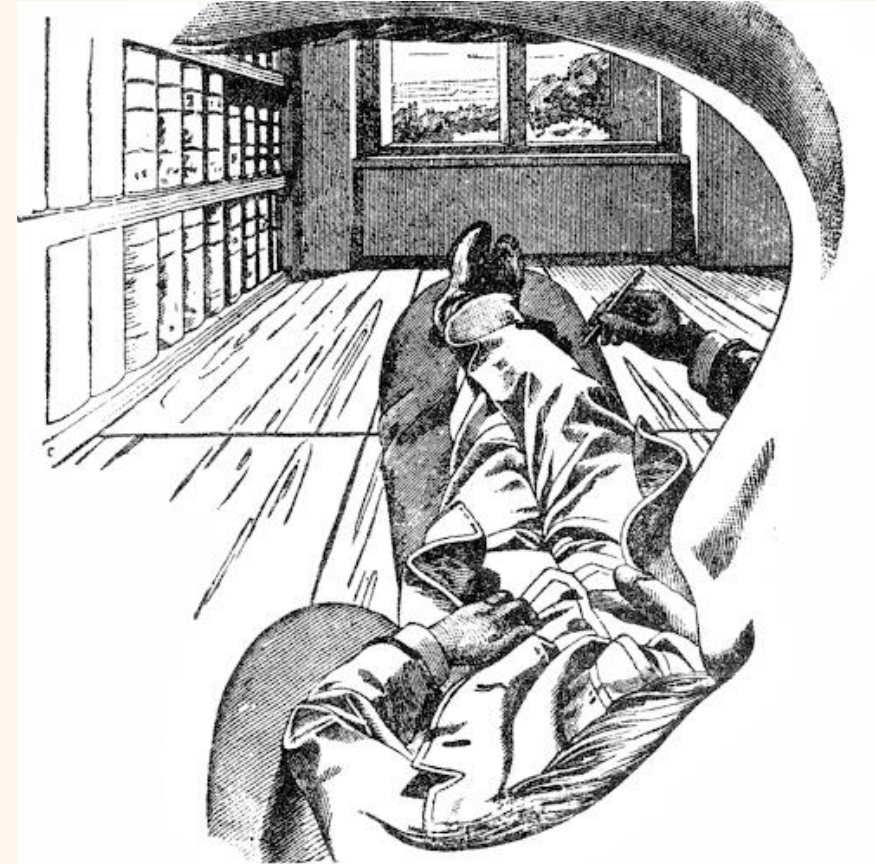
“Mind is embodied, meaning is embodied, and thought is embodied in this most profound sense. [...] According to such a view, there is no ultimate separation of mind and body, and we are always in touch with our world through our embodied acts and experiences.”

Johnson, M., and Lakoff, G. "Why cognitive linguistics requires embodied realism." (2002), p. 249.

Embodied cognition is a theoretical framework in cognitive sciences (including psychology, neuroscience, linguistics, AI and philosophy) that suggests that our cognitive processes are deeply rooted in the physical interactions between our body, brain, and the environment. It argues that our perception, thoughts, and actions are not only influenced by our brain, but also by the way our body is structured and how we use our motor and perceptual systems to engage with the world.

Further Readings:

- Shapiro, L. (2010). *Embodied Cognition*. New York: Routledge.
- Johnson, M., and Lakoff, G. (1999). *Philosophy in the Flesh: The Embodied Mind and Its Challenge to Western Thought*, New York: Basic Books.
- Merleau-Ponty, M. (1962). *Phenomenology of perception* [trans. C. Smith]. London: Routledge and Kegan Paul.

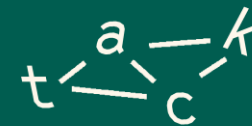


Ernst Mach, *Antimetaphysische Vorbemerkungen In: Die Analyse der Empfindungen und das Verhältnis der Physischen zum Psychischen*, Jena, 1900.

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Spatial Perception & Experience

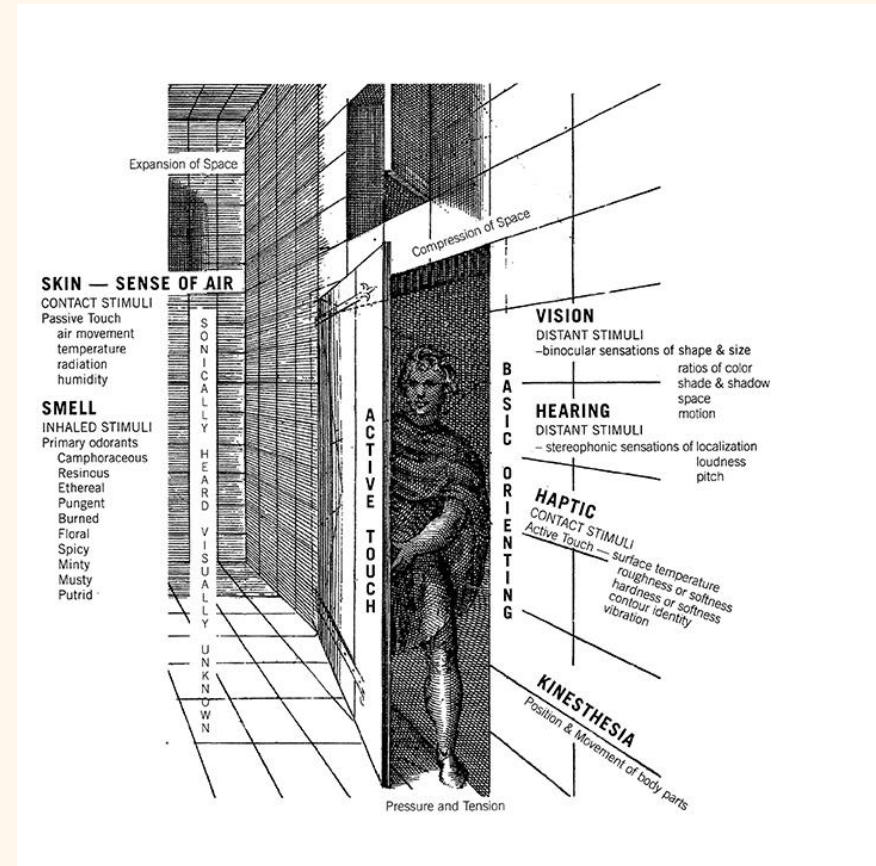
“While architectural practice has traditionally been dominated by the eye/sight, a growing number of architects and designers have, in recent decades, started to consider the role played by the other senses, namely sound, touch (including proprioception, kinesthesia, and the vestibular sense), smell, and, on rare occasions, even taste.” (Spence, 2020)

“Every touching experience of architecture is multi-sensory; qualities of space, matter and scale are measured equally by the eye, ear, nose, skin, tongue, skeleton and muscle.” (Palasmaa, 2012, p. 41)

“[I]f one’s aim is to reproduce veridical environments in a virtual world, or else to create an interface-mediated simulation of a given situation, the study of multisensory information processing and crossmodal interactions between different modalities of simulation becomes vitally important” (Gallace/Spence, 2014, p. 13)

Further Readings:

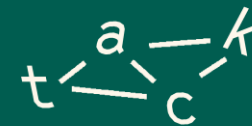
- Gallace, A., Spence, C. (2014). In Touch with the Future. The sense of touch from cognitive neuroscience to virtual reality. UK: Oxford University Press.
- Malnar, J. M., & Vodvarka, F. (2004). Sensory design. Minneapolis: University of Minnesota Press.
- Spence, C. (2020). 'Senses of place: architectural design for the multisensory mind'. In: Cognitive Research: Principles and Implications.
- Pallasmaa, J. (2012). The eyes of the skin: Architecture and the senses. John Wiley & Sons.



Joy Monice Malnar and Frank Vodvarka. Credits: Malnar, Monice, Vodvarka, Frank, Sensory Design, University of Minnesota Press, 2004.

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Integrating Embodied Cognition into Digital Architectural Design

Open-ended XR Workshop

Nowadays, digital tools and drawing software are primarily employed in architecture practice to facilitate planning, fabrication and production processes, as well as to visualize selected stages of the building design in development. However, in crucial moments of the creative design process, such as initial ideation or decision-making, both digital design tools and representation methods lack implicit qualities that their traditional/analogue counterparts continue to offer. Thus, many practising architects proceed with hand-drawn sketches, physical scale-models and mock-ups (if affordable), allowing for an intuitive, iterative and ad-hoc way-of-working that remains open to the viewer's interpretation and that supports an embodied, multisensory interaction with the designed content at different scales and levels of abstractions.

Due to this observed lack of embodied cognition in the contemporary digital architectural design process, the following VR workshop exercises are designed to discuss why and how **immersive technologies and three-dimensional, interactive, real-time** simulations could address the shortcomings of digital tools and workflows and (re)integrate intuitive, emotive and soft design factors in the contemporary design and decision-making process.

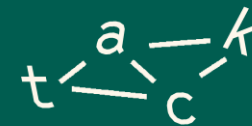


VR Workshop „Dream Boxes“, Academy of Fine Arts Vienna, March 2019.

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Architecture and its Ways of Knowing

Meditation Exercise

Please close your eyes.

Start by feeling your hands. Take one hand into the other. Let them touch each other. Now, slowly lower your hands, and let them rest on the top of your legs. What is the surface that you feel below your fingers? Which of your fingertips do you need to move to find out?

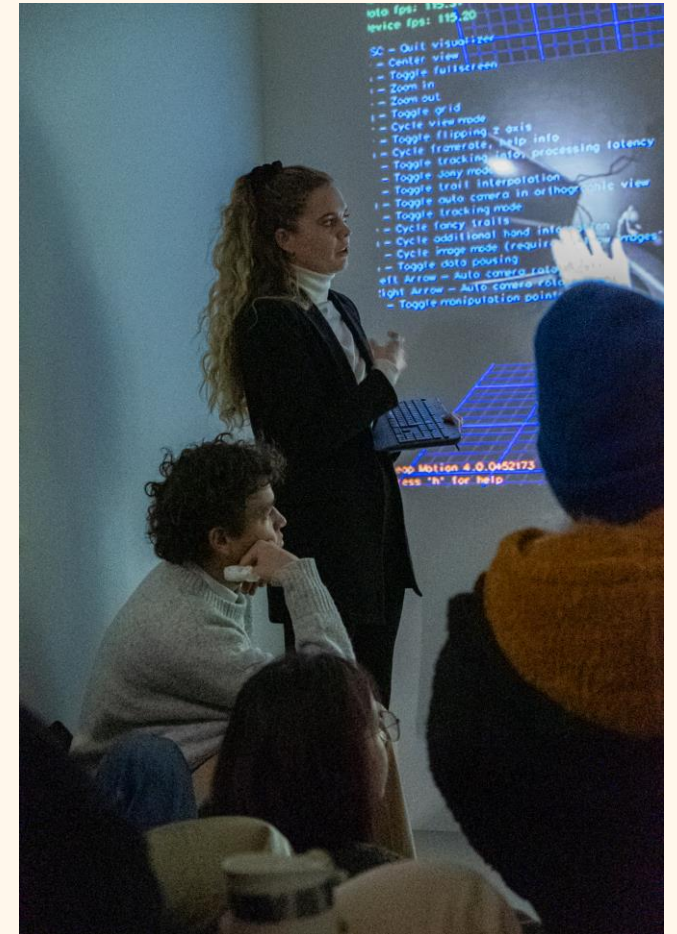
Now slowly, move your hands further back to the chair that you're sitting on. How does it feel? What is it made of? What kind of texture does it have? Is it hard, is it warm or cold? How does it sound, when you tap it, softly.

What is below you, what's the surface like beneath your feet? Is there a wall behind you? Or a window to your side? What do you hear now?

If you imagine that the things that your body touches; those things that meet your hands, those that your feet feel, those things that your legs rest on, and those that your ears hear. If you imagine that their surfaces are merely a fragment of a world only you can perceive, what would that world be like? What can you see with your inner eye? Where are you now?

Please open your eyes.

Strunden, P. "Beyond Virtual Reality" AA School of Architecture, Oct. 2020, <https://www.youtube.com/watch?v=tTZLlr4xl-Y>.

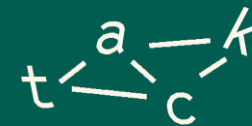


VR workshop „Rhetorical Bodies“, Academy of Fine Arts Vienna, November 2022.

Teaching Module 6



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XR Workshop

Assignment I: Body-Space-Drawing

Required Materials: A0 Paper Rolls & Pens

Task: Unroll a large sheet of paper, and place yourself on it. Ask your partner to trace a line around your body, and discuss the role of your different body parts, organs, etc. and its ability to feel, sense and perceive space.

Swap roles, by using the same sheet of paper, and gather each other's observations through notational drawings.

Questions:

1. Where does your "felt body" begin and end?
2. Can you draw the boundaries between your body and its environment?
3. How do they influence each other?

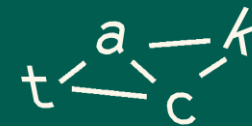


Students conducting body-space-drawing exercises in pairs, Academy of Fine Arts Vienna, November 2022.

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Architecture and its Ways of Knowing

XR Workshop

Assignment II: Enacting Space in VR

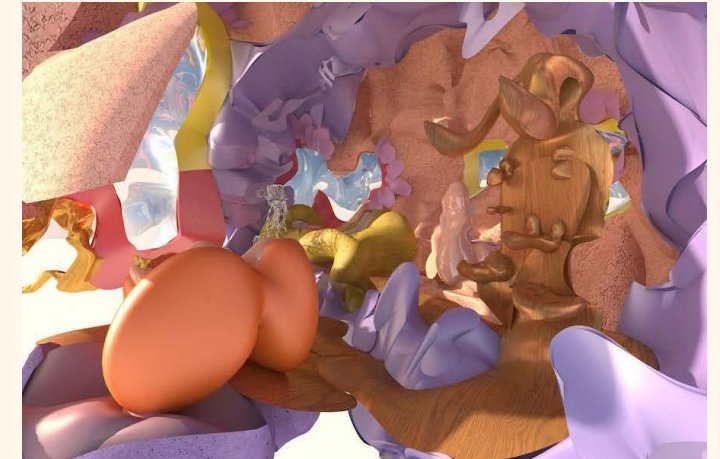
Required Hardware: Min. 2 VR Googles, such as Oculus Quest or HTC Vive Pro

Required Software (free): Gravity Sketch or Arkio

Task: Draw your a fragment of your design project in 1:1, with, through and around your felt body.

Questions:

1. Where does your body end and your design start?
2. How does your body relate to your design project?
3. How does the 3D modelling from the “inside out” differ from modelling in the software you usually use, such as Sketch Up, or Rhino?

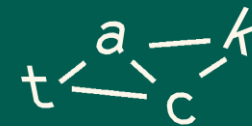


A Reciprocal Chair and interior rendering of *Bounding Bodies* drawn in VR by Jack Clay, Unit 21, The Bartlett UCL, 2018.

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Architecture and its Ways of Knowing

XR Workshop

Assignment III: Embodying Space in VR

Required Hardware: Min. 2 VR Googles, such as Oculus Quest or HTC Vive Pro

Required Software (free): Enscape or Twinmotion

Task: Immerse yourself in up to three different designs designed by yourself and/or your peers (big/small, high/low, narrow/wide). Test how it feels to be moved, vs moving yourself, vs moving parts of yourself, such as your eyes or your hands.

Questions:

1. How do the different environments make you feel?
2. How do they impact your movement, gestures, voice and mimic?
3. How does your body part configuration influence your perception of space?

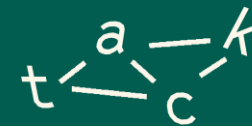


1st Year Students Exploring their Designs in 1:1 in VR, Academy of Fine Arts Vienna, November 2022.

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Architecture and its Ways of Knowing

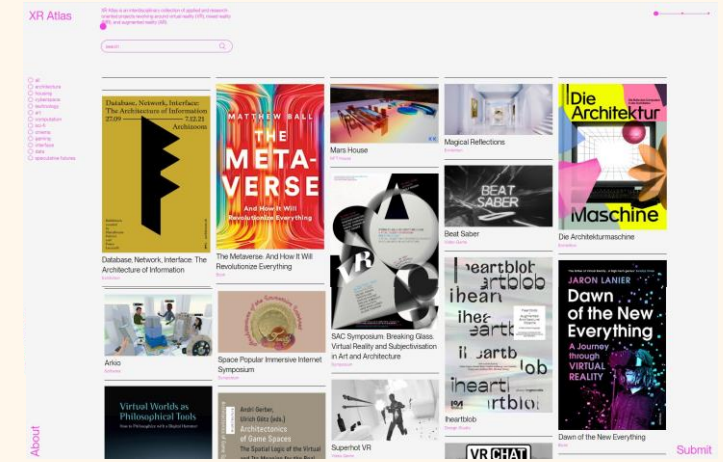
XR Atlas

Further Explore XR's Embodied Roots by Navigating the History of Virtual, Augmented, and Mixed Reality on www.xr-atlas.org

XR Atlas is a collaborative online platform that offers an educational collection of interdisciplinary projects revolving around virtual reality (VR), mixed reality (MR), and augmented reality (AR) under the umbrella of extended reality (XR).

While the metaverse is becoming one of the buzziest words in technology, gradually making its way into architectural practice and research, the collaborative online platform XR Atlas promotes an alternative roadmap to enter and understand the history of virtual, augmented and mixed reality. Instead of presenting a comprehensive historical overview of the technological advances over the last centuries, lesser-known examples from literature, film, theatre and multimedia arts are gathered that explore spatial perception in the liminal space between material and virtual worlds.

The goal of XR Atlas is to challenge the prevailing idea that VR is solely a means of escaping reality. Instead, it aims to promote a more embodied, embedded and enacted understanding of virtual technologies, freed from their purely representational capabilities. This opens up the potential for new narrative, fictional, and speculative design proposals and forms of spatial research that are unique to the medium. XR Atlas is constantly being updated and expanded by adding additional images, text, and projects. If you would like to contribute to the platform, you can do so by selecting the SUBMIT section and supporting its goal of questioning the future development and use of virtual technologies through the exploration of its past.

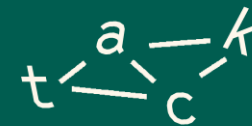


Presenting XR Atlas, Academy of Fine Arts Vienna, November 2022.

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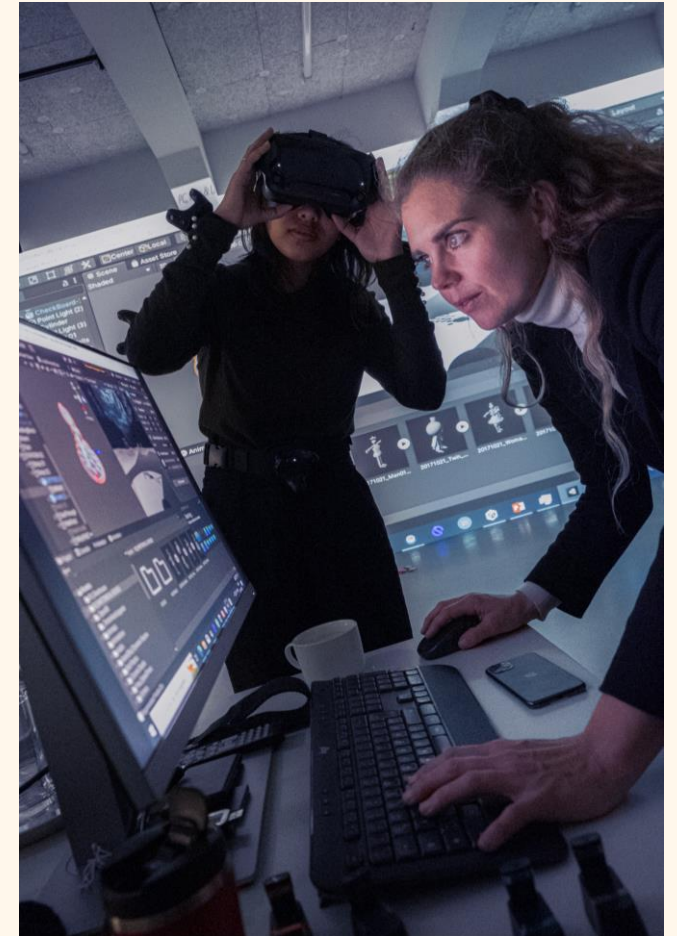
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Architecture and its Ways of Knowing

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All photographs, unless otherwise cited, are taken by Maria Belova and Christina Mara Ehrmann during a series of XR Workshops run by Paula Strunden with the students of the Academy of Fine Arts Vienna.

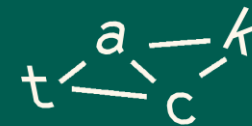


VR workshop „Rhetorical Bodies“, Academy of Fine Arts Vienna, November 2022.

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