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Johanna S. Gullberg

Cogenerating Spaces of Learning

The Aesthetic Experience of Materiality and
Its Transformative Potential within
Architectural Education

NTNU
Norwegian University of Science and Technology
Thesis for the Degree of
Philosophiae Doctor
Faculty of Architecture and Design
Department of Architecture and Technology



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Introduction

The problematic divide between convention and critique in architectural education

The Argument

As the true method of knowledge is experiment, the true faculty of knowing must be the faculty which experiences. This faculty I treat of.

William Blake¹

As I was walking down the gallery at Hardwick Hall, some would have thought that I was imagining being Bess of Hardwick, but to me it was rather a matter of positioning myself in relation to her and other humans through architecture. The physical experience of how times and ideas materialised so that I could move through them – in the yellow light, in the deep niches, in the glimpses of the garden – triggered my imagination. Architecture was giving me no less than a sense of both belonging to and being fascinated by the world, and I felt a desire to move from studies of architectural history to architectural education, for knowing not only how to analyse but also how to create such experiences. As an architect and educator now, twenty years later, I try to make others aware of the power of architectural experiences.

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That my professional training and practice sometimes risk becoming obstacles for doing so is a central motivation behind this thesis.

We² will, in this introduction, present and reflect upon our **field of inquiry**, the realm of architectural education, then present the **case** we are to study and the **methodological approach** chosen, and, finally, provide an **overview of the thesis**.

The problem

Architectural education tends to be described as consisting, on the one hand, of a mainstream where individual apprentices are taught by masters in the design studio and, on the other hand, of critical milieus set up to contrast the mainstream by implementing making and participation outside the design studio. We argue that this divide is a construction concealing a more diverse reality, which is problematic because it hinders nuanced questioning of what an architect should know and how s/he should learn. We therefore ask: *How can forms of learning that rely on making and participation in contexts outside the design studio contribute to increased abilities for critical reflection on and transformation of habits within architectural education?*

The field of inquiry: Architectural education

Looking to the history of architectural education, we pay attention to how ideas have evolved regarding what architects should know, what methods they should use, and how and where they should learn.

Vitruvius and the medieval masons: Practice as a given source of knowing

The first chapter of Vitruvius's first book of ten on architecture, produced in Rome in the first century B.C., is on the education of the architect. Vitruvius begins by stating that the architect's knowledge should be "the child of practice and theory" and include "many branches of study and varied kinds of learning."³

The idea that the architect's knowledge and forms of learning are diverse is reflected in contemporary curricula. In his reflections on the history of architectural education, Fil Hearn claims that this is not because of Vitruvius's work in itself but has "more to do with the gradual return to a cultural situation in which a holistic view of the needs of society combined with the technological demands of construction is roughly parallel to that of ancient Rome."⁴ The idea that the architect's knowledge combines theory and practice may appear recognisable to architects of our time. However, while it is customary today to think of the architect's practice as happening in the drawn representation and architectural theory as primarily text-based, Vitruvius separates practice from theory as follows:

Practice is the continuous and regular exercise of employment where manual work is done with any necessary material according to the design of a drawing. Theory, on the other hand, is the ability to demonstrate and explain the productions of dexterity on the principles of proportion.⁵

It is here possible to understand the "knowledge of drawing," which Vitruvius emphasises the architect must have, as a binder between practice (i.e. hands-on work according to drawings) and theory (i.e. the making of drawings as a means of communication).⁶ Accordingly, the successful architect must know both how to build and how to draw.

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A separation of the built and the drawn would also be alien to the medieval master mason. Members of the medieval guilds designed and built in processes where knowledge about geometry was shared orally and through practice in master–apprentice relations where master masons led construction work. In a concise overview of the design studio tradition in her dissertation on the role of the body in the architect's knowledge production in the educational studio, Inger Mewburn points out that "[i]f architects were producing representations in these times they were most certainly doing them in the context of actual projects."⁷ In other words, learning did not happen through any articulated method, but the apprentice gained the knowledge he needed by following the practice of a master.⁸

Renaissance: The architect as designer, not craftsman

With the Renaissance came a division of knowledge of building and knowledge of designing. The idea of the architect as someone who makes drawn representations to scale, or designs, was now gaining ground. Leon Battista Alberti's ground-breaking but initially rarely read *On the Art of Building*, first published in 1450, contributed to the idea of the architect as an intellectual artist and scholar who designs without being restricted by the material circumstances a builder has to include in his practice.⁹ In *On Technique*, the introduction to *The Lives* from 1568, Giorgio Vasari describes design (*disegno*), i.e. drawing, as the "parent" of the arts of architecture, sculpture and painting.¹⁰ In a paragraph on the nature and materials of design, Vasari states that design has its origin in the intellect and is a visible expression of an idea or inner conception which only the hands of someone who has practised over many years can make.¹¹ Architects, he continues, make drawings in which they compose outlines with lines, and these drawings are "nothing else than the beginning and the end of [the architect's] art, for all the rest, which is carried out with the aid of models of wood from the said lines, is merely the work of carvers and masons."¹² As Gerard Baldwin Brown remarks in a footnote to this statement, Vasari's

separation of craftsman and architect is familiar today but would have been unfamiliar to medieval and early Renaissance builders.¹³

Modernity: The atelier and the formalisation of a distance from reality

Alberti's and Vasari's intellectualisation of the architect was essential to the formalisation of architectural education a century later and may therefore be said to be the beginning of the stable tradition of architectural education as it is commonly known today. Hearn claims that the "[o]fficial academies were eventually founded in the seventeenth century to propagate exactly [Alberti's] regimen, and they dominated the preparation of young architects for at least two more centuries to come."¹⁴ The *Académie royale d'architecture* was the first school of architecture comparable to contemporary ones. It was founded in Paris in 1671 and organised formal education from the beginning of the eighteenth century. The Royal Academy was closed in 1793, in the aftermath of the French Revolution, but was basically just reformed into the *École des beaux-arts*, which was opened in 1807 and closed in 1968.¹⁵ At the Royal Academy and the Beaux-Arts school, Mewburn states, the oral and material traditions of the building site and the medieval guilds were substituted by "the different materiality of the architectural representation and the academy setting" in the atelier, and this shift led to that representation becoming the "main site of the epistemological work of the profession both inside and outside the academy."¹⁶

The general academy approach maintained the guild tradition of learning by being closely monitored by a master.¹⁷ The basic idea was that an instructor would teach a learner to become the same kind of autonomous designer he himself already was. This relationship between two individuals, still existing at most architecture schools, is a pedagogical exception which was left uncommented on until 1991, according to Dana Cuff, who then – in *Architecture: The Story of Practice*, her seminal contribution to our field of inquiry – brought light to the idea of the

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architect as individual master and its reflection in architectural education.¹⁸

If the medieval master let his apprentice follow him in the workshop and on site in the work with specific buildings, the intellectual architect could stay inside, follow methods that were written down and drawn, and devote himself, as Dalibor Vesely has pointed out, to total geometric systems constructed with lines without any relation to a real site.¹⁹ Alberti and Vasari had paved the way for French Enlightenment scholars to make architecture a primarily intellectual and form-based practice. As a professor at the Royal Academy, François Blondel contributed to the establishment of modernised instructions for design, and Claude Perrault and his brother Charles saw to it that classical ideals were replaced by personal judgement and taste or technical requirements as guidelines for design.²⁰ Architects were now trained within academia instead of in workshops. According to the hermeneutic-phenomenological critiques of the instrumentalisation of the architect's methods from Vesely and Alberto Pérez-Gómez, this change, in combination with new modes of spatial representation with projective and descriptive geometries in technical drawings, led to an enhanced Cartesian divide between body and mind in architecture and, in turn, to that questions of form rather than matter, event or experience came to dominate the discipline of architecture.²¹ However, Mewburn shows that the move from the workplace to the Academy has never been unidirectional or completed.²² The Academy is an aristocratic model *as well as* a site for experimentation with representations and traditional routines of architecture, and the building site is impossible to isolate from the demands of the market and yet it is *also* a possibility for tangible resistance against those very same demands.

Durand: Taking the art of architecture closer to science by introducing a linear design method

The Beaux-Arts combination of design teaching in the atelier with lecture hall teaching of theory, history and construction is largely recognisable to any contemporary architecture student. So are the elements of the Beaux-Arts student's training. To receive a diploma, he had to pass exams in the

lecture-based courses, work in a recognised office for a period of time, produce one design thesis including economic and structural calculations, and gain approval for at least six out of eighteen design exercises, most of them resulting in plans, sections and elevations of building proposals, but some also in visionary projects, advanced analytical drawings or theoretical investigations.²³

Educational traits established at another French school, the *École Royale Polytechnique*, are also recognisable to today's architecture students. The practice of architecture was here taken closer to that of civil engineering, and the Beaux-Arts school was, at least to begin with, distancing itself from this move.²⁴ However, the two schools influenced each other, not least through the ground-breaking modernisation of architectural education initiated by Jean-Nicolas-Louis Durand, teacher at the polytechnic school between 1794 and 1833. Durand was a former student of Étienne-Louis Boullée, who had contributed to shifting architecture away from Vitruvius's focus on building towards concept and design.²⁵ What Durand did was to make this shift operative by giving the first description ever of the stages of an explicit design method in his treatise *Précis de leçons d'architecture*, published between 1802 and 1805. His method is based on a scientific rationalisation and systematisation typical of the Enlightenment. Durand never left the neoclassical style, but by contrast to Blondel, the Perraults and all other previous architecture theorists, he categorised architecture by building types and building elements instead of classical orders and proportions. His method was intended for engineers but soon became "a classic of architectural education," and its arrangement of "problems in a sequence to avoid confusion" was widely influential during the nineteenth century, not least at the Beaux-Arts school, says Antoine Picon.²⁶ Though his insistence that arts and science could be unified in methods based on observation probably contributed to a subsequent separation of arts and science, it is worth noting that Durand regarded architecture as an autonomous art which by no means was to be seen as subordinate to engineering, and he saw the need for both the polytechnic and the Beaux-Arts traditions to exist.²⁷

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Durand describes his method as reversed to the master builder's, because the master builder begins in the elements of a building, while an architect should begin in defining a whole composition by applying "the first principles of the art" to the design problem he is to solve.²⁸ The application of the principles was to be guided by utility; the solution, represented in drawn plans and elevations, should enable a resource-efficient building process and optimised use.²⁹

The shift from classical orders and symbolism to a focus on turning students into rational generalists aiming for utility made architectural education operative as an extension of societal systems meant to foster good citizens.³⁰ In this sense, Durand's scientification of the architect's role is a major contribution to the establishment of a modern society beginning with the French Revolution and, in turn, the beginning of contemporary architecture.³¹ This transformation of architectural education can be seen as a path away from elitism. However, the idea of a total and rational system serving society can be paradoxical in the sense that what such a system in fact does is to exclude the social aspects of architecture.³² The dilemma that standardised architecture can improve the lives of the many and yet risks reducing the freedom of the individual, a dilemma which was actualised during the modern movement and is still present today, can thus be traced back to this era. It may be argued, as for instance Pérez-Gómez does, that Durand's rationalist break with Vitruvian heritage and the polytechnic civil engineering approach were disastrous because as a result, architecture and architectural education adapted to serve not humans but the building industry as reformed with the Industrial Revolution.³³ Pérez-Gómez claims that the French rationalism of the nineteenth century still influences the architect's methods because it fits the logic of mass production:

The methods of representation developed at the Ecole Polytechnique in post-revolutionary France were instrumental for the success of industrialization, and became entrenched in modern architectural practice, first in Europe and now globally.³⁴

Viollet-le-Duc: The architect must know how to build, not how to imagine the impossible

Durand's influence on architectural education was further enhanced by the work of another rationalist, Eugène-Emmanuel Viollet-le-Duc. His *Histoire d'une maison*, first published in 1873 and translated as *How to Build a House* in 1874, took Durand's description of an architectural design process in *Précis de leçons* further and is, says Hearn, "the same method still largely taught in architecture schools today."³⁵ Viollet-le-Duc aimed to modernise the education of the architect by introducing drawing as a way of analysing what one sees and thereby solving problems, rather than as a way of expressing artistic interpretations of situations, and instructed the architect to choose a site and a functional programme and then start the design process by drawing a plan.³⁶ However, in *How to Build a House*, Viollet-le-Duc also argues for architecture students to learn from Vitruvius as well as from medieval masons about the concrete matters of building.³⁷ It is possible to see Viollet-le-Duc's book, which has the form of a novel, as a modern version of Vitruvius's story of how the architect should know both theory and practice.

Eugène, an architect, gives his young and restless cousin Paul a course in "practical architecture" and claims that builders have experiences which enable them to see problems architects tend to oversee in drawings, and that the only way for the architect to discipline builders is "proving to all that you know more about matters than they do."³⁸ The "course" in which Paul is taught how to examine materials, ground conditions and constructions is given outdoors. The architect needs a kind of common sense which can only come through experiencing a building process, says Eugène, and seems to talk of what many contemporary educators term "tacit knowledge"³⁹ when he says that the "practical knowledge you will have acquired in building a house . . . will enable you to understand many things which, without practice, are inexplicable in the study of the art."⁴⁰ Eugène contrasts the educational strategy based on beginning by practising outside the institution to that of the Beaux-Arts:

[Beaux-Arts students] do *not* learn to build. They only learn to imagine and design impossible structures, under the pretext of preserving the traditions of '*high art*;' and when they are tired of putting these fancies on paper, they have a place as clerk of works given them, where they do what you are going to do; the only difference being that they feel a disgust for the work because they were expecting something very different.⁴¹

Research on architectural education

Jumping from nineteenth-century France to today may seem hasty. However, as Hearn and Cuff teach us, the layout and content of architectural education at that time is recognisable to contemporary architecture students. The atelier or design studio system is still dominant, while the importance of practical training, brought forward by Vitruvius as well as Viollet-le-Duc, is maintained in design-build courses which still tend to be seen as external to the core of the curriculum. Research on architectural education often focuses on either the studio or critical alternative educational environments. Against this background, our suggestion to look to connections between alternative and conventional educational milieus appears potentially innovative.

Schön: Reflection on action in the design studio – critical or affirmative?

The focus on the studio inside the school as a primary space of learning can be traced to the immense influence of the work on architectural education by the scholar of urban studies and education Donald Schön.⁴² Schön's critique of the dominant idea of how practitioners know is based on the thought that the practitioner's knowledge is reflective rather than

stemming from technical rationality, and can therefore be seen as a critique against the heritage of Durand. Schön has, however, been criticised for maintaining a reductive understanding of what and how architects know.

Schön's most basic thought is that reflection on action leads to that the professional practitioner's knowledge can be understood and spread, while action that goes on without articulation risks being marginalised or underestimated within education systems and societies aiming to measure the effects of learning. Architecture students are judged by their ability to design, to "reflect-in-action," rather than by their ability to talk about designing.⁴³ This is problematic, Schön argues, because actions will be interpreted differently from individual to individual, and when these interpretations remain internal, students are likely to become afraid of taking the risk to challenge what the master does. He therefore sees a critical potential of externalising experiences, or "tacit knowledge," through reflective processes and describes "reflection-*on*-action" (i.e. verbal conversations or written reflections which can improve future action) as necessary.⁴⁴ He points out the design studio at the school of architecture, with its roots in medieval guilds and the Beaux-Arts tradition, as an excellent example of a "reflective practicum" where educators and learners "make design assumptions, strategies and values explicit."⁴⁵ He therefore sees it as a space in which profession-specific pedagogies could be developed.⁴⁶

Schön's idea to articulate what was going on in the long-established closed spaces of learning – the guild's workshop, the academy's atelier, the contemporary design studio – is in itself valuable. However, rather than to an investigative development of profession-specific pedagogies, Schön's work led to an idealisation of those spaces as well as of the master-apprentice model of learning practised in those spaces. In the light of our interests, the attention Cuff has paid to Schön's focus on the studio is important to keep in mind. In an article from 2012, she claims that his work has contributed to architectural educators refraining from questioning the idea of the studio as a space, which is, as she says, at the core of the education and in which design, or "the core of the core," is something that

is taught by a master.⁴⁷ We will return to her ideas on how this core can be loosened up below, in our reflections on the field of inquiry.

Oppositions: The critical as "alternative"

Schön's influence on subsequent research on architectural education as well as on architectural educators has been seminal. Helena Webster claims that since Schön put forward the notion of reflective practice, his ideas "have framed most of the discussions about architectural education."⁴⁸

Webster argues that architectural educators have identified with Schön's idealisation of the studio model and his introduction of the term reflection-in-action for describing what teachers and students of architecture do in the studio "without sufficient understanding of [the] theoretical limitations and methodological errors" of his work.⁴⁹ Though to attack Schön is not the primary concern, there is a need for "cracks" in and "blurs" of his dominance, she continues, and proposes a range of alternative perspectives researchers of architectural education could take.

Webster is only one of several influential scholars who depict the realm of architectural education as consisting of a conventional core which Schön's work reinforced but to which reactions are and should be made. Ashraf Salama's overview of spatial design education from 2015, *Spatial Design Education: New Directions for Pedagogy in Architecture and Beyond*, is divided into a section on traditional approaches followed by sections introducing "pioneering," "new," "critical" and "transformative" approaches, ending in his own "trans-critical" pedagogy.⁵⁰ Salama attends to the critical function of going outside the known forms of learning when he describes the existence of what he calls a new "learning paradigm in architecture," where students become "critical thinkers, active learners, and eventually, responsible professionals."⁵¹ The paradigm includes forms for architecture students to engage in teamwork in the one-to-one mode and have since the 1960s been developed in hands-on projects, community projects and design-build and live studios at many architecture schools.

The website, articles and exhibitions of the *Radical Pedagogies* project, run by Beatriz Colomina in collaboration with PhD students at the School of Architecture at Princeton University, provide overviews of approaches and examples of alternative milieus for architectural education. They are introduced as challenges to conventional modes of architectural education inherited from the polytechnic and the Beaux-Arts education systems, and placed in categories with telling names such as "Participative Educational Democracies," "Politics of the Body" and "Feminist Pedagogies."⁵²

The authors of the widespread critique of architectural education and practice called *Spatial Agency: Other Ways Of Doing Architecture* – Nishat Awan, Tatjana Schneider and Jeremy Till – point to the coexistence of a stable tradition and alternative approaches within architectural education. Similarly to what Till does on his own in *Architecture Depends*, an entertaining critique of the present state of architectural education, they argue that the routines at architecture schools generally must be reformed because they are based on the obsolete idea that students should sacrifice their health in the competition with their classmates to gain a master's approval by learning to "perform [his] rituals."⁵³

The alternatives to the stable tradition, the authors of *Spatial Agency* claim, remain on the surface while the mainstream is a "notably under-theorised" underlying agreement on how things are done.⁵⁴ They propose the introduction of "critical praxis" as a response to the habitual predetermined actions of architects, a notion they distinguish from that of "critical architecture" as the latter is associated with practitioners who aim to overthrow given concerns and structures of traditional practice by playing with those very same concerns and structures, while they want to point to the potential of practices which pay attention to concerns and structures external to architecture and let these influence their ways of designing.⁵⁵

In line with Webster, the *Spatial Agency* authors argue that Schön contributed to the tendency of not questioning habits because he comforted architects to think of their practice as reflective, while most architectural practice in fact remains instrumental and "determined in reaction to short-term priorities of clients and the markets."⁵⁶ While Schön has been criticised for excluding political dimensions of practice, Awan,

Schneider and Till present the sociologist Anthony Giddens's idea that practical knowledge, if it is mutually negotiated through reflection and action, can make learners aware of their agency to change discursive and political contexts.⁵⁷ Both they and Salama also bring up Thomas Dutton's critical pedagogy model for including the "hidden" – social – aspects of the design studio, initiated in Miami in 1987, as one example of how critical inquiry can be set to work within architectural education.⁵⁸ Risks and possibilities with applying critical pedagogy to architectural education will be touched upon in the fourth chapter.

Schön's critics propose that there is a need for a more nuanced landscape of research showing how architectural education can include social and "real" aspects of architecture which, as we have seen, were marginalised when formal architectural education was established. A common trait is that they point to the transformative value of letting architecture students meet a physical situation outside the studio as well as an intellectual outside. The studio tradition, where lecture-based courses and studio pedagogy are kept separate, is still going strong, though lecture-based learning has been shown to be inefficient, while the notions of "'experience', 'making' and 'active engagement'" remain hidden in alternative environments for design education, says Salama, and points to "a desperate need" for pedagogies encompassing active and experiential learning as it happens in class and off campus.⁵⁹

An alternative tradition: Making, socialisation and relocalisation as counter-tactics

We may get the impression that it is only recently that calls for challenging the idea of the architect as an intellectual designer distant from reality have been made. However, the proposals mentioned can be seen as continuations of a tradition of challenging what has been regarded as a stable tradition – another rather stable tradition based on being in opposition to a prevailing order of things. We have, for instance, seen how Viollet-le-Duc contrasted the architecture student with practical experience from the atelier-trained student, and how Schön's work sprung

from a critique of the dominance of technical rationality. Another famous counter-position was taken by Gottfried Semper in the early 1860s, when he proposed a crafts-based alternative to Durand's scientific method for design in *Der Stil*. While Durand defined the steps of the architect's design process at the drawing desk, Semper claims the materiality of architecture stems from the four technical arts of ceramics, carpentry, masonry and textiles, for instance from when a human weaves his or her enclosure. The Arts and Crafts movement and the Bauhaus school are two other historical strongholds of opposition against the idea of the architect as individual designer of representations, and towards an idea of the architect as someone who knows crafts and is aware of his (or her) social and political responsibilities. The Bauhaus school has been described as an early, rare and influential "wholesale revision" of architectural education.⁶⁰

The Bauhaus school was established by the architect Walter Gropius in Weimar in 1919, moved to Dessau in 1925, and to Berlin in 1932, where it was closed by the Nazi regime in 1933. Its craft-based artistic education, where architecture was one of several fields of study, was a reaction against the Beaux-Arts academic and elitist approach to art and architecture.⁶¹ This approach was reflected in the structure of the programme, where there was a focus – not least in the famous preliminary course – on including practical training under the guidance of masters from different artistic fields.⁶² Although Bauhaus students were engaging in practical exercises and visited industries, Salama claims that the Bauhaus school maintained the idea of the architect as an individual master and that the location and design of the school as an isolated world contributed to this. In there, Salama argues, the master image of the architect could be affirmed, this time by teaching students to take back control of the design process through handling crafts.⁶³

However, it is also possible to understand the masters of the early Bauhaus as facilitators enabling practical experiences through which the students could become independent and playful practitioners who learnt from each other as well as the masters. Dorita Hannah shows that until the late 1920s, festivities including performances were a central part of the life of the masters and students at the Bauhaus and that there was room for combining practical technical training – or making – with playful forms of

learning without any predefined function.⁶⁴ If Viollet-le-Duc's architecture student should know crafts and materials in order to discipline his workers, the Bauhaus student was to have hands-on experiences himself, and if the rationalist's encouragement of practical training was based on arguments regarding efficiency, the Bauhaus school – at least during the first half of the 1920s – enabled experimentation with hands-on making beyond function. Architecture was set in relation to other art forms and explored as a subversive art rather than an art serving societal progress.

The school's initial criticality against prevailing habits paradoxically led to new habits of designing buildings based on modernist types being formed.⁶⁵ This development stemmed from a profound shift from Expressionism to New Objectivity, which the Bauhaus was affected by and contributed to, not least by adopting Constructivist ideas of formal abstraction.⁶⁶ Gropius now proclaimed that practical training would make architects able to work with modern industrial technology and thereby make architecture useful for and available to large parts of the population.⁶⁷ When Hannes Meyer, who at the time was convinced that architecture as a practice was more akin to science than art, took over after Gropius in 1928, the education was further rationalised with the intention to make architects prepared to serve societal change with standardised modernist architecture.⁶⁸ It is worth noting here that there is a parallel with Durand's total system, in which the idea of serving society led to the marginalisation of human experience in favour of mass production.

We have seen that hands-on and on-site exercises have been introduced, for instance by Viollet-le-Duc and the Bauhaus, as contrasts to exercises based on designing representations, commonly drawings, to scale. Another wave of such "alternatives," where acts of making were seen as emancipatory, came with the political shift of the late 1960s, for instance in the educational workshops of the dancer Anna Halprin and the landscape architect Lawrence Halprin.⁶⁹

For the last two decades at least, the idea of the architect as a maker with knowledge of crafts has been revived, for instance through influential books like *The Craftsman* by the sociologist Richard Sennett, *The Thinking Hand: Existential and Embodied Wisdom in Architecture* by the architect

Juhani Pallasmaa, and *Making: Anthropology, Archaeology, Art and Architecture* by the anthropologist Tim Ingold.

Forms of learning which implement the idea that movement between concept and built construction, or the realms of design and making, affects the architectural practice have been tested out in various contemporary "alternative" courses, like the Rural Studio at Auburn University, Alabama, and the live studio pedagogy developed at different universities in the United Kingdom and theorised primarily by Harriet Harriss. "The Civic University" in London, run by the architectural firm public works, and the "Urban School Ruhr," set up in 2016 by the architectural practice raumlaborberlin, have played with the idea of the educational institution by setting up "spaces of learning" such as "Civic Classrooms" and "AS/IF Installations" in urban space to provide opportunities for knowledge to be shared between experts, citizens and activists, i.e. to make the city co-produced rather than planned from above.⁷⁰ The contemporary "alternative" milieus just mentioned have in common that they privilege the one-to-one mode, where the student acts as builder. In relation to "making," they tend to bring up participatory and social aspects of architecture as essential. Moreover, contemporary "alternative" educational milieus tend to be set up outside the studio and thus involve a relocalisation of learning.

Reflections on the field of inquiry

The historical overview shows that architectural education has been formed by continuous inquiries into what defines architecture as an art, which have led to different perspectives on what, how and where architects should learn to be able to create architecture. Vitruvius stated that architectural education should include a variety of ways of learning through which theory and practice, including knowledge of building, were combined. The move into curricular structures and institutional spaces led to a reduced awareness of built reality and its physical and social dimensions, and this is something "alternative" milieus of architectural education continuously try to fix.

Acknowledging a diverse reality

In spite of the continuous inquiries, the idea of a normative core defining what architects should know (the content of the education), how they know and share their knowledge (what methods are taught), and the educational models or forms of learning through which architecture students assimilate content and methods has built up over time. In terms of content, we have seen the emergence and solidification of the idea that architects should know how to compose or design buildings at a distance from manual work, that this is their practice. Their design abilities should be accompanied by knowledge of architectural theory, history and construction through theory-based studies, where principles and narratives are presented in texts and formulas. The primary method they are taught is to design through drawings made according to standardised scales and formats, which reveal what they have learnt about composition as well as theory, history and construction. The primary form of learning to design is the master–apprentice model which allows for a unidirectional transmission of knowledge and know-how from an experienced to a novice individual, and which is enacted in a space – a studio or workshop – that supports this transmission.

The overview also shows that the normative core continuously is and has been interrupted. Two traits appear as central to these interruptions, or "alternative" educational milieus: making as opposed to designing, and participation as opposed to individual learning from a master. The idea of the architect as maker has been introduced from time to time, thereby expanding the architect's practice towards the hands-on and the full-scale. Non-hierarchical or participatory pedagogical models have been implemented, and this implementation has involved moves outside the container spaces of the studio, workshop and lecture hall.

At a distance, it is thus possible to describe milieus of architectural education as either more "stable" or more "alternative." However, by establishing an overview of our field of inquiry, we have become aware that the reality of architectural education is more nuanced than that. The formative rationalist approaches included both the introduction of a general design method and practical training. Durand's method, which

today tends to be known as one contributing to a complete instrumentalisation of architectural education, involved social intentions and an understanding that different kinds of architectural education are needed. Schön's work can be regarded as a preservation of stable ideals or as a contribution with critical potential because it allows architects to become aware of what and how they know. And though the Bauhaus was clearly innovative in terms of introducing hands-on making, its workshop training can also be seen as a continuation of a master–apprentice model with medieval roots, or as a failed alternative to Beaux-Arts elitism which led to new modernist habits.

We have seen that Vasari and Alberti brought the idea of the architect away from the building site; Boullée and Durand reacted against Vitruvius's focus on building; Semper wrote in opposition to Durand; Viollet-le-Duc and the Bauhaus proposed contrasts to the Beaux-Arts atelier system; and Schön's theory was presented in opposition to technical rationality. What is more, contemporary researchers of architectural education appear to reinforce binaries: the Radical pedagogies are presented in opposition to the academy tradition and the polytechnic tradition; Salama's divisions maintain a stable tradition next to alternatives; Vesely and Pérez-Gómez turn their backs on the mainstream instrumentalisation of the architectural practice; Webster presents Schön as a dominant voice to react to; and Awan, Schneider and Till, though seeing the need to go under the surface of the mainstream, present "other" ways of doing architecture – that is, they risk contributing to the idea that alternatives remain as something other, something outside the curriculum, and thereby consequently to letting the mainstream of architectural education remain silently agreed on. Research in which the divide is taken for given contributes to making it real at architecture schools as well as in the profession at large. It is troublesome that initiatives to change the core of architectural education tend to be presented as counter-narratives or breaks rather than continuations or developments of an established mainstream, because thereby the stable tradition and the tradition of challenging the stable tradition remain parallel, i.e. the agreement on a core is largely untouched. The overview above, we argue, shows that the core's establishment has been promoted by rather than interrupted by counter-reactions throughout history, since

they have been introduced and researched as being in opposition to the mainstream.

However, as Mewburn says, there is room for experimentation and convention both on site and in the studio, both when building and when representing architecture. A challenge within research on architectural education appears to be to acknowledge the existence of a stable tradition and yet make efforts to question the constructed divide, to enact an oscillation between the "stable" and the "alternative" which lets us look again at the content, methods and forms of learning that they come with. We therefore propose that setting the notions of making and participation in relation to those of design and individual learning seems relevant. Moreover, we argue that it appears beneficial to do so from within, by acknowledging the diversity of architectural education and acting inside it rather than describing it from a distance.

A need for articulating nuances

But why, then, is any change of the core needed? The overview above has exposed at least two major problems with and reasons for changing the agreement on what architecture students must learn. First, if education is seen as training for professional work life, the prevailing atelier tradition does not prepare architecture students for what they are actually going to do after graduating. That is, they will – as Viollet-le-Duc pointed out – have little knowledge of how the houses they design can be built and of how to communicate with clients and users. Second, the unarticulated agreement on a core is also problematic if architectural education is seen as more than profession-oriented, i.e. as a way of knowing and approaching the world in a broader sense, because the master-apprentice model reduces the student's ability to nuanced critical thinking and nurtures the idea of criticality as being opposed to something, as the master in the studio gives his view onto the field of architecture rather than opens up a multitude of perspectives to the student. This may lead to learners either being paralysed and refraining from practice or joining the mainstream of professional practitioners.

Instead, to set "stable" and "alternative" forms of learning in relation to each other appears a wise strategy for making learners aware of material and social dimensions as well as for breeding critical perspectives that enable the challenging of habits rather than lead to new domains of habits. That is, the questioning of the either/or of architectural education entails the possibility of new views on what it means for an architect to be critical. That there is a need for such views is something Nel Janssens points out. The idea of the architect as an individual designer who knows how to change the world, which we have seen emerge through the history of architectural education, remains because architecture schools still today foster a military language, she argues, where seminars are called "battles" and workshops encourage students to "reclaim" this or that.⁷¹ Janssens suggests that the use of language at architecture schools reveals that architects have learnt, and that future architects are still taught, to enter discussions by making statements *for* something and *against* something else, with the consequence that they find it less valuable to be able to listen and to engage in conversations which allow for the acknowledgement of nuances, experiences and emotions. Although this remark is easier to accept if we think of the idea of the architect as individual master as universally prevailing (something we have seen is not true), it convinces us that the stable tradition and its master–apprentice model must be questioned.

How to accept that newness and norm depend on each other, yet act critically

Cuff describes the coexistence of stable and critical traditions of architectural practice and education.⁷² She shows that contemporary architecture students worldwide are trained just like generations before them have been, by a master who follows them in the development of individual projects through drawings and models in the studio at the architecture school.⁷³ Beginning a talk in Stockholm in 2017, she asks rhetorically if she is not exaggerating the constancy of architectural education.⁷⁴ Well, she smiles after showing similar images of studios from

different times, some students work in groups now. The ideal of the studio and the learner becoming an autonomous designer in there lives on and it does so, Cuff argues, because architecture schools are monitored by academic institutions and professional organisations that seek to maintain the story of the profession as mythically timeless because this story makes the service market predictable and efficient.⁷⁵ The education marginalises many aspects of the architectural practice, not least, says Cuff, the fact that architecture is a "social construction" and that most design processes are collective.⁷⁶ Cuff also shows that the hegemony of the traditional studio model constantly is and has been challenged by alternative models or counter-traditions setting "the stage for transformation" by defining crises demanding new forms of learning and practising.⁷⁷ Against the background of our overview of architectural education, Cuff's reinforcement of the dominance of the studio tradition may appear as a simplification.

However, Cuff introduces a possibility for moving away from the simplified either/or when she draws on Gregory Bateson's take on the double-bind theory, presented within the field of psychology, to describe the field of architecture as characterised by a "fragile balance" between permanency and disruptions, which she calls "architecture's double-bind."⁷⁸ This is a position which allows us to blur the divide between convention and breaks with convention. The double-bind situation, as described by Bateson, always includes two individuals: one who sets the rules and one who follows.⁷⁹ A local context of habits is thus shaped, and experiences of breaches in the contextual structure, or double-binds, will be painful but can, to an individual who knows how to play with the given rules (for instance an artist), entail innovative behaviour or creativity.⁸⁰

Furthermore, the innovative action has the agency to change the whole setting, because context and actions must, according to Bateson, be understood as mutually dependent.⁸¹ That is, an established context can never be seen as permanent; one single action can transform it. To contrast crisis to norm can make architects aware of potential for transformation, Cuff argues, but the double-bind is more accurate for describing the architectural practice because it "reflects the stasis and change that are part of architecture's material circumstances":

In material terms, the crisis that produces a tabula rasa offers an open field for innovation, and a reduction of complexities inherent to working in context. In socio-political terms, crisis uniquely holds the potential for radical change, akin to a collective version of shock treatment. The clean slate, physical and/or mental, is the abstract precursor for change, whereas in fact, the practical precursor is a well-defined set of norms.⁸²

In other words, if practice is to be changed, the critical or new must be seen in relation to existing conventions. As described above, "critical architects" have often got stuck in the blank space of crisis, while most other architects, as for instance Pérez-Gómez points out, have adapted to the efficient norm. However, the essential circumstance Cuff frames with the double-bind notion is that the architect's practice never is a choice between either norm or newness. Any radical piece of architecture depends on the idea of a static tradition and this is a fact architects should take into account more consciously, she argues, because "[w]ithout that stable element, variation would not be identifiable."⁸³

Following Cuff's argument, we suggest that architectural education and research on the same should enact this dependence, rather than maintain a divide between the norm and the new. With the double-bind idea in mind, we begin to think of milieus of architectural education as contexts formed of habits predefined by a master, and speculate about if the learner can acknowledge and act creatively in gaps in the habitual landscape, and if their actions then may contribute to changing the local habitual context and perhaps, in turn, the prevalent state of our field of inquiry.

Cuff is not the only one to spot the need to go beyond binaries. We have, for instance, seen that the authors of *Spatial Agency* called for a critical praxis to explode the set frames of the field of architecture. Yet architects tend to foster the idea of critical practice as parallel to normative practice, of criticality as negation rather than negotiation, and this is a trait

of the profession which can be traced back to the modernist avant-garde and the early days of "critical alternatives." We suggest that architectural educators and researchers of architectural education should be aware of how the avant-garde's narrative of progress and nihilation of the past has been problematised.

During the first decades of the nineteenth century, Count Henri de Saint-Simon and his followers introduced the avant-gardist as someone – artist, scientist, industrialist – who was guided by his imagination to march against the ruling regime of reason.⁸⁴ By contrast, Percy Bysshe Shelley claimed that to be avant-garde means to use one's imagination for the sake of imagination.⁸⁵ While Shelley's view did not set the imagination in any given direction, Saint-Simon saw the artist as having a mission outside art.⁸⁶ The two forces are still shaping the artistic field, says David Cottington, but whether political or artistic, the avant-garde is considered as presenting a newness that is implicitly political in its questioning of the given and its strive for utopias.⁸⁷ The idea of the avant-gardist as someone who marches, like a soldier, against an enemy or as the leader of a population, is essential to remember because the avant-gardist is generally thought of as a critical thinker, warns Matei Calinescu.⁸⁸ Rather than on the positive force of imagination, the criticality in many of the avant-garde manifestoes was built on a fundamentally negative and dogmatic approach to the existing and the past, which neglected nuances and was therefore bound to be self-destructive, says Calinescu.⁸⁹ The architects who, as Cuff says, set the stage for transformation by understanding crisis as a *tabula rasa* can be seen against this background. The radical new will then have to be destroyed and replaced by a new newness as soon as it is no longer new, all while the mainstream flows as usual.

However, Cottington notes that the "avant-garde formation in the twenty-first century is thoroughly professionalized, and in ways that are no longer 'alternative' but normative for contemporary culture."⁹⁰ That is, critique based on negating the existing may contribute to change for the sake of change rather than any lasting socio-political transformation, since the avant-garde principle of progress through change has been absorbed by capitalist logic and popular culture and has thereby lost its revolutionary roots.⁹¹ What does this mean for the contemporary

architectural educator? If s/he aims to set up forms of learning enabling criticality, s/he must be aware that the once radical logic of the new can be used for several purposes. Moreover, the educator must be aware that to contrast one approach to practice against another risks shutting down imagination and reducing ambiguous and unpredictable dimensions. With these reminders regarding criticality in mind, we look to the critical potential of introducing methods and forms of learning characterised by making and participation into the stable tradition of architectural education.

Making and design

Our historical overview highlights the need to challenge the understanding of the architect as designer of norm-directed drawings, established through the work of Vasari, Durand, Viollet-le-Duc and Schön. We have seen that the idea of the architect as engaged maker has been presented as an alternative. Why should we look further into this idea?

The introduction of making includes acknowledging the need to include material aspects of the practice and an expanded repertoire of methods for working with materiality. That is, content, methods and forms of learning need to be revised to include materiality, and therefore the divisions between matter/body and form/mind which characterise the conventional forms of learning need to be questioned. We propose that the researcher of architectural education can do so by acting within educational milieus. Hilde Heynen and Gwendolyn Wright support this endeavour as they propose that the "institutional realities of architectural education, the structuring of the profession and the organization of architectural media" could become more diverse than they are today if theoretical perspectives attending to materiality were set in relation to the everyday practice of architecture.⁹² Materialised negotiations of bodies and differences have entered architectural theory, especially via feminist, postcritical and postcolonial perspectives, but they "have not achieved a profound change in conventional practices and disciplinary boundaries,"

Heynen and Wright claim, while pointing to a promising increased interest in practice among theoreticians.⁹³

"A design" is a result that implies that knowledge has been applied to solve a problem, while "to design" is an ongoing process where solutions are tested. The idea that a process should lead to a design can be reframed as learning with a determined goal, and the idea of design as process opens up for thinking of learning to design as an unpredictable movement. What can this, in a concrete sense, mean to the architect's practice and the products of design processes? In the paper "Translations from Drawing to Building," published in 1986, Robin Evans states that the architect's drawing is not his or her product, but a mediation between idea and product (house), while a sculpture or painting is the product per se. This idea may seem clear, but the understanding of drawings as mediations risks separating the drawing or design from reality. The drawing in itself can also be thought of as a materialised continuous participatory process including influences from encounters with materials and humans. Bruno Latour's steps towards a philosophy of design, "A Cautious Prometheus," questions the modernist divide between materiality on the one hand and design on the other. This divide reduces the understanding that the designer's choices between a multitude of possible solutions in relation to an existing context have ethical and political dimensions, he argues. The challenge for designers (architects included), he says, is to develop drawings – designs in a literal sense – that rather than being beautiful objects become things or gatherings that reveal the process behind them. Latour asks:

[W]here are the visualization tools that allow the contradictory and controversial nature of matters of concern to be represented?⁹⁴

This question, straightforward though it may seem, is an opening to a destabilisation of architecture as a discipline which should be taught in the isolation of the studio. To move educational projects outside the studio entails possible changes of how architecture is taught and of the methods

for communicating architecture and thus, in turn, transformed understandings of what architects do when they design.⁹⁵ With this thought in mind we may listen to Cuff, who points out that the notion of design or *disegno* holds more than drawing as we know it:

Disegno itself implies both concept and realization, a conjunction of idea, if not theory, with practice, and more literally with drawing.⁹⁶

We have seen that the division between the architect as maker of representations and the craftsman as maker of real constructions emerged in the sixteenth century and has remained until today. In "live" or "design-build" environments, the on-site intervention made through hands-on exercises, rather than the drawing, is the central form of inquiry through which concepts are realised. Cuff suggests that a pivotal shift has come with the return to the one-to-one mode enabled by the introduction of new media for 3D modelling without 2D drawings. She claims that this (re)introduction is a disruption of the dominant tradition which can have more than temporary effects because it destabilises the idea of the architectural representation as we have known it since the Renaissance by literally moving between concept and realisation:

One of the most provocative challenges to the core regarding representation is the ability to work, for the first time since medieval crafts, in a one-to-one fashion, without representational intermediaries.⁹⁷

Though the one-to-one fashion Cuff talks of is digital rather than hands-on, her argument allows us to suggest that also the physical full-scale intervention enables the architect to move between representation and experience. Rather than leaving the representation, as Cuff argues, we suggest that the one-to-one mode may influence the way representations

are made. As we think of design as a movement between theory and practice which is materialised (in a drawing), the notion of design becomes an invitation to explore what it means to draw, or to materialise a movement. This allows questioning of the prevalent idea of the architect-educator as an individual designer of representations parallel to the real world, and enables us to think of the architect as both maker and designer – or designer in a wider sense.

Participatory and individual forms of learning

We have seen that non-hierarchical processes of learning tend to be set up as opposites to top-down transmission of knowledge from one individual to another. There are, according to Salama, three ways in which architecture students today are taught to think of design decisions. There is the die-hard opposition between (1) decision-making based on intuitions that reason cannot explain or (2) on well-defined criteria that lead to measurable solutions or designs, but also (3) educational environments in which learners are trained to make decisions in participatory processes.⁹⁸ Social and political dimensions involved in such processes risk becoming peripheral because tangible practical problems demand attention. Moreover, bringing in such dimensions can lead to learners being directed in their thinking about how architecture can improve society. Nonetheless, we argue that conscious introductions of participatory forms of learning in relation to the idea that design decisions are made by individuals and based on either intuition or rationality has a potential to lead to lasting changes of the stable tradition.

The educational environments working with participatory processes share, according to Salama, a goal of improving the quality of life through experience-based pedagogy and societal engagement in the spirit of John Dewey.⁹⁹ Participatory processes appear to have a potential to articulate the mainstream and buttress a criticality based on negotiation and experience because, as Salama explains, they enhance the idea that each problem has a multitude of solutions and that continuous changes to conditions and solutions are part of the design process. They also have an

inherent potential for undermining hierarchies, as the most novice participant's opinion or action can be as decisive for the process as the most experienced participant's. Moreover, the design process automatically becomes transparent when it is participatory, as the design task and its transformations have to be shared in a group.¹⁰⁰ Like intuitive and rational design processes, participatory processes lead to designed results, but they do also – and this is perhaps more important within the educational setting – allow for conversations about how one designs and how one learns to design. That is, participatory processes entail articulation of experiences and are therefore a vehicle for learning.

The participatory design process leads not to objective knowledge, but it also does not lead to knowledge that is purely intuitive or subjective and can remain within individuals. It leads to a collective understanding of an intersubjective kind which, because it is shared and thereby expressed, can be transferred from one specific situation or process to other situations or processes. Such winding roads to solutions, sceptics might feel, are frustratingly slow and based on an idea of equality which is impossible to combine with getting something done. Professional design teams need to be efficient and someone has to be in charge of making uncomfortable decisions. Even if so, that someone will probably make better decisions if s/he is trained in educational environments based on participation, because s/he will then know that decisions affect others.

Summing up the reflections

We have seen that making and participation are common traits of contemporary "alternative" educational milieus, and that these notions allow us to connect the materiality of architecture to social, critical and imaginative dimensions of the architect's practice. Moreover, the introduction of making and participation can lead to the general knowledge of architectural theory, history and construction being activated in relation to specific problems posed in design courses. We have argued that there is an urgent need for research developing pedagogical models or forms of learning through which the potential of implementing

making and participation in architectural education can be further developed so as to actually influence the architect's practice. This is why we ask: *How can forms of learning that rely on making and participation in contexts outside the design studio contribute to increased abilities for critical reflection on and transformation of habits within architectural education?*

We will now introduce the case chosen and our methodological approach to that case. Further reflections on methodology will be made in the following chapter.

The case chosen: Making is Thinking in a national and local context

Barbro Grude Eikseth's recent dissertation on Norwegian architectural education from 2009 to 2012 compares understandings of the profession within educational and professional milieus. Eikseth shows that the three Norwegian schools of architecture – the Oslo School of Architecture and Design (AHO), the Faculty of Architecture and Design at the Norwegian University of Science and Technology (NTNU) in Trondheim, and Bergen School of Architecture (BAS) – share a foundation in "project-based studio education from the academy tradition, combined with experimentation and 'learning by doing' from the Bauhaus tradition."¹⁰¹ Norwegian architectural education thus appears as a potentially beneficial context for studying our problem.

Attending to what separates the three schools, Eikseth shows that AHO can be characterised as a diverse school based in the academy tradition, that BAS has a specific heritage in Oskar Hansen's experimental educational practice which includes full-scale building as a central form of learning, and that NTNU includes a relatively large degree of elements recognisable from the polytechnic tradition.¹⁰² During the last two decades, however, to learn by working in the one-to-one mode has also been a central approach at NTNU. While AHO leans towards the academy tradition and BAS's approach is radical by international standards, the education at NTNU appears to be an appropriate context for studying our

problem since the two legs of studio tradition and experiments outside the studio coexist there.

Until the late 1990s, the teaching at NTNU was characterised by a modernist heritage enhancing functional and abstract aspects of architectural space.¹⁰³ In 2002, this tenacious tradition was challenged by a new leadership which introduced methods enhancing material and practical aspects of the profession as well as an increased focus on pedagogy. This change entailed the idea of letting each student's background and prior experiences affect the education, an idea possible to implement not least because new spaces for experimentation were arranged inside the school and courses including field studies and building exercises set up outside the school.¹⁰⁴ Such exercises have since the early 2000s been an essential part of the first year of the architecture programme at NTNU as well as of eligible master's courses, and they formed the platform for the NTNU Live Studio, started in 2013. With these educational elements, NTNU has become part of an international network of "making approaches" to architectural education. For instance, the NTNU Live Studio has developed contacts with the Live Projects programme at the University of Sheffield School of Architecture and with Andrew Freear, leader of the Rural Studio. The focus on pedagogy and the learner's experience was further enhanced in 2014, with the establishment of a centre for research on architectural education, TRANSark – an abbreviation of transformative learning in architectural education. TRANSark aims to develop research on and practices for architectural education and is a potential framework to support the need, at NTNU and globally, for theorising and thereby developing forms of learning.¹⁰⁵

TRANSark is based on the definition of a crisis. If Schön reacted against technical rationality and Gropius against the distancing from practical training, TRANSark's existence is conditioned by the idea that conventional forms of learning do not prepare architecture students for an unpredictable future. This is a critique we recognise from Till, among others, who in *Architecture Depends* argues that architects undermine their own relevance in a changing world if the education continues to regard established attitudes, methods and techniques as given. The centre consists of four "pilots" or milieus aiming to develop appropriate

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alternatives. Three of these are directed by architects – Gro Rødne is in charge of Making is Thinking; Steffen Wellinger, who also runs NTNU Live Studio, is the front figure in Live Learning; and Bjørn Otto Braaten manages Complexity and Depth – with one overarching pilot based in the field of education, called Emerging Pedagogical Practice and directed by educational scholar Leif Martin Hokstad at NTNU's Department of Education and Life-long Learning.

Educational ideas on transformation as discussed within the "threshold concepts framework" form a common entrance to pedagogy for the founders of TRANSark.¹⁰⁶ TRANSark was built in relation to the framework of threshold concepts and transformative learning, says Rødne, simply because several colleagues at the faculty had independently of each other become interested in Hokstad's work within that framework, which had made them realise that their experiences of teaching could be food for research as well as enriched through research.¹⁰⁷ This internal coincidence, she continues, was simultaneous with encouragement from the top levels of the NTNU administration to develop the kind of teaching that was going on in the architecture programme. Though the threshold concepts framework has been formative for TRANSark and Making is Thinking, Rødne emphasises that the theoretical horizons of TRANSark should not be confined to this framework.

What the notion of transformation implies in this setting is suggested by the fact that TRANSark's vision is accompanied by a quote from Pallasmaa:

Architecture can be a way of learning about the world and yourself as much as being a way of making one's living.¹⁰⁸

In other words, the idea that architectural education can do more than turn students into employable professionals is central here. Moreover, TRANSark acknowledges that transformative learning "implies

transformations for the teachers as well as for the learners."¹⁰⁹ Architecture educators are often practitioners basing their approach to teaching on their practice rather than on any pedagogy, and this means that their idea of the design process in educational settings as a process of learning remains limited. Schön tried to change this circumstance, but his work comforted architects to go on as usual. Hokstad et al. suggest, when presenting the goals of TRANSark, that architecture educators need to acknowledge that they are "dual professionals" – designers and educators – and that consequently they must rethink the role and competence of the teacher.¹¹⁰ The initiators of TRANSark thus suggest a possible path towards challenging the master–apprentice model, which Schön contributed to maintaining, and which still is a major educational model in Norwegian architecture schools.

Seen against the overview of our field of inquiry, the TRANSark pilot *Making is Thinking*, first implemented in 2013, appears as a relevant milieu to study because it *combines* forms of learning characterised by making and participation with more conventional ones. Making in hands-on exercises to scale and at full-scale here happen both inside and outside the institution, and the making is in turn related to forms of reflection on learning and a theory course. In addition, *Making is Thinking* sets up both participatory and individual forms for coming to design decisions.

While other design-build and live studios, including NTNU Live Studio, focus on making as building, *Making is Thinking* sets out to expand the idea of making by developing artistic approaches to live learning. This is a tactic for discursively moving between inside and outside. By setting up connections with other artistic fields and by using the bricolage principle, i.e. letting the new emerge by making combinations of what is available and previously perceived as given or negligible, *Making is Thinking* invites learners and educators to explore the limits of their own practice.

In short, *Making is Thinking* aims to enable learners to move in contexts discursively and physically inside and outside the known, and thereby let them question but not reject the methods of designing and the spaces of learning to design that they are used to. This approach appears valuable because to become aware that norm and crisis are related is, as

Cuff says, a path towards letting "the clichéd depictions of architecture shatter, creating new insight into the profession."¹¹¹

Hence, *Making is Thinking* prepares the ground for oscillation between "conventional" and "critical" approaches to architectural education, and we decided to suggest possible responses to the research question by zooming in on one specific case within the pilot, a master's semester running from February to June in 2016. The semester consisted of the master's course in design "*Making is Thinking: In the Overlap Between Artistic and Architectural Methods*" and the theory course "*Aesthetics, Theory and Practice in Architecture*," and ended in the festival *Hendelser på Nyhavn* (*Events at Nyhavn*), held for the first time on 11th June 2016.¹¹² *Making is Thinking* collaborated with the experimental theatre company *Cirka Teater*, based in the industrial harbour area of Nyhavn since 1986, to make events for the festival.¹¹³ That is, the theatre was the other artistic field *Making is Thinking* was primarily connected to this time. In addition to working in a space called the FormLAB inside the architecture school, the students also worked at the harbour.

The aim of the festival was, in relation to a major process of urban transformation, to raise awareness of the diversity of cultural production going on at Nyhavn today. *Making is Thinking's* aim with participating in the collaboration was partly to contribute to the debate about the area's future. However, the collaboration can, from *Making is Thinking's* point of view, be seen as one of many processes of hands-on experimentation aiming for the milieu's overarching goal of developing theories and practices for challenging design habits. To our case study, the festival and the urban transformation of Nyhavn form a background. Rather than on the final results and their influence on the development of this specific area, the study focuses on the whole semester and the learning processes of its fourteen students.

The specific context of the case presents tentative perspectives through which the idea of transformation through making can be taken further by the researcher. The position within TRANSark makes the threshold concepts framework one of those perspectives, and this framework, in turn, is a point of departure towards other positions in the field of education. The collaboration with the theatre company, on the

other hand, opens up the field of theatre and performance. The understanding of estrangement as an aesthetic strategy for transformation, described already by Aristotle but coined and spread by the Russian Formalist Viktor Shklovsky in "Art as Technique" from 1917, emerges as we look to how architects know by moving between describing the existing and projecting futures in the first chapter. Throughout our case study, in the second and third chapter, strangemaking is set in relation to a central learning goal of the semester – that students should learn to acknowledge and use the strange and unexpected – and to the lived experiences of the unfamiliar reported by the participants. The potential of estrangement techniques is then further discussed in the fourth chapter.

Several scholars propose researchers of architectural education should make connections outside the field of architecture. In our case, the educational connection seemed to allow for theorisations while the theatre connection could enable expansions of the idea of making through practice within architectural education. As the case study developed, the notion of performance appeared as one, where theatre, education and architecture could meet and learn from each other.

The method chosen: Action Research

We have seen that although architecture is a projective practice – that is, it not just describes a situation but also projects ideas for how the situation could change – architecture students are often taught to implement proposals at a neutral distance to the existing or engage in full-scale building without being given the opportunity to reflect upon the possible effects of that engagement. Based on this, we have argued that the Making is Thinking semester was a relevant case to study since it had a structure allowing for combining distance and engagement. For the researcher's investigations of our case, another such structure was required, one that could allow the researcher to be not only a dual but a triple professional, acting as researcher, educator and architect throughout the process. We were in search of a methodological approach that would allow us to work

from within the architect's practice and also to communicate with researchers in other fields.

We began to look for experience-based methodologies enhancing participation and our attention was drawn towards action research. Salama says that action research is a tradition especially fit for informing participatory design processes involving actions and reflection upon actions.¹¹⁴ Ilpo Koskinen et al. include action research in their overview of methodologies for design research, and stress its constructive and collective features.¹¹⁵ And, from within the framework of action research, Morten Levin and Ann W. Martin claim that action research is relevant for project-based teaching in schools of architecture, where the educational process involves experiences of practising.¹¹⁶

Action research is based on that knowledge stems from experiences rather than predefined principles, that processes of learning must be participatory rather than directed by a researcher or other authority, and that forms of inquiry should be engaged rather than distanced. To think of these outsets in relation to our case appeared potentially fruitful. We therefore began to look for how to implement action research and found that the "cogenerative learning model" – hereafter called the cogenerative model – developed by Levin and others, could provide us with a useful structure for studying our case.¹¹⁷ By contrast to conventional learning models within architectural education, this model fosters participation or colearning rather than the individual learner's progress. Moreover, the cogenerative model is attractive from an architect's point of view because it gives importance to the physical-material circumstances of learning by instructing the researcher to set up learning arenas, thus potentially meeting the need for including materiality in research on architectural education and enabling investigations into what architecture students can learn through making. The cogenerative model made action research workable and appeared as a possible vehicle for developing an approach to research *within* architectural education which could be spread to situations other than ours.

The cogenerative model implements double learning loops in the specific context studied. The first learning loop belongs to the participants and leads to a shared understanding, or local theory, within a community

and of a situation, while the second loop belongs to the researcher/s and should generate knowledge that can be applied to other communities and situations. A key question when making ethical and privacy considerations regarding our case study, which is called "Learning through making architecture," is that continued anonymity is taken care of throughout the entire process; when data is collected, stored, shared and published. The case study was notified to the Data Protection Official for Research, Norwegian Centre for Research Data (NSD) and made according to NTNU's guidelines for collection of personal data for research projects. It was designed as a cogenerative dialogue in which the students of the master's semester acted as research participants, or colearners, and the author as researcher. In the description of the case study in this thesis, the fourteen colearners have been coded as CL1–CL14.

Morten Levin was contacted and acted as an advisor in the early phases of our study.¹¹⁸ Our cogenerative dialogue happened on four occasions, referred to as learning arenas, during the spring semester. In 2018, it was followed up by a question asked to the former participants. The dialogue and analysis of its outcomes form the core of this project. Three other interviews held in 2018 have also informed the project's direction. Berger and Sæther were then interviewed separately about Cirka Teater's history and artistic intentions, and Rødne and the artist Alex Booker, who has formulated ideas on architectural education which informed the setting up of Making is Thinking, were interviewed about the overarching intentions of Making is Thinking.

The structure of the thesis

The structure of this thesis is built around the analysis of the case study as a core to which we arrive through the first and second chapters and which we propose continuations from in the fourth chapter. The methodological approach comes through in the presentation of content, and the first chapter includes a reflection on how and why the elements in the thesis belong to different genres or take on different characters depending on how they are written.

Introduction. The introduction has aimed to describe a coexistence of "conventional" and "critical" milieus of architectural education and the need for nuancing the constructed divide between these categories. Making is Thinking has been proposed as a case relevant for studying this problem, and the cogenerative model for action research as a seemingly relevant methodological approach for designing a case study.

Methodology. The first chapter, on methodology, gives a broader background to our choice of the cogenerative model for studying an educational milieu at a school of architecture. The chapter looks at how architects know and the need for research structures which frame their ways of knowing. We turn towards the field of experiential learning and more specifically action research and the cogenerative model to develop such a structure. We expand on why the cogenerative model is appropriate for studying the problem and case at hand and suggest that it constitutes arenas for mutual learning where conventions and breaks with convention can be negotiated locally as well as in relation to the wider field of architectural education.

Case study. The second chapter begins with a background to the case, based on interviews with the initiators of Making is Thinking and the founders of Cirka Teater. An introduction to the practical circumstances of our case, the Making is Thinking semester in 2016, is then made. The main part of the chapter, a chronological exposition of our case study, follows. Our cogenerative dialogue is intertwined with descriptions of the semester's exercises, and a movement between reflection in the learning arenas on the one hand and action in the courses on the other is narrated.

Findings. The third chapter is a thematic exposition of the findings we made through our cogenerative dialogue, seen in relation to the outcomes of the interviews with the founders of Cirka Teater and the initiators of Making is Thinking. The chapter reflects the cogenerative model, with one presentation of the participants' loop and one of the researcher's loop. Based on our findings, we then propose projections for further research regarding the development of ideas on the transformative space of learning as an aesthetic experience, including material and embodied dimensions which may be possible to develop by applying performative perspectives to architectural materiality.

Projections. In the fourth chapter, we make a selection of perspectives, examples and spatial models through which we suggest possible continuations from our case study. By looking to and problematising examples of immaterial and material transformative spaces, constructed by educational scholars, theatre-makers and architects and in relation to existing discursive and physical contexts, we contextualise our findings and suggest how the learning arena – as a material space of learning – can be understood and developed beyond our case and in relation to the realm of architectural education at large.

Conclusion. Here, we make a short summary of the thesis.

First chapter

Towards the cogenerative model

The whole factual world of human affairs depends for its reality and its continued existence, first, upon the presence of others who have seen and heard and will remember, and, second, on the transformation of the intangible into the tangibility of things.

Hannah Arendt¹

Based on a need for blurring the constructed divide between tradition and innovation, emerging as we investigated the history of architectural education in the introduction, we asked: *How can forms of learning that rely on making and participation in contexts outside the design studio contribute to increased abilities for critical reflection on and transformation of habits within architectural education?*

In this chapter on methodology we are to deepen our reflections regarding our methodological approach for studying the case at hand, the Making is Thinking semester in 2016, a study through which we intend to address the research question.

We begin by setting **three case-specific conditions**: our method must allow for understanding making as knowing, that the researcher is

active, and the negotiation of identities and roles in participatory processes. We then describe how architects as "aesthetic practitioners" own a **descriptive–projective kind of knowledge** based on experiences, and therefore possibilities to strangemake the habitual by creating new perspectives of the world. We argue that the architect's ways of knowing can be supported if reflexive, transdisciplinary and narrative methodological perspectives are combined. We show that there is a need – within architectural research in general and research on architectural education specifically – for **research structures** which are rigid *and* allow for the experiential, active and participatory, and then expand on why **the cogenerative model for action research** is an appropriate such structure. Along the way, we introduce ideas on how connections between architecture and academia as well as architecture and art can contribute to critical reflection on habitual patterns within architectural education.

Our case seen against a wider picture of the architect's ways of knowing and the need for methodological approaches framing those ways

In the introduction, we brought forward **three major specific circumstances** that made the collaboration between Making is Thinking and Cirka Teater in 2016 appear as a context in which responses to the question posed could emerge. First, while other "critical milieus" leave the studio and the institution behind, making here happens both inside and outside the walls of the architecture school. Second, while architecture students traditionally have worked individually and teamwork has been associated with alternative pedagogies, the design course includes both participatory and individual forms of decision-making. Third, while architectural educators tend not to stress the importance of training oneself in giving words to how one comes to design decisions, comparisons between habits and breaks with habits are here enabled as

structured forms of reflection – a log, a process book and a work box – were an essential part of the semester.

Regarding the third circumstance, we may note that the students, i.e. the potential case study participants, had made their choice of master's course knowing that reflection on learning would be a major part of the Making is Thinking semester. This was a beneficial point of departure for the researcher, as the participants were likely to be interested in discussing educational matters. We may note that the introduction of structured forms of reflection can be seen as a response to calls to make the architect's ways of knowing explicit, which have been heard at least since Schön presented his work on architectural education in the 1980s.

Taken together, the three circumstances describe an educational milieu aiming to encourage questioning of conventions not by abandoning the stable tradition of architectural education, but by enabling new views on the known and, not to forget, opportunities for reflection on those views.

In relation to the above, **three basic conditions for the choice of method** emerged in discussions with peer researchers from the fields of education, work science, design and architecture about the design of the case study:

1. The idea that reflection upon making can support students in breaking design habits is central in the case at hand. The methodological approach therefore had to acknowledge and make workable the idea that *learning and knowing can come through making*.

2. The researcher was to be both an educator involved in the planning and realisation of the master's course and a researcher carrying out a case study set up in relation to the course. Given this fact, the methodological approach had to support the idea of *the researcher as an active participant* in shaping an evolving process – one taking part in the movements in and out of the institution, between making and reflection, participation and individual work, rather than a passive observer separated from the course of events.

3. The case at hand is, similar to many "alternative" educational milieus and most post-educational design processes, characterised by a

diversity of roles, stemming from the move outside the institution and the inclusion of participatory exercises. Learners, educators, builders, architects, scenographers, actors, spectators, researchers, participants and citizens took part, and throughout the phases of the semester the author and the participants in the study were to move between several of these roles. It would therefore be potentially fruitful if the method chosen enabled *negotiations of and reflections on roles*, shifts of roles, and the effects of meetings between individuals with different roles.

These conditions guide the following reflections on our choice of methodological approach.

The architect as researcher and aesthetic practitioner

Through the process of designing the case study and filtering out the circumstances and conditions described above, the author was forced to reflect on her identity as an architect and its influence on her approach to research. That is, she had to give words to ways of dealing with problems and situations which tend to remain silently taken for given among architects.

A defining trait of how architects know and approach the world is that, while scientists describe the world, architects act in the world to change it. This is a difference worth highlighting here because it is reflected in the relation between a stable tradition of architecture, still marked by Durand's scientification of the practice, and alternative educational milieus aiming to enhance the architect's possibilities to achieve societal transformations through his or her practice. However, as pointed out in the introduction, this difference is a reductive simplification.

Descriptive–projective knowing

As we turn to research on how architects know and communicate their knowledge, the idea of a *simultaneity* of descriptive and projective modes of knowing emerge. Coming back to the case chosen, this simultaneity is reflected in the title and intentions of *Making is Thinking*, and the milieu therefore appears as a valid point of departure for developing ideas on how the architect – from within practice – can become aware of and work with the inevitable dependence, described in the introduction, between a stable tradition and attempts at breaking with that tradition.²

We look to research discussing the architect's practice as a knowledge practice.³ Our intention is to show how the characteristic conditions of our case could be seen, against a wider background of research, as relevant to other researchers of architecture, and, in turn, to point to why the architect's ways of knowing may be valuable to scholars in other fields.

The architectural theorist Catharina Dyrssen's description of "architectural thinking" in the article "Navigating in Heterogeneity" brings light on the descriptive–projective way of knowing as a core of the architect's practice. Dyrssen builds upon a body of research on how designers know, including works by Halina Dunin-Woyseth and Nigel Cross which we will mention in the following section, to describe how architects know. She describes architectural thinking as "to basically think in three dimensions regardless of scale, and to actively deal with complex spatial situations that are constantly changing over time."⁴ Essential to us, as we move towards a research method with the circumstances and conditions of the case at hand in mind, is that Dyrssen argues that architectural thinking characterises both the architect's practice and architectural research methods.

One of the main points Dyrssen makes is that the architect's ways of thinking and knowing are characterised by the projection of ideas towards an unknown future. She wishes to bring forward the architect's possibilities to "shake up ingrained patterns of thought" from within practice.⁵ We bring forward three traits from her description of how and under what circumstances the architect has such possibilities. First,

Dyrssen stresses that the architect works with "space and matter/materiality."⁶ This means that the architect can change habitual patterns of thought by making material projections, for instance models or simulations. That those projections are made in relation to and as part of complex realities is a major point Dyrssen makes. Because, second, while the designer generally works for a client, she says, the architect's practice is characterised by the fact s/he "works in broader contexts and more open complexities involving artefacts, spaces, processes and systems and ranging from the detailed to an interregional and global scale."⁷ And, third, like Dana Cuff and Ashraf Salama, Dyrssen argues that architecture is a social and participatory practice rather than an individual one; it is to "a large extent . . . an intersubjective activity where communicative aspects are important and where knowledge production opens up for collective action or teamwork."⁸

To think of the architect in this way, as someone who describes and is influenced by complex physical and social contexts as s/he works with space and matter to make projections, allows us to argue that the circumstances of our case are typical. Hence, our case becomes relevant to study as an example of an educational milieu implementing core characteristics of the architect's approach to the world.

As mentioned, Dyrssen helps us understand the practising architect and the architectural researcher as individuals who engage in making of space and matter and who are active participants in complex situations like the one our case presents. Architectural research is and should be, she argues, influenced by the fact that architects (just like designers) are experts in dealing with "'fuzzy' or 'wicked'" problems which are "impossible to define beforehand, specifically embedded in a situation and requiring combinations of creative and analytical strategies" and that they approach these problems by "explor[ing] the possible and the future through invention and intervention," i.e. by actively changing situations.⁹ That is, we suggest, the projection of situations has to Dyrssen a transformative function.

At the same time, however, she emphasises that architectural research is based on moving between the existing and the coming, or analysis and innovation:

It breaks up the traditional linear narrative of the research process, as starting with a problem, moving through analysis and theory, applying theory back to empirical studies, and finally arriving at concluding solutions. Instead, it promotes constant, quick shifts between innovation and analysis. Associative, lateral thinking is combined with logic/deductive reasoning and theoretical reflection.¹⁰

The discrepancy between the known and the sensed

What Dyrssen points out is that the architect has an ability to construct new situations and yet relate to the existing order of things. With the philosopher Mats Rosengren, we can understand the shifts Dyrssen describes as based on an ability the architect shares with other artistic knowers: the ability to imagine futures.¹¹ In his essay on knowledge practices as "doxa" which are situated and therefore undergo constant transformations, he argues that this ability is a key to challenging established habits of knowledge practices and that artistic ways of knowing and approaching the world therefore is of relevance to other fields.¹² That is, as descriptive–projective knowers, architects have a knowledge of how to challenge habits which can be valuable to others.

With the sociologist Johan Asplund, we can further understand the possibilities that lie in the fact that the shifts between innovation and analysis, or new and existing, are *materialised* by architects (for instance in models, as Dyrssen says). Artistic and scientific processes can, according to Asplund, produce constructions, or "simulacra," through which the world can be seen as if with new eyes. The presentation of a work of art and a scientific discovery can cause insights and be discussed in terms of knowledge, he argues.¹³ However, while natural science tends to explain situations, and humanities and social sciences often use narratives to describe them, the artistic simulacrum, says Asplund who exemplifies

with the thunder machine at the theatre, produces a striking experience which is similar to a real experience (of thunder) and at the same time clearly an illusion parallel to reality. It is in the discrepancy between illusion and reality that the new or unexpected can emerge.¹⁴ While scientists write books, the artist – for instance a theatre-maker – or architect can, we may thus think, enable learning by giving humans a material and sensual glimpse of that what they have taken for granted is not necessarily true. What they then produce is an aesthetic experience. That is, they act as aesthetic practitioners.

To nurture the materialised discrepancy between illusion and reality and its potential as a key for recognising and working with the strange and unexpected, we look to the aesthetic notion of "estrangement" or "*ostranenie*" as described by Shklovsky in 1917. Shklovsky drew on Leo Tolstoy's idea of poetry as a critical activity with the function to undermine established social relations and habits to propose that what the poet does is to "strangemake" reality.¹⁵ The notion has been taken to architecture, for instance by Heynen and Wright who propose that architectural representations can reinforce or undermine norms and that this can be understood in terms of familiarity and estrangement.¹⁶ Eivind Kasa has brought up Shklovsky's strangemaking to support his argument that aesthetic quality can be objectively judged.¹⁷ The architectural theorists Alexander Tzonis and Liane Lefavre use Shklovsky to describe how architects can design by "critically reconstructing" the ordinary.¹⁸ The critical reconstruction of the ordinary is a principle of strangemaking which can be thought of in spatial terms through classical architecture as well as through Bertolt Brecht's stagings, they state.¹⁹ Thus, estrangement connects theatre-makers and architects as aesthetic practitioners.

The aesthetic experience lies at the core of architecture but has been marginalised in architectural education, and a chance for criticality to emerge through practice is thereby lost. However, Making is Thinking's central learning goal regarding the recognition and use of the strange and unexpected is one way through which we can think of the architecture student as someone who, like other aesthetic practitioners, has a possibility to use his or her ways of knowing to create wonderful or perhaps shocking shifts or glimpses which may appear as strange because

they are unfamiliar, but which are valuable, as Shklovsky says, because they can "recover the sensation of life."²⁰ When perception becomes habitual, one stops to pay attention to, for instance, the stones in a wall, but art "exists to make one feel things, to make the stone *stony*."²¹ Art makes the familiar strange again, makes it possible to rethink what a stone is and what it can do. The process of perception, which strangemaking prolongs, is "an aesthetic end in itself," and Shklovsky points out that in this process, it is the experience of the stone and not the stone as object that matters.²² In other words, an aesthetic experience of a stone can allow the individual to perceive the stone in itself or the event when the wall is repaired as if it were the first time s/he saw a stone or saw someone lift a stone.²³ This appears to be a path towards actualising the aesthetic experience in architectural education.

Combining research methodologies to make the descriptive–projective workable

We have now pointed to the value of the architect's descriptive–projective way of knowing. How then can it be framed methodologically? Let us, for a moment, lift our gaze and recall Friedrich Nietzsche's encouragement to historians and scientists to learn from artists to engage in events instead of observing them, Paul Feyerabend's agitation against predefined methods as reducing the researcher's horizon, or Donna Haraway's undermining of the white man's perspective through the presentation of knowledge as situated.²⁴ It is in the wake of such radical ruptures, in the scepticism against the idea of the researcher as someone who observes and is in charge of universal truth procedures, that we begin to look for methodologies which can include the architect as researcher. As a starting point, we combine three established perspectives to methodology which seem to allow us to work with – and not against – the conditions we have set up and the basic idea of the architect's knowing as simultaneously descriptive and projective: the reflexive, the transdisciplinary, and the narrative.

The reflexive and transdisciplinary are both elements in Michael Gibbons et al.'s description of Mode 2 knowledge as opposed to Mode 1 knowledge. This distinction has been used by Dunin-Woyseth to contrast the knowledge of "makers," including architects, from the prevalent idea of reliable knowledge.²⁵ Mode 1 nurtures concepts and procedures which have been regarded as belonging to scientific practice in the Newtonian tradition, while Mode 2 is knowledge production in context characterised by transdisciplinarity, heterogeneity, social accountability and reflexivity.²⁶ On the basis of our introduction, we suggest that the two modes both exist in architectural education: the French rationalists pulled towards knowledge of the Mode 1 kind, while Mode 2 is preferred in "alternative" milieus. Though the dual opposition risks enhancing the divide between convention and breaks with convention, it can help us distinguish the kinds of knowledge that risk remaining "hidden" within architectural education.

In addition to the reflexive and transdisciplinary, we also introduce the narrative, primarily because it specifies how verbal and non-verbal articulation of experiences can catalyse negotiations of roles and identities.

Reflexive research

Mats Alvesson and Kaj Sköldbberg, in their widely read overview of empirical methods within social sciences and humanities, introduce the reflexive researcher as an empirical researcher who acknowledges that there is an established reality and works with "well thought out" excerpts of this reality to generate new perspectives and possibilities rather than maintain and establish "truths."²⁷ Though they focus on the researcher as a producer of texts, we propose that their presentation of the reflexive researcher allows for the architectural researcher to, just like the practising architect does, work with and bring new light to tangible excerpts of reality.

A defining trait of reflexive methodology as described by Alvesson and Sköldbberg is that it does not point to one methodological framework as reflexive, but to four "reflective areas" which the researcher should take

into account "regardless of the specific methods he or she prefers," and thereby opens up for combining elements from different methods.²⁸ What the reflexive researcher has to do is enter the "areas" to, first, implement rigorous techniques for processing data, second, clarify that s/he is an interpreter who does not strive for objective truth, third, communicate an awareness that social science research always is part of political and ethical contexts, and, fourth, recognise that the work s/he produces has a life of its own, beyond its author and the excerpt of reality at hand.²⁹ That is, reflexive research allows the researcher in this case to actively shape the research process (second condition) as long as she communicates how and why she does so, and for discussion of negotiations of roles and perspectives (third condition). We bring these four reminders with us as we move on, not least because they seem to enable us to review Schön's idea of the reflective practitioner in a nuanced way.

Transdisciplinary research

Transdisciplinarity has become popular among design researchers because it is an "in-practice model" through which the designer's ways of dealing with tangible real-world situations can be understood as knowledge production.³⁰ That making and knowing are related (first condition) and that the researcher is active (second condition) is thus central in transdisciplinary research. Architecture is transdisciplinary, Isabelle Doucet and Nel Janssens argue, because it is as much a discipline as it is a profession, and it is built up of both disciplinary and non-disciplinary forms of knowledge, or "designerly ways of knowing," as they say with reference to Cross.³¹

Doucet and Janssens argue that transdisciplinarity is more relevant to architects than the popular idea of interdisciplinarity because the former notion involves connections not only across academic disciplines, but also between academia and professional practices. Based on this comparison, they claim that architects, as experts in handling the link between theory and practice, are fit to contribute to how researchers can act in the ongoing general hybridisation of knowledge production, which is built upon an increasing awareness that "discipline-bound

epistemology alone cannot effectively deal with the world's complexity."³² Dyrssen makes a similar point as she suggests that architectural thinking can be valuable to other research practices because many fields today are defined by increasingly "heterogenic, often transdisciplinary conditions of enquiry."³³ In other words, transdisciplinarity is a framing notion through which we can communicate what our project is about to other academics.

Narrative research

As Catherine Kohler Riessman shows, in narrative research, participants form their identities as individuals and communities through telling stories about experiences and objectives (third condition). The narrative includes anticipated futures which trigger emotions and actions and therefore has a political function to encourage others to engage in processes of change outside the specific case.³⁴ In other words, it is projective. Moreover, the narrative can be thought of as a materiality in the making (first condition), since Riessman presents the researcher as someone who actively interprets and narrates reality through verbal and non-verbal actions (second condition). This makes it attractive to spatial practitioners doing research, and Mewburn's study of gestures in design studios is one example of an application of narrative analysis in research on architectural education. In particular, the narrative strategy Riessman calls "dialogic/performance analysis" seems valuable to us, as it recognises and makes workable the fact that stories, for instance at the theatre, are told and identities formed through verbal as well as visual and embodied expressions.³⁵

The entwinement of architectural research with architectural practice as well as the juxtaposition of different methodological approaches described above come with risks of empty popularisations of ideas such as those expressed in the conditions above – to learn through making, to be an active researcher and to engage in participatory processes. At worst, if those ideas are artificially treated within architectural education and labels such as reflexive, transdisciplinary and narrative applied to them, they

risk resulting in false promises of educational innovation. The need to be more concrete about *how* research is to be done based on the conditions set up and the ideas of architectural knowing presented above is therefore urgent.

A need for structures that allow experiences and reflections on experiences

The tension between stable and alternative forms of learning exists in architectural education and also in architectural research milieus. If Dunin-Woyseth used the Mode 1 and Mode 2 model, Nel Janssens and Gerard de Zeeuw have recently described observational and non-observational research as two opposing strands. Non-observational research is yet another term for lifting the descriptive–projective, active kind of knowing of aesthetic practitioners. However, in addition to another term for framing what we do, Janssens and de Zeeuw give us two reminders which became important as we analysed our case study. First, the architect who is an active researcher (second condition) must learn to acknowledge individual experiences and thereby preferences, emotions and values. Second, this researcher must implement some kind of rigorous model for investigating those experiences. Although there is "little doubt that experiences form a substantial and important input to what architects do," they state, the preferences and emotions which are always included in experiences are marginalised within architectural research. This might not be a problem in technical or historical research, they claim, but it "impede[s] the development of architectural design research."³⁶ Consequently, we realise that it is essential to take seriously the individual's experiences – including the dimensions which are hard to talk about – in research on design courses, like ours.

A key reason why architectural researchers currently exclude emotions and preferences, Janssens and de Zeeuw argue, is that they often use traditional, protected or observational research procedures. They note that there is an increasing number of research projects aiming to challenge this idea, and yet they stress that "[e]ven today much of the work that takes

emotions and preferences seriously is limited to exploring observational categories."³⁷ A central challenge for non-observational researchers is therefore, they propose, to design "instructs," or structures "to help people interact to implement their purposes and improve their activities."³⁸ The instruct is to have "the capacity to allow for many possible, evolving and improving experiences," and by structuring interactions in instructs, architectural researchers can improve their "ability to act."³⁹ When instructs are good, they can lead to knowledge based on actions and interactions becoming increasingly stable and thereby comparable to knowledge stemming from observational research, where theories are imposed on actions.⁴⁰ That is, the instruct is a potential means of letting the non-observational or alternative *meet* the observational or stable.

Worldmaking and the materiality of the researcher's model

The notion of worldmaking, coined by Nelson Goodman in 1978, allows for understanding knowledge processes as consisting of "as much remaking as reporting" and therefore resulting in a multiplicity of interpretations of reality, or worlds.⁴¹ Tzonis and Lefaivre point to Goodman's worldmaking as one approach to thinking of strangemaking in spatial terms.⁴² A certain aspect of a world, says Goodman, can be accentuated, exaggerated or distorted, events otherwise spread out in time and space juxtaposed, elements of a world excluded or exchanged during the process of making.⁴³ These strategies of worldmaking appeared to us as possible instructions for introducing the strange and unexpected into processes of learning to design. It is not uncommon among researchers of architecture and design to talk about interpretations of situations made in their fields in terms of creating worlds. The idea that architects experiment by modelling and re-modelling worlds in the world, or open and material systems in given situations, is central to Dyrssen.⁴⁴ In their overview of approaches to design research, Ilpo Koskinen et al. claim that researchers generally refrain from saying anything about the future, while the potential of design research is to build on the designer's specific know-how of constructing imagined worlds by putting concepts into workable, often tangible, forms.⁴⁵

Janssens and de Zeeuw draw on Goodman and Jean-Luc Nancy to liken the making of an instruct to that of making a world, and tie the idea of instructs for research to the practice the architect knows by proposing that a building can be understood as a "materialised instruction" or a "structure in which a variety of experiences are made possible through the interactions between people and between people and the material structure."⁴⁶ What they do is to look from an operative point of view on methodology to the basic idea that experiences in artistic practices are bound to materiality – or that knowing and making is related (first condition) – and that the materiality is related to human interactions (third condition). The instruct, they conclude, is a possible bridge between design and research within the field of architecture as well as between architecture and other creative fields.⁴⁷ That is, the instruct as a designed immaterial or material structure appears to allow for an understanding of active research which is workable to the author, not least because it can potentially let her communicate her architectural ways of knowing to non-architects.

At this point, it is important to note that it was never an option that the researcher in the case at hand would make design investigations typical for a practising architect. While analysing the case study, as we will see in the third chapter, she took part in educational material experiments which influenced her direction. Her primary task, however, was to design a structure allowing architecture students to reflect upon their practice. Yet, we argue, also this design process – the one leading to a methodological approach and model – was influenced by the researcher's identity as an architect, and Janssens's and de Zeeuw's description of the instruct enables us to situate that thought.

Towards structures for including the experiential in architectural education

Doucet and Janssens describe how the architect, when s/he acts in the world and thereby solves societally important problems to which no

certain knowledge applies, engages in real-world experiments which enable learning processes.⁴⁸ This basic understanding of the architect as enabler of learning through practice is essential when we design a case study guided by this question: *How can forms of learning that rely on making and participation in contexts outside the design studio contribute to increased abilities for critical reflection on and transformation of habits within architectural education?*

By drawing on Doucet and Janssens as well as Dunin-Woyseth, Salama gives a slightly more operative proposal as to how architectural educators and researchers of architectural education can deal with learning processes on the basis of their practice. He suggests that transdisciplinarity is a notion through which models for spatial design education that integrate theory and practice could be developed and discussed within wider academic settings.⁴⁹

We can now think of our real-world experiment as enabling learning in general and educational models more specifically. When we do so, we must not forget to acknowledge the individual's experience. As Janssens and de Zeeuw say, experiences involve individual preferences which "cannot be generalised in a stable way" and therefore risk getting lost when observational categories are applied to research within architecture.⁵⁰ To begin in the individual's experience thus appears as a possible "bottom-up" point of departure for developing forms of learning beyond established and yet rather vague or silent agreements on the "critical" and "conventional" in architectural education by oscillating between the learners' past (of conventional courses) and present (of methods in *Making is Thinking*) experiences. This outset might seem so obvious it should be unnecessary to lift, but it emerges as radical in the light of what we now know about the hierarchical and standardised traits of architectural education. To make a study including this outset at NTNU's architecture faculty is appropriate, first, because it is not alien to the educators there – as we saw in the introduction, the intention to include students' experiences has been evident at NTNU since the early 2000s – and, second, because the effects of this intention have been little researched.

Schön's appreciation of experience-based knowing

The architect's ways of knowing should be described and nurtured. This is, as we have seen, a thought embraced by many scholars and it guides our investigation into architectural education. Not least Schön, author of the most influential research on our field of inquiry, sees the practitioner's experiences as an underestimated source of knowing, which the researcher should help the practitioner bring to light. The combination of action and reflection – or making and thinking – that characterises the case at hand provides us with the opportunity to acknowledge Schön's essential introduction of the architect as a reflective practitioner and to point to possibilities for critically *building upon* his understanding of how the experiential should be part of the architect's education. We will follow up on this proposal in the fourth chapter. It is an attempt to address the need, described in the introduction, for a middle way between the stable tradition Schön's work can be seen as a continuation of and the demands for drastic changes to architectural education.

We know that we must be cautious with resting in the idea of the architect as a reflective practitioner. Yet, in addition to the primacy he gives to experiences, two of Schön's intentions with launching the reflective practitioner stand out as attractive to us against the background of the discussion above. First, he describes architects as knowers who change (act) and analyse change (reflect) in material situations. One of the sources he uses to describe this way of knowing is Goodman's worldmaking. In fact, Schön goes as far as saying that "processes of worldmaking . . . underlie all of [the practitioners'] practice" when he describes how practitioners move back and forth between setting and solving problems:

Through countless acts of attention and inattention, naming, sensemaking, boundary setting, and control, [communities of practitioners] make and maintain the worlds matched to their professional knowledge and know-how.⁵¹

Second, Schön argues, by drawing on John Dewey, that architects need to step out of specific situations to reflect upon their practice and thereby articulate their ways of knowing in a more general sense, and that researchers of practices can assist them in doing so. He claims that researchers just like architects need to reflect upon their practice and that meetings with practitioners can catalyse their reflection. While the designer aims to transform situations, the researcher has traditionally been concerned with explaining them, but the practitioner and the researcher must, according to Schön, learn from and respect each other's knowledge.⁵² What the researcher should learn from the professional practitioner is the ability to act in "indeterminate zones of practice" in which problems of an uncertain and deeply human kind appear: problems involving unmeasurable experiences which Schön thinks a dominant tendency of rationalising knowledge within academia is risking cutting out.⁵³

However, a major problem – to which we will return in the fourth chapter – is that Schön himself made his studies at a distance from the design studio. Our methodological approach is chosen to instead support mutual exchanges of experiential knowledge between practitioners and researchers.

Salama's and Khonsari's arguments for experience-based educational models

Salama and Torange Khonsari, one of the initiators of the Civic University, underline that there is a need for methodological approaches like ours. Salama states that although architectural educators today know that limitations come with the studio as a space of learning and the master-apprentice model reproduced in there (formed as we have seen by educational routines established in eighteenth- and nineteenth-century France), they tend to give students "ready-made interpretations" of the built environment and thereby reduce opportunities to think independently through active learning in the actual environment.⁵⁴ Khonsari makes a similar analysis. Experience-based learning is now recognised as valuable for expanding and transforming the architectural

practice beyond traditional procedures, he claims, and yet design studios at schools of architecture continue to arrange linear processes from brief to detail.⁵⁵

What can be done to solve this problem? Khonsari suggests that experience-based approaches to knowledge make it possible to argue that educational projects where institutional boundaries are explored physically, on sites outside the school, and/or discursively, in collaborations with other artistic disciplines, prepare learners for the future better than studio-based projects.⁵⁶ Salama proposes that forms of learning and teaching that acknowledge learning as transformative as well as integrate teaching and practice should be developed, and points to the work of Dewey and David Kolb⁵⁷ as sources of knowledge for how this can happen.⁵⁸ He argues, not unlike Schön and Khonsari, that theories of experiential learning are relevant to architectural education because they make it possible to include hands-on experiences as a source of knowledge and to regard dialogues between educators and learners as processes through which knowledge is constructed and transformed.⁵⁹

Salama emphasises that both educators and researchers must change their habits if change is to come. Though experience-based and process-based pedagogies have been common in progressive educational environments since the 1990s, the majority of existing research supports the educators' habits as it keeps focusing on the design studio.⁶⁰ Research on learning outside the studio is therefore needed, and models for active and experiential learning should be developed. In fact, Salama makes what can be seen as an education-specific extension of Janssens's and de Zeeuw's call for "instructs" when he emphasises that experiential models are inquiry-based and therefore encompass instructional strategies for how experiences of phenomena and transformative actions made to phenomena can be thought about and assessed.⁶¹ That is, the educator or researcher who starts in experiences must, if the experiences are to catalyse learning, create a structure in which they can be reflected upon. We recognise the idea of reflection on action from Schön, but by contrast to him Salama puts the *learner* in the centre. Educational research on and examples of student-centred environments should be developed and spread, Salama says, so that architectural educators learn to recognise

students as active contributors rather than passive receivers, and thereby include social, moral and even spiritual dimensions of becoming an architect in the education.⁶²

Alex Booker and Gro Rødne, the initiators of Making is Thinking from whom we will hear more in the following chapter, echo Salama and Khonsari when they state that architecture schools will produce architects unable to deal with the unpredictability of reality until hierarchical master–apprentice models are replaced by collective learning models that support social and experimental aspects of architecture. Moreover, just like Khonsari, they propose that architects can learn from artists about how to approach experimentation. As mentioned in the introduction, while many design-build studios leave the school, the exchanges with other arts single out our case. One of Making is Thinking's starting points was in fact that architectural education – at NTNU and probably also at other institutions – marginalises the idea that the architect's practice is one of several artistic or aesthetic practices. The department where Making is Thinking was developed has, as we will see in the following chapter, a long tradition of introducing aesthetic theory and artistic practice to architecture students. When we take on Salama's challenge to develop models for experiential learning, we do so based on this tradition.

Options for designing a case study

We have seen that though there is agreement that the architect's simultaneous description and projection is valuable, and that there are established methodological approaches through which it can be framed, there is still a need for architectural researchers – not least those investigating architectural education – to construct investigations incorporating the characteristics of the architect's experience-based ways of knowing. Our decision to use the cogenerative model as a means for such investigations was preceded by a consideration of options, made with the case-specific conditions listed above in mind: the methodological approach should allow for learning and knowing to come through making, for the researcher to be an active participant in shaping an

evolving process, and for negotiations of and reflections upon roles, shifts of roles, and effects of meetings between individuals with different roles.

The threshold concepts framework

The threshold concepts framework and its understanding of transformative, or "transformational," learning is foundational to TRANSark and functions in this thesis as a point of departure for developing perspectives on transformative experiences of learning within architectural education.⁶³ To investigate the option of setting up a case study within this framework therefore seemed relevant, and though we landed on the decision not to do so, it still seems relevant to give a rather lengthy report from our investigation here, since, first, this framework is unfamiliar to most architectural researchers and, second, we will return to discussions of liminal space as transformative in the fourth chapter.

Jack Mezirow introduced the term transformative learning in 1978, and his descriptions of how shifts of perspectives trigger learning is foundational to the threshold concepts framework.⁶⁴ In this framework, the transformative experience of learning is described as "a deep, structural shift in the basic premises of thought, feelings, and actions . . . a shift of consciousness that dramatically and irreversibly alters our way of being in the world."⁶⁵ This means that in addition to traditionally epistemological aspects of knowing, feelings and actions are accounted for here.⁶⁶ Jan H. F. Meyer and Ray Land, two of the framework's protagonists, emphasise that educators should help learners to balance ontological, epistemological, emotional and cultural aspects of learning, because if not, the ontological and emotional risk becoming marginalised.⁶⁷

The threshold concepts framework is interesting to architects since the state of uncertainty is described in *spatial terms*, and includes emotions and values – spatial aspects architects tend to ignore. Threshold concepts scholars describe the experience of transformation as passing a threshold or, with reference to the anthropologist Victor Turner, a liminal space. The learner enters a liminal space or threshold when s/he has encountered

"troublesome knowledge" (in the pre-liminal phase), and this encounter leads to transformation(s) of identity and knowledge through ontological and epistemological perceptual shifts which disturb his or her worldview.⁶⁸ The disturbance can entail transformation in terms of "acquisition of powerful knowledge and . . . significant shifts in ontology and identity" or "design fixations" and "*Einstellung* effects," i.e. that habituated views and methods stand in the way for the learner's recognition of new or unfamiliar aspects of a situation, so that "the first idea prevents a better idea."⁶⁹ In addition to being transformative and troublesome, learning thresholds are irreversible, because they leave deep traces that will be difficult to unlearn or forget once one has passed a threshold, and integrative because the shifts make people connect phenomena they had previously thought of as isolated.⁷⁰

Though thresholds are irreversible, Meyer and Land use the understanding of thresholds as liminal to describe a situation or space where the learner can both look *back and forth*, where the worldview or understanding of a problem s/he had is questioned and new perspectives emerge.⁷¹ Hence, the threshold concept appears as a notion through which the architect's descriptive–projective knowing and the idea that there is a value in bringing together old and new perspectives can be framed. In fact, Dyrssen proposes the liminal state as one that "gives the researcher a space for contemplation and deeper investigation" which can serve for playful experimentation with the "real."⁷² The threshold concepts framework is a potentially interesting option for developing the idea of liminal space from an educational point of view, and can thereby contribute to understanding of how the new or alternative – the strange and unexpected as Making is Thinking's learning goal says – can be introduced so that it leads to constructive transformations of established ways of solving problems rather than a maintenance of the given. That is, it could allow us to investigate how techniques of strangemaking architectural conventions can be used to trigger reflections upon and transformations of habits.

How would a threshold concepts case study be set up, then? Triangulation allows educational researchers, for instance those interested in threshold concepts, to bring together mixed kinds of methods and data

to circumscribe and stabilise findings, says Glynis Cousin.⁷³ Jan H. F. Meyer et al. describe a specific case where triangulation of analytical knowledge from experts, statistical knowledge from researchers and experience-based knowledge from learners strengthened findings about how engineering students increase their ability to deal with troublesome concepts by reflecting upon their experiences, and thereby develop "metalearning capacity."⁷⁴ To set up a case study for triangulating knowledge from our expert users – the theatre-makers – with knowledge from architecture students and an architecture researcher, and thereby move from situated and individual transformative experiences of learning towards general traits of such experiences, appeared as a possibility.

However, aware that materiality and making are central to the architect's ways of knowing, a drawback with the threshold concepts framework was that *the spatial-material remains metaphorical here*; the notion of threshold concepts is a "useful metaphor" developed to facilitate the understanding of learning experiences as "conceptual gateways."⁷⁵ Even in studies of design education, Jane Osmond and Andrew Turner stick to thinking of the liminal space where designers deal with threshold concepts as immaterial or as a "bubble."⁷⁶ To introduce materiality into the threshold concepts framework could be seen as a challenge. Nevertheless, the conceptual understanding of the liminal space of learning appeared as an obstacle for developing a case study based on the (first) condition that making and knowing are related, and more generally on the idea that the architectural experience includes materiality.

Grounded Theory, Actor–Network Theory and Action Research

We therefore, in search of structures including materiality and making, looked to other methodological frameworks. Grounded theory, actor–network theory and action research, all relatively well known to architectural researchers, appeared as three possible options. Grounded theory seemed appropriate for meeting the need for making architectural thinking workable through research based on being close to actual events, but does, however, risk turning the researcher into an unreflected organiser or "coder" of massive amounts of data rather than an interpreter

of a well-chosen excerpt of reality.⁷⁷ To take on such a role appeared to limit the researcher's opportunities to engage as an active participant (second condition). By contrast, the idea that participants as well as material contexts have agency is central to Bruno Latour's actor–network theory.⁷⁸ Dyrssen and Awan, Schneider and Till point out that the focus on agency makes actor–network theory appropriate for architectural research in general.⁷⁹ Albená Yaneva and Inger Mewburn have independently of each other shown that actor–network theory is useful for studies of architectural education, and it is a framework which could meet our conditions.⁸⁰ Nevertheless, although action research is based on ideals of questioning established structures, routines and values, and therefore is perhaps not the obvious choice for nuanced approaches to stable traditions like that of architectural education, the cogenerative model for action research appeared as the most appropriate option, and we will describe why in the following section.

Action Research and the cogenerative model

Action research was developed in the 1960s and promotes a down-to-earth understanding that research is meant to involve communities and change real-world situations. While other methods tend to describe a fixed frame for the researcher's investigations, action research can be likened to a platform on which a variety of procedures can be used.⁸¹ Hence, action research aligns with the mixed approach to method described above.

We have heard from several scholars that empirical research – in general, on the field of architecture, and on architectural education – relies on models which are open *and* rigorous. Against this background, the freedom on the action research platform may be deceptive in the sense that it risks making "anything go" as research.⁸² Yet, the freedom appears as an opportunity for investigating, through the case at hand, both what an architectural experience of knowing and learning can be and how a model for interpreting such experiences can be developed. And as we have seen, there is a need for such research.

As mentioned in the introduction, Koskinen et al. and Salama propose that action research is appropriate for architectural and designerly research. Koskinen et al. show that action research, or research based on action or "co-design" with the goal to "use knowledge gained by studying a group or community in order to change it," is a kind of constructive approach to design research developed primarily in Italy and Scandinavia.⁸³ In our field of inquiry, architectural education, Salama discusses the potential of social constructionist models for developing complements to traditional design pedagogy such as hands-on pedagogies, live studios and community projects.⁸⁴ One of the approaches he suggests is the "Action Research Approach."⁸⁵ "Research-in-action," he argues, allows for information gathering and testing of design hypotheses to go on simultaneously and may therefore "help students and users experience a greater sense of control of their design process and decisions and thus their learning."⁸⁶ That is, action research allows for inclusion of the descriptive–projective understanding of the world in learners' design processes *and* in their processes of learning. Consequently, learners can – for instance within architectural education – become able to question and change forms of learning, i.e. actively contribute to transformations rather than passively be transformed in relation to a stable context.

Let us specify **four traits of action research** which contribute to making it relevant for us, four beams in the platform, if you like.

First, there is the basic idea that *research is to change situations*. Though it comes with a risk of marginalising the scepticism that belongs to research, this idea makes action research appropriate within architectural research, because as we have repeated, architects are trained to deal with complex real situations by simultaneously understanding and changing them.

Second, while many other research methodologies focus on observations, action research *acknowledges commitments and objectives* as part of research procedures.⁸⁷ Against the background of the importance for architectural researchers to take the individual's experience seriously, this is another reason for choosing action research.

Third, action research has a double focus on *theory and practice*. This means that process and result become equally important as theories (ends) stem from practice (means) rather than being applied to practice; they are agreements formed through negotiations in processes of practice and can be accepted by a smaller or larger community but never become universal.⁸⁸ This understanding of practice as being on the same level as theory sits well with the description of the reflexive researcher as someone who pays attention to relations between what knowledge is and how it comes about.⁸⁹ Moreover, it supports the idea of the researcher of architecture as someone who makes use of his or her ways of knowing as a practitioner. Following Doucet and Janssens, we may say that the architect, who by nature practises transdisciplinary knowing, is an expert in bridging the gap between theory and practice who *needs to become aware of the potential of his or her expertise* – and that action research may be one way of increasing that awareness.

Fourth, action research acknowledges an *ethical dimension of practice*. John Elliott draws on Aristotle's distinction between knowers relying on practical wisdom (*phrōnesis*) and knowers striving for universal truths (for establishing an *episteme*) to say that the action researcher's formation of theories based on practice involves an ethical dimension, and that action research therefore is suitable for building educational theories in spheres where knowledge stems from practice in the sense of ethical actions.⁹⁰ Architectural education is such a sphere, where ethical aspects of concrete actions are dwelled upon, or, as the initiators of Making is Thinking state in the next chapter, it should be.⁹¹

Three pillars of Action Research

We base our choice of action research on the four traits described. Yet, to make the freedom on the platform an opportunity and not a trap, we need to articulate distinguishing marks, or "pillars," which can guide us in the design of a case study. Peter Reason and Hilary Bradbury point out that action research procedures have in common that they are based on non-hierarchical ideals and aim to create communities where practical

problems are solved through living inquiry.⁹² Based on this description, we bring forward *experiential knowledge, engaged (or living) inquiry* and *participatory processes* as **three pillars of action research** which mark out a space for developing a case study design that meets our three conditions.

Experiential knowledge

Among academic methodological perspectives, action research stands out as one that gives priority to experiential knowledge. Thereby, it allows for understanding making as knowing (first condition). A researcher who gives priority to the experiential understands a human individual's encounters with the world, let us say with a built space or another human individual, as forming a primary source of knowledge.⁹³ As we have seen, the architect's knowing involves materiality. In the experiential knowledge of an architect, materiality is thus an essential element, and so is in turn the corporeal experience of materiality.

When the experience as primary source of knowledge is to be utilised as one through which both theories and practices can be developed, the encounter with the world is in itself not enough. The researcher has to set up structures for processing encounters – in our case encounters involving materiality and the body – so that they can be articulated and contextualised. In action research, practice and theory are integrated through cycles of action and reflection bridging "the 'gap' between knowing and doing that befuddles so many change efforts and 'applied' research."⁹⁴ We propose, from this first pillar, that we can review Schön's favourite couple action and reflection, and think of new models for working with it.

Engaged inquiry

Engaged inquiry, as opposed to passive observation, characterises action research. The idea of the active researcher, who may observe at times but does so while taking part in events, is thus lived here. We have learnt that action research is a platform rather than a fixed frame. It is, according to

Reason and Bradbury, "not so much a *methodology* as an *orientation to inquiry* that seeks to create participative communities of inquiry in which qualities of engagement, curiosity and question posing are brought to bear on significant practical issues."⁹⁵ In combination with the fact that experiential knowledge is fundamental for action research, this priority of making inquiries related to practical issues opens up the option for the researcher to study designerly forms of experiencing or knowing which include, like our case, material, spatial and visual forms of inquiry.

Participatory processes

We have, by drawing on Salama, pointed out participatory decision-making in design processes as potentially fruitful to develop from an educational perspective. We have also seen that the existence of a complex web of actors is a defining trait of our case, and that it therefore would be beneficial if the method chosen buttressed the negotiation of and reflection upon roles. Action research's fundamental criteria that research should be made *with people* and *within processes* rather than on people and processes is therefore a decisive reason for our choice of method. However, this non-hierarchical approach cannot mean – if action research is still to be called research – that the researcher's role is the same as those of the participants in the study s/he sets up. No, the researcher must move between specific experiential practice and general claims, between enabling and analysing participation. As Reason and Bradbury say, the action researcher is bound to, first, act as an inquirer inside a community of practice, and, second, engage in interpersonal dialogue in the same community, but also, third, to reach out towards a broader and impersonal audience.⁹⁶ This is a demanding movement that requires the researcher to reflect upon how and to what extent s/he directs the process and turns it into research in a structured manner.

In short, action research is appropriate for designing a study of our case, because the focus on experiential knowledge can potentially support the idea that learning and knowing can come through making (first

condition), the emphasis on engaged inquiry supports the idea of the researcher as an active participant in shaping an evolving process (second condition), and the primacy of the participatory process and the fact that research is made with people seems to potentially enable negotiations of and reflections upon roles, shifts of roles, and effects of meetings between individuals with different roles (third condition).

Methodological impact on the expression of content

Our mixed methodological approach comes through in the presentation of content as it allows the researcher to take on different voices depending on her position so that the thesis becomes a combination of genres. The chronological and then thematic narrative in the second and third chapters forms a core in the composition. The introduction and this chapter are analytical preparations for our central narrative and the fourth chapter proposes continuations of our story. To combine analytical and narrative ways of writing is a tactic for expressing the links between specific experiences of practice and theories which define the architect's and the action researcher's ways of knowing. All parts of the thesis – analytical or narrative, the history of architectural education and the individual learner's sigh – are influenced by the researcher's interpretations.

The cogenerative model

One of the ideas behind *Making is Thinking*, and a motivation behind this research project, is to find ways of communicating how architects know to academics external to the field of architecture. We have mapped a terrain including reflexive, transdisciplinary and narrative takes on empirical research and concluded that action research offers a relevant methodological platform to stand on in this terrain.

The choice of action research is potentially controversial. De Zeeuw has pointed out that research approaches for improving social

interventions, such as action research or Mode 2 perspectives, tend to mix up or lose the balance between (descriptive) observations and (projective) judgements (which include emotions, values and preferences) when they are applied to education.⁹⁷ He proposes a "hybrid" between non-observational and Cartesian or traditional observation-based research in which the idea that "people cooperate in some task, as in action research" is supported by structures through which the cooperation can negotiate and agree on its direction and purpose.⁹⁸ In spite of de Zeeuw's scepticism, we argue that it is not necessary to move outside the action research platform to construct a reliable methodological structure. The cogenerative model allows for the implementation of the idea that actions and experiences must be systematically reflected upon if they are to be the basis for research. While designing and executing our case study, we felt that this model gives clear instructions as to how the basic traits and values of action research can be turned into guidelines for practising research in a rigorous way, without reducing architectural knowing by measuring it with standards alien to its nature.

Action research is based on radical ideals of questioning establishments, and the cogenerative model's primary goal is to empower participants to take control over their situation.⁹⁹ However, in line with Janssens, de Zeeuw and Salama, Levin – the main constructor of the cogenerative model – emphasises that although social and material processes are unpredictable, the one who researches such processes has to maintain some sort of academic integrity.¹⁰⁰ Moreover, as they discuss transformative learning from an action research point of view, Levin and Martin argue that the action researcher must learn to combine ideas from adult education scholars such as Mezirow, which "hold the values of experiential learning, reflective practice and transformational learning" and conventional expectations on an academic product.¹⁰¹

That is, action research, and especially the cogenerative model, allows recognisable procedures which represent stable traditions to be combined with experimental procedures with the potential to undermine those traditions. The former procedures are necessary, because although action researchers act within processes they do not fully control, integrity and rigour require of them to at any time be able to transparently frame

and communicate their interests and larger aims. A major challenge for action researchers is therefore to communicate their intentions and strategies to the participants while giving both themselves and the participants the possibility to experiment and thereby influence the process.¹⁰² The cogenerative model facilitates this by providing opportunities for *oscillating* between analysis and engagement. The main reason for this is its implementation of double loops of learning, one belonging to the participants and one to the researcher/s (see Diagrams 1 and 2; all diagrams at the end of this chapter).

Let us set the **double loops of learning** in relation to the other terms of the model. The participants in a cogenerative study are **colearners**, not subjects, clients or data sources.¹⁰³ The model instructs a process where their situational actions form the basis for production of theories. The colearners, as well as the researcher, enter the process with different **frameworks**. The framework is an abstract construction – an understanding, a language or a cognitive map.¹⁰⁴ Through engaging in **cogenerative dialogue** with the researcher, the colearners become aware of and learn how to explain and reflect upon their different frameworks.¹⁰⁵ By contrast to the master–apprentice model, this dialogic approach to learning allows for exchanges of ideas and thereby negotiations of presumptions. Two kinds of theories are built up through the dialogue, since its reflections and actions are cultivated in the **two separate learning loops**. Through engaging in the dialogue in their loop of learning, the colearners reflect upon their actions and produce a new and shared framework, a **local theory**, a new way of looking at things, or a common map.¹⁰⁶ The local theory may, in turn, inform a new and more **general theory**, which stems from the researcher's learning loop. Exchanges can be made between the loops because they meet on the **learning arena**, to which we will soon return.

The idea of feedback loops as catalysts of shared knowledge is made explicit and workable in the cogenerative model but is not at all unique for it. Bateson claims that adaptive learning is always based on feedback loops through which particular problems are solved and habits established:

By superimposing and interconnecting many feedback loops, we (and all other biological systems) not only solve particular problems but also form *habits* which we apply to the solution of *classes* of problems.¹⁰⁷

Bateson describes habits as "rigid" and "hard programmed," and they are also "unconscious" in the sense that "a *habit* of not examining them is developed."¹⁰⁸ That is, feedback loops lead to the establishment of habits which humans are trained not to question.

The cogenerative model is constructed to support transformations of individual frameworks, i.e. changes of habits, but is also leading towards a common map and a possible establishment of new habits. We have noticed the risk with seeing transformation as something that happens to learners but leaves their context unchanged. Bateson points out that the double-bind perspective enables a *continuous* questioning of habits, because it entails the idea that feedback loops and the meanings of what is treated in them are context-dependent, and that the context is not independently given but changed by learners' actions – the actions are parts and not products of the context.¹⁰⁹ That is, learners and their context change simultaneously.

To experience double-binds is to experience differences or "breaches in the weave of contextual structure," a weave consisting of feedback loops.¹¹⁰ The breaches force learners to change habits, a transformation which can be either painful because learners get stripped of their "rules for making sense" of the relationship to their educator and/or educational milieu, or helpful as breaches – if learners still trust their educator – can "promote *creativity*" and enable learners to act "in ways never seen before."¹¹¹ While schizophrenic individuals lack the ability to make sense of and play with combinations or double-binds of feedback loops, artists are trained to play with the formation of solutions and habits.¹¹² This is a logic we recognise from the threshold concepts scholars and the notion of the *Einstellung* effect: to change habits can cause resistance or creativity.

Bateson's understanding of the learner as part of a context entails the idea that the learner can change any established context by testing unexpected solutions and changing habits. We propose that the educator can trigger such tests by implementing estrangement techniques. That is, a conscious introduction of feedback loops and breaches in a given context could make architecture students aware of their possibilities for playing with (rather than turning their backs to) the solutions and habits that characterise the stable tradition of architectural education.

The learning arena, where our loops cross each other, is an overlap where participants can reflect on experiences of breaches, where habits can be questioned, tensions appear and problems yet be solved. It is constructed by the researcher and does, interestingly enough from an architect's point of view, set physical or material structures in relation to colearners and their processes of learning:

The model relies on the *mutual learning* that takes place when local problem owners (insiders) and facilitating researchers (either outsiders or specialists within the organization) join forces to solve pertinent local problems. Central to this is the creation of learning arenas where insiders meet and learn together. A learning and developmental arena is composed of the participants, a *physical structure* and the actual learning processes that take place. The grounding factor in running a co-generative learning process is for the facilitator to construct learning arenas that enable the local stakeholders to generate the necessary knowledge and action designs to solve their pressing problems.¹¹³

While the participants' loop mainly leads to local knowledge about their community, knowledge that can be applied to other situations by other researchers emerge from the researcher's loop. However, for a cogenerative dialogue to be successful, feedback and new learning from both loops must be exchanged on shared learning arenas, so that

experiential ways of knowing constantly challenge any conclusions or categorisations made.¹¹⁴ The learning arena therefore catalyses new solutions as well as critical reflection upon those.

All in all, the cogenerative model provides a spiralling and continuous sequence of cogeneration which seems appropriate for a nuanced critical approach to the stable tradition of architectural education. The sequence below, described by Levin in 2014, seems to house the complex relations between stable and alternative traditions in our field of inquiry since it simultaneously includes ruptures (experimentation and reflection on experimentation) and promotes the establishment of improved "action-knowledge capabilities" for the participants as well as "meaning (publications or insights) for the research community":

- a. Collective reflection in order to develop alternatives for action
- b. Experimentation to achieve the desired goals
- c. Collective reflection on the results achieved
- d. Separate learning loops, related to participants and leaders of the change process
- e. Feedback and new learning on the shared learning arenas¹¹⁵

Habits that emerge through feedback loops can be challenged on the learning arena – it seems to enable learners to become aware of and do something creative with contextual "breaches." The cogenerative model can thus perhaps support the students in, as the learning goal says, recognising and doing something with "the strange and unexpected" that appears in those breaches.

Last but not least, it seems likely that architectural research can contribute with perspectives on what it means for the physical structure to be recognised as a part of the learning arena. The idea of the learning

arena allows the architect to make associations based on his or her training to handle place, space and form and how these change with the continuous movement of time. Inspired by Koskinen et al., Dyrssen, Asplund, Riessman and Janssens, we come to think: what if the learning arena is a spatio-temporal gathering place where the flow of the learning process and its material and immaterial outcomes are concentrated and therefore allow for studies of how architects (as individuals and community) inquire into and intervene in the world? That the cogenerative model fuels this way of thinking of *a physical space for challenging habits* is a major reason for it appearing to be potentially rewarding in relation to architectural education.

Filtering our environment through the cogenerative model

Our cogenerative dialogue was set up in relation to the course activities in the FormLAB at NTNU's Gløshaugen campus and at Cirka Teater's premises at Nyhavna, and was designed based on sequences for continuous cogenerative learning processes or spirals in and around learning arenas, as described with reference to Levin above. Our double loops of learning were intended to nurture, first, the course activities and the students' development and, second, the development of research that should reach the local environment of Making is Thinking and NTNU as well as the general body of research on architectural education.

Bateson argues that if learners are to react creatively to what they do not recognise, educators must make sure that learners trust them though they undermine their habits.¹¹⁶ Contemporary research on education supports this idea. Threshold concepts scholar Peter Felten points to the importance of a sense of "confidence and belonging" if one is to pass a threshold.¹¹⁷ David Carless shows that trust, an "important but underexplored" aspect of learning, can be catalysed if educators arrange dialogic feedback processes.¹¹⁸ The cogenerative model appeared as an opportunity for handling change in a structured way and thereby hopefully catalyse experimentation. Our cogenerative dialogue was set up

with the intention to stage safe spaces, without assessment or time pressure, where the students would allow themselves to speak openly about the relations between processes/methods (means) and results (ends) in this (alternative) semester compared to other (more or less conventional) semesters. The learning arena was meant to be the place where colearners would dare to fumble for words that describe an embodied experience or a vague thought, where non-verbal forms of inquiry would be reflected upon, and a situational understanding built up through a reciprocal movement between non-verbal and verbal communication. This kind of safe space for conversation is uncommon and much needed at schools of architecture, says Janssens, and the cogenerative model appeared as a possible path towards constructing such a space, since the action researcher learns by doing and thereby discovers, recognises and names the known.¹¹⁹

We have argued that there is an urgent need for architects to give words to how they know because by doing so they may begin to question their design habits. In our learning arenas, the participants were to practise *how to talk about* experiences of making and products of making, while the researcher was to practise how to listen to and interpret what they said in relation to what they did. Architecture-specific modes of communication such as images and models were to influence the direction of our dialogue, but they were, as mentioned above, never intended as primary modes of the researcher's investigation. The research project was to be an exercise, for the participants and the researcher, in giving words to the effects of engaging in the exercises in the semester's courses. That is, though the researcher took part in forming exercises in the design course and engaged actively in building on site in order to get closer to the experiences the participants described, her theorisations (towards a "general theory," as the cogenerative model suggests) are text-based and not architecture-specific; she does not produce new images, drawings or models to communicate the outcomes of the study.

For the participants or colearners, words were to be the primary form of expression on our learning arenas. However, their words were to be more directly related to specific experiences and products of making, and they would often bring images or models into the conversations by

pointing to them or showing them while they responded to the researcher's questions. Because, as Levin and Martin say:

Experience remains the foundation of action research learning, but reflection and framing in language that captures learning deepen the understanding.¹²⁰

In our case, experiences bound to materiality and material products were to be shared by the researcher and the participants and influence the direction of the dialogue. In the following chapter, images of events and products will accompany descriptions of exercises in the course discussed in our cogenerative dialogue. These images are central for giving the reader an idea of the material the learners produced. However, they should only be seen as hopefully informative traces of important moments in the students' learning trajectory – to communicate the outcomes of our cogenerative dialogue in architecture-specific, experiential forms remains a possible future task.

The invitation to participate in the case study

Communicating our case study's conditions and purposes to its potential participants – the Making is Thinking students – was an essential point of departure for the sequence of cogeneration. The presentation of the semester given in 2015 included information about a case study that was due to happen. This was the beginning of the researcher's learning loop. As the beginning of the participants' loop, the students were asked three questions, via email, about their expectations for the semester before it began. At the beginning of the semester, in February 2016, the author introduced them to the study in an oral presentation and a document including (a) a very brief introduction to action research and the intentions of the case study and the courses; (b) a more concrete description of the relations between the design and theory courses and the case study; (c) a

timeplan for the case study; and (d) two diagrams (Diagram 1 and Diagram 4 at the end of this chapter).¹²¹

The introduction also informed the students that if they agreed to participate in the case study, not only verbal reflections made on learning arenas but also material they produced in the course could be analysed as research data. The students were invited to become colearners in an evolving research project and were to decide whether they wanted to sign an agreement on participating in the study or not. All fourteen students signed the agreement. They could withdraw at any time, but all stayed until its end.

By adapting two diagrams of the cogenerative model – one from 1991 and one from 2014 – to our case, the researcher aimed to establish a shared understanding of our environment (the original diagrams sit next to ours in Diagram 1 and Diagram 2). While the diagram from 1991 shows the double loops of learning without reference to the place where these are negotiated, the one from 2014 shows the learning arena in the centre. A series of learning arenas, forming a cogenerative dialogue, were to be held throughout the spring semester of 2016. Several hypothetical diagrams of the relations between the actors within the process at Nyhavna, and the relations between the course activities and the learning arenas in the cogenerative dialogue were made (see Diagrams 3 and 4).

One of the diagrams (Diagram 4) documents how the researcher, before the case study began, imagined the relations between the actors and their activities in the process, as seen through the perspectives of the theory course, the design course, and the PhD thesis. That is, speculations about roles (third condition) were enabled. The right-hand side of the diagram belongs primarily to the researcher. Two nodes called "new design proposals" (representing the design course and "making" aspects of the semester) and "reference analyses" (representing the theory course and other "thinking" aspects of the semester) on the left side meet in one node here, symbolising the researcher's intentions to combine practice and theory. The left half of the diagram belongs mainly to the colearners. The concerns of the theory and design courses create a vertical tension in this half of the diagram, between "mapping urban change" and "changing physical context," two designerly activities that were to be discussed in

both courses. The notions of "context" and "mapping" include both abstract and concrete aspects of the world and were here intended as binders between practice and theory, education and research. As an extension of this thought, "academia/changing discourse" and "inhabitants/changing physical context" are placed along the stretch between PhD study and master's courses, with the intention that these two perspectives may contribute to constructive negotiations between conceptual thinking and practice, which were to happen on the series of learning arenas which made up the cogenerative dialogue: the learning arenas that the researcher was to actively form (second condition). An axis in the upper part of the diagram shows an imagined tension between the two kinds of contextual effects of the process: "changing physical context" to the left versus "changing discourse [or discursive context]" to the right (stemming from the first condition: making as knowing). While the former is based on mapping of Nyhavna, the latter is based on "meta-mapping" of learning processes in the log, process book and work box (these are described in the second chapter) as well as in the cogenerative dialogue.

While the diagrams may be said to pave the way for interpretations and for participants to position themselves within a complex environment, the written introduction of the case study to the potential participants risks to have formed their way of thinking. The first part (a) of the case study description does not signal neutrality but rather a desire to convey ideals of participation and critical thinking. Looking back, the effects of this description, which can be read as didactic, might have been contradictory to the aim of letting the colearners' experiences form the process. However, the text includes the idea that the experiences and arguments of each participant were to be of equal value, meaning that everyone was asked to be self-critical in order to contribute to a collective critical strategy for Nyhavna. Such a strategy, the text continues (indirectly referring to the learning goals of the design course), was to emerge if everyone participating acknowledged conflicts, contradictions and negotiations as openings through which unexpected insights could be let into the process. The introduction to the case study also says that everyone participating was to be responsible for documenting their work in order to support the researcher's aim to investigate how knowledge comes about in the education and professional practice of an architect. In addition, the

introduction reveals the researcher's initial interest in the coming transformation of the bunkers at Nyhavna as a case through which the activation of architectural history could be discussed, as it asks the colearners to relate experiences, registrations and interpretations of the existing situation at Nyhavna to situations in other times and places.

The second, and less manifesto-like, part (b) of the case study description introduces the preliminary research foci in relation to the phases of the semester. The research focus during the mapping phase was announced as being the colearners' interpretations of the existing layers or formations at Nyhavna, as they came through in drawings, (videos of) performances and models. During the design phase, the focus was to be turned to the their interpretations of historical references, in drawings and models. And finally, the preliminary research focus during the building phase was to study how material made during the first two phases was expressed in full-scale interventions.

The timeplan (c) in the case study description was subject to slight changes. Learning arenas were planned to be set up in relation to the end of each phase of the course, at the beginning of March, May and June. In practice, the arena following the design phase was delayed a few weeks into the building phase. Another change was that though the plan included colearners having the opportunity to give feedback on oral presentations of preliminary findings given by the researcher in between the learning arenas, such opportunities were not realised. This was partly because of (a perceived) lack of time, and partly because the colearners and the researcher were constantly communicating anyway, so that the researcher could digest what had happened in the courses and sketch questions for the next learning arena.

In the beginning of the process, Levin was guiding the work with how to formulate appropriate questions. It is important to remember that a consequence of the process being based on cooperative or living inquiry in a spiralling sequence is that input from participants can undermine the initial ideas of what characterises a case, and that designs of action research case studies therefore are bound to change.¹²² In the following two chapters we will see what this meant for our case study.

Diagram 1 See page 82. Adaptation of "A Model of A Participative Action Research Scandinavia Style: The Cogenerative Way" from 1991. Original diagram on top, see Elden and Levin, "Cogenerative Learning," 130, Figure 9.1. Below redesign made by the author in 2015, maintaining principal layout and text inside circles, adding case-specific components in text outside circles.

Diagram 2 See page 83. Adaptation of "The Co-Generative Action Research Model" from 2014. Original diagram on top, see Levin, "Co-Generative Learning," 110, Figure 1. Below redesign made by the author in 2015, maintaining principal layout and text inside circles, adding case-specific components in text outside circles.

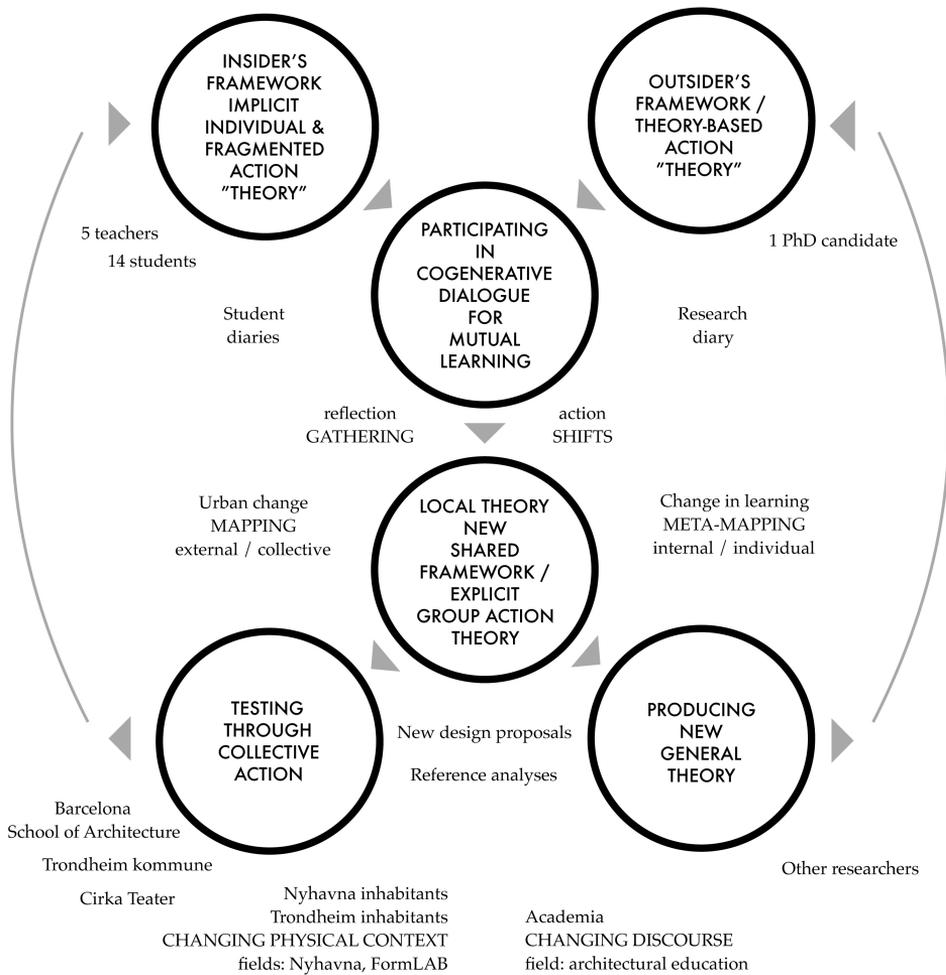
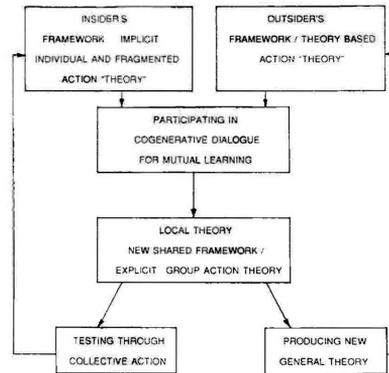


Diagram 1 Caption, see page 81.

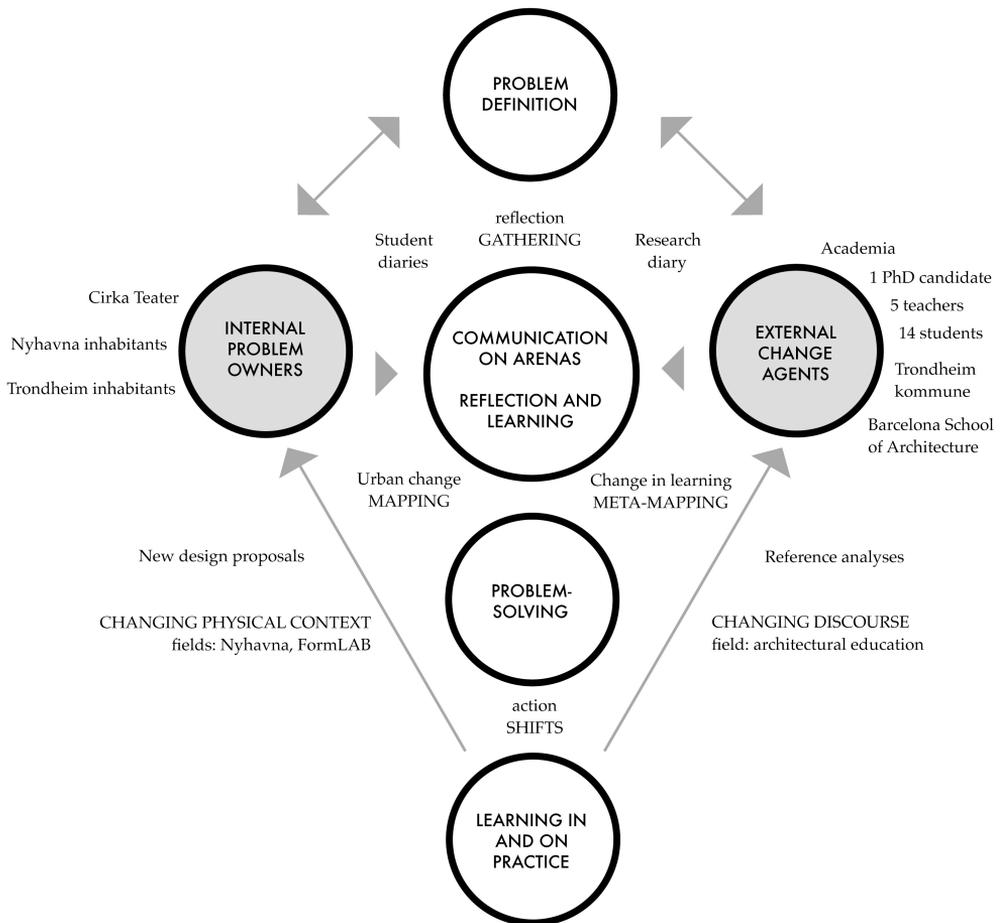
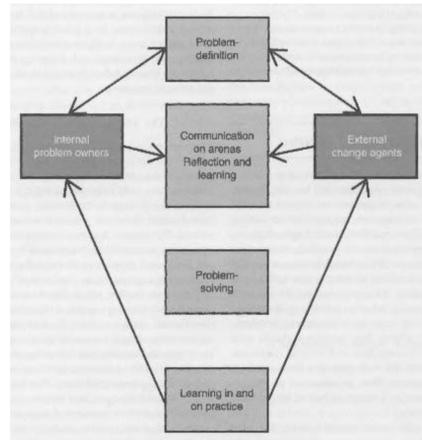


Diagram 2 Caption, see page 81.

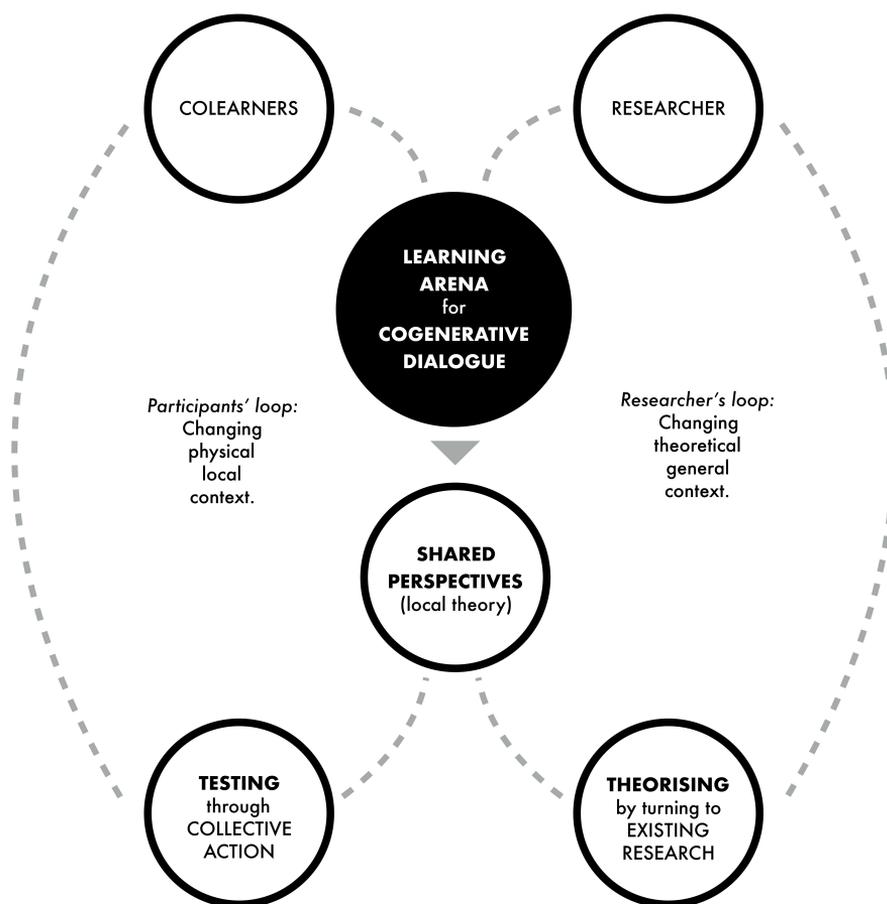


Diagram 3 Loops of physical and theoretical change. Combining elements of the diagrams from 1991 (Diagram 1) and 2014 (Diagram 2), including the learning arena at the centre (as in Diagram 2) and the tension between "testing through collective action" and the production of theory (as in Diagram 1).

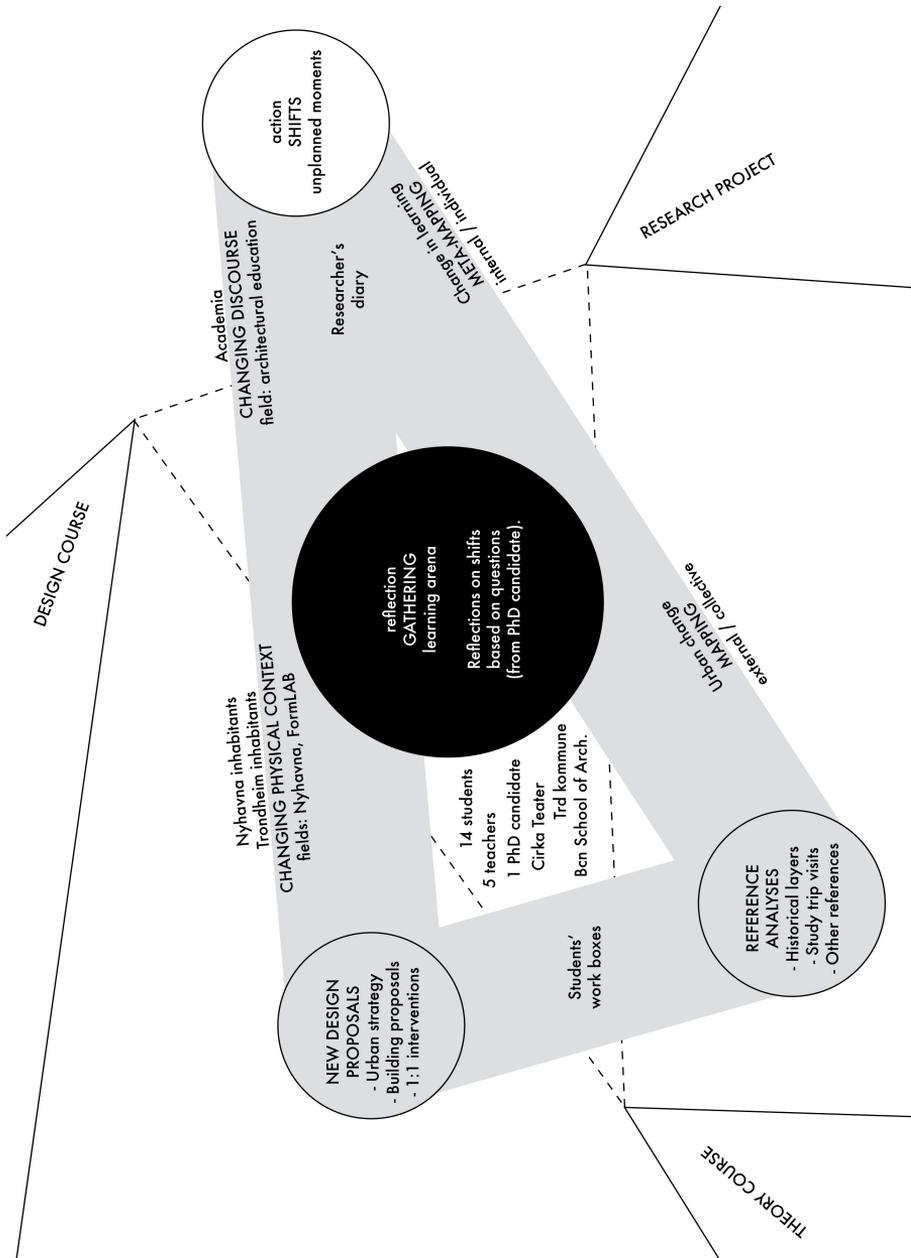


Diagram 4 Mindmap of the process, October 2015.

Second chapter

Our cogenerative dialogue and its context

We are unknown to ourselves, we knowers: and with good reason. We have never looked for ourselves, – so how are we ever supposed to *find* ourselves? How right is the saying: 'Where your treasure is, there will your heart be also'; *our* treasure is where the hives of our knowledge are. As born winged-insects and intellectual honey-gatherers we are constantly making for them, concerned at heart with only one thing – to 'bring something home'. As far as the rest of life is concerned, the so-called 'experiences', – who of us ever has enough seriousness for them? or enough time?

Friedrich Nietzsche¹

In the first chapter, we reached the design of the case study. We are now going to look to how this design was implemented. To take experiences seriously and give them time is what this chapter aims to do.

We give a **background to the case** by presenting, first, how the initiators of Making is Thinking aim to change architectural education, and, second, what the founders of Cirka Teater think architects can learn from them. The notion of transformation is in this background set in

relation to the need for architects to move between concept and realisation, and the idea that artists can teach architects to introduce ruptures and strangeness in their design processes. We introduce **the practical circumstances of our case**, the Making is Thinking master's semester in 2016, including the central learning goal of working with the unexpected. **A chronological overview of our case**, where brief descriptions of course activities are interposed with descriptions of what happened on our learning arenas, then follows. Themes – which can be read together with the learning goals of the semester as well as against the background's broader weave – are marked out (in *italics*) in the chronology. The scattered themes are then brought together in **a tentative outline of tracks of transformation in the colearners' learning trajectory**. There is an overarching track from skills to perspectives, which involves going from distanced to engaged inquiry, from project and individual to process and collective, from being inexperienced in talking to others to being able to verbally articulate professional identity.

An extended thematic analysis of the outcomes of the case study will be made in the third chapter.

Background to our case: The foundation of the Making is Thinking milieu and the introduction of Cirka Teater's approach to material space

The collaboration between Making is Thinking and Cirka Teater is based on two shared ideas.

The first is the possibility of mutual exchanges of knowledge between the two environments because they share the "bricolage approach" to artistic process, of beginning in what you find rather than in a plan or manuscript.

The second is the thought that the tension between the stable permanence, which architecture strives for, and the intensity of the now, which theatre embraces, could be productive. Gilles Berger states:

We are building for this very moment, not, like architects do, for the future. Theatre is now. I work hard during months for a performance that lasts half an hour, and right afterwards I demount all that I built again, and it is gone. It is a good image of being human. We disappear, everything disappears.²

However, the collaboration also involves asymmetries. While *Making is Thinking* comes from the outside and has little to lose when the harbour is transformed, the municipal plans for Nyhavna will affect the theatre company's daily life, and, according to Sæther, they are "definitely afraid" that the area which has shaped their artistic language and enabled them to live their dream "will develop into something completely different now."³ Instead of adapting to external decisions made about Nyhavna's future, Cirka Teater decides to influence the seemingly unavoidable gentrification process. At the festival they therefore aim to give a theatrical comment to the debate, a momentary experience of the history of Cirka Teater entwined with the history of Nyhavna. This is a playful yet serious comment which could both "make people smile" and "change their lives."⁴ Cirka Teater's goal with initiating the festival is that the future Nyhavna will include a new unique institution, a theatre house (*scenekunstarena*) where children can engage in theatre as active participants rather than (passive) spectators.⁵ *Making is Thinking* aims to contribute to this goal, but their engagement at Nyhavna can at the same time be seen as an opportunity for experimentation directed towards architectural practice and education at large; towards the activation of architecture students. As mentioned in the introduction, it is this latter aspect of the engagement we study.

Three interviews held during spring 2018, one with the initiators of *Making is Thinking* and one with each of the two founders of Cirka Teater,

let us present a case-specific background against which themes appearing in our cogenerative dialogue can be understood (see interview guides in Appendix I and Appendix II). This section on the background of our case includes quotes from those interviews, like the ones from Berger and Sæther above. Moreover, material from the interviews with the theatre-makers is included in the chronological overview of our case study further on in this chapter, in particular in the sections on course activities. In the three interviews, the notion of transformation is brought up, and how it can be seen in relation to the architect's and the theatre-maker's practices as well as in relation to architectural education. More specifically, the interviewees talk about that architects must learn to move between concept and realisation when creating material space, that artists can teach them how to make that move, for instance by introducing iterative experimentation and strangeness or surprise in design processes, and that this move could entail an inclusion of aspects of material space architects tend to marginalise: the corporeal, the political and the emotional.

Making is Thinking on how architectural education should change

The initiators of Making is Thinking (the artist Alex Booker and the architect Gro Rødne) were interviewed by the author on 13th March 2018.⁶ What follows is a review of the interview with them.

Knowledge transformations need new forms of learning

We saw in the introduction that TRANSark aims to prepare architecture students for an unpredictable future. Making is Thinking's tactic for contributing to this is to introduce hands-on techniques and thereby enable architecture students to challenge habitual and preconceived manners and thoughts ("design fixations" or "*Einstellung* effects") regarding design, i.e. to enable transformative situations that open up alternative perspectives on architecture.

Rødne and Booker prefer to talk about professional transformations, or "knowledge transformations," rather than personal ones. Rødne is clearly disturbed by the associations others might make if an educator talks about changing students deeply. If students, for instance in a situation set up by Making is Thinking, learn to leave the norm of functionality and act on complex problems, says Booker, this means that their knowledge has been transformed, because they have gained a changed perspective on problem-solving which can be applied to other situations and thereby contribute to changing society for the better.

That knowledge transformations have a social function is important to Booker and Rødne. It is our duty to provide an education which enables students to form their roles as architects *within* society, says Rødne. The emphasis of the course should, ideally, be just as much on societal dimensions as on methods and tools, she continues self-critically, but it might feel safer as a teacher-practitioner to focus on the hands-on aspects of the practice – and those aspects have a tendency to "eat" time that could have been used for reflection.

A social understanding of architecture entails the need for a social model for teaching architecture which prepares students to act in an uncertain future, says Booker, while the master–apprentice model is complicit in the nihilation of architecture as an independent and inventive discipline. In fact, a core aim of TRANSark and Making is Thinking, Rødne and Booker underline, is to question the conventional master–apprentice model as a model for transmission of knowledge. It is not fit, Rødne points out, for our main task to train the students not to do what tutors tell them but to critically reflect upon and reformulate the tasks they are given, with the bettering of society in mind. As tutors we should not be their masters but provide situations, strategies and methods with which they can solve different and unforeseeable problems, she states. And such teaching is expensive because it requires tutors who respond to each student's development, Booker adds. He also points out a political dimension for why educational "actionism" or engagement may not be supported, as he claims that it can be a counterforce to the academic neoliberal capitalism of the contemporary academy.

Transformation from concept to realisation is a starting point for empirical research

To consciously introduce research projects is a tactic for emphasising the reflective and social dimensions which easily get lost in the everyday of education. Connected to the establishment of TRANSark was the PhD in "Architectural theory and transformative learning in architectural projects from concept to realisation," through which this study was made possible.

Booker argues for the need for research projects like this one by describing a paradox. Students on the architecture programme are generally more satisfied than most other students and the university is proud of the hands-on and problem-based learning practised here. And yet, he continues, there is also a serious demand from the university administration for a cheaper and more efficient architectural education. He thinks that the threat from those who desire efficiency, which has as one of its major potential consequences that the need for space – for workshops and studios – is questioned, must be met by empirical research that formulates what the "tacit knowledge" of the architect is. Booker's call for empirical research above and Rødne's for critical reflection form an entrance for a researcher with the task to look at the connections between thinking and making, or concept and realisation as the announcement of the PhD position said.

Largely unaware of TRANSark's establishment as well as of educational theories and the world of theatre, the author applied for this position based on her experiences as an educator in design and history courses at Umeå School of Architecture, Sweden. Her intention was to open up architectural history by making "epistemological and material experiments based on architecture of the past" and thereby set the "imagination in motion" and in turn enable critical views on the contemporary architect's habituated roles and techniques.⁷

Aesthetic rationalities catalyse the architect's ability to imagine

The Making is Thinking milieu is at first glance an obvious continuation of a Nordic focus on the architect as maker or craftsman. The work of

scholars like John Dewey, Edward de Bono,⁸ Richard Sennett and Juhani Pallasmaa, who discuss how humans learn through sensing the world and doing things with their hands, is foundational to *Making is Thinking*, says Rødne. In fact, the title *Making is Thinking* is taken from the first page of *The Craftsman*, where Sennett says that the guiding intuition for his work with the book was precisely "Making is Thinking."⁹

However, *Making is Thinking*'s take on "making" is defined by cross-pollinations with other arts. With Eikseth's characterisation of Norwegian architectural education in mind, *Making is Thinking* can be described as an educational strategy for combining Bauhaus and academy heritage with contemporary full-scale exercises. While NTNU, as mentioned in the introduction, has a polytechnic character, the experimental Bauhaus tradition was a shared reference at the Department of Architectural Design, Form and Colour Studies, the department responsible for developing the artistic elements of the architectural programme to which Rødne and Booker belonged (until reorganisations in 2017) and where what was to become *Making is Thinking* began to emerge.¹⁰ As mentioned in the previous chapter, aesthetic theory and artistic practice characterise the department's tradition. Visual artists have been employed here since the 1950s. Most well-known are those who belonged to the nationally important artist collective Gruppe 5 during the 1960s and who continued to influence the education of architects also thereafter.¹¹ The department's focus on aesthetic theory was primarily established by Jan Brockmann during the 1970s and 1980s. Artists with close connections to that era have recently retired and Nina Eide Holtan, who has an active role in *Making is Thinking*, is now in charge of developing the artistic elements of the architectural programme. *Making is Thinking*, says Booker, is meant to build on the established tradition by entangling aesthetic rationalities of art and architecture at both the practical and theoretical level.

Architecture must be liveable, Booker continues. This condition is not controversial in itself but risks restraining architects by social and functional norms. *Making is Thinking* challenges this risk, he claims, by opening up to artistic ways of existing in paradoxical relationships suspended from demands on functionality. In the everyday of the

education, the need for such an opening is obvious, according to Booker and Rødne. Architecture students get stuck in design fixations and put all their effort into making nice presentations of the very first idea they get when presented with a problem to solve. Thus, we may say with the discussion in the first chapter in mind that the projective dimension of the architect's ways of knowing has been reduced and must be recovered. That architects are not trained to handle unpredictable knowledge disqualifies them from becoming true problem solvers, turns them into obedient knowledge consumers and leads to a "*devastating* poverty of the imagination," Booker claims vividly:

True challenges are complex, entangled, uncanny, potentially quite disturbing – and avoided by most architects. They practise habituated problem-solving and thus produce habituated solutions, and it is therefore necessary, from an artist's point of view, to introduce what might be called "the viral" or "the contamination." I mean contamination in [the architect Bernard] Tschumi's sense, as in turning things upside down and then looking at them from a new perspective. To take such action is essential if one is going to have any true development as a practitioner.

Yes, Rødne agrees, many projects are extremely predictable and any demand on changing the foundations of their design idea seems to threaten the students' sense of control. But architects must, she emphasises, challenge themselves to take on different perspectives throughout a design process, or in other words, to acknowledge the strange and unexpected and do something with it, as one of the central learning goals of *Making is Thinking* (2016) states.

Could strangeness be introduced through iterative experimentation?

The assembling of ideas on which Making is Thinking is built began in 2005, when Booker made sketches for a master's course in architecture based on a perceived need for radical design strategies within the field of architecture.¹²

The master's-level projects Booker saw as a new employee at NTNU's architecture school in the late 1990s revealed a level of conservatism and instrumentalised rationality which struck him as obsolete in comparison to other schools of architecture and design, and which made him formulate the need for radical design strategies involving creative risk-taking, unexpected qualities and forced relationships.¹³ An artistic aesthetic rationality based on acting without a preconceived idea of what that thing will be in the end can be useful for meeting this need, says Booker.

The architect can learn from the artist how to engage in iterative experimentation towards an unknown horizon in Hans-Georg Gadamer's sense, he continues, because "the artist knows how to take something, do something with it, and then do something else."¹⁴ Experimentation, he says, is not referring to the idea of the researcher as someone who experiments in order to gather empirical evidence, but to this very process of marginalising prejudices and preferences by first doing and *then* making judgements of what happened. These judgements, he continues, are made on subjective and qualitative grounds and will not lead to any absolute evidence or final definitions. This is essential, Rødne fills in, because as the ideas of what architectural design processes should lead to shrink, architecture becomes increasingly predictable. Making is Thinking therefore aims to give students methods for how they may surprise themselves, and methods for reflecting upon the value of those surprises. That is, to enable surprises is a central tactic for challenging habits within Making is Thinking.

Explorative making, Rødne proposes, has the potential of trespassing on what one is able to come up with through thinking. Here, architects have a lot to learn from other creative practices, she argues, and

brings up the example of the film director David Lynch and his use of a red light bulb in *Inland Empire*:

Lynch was giving instructions to an actor. In one scene he told the actor to do whatever he wanted with a red light bulb. The actor placed the light bulb in his mouth and the atmosphere of the scene changed completely, a change that surprised Lynch and which he kept in the movie.

Rødne suggests that architects introduce too few "red light bulbs" because they are trained to think and argue for their work based on a rationale of functionality, within which an alleged need for disruptions becomes absurd.

One can learn about the relation between concept and realisation through the body

As we have seen, Booker and Rødne reflect upon the social function of architecture, which they think can be catalysed by artistic experimentation through hands-on making. The body and the performative may be regarded as implicit in such a focus, and these notions were, as we will see in the following parts of the thesis, emerging as essential in our case. However, the notions are not central in Rødne's and Booker's replies.

When asked about the relation between academic knowledge and skills, Rødne points out that teamwork through one-to-one building – as practised in the first bachelor-level year and in other courses at NTNU, including Making is Thinking – is founded upon the human body's ability to work and experience.¹⁵ One may know the principles of construction, says Rødne, but it is a completely different thing to make a construction one can touch and thereby gain what she calls tacit knowledge:

To learn through the body by building is not a simple or predictable transfer of known principles to a concrete reality, but a way of actually understanding the effects those principles will have on the experience of architecture. It is easier to oversee a miscalculation if one has not experienced the difference between standing inside a construction in tension and a construction which is about to collapse.

The theatre has an educational function

The collaboration with the theatre company was based on experiences of how essential this difference is, says Rødne, and the thought was that the theatre company would contribute to enhancing the importance of engaging in "reversed processes," or, in other words, processes where making comes before thinking. It worked, she continues, because this might have been the first time someone told the students, like Berger did, to "go more crazy" and to forget about having an exact plan. Thus, Rødne links an enhanced focus on knowing through the body to the theatre company. Booker, who has never been involved in the collaboration with Cirka Teater, has another, more theoretical, point of view on the theatre's role in architectural education. The social interaction in learning processes, as opposed to the master–apprentice model's focus on the production of individual professionals, could be understood through transfers of performance notions to academia, such as Erving Goffman's idea of the presentation of the self, Booker suggests.¹⁶ And the theatre, he continues, has the capability of keeping the start-space of a design process open and delaying the tendency of objectification, because:

To experiment with things can be thought of as putting them in a theatre of action, where the suspension of

disbelief enables one to act without preconditioned judgement.

Hence, Rødne and Booker are proposing that letting the strange or unexpected in via the theatre – its concrete procedures and conceptual constructions – could enable architecture students to expand the possibilities of what architecture is. The theatre company's function, from the point of view of Making is Thinking's aims to develop architectural education, can be understood as stimulating architecture students to, as the central learning goal says, include the strange and unexpected in their design processes – not just in a conceptual or explorative dimension or phase of the process, but also in the realisation of material spaces.

Cirka Teater on what architects can learn from them

Anne Marit Sæther was interviewed on 4th April 2018 and Gilles Berger on 15th May 2018. The two interviews followed the same guide, including questions about their approaches to theatre, the history of Cirka Teater and the collaboration with Making is Thinking in 2016.¹⁷ The importance of the theatre's ways of working with material spaces had become more and more evident in our cogenerative dialogue, and a need for the researcher to hear Berger and Sæther articulate their thoughts on working with space and with architects emerged. By contrast to Booker and Rødne, they actively took part in all phases of the semester.

Strangeness comes through unexpected meetings with others

Just like Booker and Rødne, Sæther and Berger emphasise that the unexpected encounter with a material can guide an artistic process. For instance, the feeling of strangeness they experienced when they found an overwhelmingly big and alien material consisting of 22,000 plastic balls in

the bunker's wall made them produce a play on environmental issues built on that feeling rather than any political agenda.¹⁸

Berger and Sæther argue that architecture students can learn from them and the theatre generally to see the world with new eyes by beginning in tactile experience. This proposal is based in their own educational background. Berger and Sæther met while studying physical theatre in Paris during the early 1980s, and their training is closer to that of dancers than to that of actors working with text-based theatre.¹⁹ Berger also studied art and interior architecture, and the combination of physical theatre with the creation of objects was fundamental for the direction Cirka Teater's work was to take. Moreover, Sæther mentions free theatre groups created in Norway and Sweden after 1968 as sources of inspiration because they practised an uproarish attitude to theatre by exploring possibilities of meeting audiences in unexpected situations, outside institutions and in the streets.²⁰ As contemporary references, Berger and Sæther point out three French experimental theatre companies working in public space: Génèrik Vapeur, Royal de Luxe and Ilotopie.²¹ In particular, Ilotopie, a creative interdisciplinary group where sociologists, composers, architects and theatre-makers contribute to expressing a theme theatrically, has made Berger believe in collaborating with architects. They create things which are interesting because they are strange in the sense that they are hard to define as either art, architecture or theatre, he says. A major lesson such projects can give architects, Berger suggests, is the ability – he holds an imagined object in his hands – to start experiencing the tactility of the world:

Instead of, like most architects, thinking first, then drawing and then building, we do the reverse and ask: What does this form *give*? It is about experiencing the form. Not "aha, I can draw this perfectly," no, *what the form gives to you*. How is it veined, what is its temperature, what is its transparency?

That is, probably unknowingly, Berger paraphrases Shklovsky on how art makes the familiar strange and thereby prolongs the process of perception, or the aesthetic experience.

The body generates material space

While Booker and Rødne have no major focus on the body and its relation to space, this theme permeates the conversations with Sæther and Berger. This is a difference we will return to in the following chapter. At the schools in Paris, Berger and Sæther had learnt to "create spaces and constructions" with bodies and relations between bodies as the only "building material," says Sæther. It was not until they were to set up their first production, *Og så kom fyren* (1984), that they realised the potential of combining embodied construction of space with Berger's ability to build things.²² A few days before the premiere, Berger found two ovens in a pile of garbage by the fjord, which he rebuilt into a theatrical "oven" strong enough to stand upon, big enough to hide within. Sæther describes this very first process, in which Berger showed his ability to create spaces by fusing bodies with objects, as a miniature of Cirka Teater's œuvre:

This is what has become our methodology, to work from within the body with relations to spaces and to materials, seeing spaces and objects as dead material which we can make come alive so that they in fact become physical coactors. To improvise with objects in this way has been our way of creating stories.

The same principles apply to *Musika Mobile* (2009) and *Mekatonia* (2012, 2014), two large and spectacular constructions occupying urban spaces in Trondheim during festivals which can be seen as closely related to *Hendelser på Nyhavna*, but the latter production exceeded all previous ones in terms of size of constructions and number of bodies involved.²³

The emotional is political and material space moves to cause movement

While the Making is Thinking initiators mainly talk of political dimensions in relation to defending how architectural education is set up within the university, Sæther and Berger more explicitly describe the political as placed at the core of their practice. Their large-scale productions in urban spaces outside theatre houses are founded upon a desire to be a part of society by captivating and communicating with people – and especially children – in unexpected places. To expose children such that the theatre can affect them and they can affect the theatre is a political motivation for our work, says Sæther. Through mechanisms of surprise, the theatre can remind people that there is more to reality than one might think, says Berger. This means that the surprising, strange or unexpected are central to challenging habits. And to Berger there is clearly a political dimension in providing changed perspectives, but, he emphasises, a theatre production has failed if it becomes propaganda.

We have seen Janssens and de Zeeuw argue for how emotions can be included in architectural research. Talking to Berger and Sæther, this seems to be something architects can learn from theatre-makers. The task of the scenographer, says Berger, regardless of worldly limitations, is to communicate by materialising content – a theme, story, place or idea, for instance – through the creation of a space that needs no actors or explanations. This spatial communication of content is poetic and guided by emotional relations and humans, he continues, while architects are too strictly guided by functionality. Architects should learn to include emotions, Berger argues, for the sake of the poetic in itself and because the poetic is connected to the political. In other words, the notion of transformation does, according to him, include human/existential and political dimensions, and architects can learn from the theatre about how to reach these by creating concrete experiences of movement in and of space:

I see movement that architects tend not to see. They are used to building something fixed and I look for what

the space can give me in terms of movement: movement of light, of people, of objects. In all my work the [possibility of constant] transformation of scenography is central – where I start and where I land. It is this transformation of the space that should be able to tell a story, without actors or text. A fixed space cannot do that. A space that evolves and takes on different poetic aspects – is violent or soft or coloured – such a space *goes into the emotional in people*.

If architecture students learnt to create such spaces – spaces which include movement and therefore embodied and emotional surprise – people would understand that what they do is important, says Berger. We will return to this idea, present in the work of Shklovsky and Friedrich Schiller, among others, of how the space at the theatre can open up new knowledge perspectives, in the fourth chapter.

Our case: The Making is Thinking master's semester in 2016

In the introduction, we briefly described why we decided to study the Making is Thinking semester in 2016. Let us now, with the intention of informing the reader about the practical circumstances of the case, introduce the elements of the case chosen by looking to the learning goals of the design and theory courses, the semester's organisation and the people involved in the semester, its physical contexts, and its layout.

Learning goals

The Bologna Process states that learning goals must be defined for each course within European higher education.²⁴ Students should know what they can expect to learn and that certain skills and theories are included in

the education of, for instance, an architect. However, transparency entails requirements on measurability and standardisation which risk maintaining stable traditions of education and marginalising ambiguous and innovative ways of knowing.²⁵

The learning goals of the design course "Making is Thinking: In the Overlap Between Artistic and Architectural Methods," as they were formulated in 2016, can be read as a critique of the idea of measurable learning goals. The students can expect to experiment with mixed media and analogue materials. At the same time, the experimentation is aimed towards goals that are less easy to grasp and which in fact reveals intentions to undermine the idea of what an architect should know:

This course aims to:²⁶

- re-engage analogue materials and observation as a ground for idea generation;
- explore a range of mixed media in idea development and presentation;
- enable form and structure experimentation as a methodology, integrating material, space, light and aesthetic motivations;
- make creative use of and appreciate the unusual, the strange and the unexpected;
- invoke curiosity and increase the ability to experiment towards radical solutions;
- challenge prevailing design habits and design preconceptions in order to reveal new possibilities.

The potentially subversive learning goals which imply transformations – especially the idea of making creative use of and appreciating "the unusual, the strange and the unexpected" – are central to our

investigation. This goal appears as a condition for, as the other goals say, engaging in and experimenting with materials and spaces towards radical solutions and thereby challenging design habits.

The learning goal of the theory course "Aesthetics, Theory and Practice in Architecture," stated in the course description, is that students should gain knowledge about how architectural theory has and does influence architectural practice by gathering, analysing, contextualising and comparing arguments. The course is thus an opportunity for reflecting upon implications of challenging design habits.

The fact that the semester is a master's semester means that the students are in the fourth or fifth and last year of their education. Master's students in general have tried different ways of working with architecture and probably have an idea of their interests within the field. They have experiences and design habits which they can reflect upon and experiment with more consciously than most bachelor students. They may, on the other hand, have to struggle to become aware of and change habits that have become normal to them.

Organisation and persons involved

The Making is Thinking semester and the festival *Hendelser på Nyhavna* are separate processes although the festival is a basic motivation in this semester's version of the course.

The central participants in the course are the fourteen students who have chosen to spend one semester of their master's education with Making is Thinking. Half of them are female and half of them male. Half of them have previously been studying at Norwegian schools of architecture – five of them at NTNU and two at BAS – and half of them are exchange students or students who have previously studied at other architecture schools in France, Germany, Italy, Mexico and Portugal.

The educators in the design course are (in alphabetical order) Nina Eide Holtan, Johanna Gullberg, Gro Rødne, August Schmidt and Sebastian Østlie, and the theory course is given by Eivind Kasa. All of the

educators are architects from the Department of Architectural Design, Form and Colour Studies.

The founder, director and actor Anne Marit Sæther, the founder, scenographer and actor Gilles Berger, and the producer Monica Stendahl Rokne from the theatre company Cirka Teater act both as educators in the process and clients with requirements on the interventions built for the festival at the end of the semester. They are involved in the planning of the semester and in workshops from its beginning. During the last weeks of the semester, students, tutors and theatre-makers collaborate intensely on site at Nyhavna.

Representatives from the municipal urban planning office and the harbour make the work on site during the semester possible. They are also deeply involved in the planning and realisation of the festival, which had been initiated by Cirka Teater and Making is Thinking and in the end came to involve a multitude of people and organisations active at Nyhavna.²⁷

The author has an active role in the semester. She acts as coordinator of the semester, tutor in the design course, festival organiser and researcher.²⁸ Because of her role as a researcher, she does not take part in examining the students.²⁹

Physical contexts: Nyhavna and the FormLAB

Making is Thinking works in spaces both inside and outside the institution. During the semester at hand, the students work in a room at NTNU called the FormLAB and at the industrial harbour of Nyhavna (Figure 1).³⁰ The FormLAB is a combined seminar space and workshop, with tools, materials and large tables. During the semester being studied, it is sometimes also recognisable as a design studio, with individual desks for each student.



Figure 1 Colearners working with mappings of Nyhavna in the FormLAB.

Our central node at Nyhavna is a red bunker called Fyringsbunkeren, "the heating bunker" (Figures 2, 7). It was built during the German occupation of Norway from 1940 to 1945 and contained steam units for heating the grey sister submarine bunkers Dora I to its east and Dora II to its west in case of emergency. The Norwegian Central Board of National Antiquities has identified the three bunkers as forming a unique historical environment by international standards, and the bunkers have a central position in the ongoing urban transformation of Nyhavna.³¹ Fyringsbunkeren has two extensions made after the war, one on top of its original concrete structure and one on the ground level, in the direction of the city centre, facing south. Since 1986, Cirka Teater's offices, workshops, storage and rehearsal spaces are in the top extension. While the FormLAB is a safe space for students, educators and researchers, Sæther and Berger literally call Nyhavna their "home."



Figure 2 A map of Nyhavna, with Fyringsbunkereren.

Layout of the semester

The semester's layout is the implementation of the characteristics of Making is Thinking described previously. It shows how learning inside and outside the school, individual and participatory forms of learning, and forms of reflection are to be put into practice.

The theory course consists of a series of lectures given in the FormLAB, and is examined through an individual essay in which each student reflects on his or her work in the design course within a tailor-made framework of architectural theory.

The design course is divided into a mapping phase, a design phase and a building phase. Each phase includes individual work and teamwork, and the assessment criteria of the course acknowledges both as equally important. The exercises in the phases are described below, in relation to our cogenerative dialogue. A main intention is that hands-on exercises should be done during each phase. These "activating exercises" blur the borders between the three phases; the students experiment with building while mapping Nyhavna, and they design while building the scenography inside Fyringsbunkeren.

A central thought is that the students should form their own projects based on mapping through making rather than be given a predefined task. This tactic is risky on the educators' behalf. Rather than by discussions about an appropriate programme and site, the semester was preceded by conversations in which the educators tried to speculate on what kind of projects the students could come up with and where the limit of an "architectural project" is. Could a dance performance be assessed as a result within an architecture course? If so, what kind of representation or documentation would make it assessable?

The introduction of given forms of reflection is meant to balance the risk of letting students form their projects; even if the resulting project fails, there will be documentation of how and why it was made, and this documentation will be part of the assessment. Each student is asked to keep a log of key thoughts emerging from day to day in his or her learning process, including both productive and stuck moments. Moreover, each student is asked to fill a work box and a process book with process models, sketches and written reflections on his or her learning process.³² In addition to being a part of the courses, the logs, work boxes and process books form a data source in our case study.

So far, we have come to know Making is Thinking's educational intentions and why Cirka Teater was invited into the master's semester of 2016, as well as the basic facts about how the semester was set up to put those intentions into practice. We will now move on to our study of this semester.

Our case study: A chronological overview

Summary of course activities and learning arenas

Course activities (1): What to build expectations on. Design course presentation, autumn 2015.

The first learning arena: Expectations. Individual responses via email, February 2016.

Course activities (2): The mapping phase (the first five weeks (8 February – 11 March)). Experimental mapping exercises on site, the first workshop with Cirka Teater at Fyringsbunkeren, a competition with proposals for the festival scaffold in the FormLAB, choosing sites for design proposals at Nyhavna, a collage workshop in the FormLAB.

The second learning arena: On mapping. Informal group discussion in the FormLAB, 8 March 2016.

Course activities (3): The design phase and the building phase (study trip, week 6 (14–18 March); design phase, six weeks (28 March – 6 May); building phase, six weeks (9 May – 17 June)). Study trip to Barcelona, reference study assignment in the FormLAB, interview assignments on site, theatre and drawing workshop at Fyringsbunkeren, the festival and the building process.

The third learning arena: On including references and conversations in a design process, and on beginning to build. Interviews with one, two or three participants at a time, in the FormLAB, 25 May 2016.

The fourth learning arena: On what a learning situation is, how built and represented space are related, and what is worth remembering. Individual interviews on site at Nyhavna, 9, 10, 11 June 2016.

Follow-up question: What remained. Individual responses via email, March 2018.

To differentiate the roles of our colearners, they are called "students" when course activities are described and "participants" when our cogenerative

dialogue is described. As mentioned in the introduction, the colearners are referred to as CL1–CL14. Written and oral conversations on the learning arenas were mainly held in English, but sometimes colearners used Norwegian and the researcher Swedish; the author has translated responses in Scandinavian languages into English.

Course activities (I):

What to build expectations on

The Making is Thinking master's semester was eligible and the students had made their choice based on a written presentation, which Rødne was in charge of and introduced orally in the autumn semester 2015. The presentation included formulations of the problem the design course takes on, the question about the role of art and creative workers in processes of urban change and gentrification, but focused on the methodology of the course, its participants (including the theatre company and the researcher) and layout. The presentation, with specified hand-in requirements added, was given to the students at the beginning of the spring semester, in February 2016, and was the document on which the students based their choice and expectations.

The first learning arena, February 2016:

Expectations

In a conversation, Levin emphasises that the initial frames and expectations of the participants in a cogenerative dialogue must be made explicit. The researcher has to be prepared to let even those expectations change his or her focus, he says. Hence, before the course begins and before they have agreed to take part in the case study, the fourteen admitted students are asked via email about their expectations for the Making is Thinking semester (see interview guide for our whole cogenerative dialogue in Appendix III). These expectations are probably primarily based on Rødne's presentation of the semester. The fourteen

potential participants are also asked to say what they know about Nyhavna and to mention reference projects they can think of in relation to the area and the content of the coming semester's courses. Though non-physical, this is our first learning arena. All fourteen interviewees reply.

Question 1.1: What do you expect to learn during this semester, through the courses "AAR4611 – Making is Thinking" and "AAR4909 – Aesthetics, Theory and Practice in Architecture"?

Almost all participants expect to leave the semester with an improved repertoire of skills and methods for handling design processes, and some of them expect an emphasis on how one *learns* through designing. Several of the responses reveal an anticipated focus on experimentation rather than designed results, as the participants talk about exploring different "forms of investigations" (CL10) or "new method[s] of finding ideas" (CL12), to "experiment with different art forms" (CL8) or "art techniques" (CL13), and to "focus on the process through production and experiment" (CL2). Some responses list skills within drawing, model-making and full-scale building on an urban site. Some link pragmatic skills to expectations on getting a different perspective on urban development, new approaches to mapping and to how one as an architect can propose what should happen on a site, i.e. programme a site. One participant says that the use of digital tools in other courses has made her drawings and illustrations become flat, and she hopes to begin to "love making things" (CL9) again. What the participants at this point say about skills and experimentation sometimes echo learning goals and aims of Making is Thinking, for instance of re-engaging analogue materials and enabling form and structure experimentation. This might mean that they start to make those goals their own, or that they copy formulations.

However, several participants also touch upon more profound effects of getting outside one's comfort zone by making hands-on experiments, effects which may have been implicit in course descriptions but which appear to stem from their own desires. By testing new techniques, a couple of participants expect to develop more sensuous ways to represent and work with architecture and to see architecture

"from a new perspective" (CL13). Another one wants to explore architecture as a "living organism that expresses something to others" (CL1), in other words to communicate through architecture. Yet another participant hopes to learn to approach architecture as "an art and as a way of being in life" (CL3). That *participants connect experimentation not only to developing skills, but also to profound transformations of their understanding of architecture* appears to be a tendency worth following up throughout the cogenerative dialogue and paying attention to in the fieldwork.

Question 1.2: What do you know about Nyhavna now, before the courses begin?

The responses to this question are rather predictable. However, apart from facts about Nyhavna, some describe the coming semester as an opportunity to get closer to and work with the sensuous, chaotic, strange and rough that Nyhavna holds, while other courses in which they worked at Nyhavna or with similar sites have, as one of them puts it, "failed to take into consideration the actual physical qualities of the area" (CL4). Hence there is at this point of the dialogue a slight inclination towards the experiential, processual and physical, and a tendency to describe these dimensions as marginalised within conventional design and planning practices.

Question 1.3: Thinking about your expectations regarding the semester courses (AAR4909 and AAR4611) and the area we will work in (Nyhavna), can you mention any urban planning and/or architectural reference projects you come to think of? If so, please tell how and why they matter to you.

Despite the inclination towards the experiential, only two responses to this question include something other than recent large-scale urban transformations of harbours in European and American cities. One description of a reference (by CL14), an art exhibition in which objects and materials were composed to create a spatial experience as something architects could learn from, stands out from the rest.

Course activities (2): The mapping phase

The students are told to spend the **first week** of the semester at Nyhavna. Guided by Eide Holtan, they randomly explore and map things they find interesting by making paintings, collages, ink drawings and other visual interpretations of the site (Figure 3). These rough exercises initiate the movement between the site and the studio, enabling learners to test something new outside and then bring the same technique and the material produced into the FormLAB. Hence, the design studio is from the beginning of the semester one of many locations for designing; it is established as a conscious choice of educational space rather than an unquestioned given.



Figure 3 A colearner's drawings and collages from the first week of the semester.

Another kind of mapping, of Cirka Teater's world inside Fyringsbunkeren, is undertaken in a three-day workshop during the **second week**. Sæther and Berger introduce Cirka Teater and their dream

of a theatre house for children at Nyhavna to the students. They emphasise the idea of creating constructions by recycling and recomposing found objects as a guiding principle for all their work. In exercises set up by Sæther, the students then activate their bodies and sense the world of the theatre rather than collect information about it (Figure 4). They move in relation to cylinders and cubes, build a landscape with stones and make paper figures come alive through moving with them.



Figure 4 A colearner's process book with images from the first workshop with Cirka Teater.

Architects and theatre-makers share an interest in spaces, bodies and objects. Nevertheless, the beginning of the semester is characterised by a tension between the students' aims to expand their repertoire and their willingness to actually open up for learning from the theatre company.

Looking back, when interviewed, Sæther remembers her surprise at finding the architecture students "more reserved than any other group" she had ever met. They were horrible cats, but good stones, she says,

smiling. While she is used to those who come to her classes being attracted by theatre as a form of expression, she felt that the architecture students were "complete amateurs" in exploring their bodies and unwilling to open up to the world of theatre through her exercises. The first workshop day was very uncomfortable for everyone, including herself, she recalls. On the second day she made new attempts to reach out to the students, and realised they were comfortable when she let them "play master builders." What she did was to ask them to use objects from Cirka Teater's storage to "build worlds, not to use their bodies but to build spaces for their bodies." Thus, the point where the body meets material spaces and objects seems to be one where architects and theatre-makers can meet. That architecture students do not know how to engage their bodies is not their own fault but a societal tendency, according to Berger. They came here to try something new, he says, something which challenged their habit of having finished designs before actually doing anything. But because that is what they are trained to do, he argues, they were – like most others in our society – using their "intellectual skills but not their senses, their body." To start without a "made-up dream situation" but with found stuff with which they should compose a space guided by a vision rather than a complete plan was therefore tough for them, he continues:

They are not used to beginning from how a form or space is experienced. It seems to me that this is something architecture students need to work with, and something we can help them with.

Berger sees the fact that the students were struggling to leave what he describes as the Cartesian normality they had previously been trained within as an obvious sign that Cirka Teater's and Making is Thinking's approach is needed within architectural education.

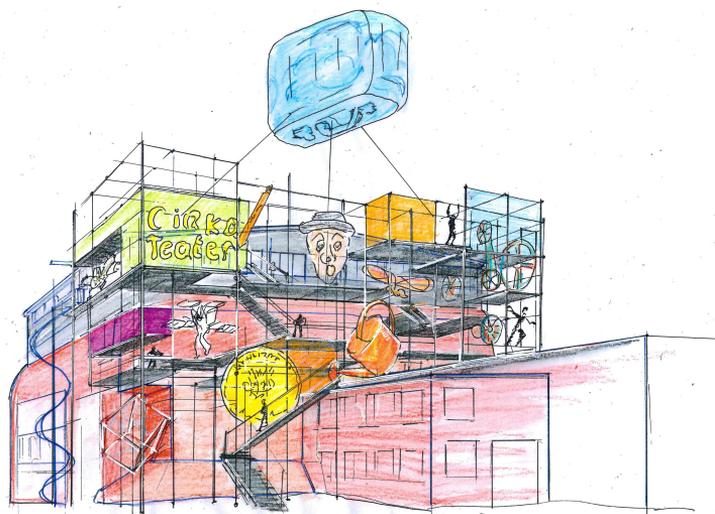


Figure 5 Berger's sketch of Fyringsbunkereren in scaffold construction with scenographic objects, made in 2015.



Figure 6 A colearner's model of Fyringsbunkereren and a scaffold construction, made during the competition week.

The students spend the **third week** of the semester mainly in the FormLAB, working in competing teams, instructed by August Schmidt, with proposals for the scaffold that is going to be built around Fyringsbunkeren for the festival in June. The instructions for the competition is a programme listing the main functions of the scaffold and a sketch made by Berger (Figure 5). A winning team is selected by the Making is Thinking tutors in conversation with Berger and Sæther. Their sketch model shows an explosion of scaffold elements, quite different from Berger's sketch of a grid structure with objects from the theatre's productions (Figure 6).

After the competition, three students are chosen to form a team that is to be in charge of the design and implementation of the structure on site. At this stage of the semester, the students work with the whole scaffold. In April, however, Berger is to take over the responsibility for the design and construction of the part of the scaffold which will house theatre performances. The scaffold outdoors thereafter consists of two main parts, hereafter called the "theatre scaffold" and the "exhibition scaffold" (Figure 7).

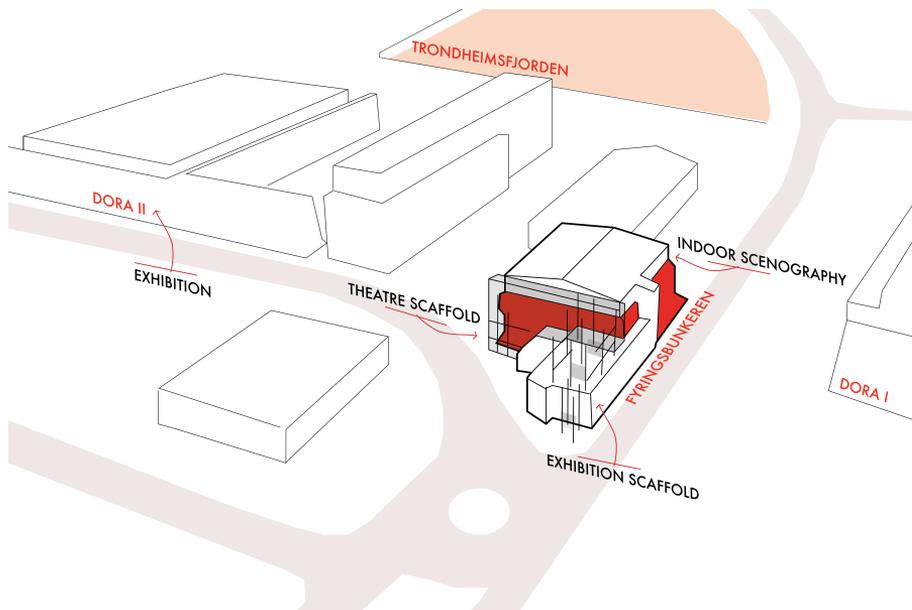


Figure 7 Overview of Fyringsbunkeren with construction areas outdoors and indoors.

We introduce the scaffolds here because they materialise, throughout the process, differences and negotiations between how theatre-makers and architects work with a similar structure to design material spaces. The theatre scaffold can be read as a realisation of Berger's first sketch, while the exhibition scaffold is a development of the exploding winning model. The separation of the two scaffolds can also be seen as a consequence of a disappointment with the architecture students' ability to move from concept to realisation.

In addition to a winning concept, the competition generates a lot of material which remains a common reference throughout the semester, for instance a series of conceptual models showing the relation between the existing heavy bunker and the imagined scaffold's lightness (Figure 8).



Figure 8 A series of conceptual models made by colearners during the competition week.

The students return to Nyhavna during the **fourth week**, as they are given the task to choose sites for their individual projects. In relation to choosing a site, they are given an interview assignment, written by the author. Each student is asked to bring a map of the site chosen and a

collage with an interpretation of that site, both made for non-architect interviewees. The assignment is made with the case study in mind, as part of a search for material forms of inquiry which support participatory processes outside the studio, as opposed to architectural representations where building proposals or site analyses appear to be finished. The collages, as "loose" or active material projections, are supposed to function as a means for the students and their interviewees to imagine – verbally and through making changes to the collages – how actions or events could happen on the chosen sites, and thereby allow the students to test what it might mean to simultaneously inquire and design/form a situation while being in it. When setting up spaces in this way, architects can probably learn from the theatre's expertise in how to engage an audience. Sæther talks of how theatre is absolutely dependent on communicating with people through creating relations between actors, spectators and the spaces they are in and/or create:

Our art work is *nothing* if there is no audience. An architect does not have to be in the house he or she made for it to exist; no one has to be there and the house is still there. But our performance does not exist without an audience. We are therefore constantly reminded of what communication is.

Collages are also made in an intense one-day workshop during the **fifth week** (Figure 9). The students cut up collages of Antwerp's harbour, made by students in another Making is Thinking workshop given by Nina Haarsaker and the author in Antwerp.³³ They compose the pieces into a three-dimensional fictive harbour area, in which they then – through making charcoal drawings and new collages – imagine placing their own proposal for Nyhavna. The educators' intention is to align making with thinking in practice, or to put what Booker called iterative experimentation into practice: to make the students externalise and materialise ideas that could potentially surprise, disturb or inspire them.



Figure 9 Fictive harbour landscape and charcoal drawings from one-day workshop in the FormLAB, with collages from Antwerp. See also video by Wormdahl, "Making is Thinking."

The students then, at last, make their first conceptual models of and preliminary programmes for their proposals for Nyhavna. The task to design a programme is demanding, since in most architecture courses the tutors decide on one programme all students work with. The students are working in pairs (four students) or individually (ten students, three of whom are in the scaffold team) with design proposals. All in all, nine architectural proposals for Nyhavna are developed: a superstructure on top of some of the area's industrial buildings, a labyrinth installation next to Dora II, a bathing complex between Dora I and Dahls brewery, ateliers and gallery for Atelier Dora inside Dora II (pair; Figure 10), a mobile creature/structure (pair), a sauna tower next to Dahls, a cavelike space next to Dora I, an urban garden and restaurant at Transittgata, and a reflection tower by Transittkaia with a view towards the fjord.

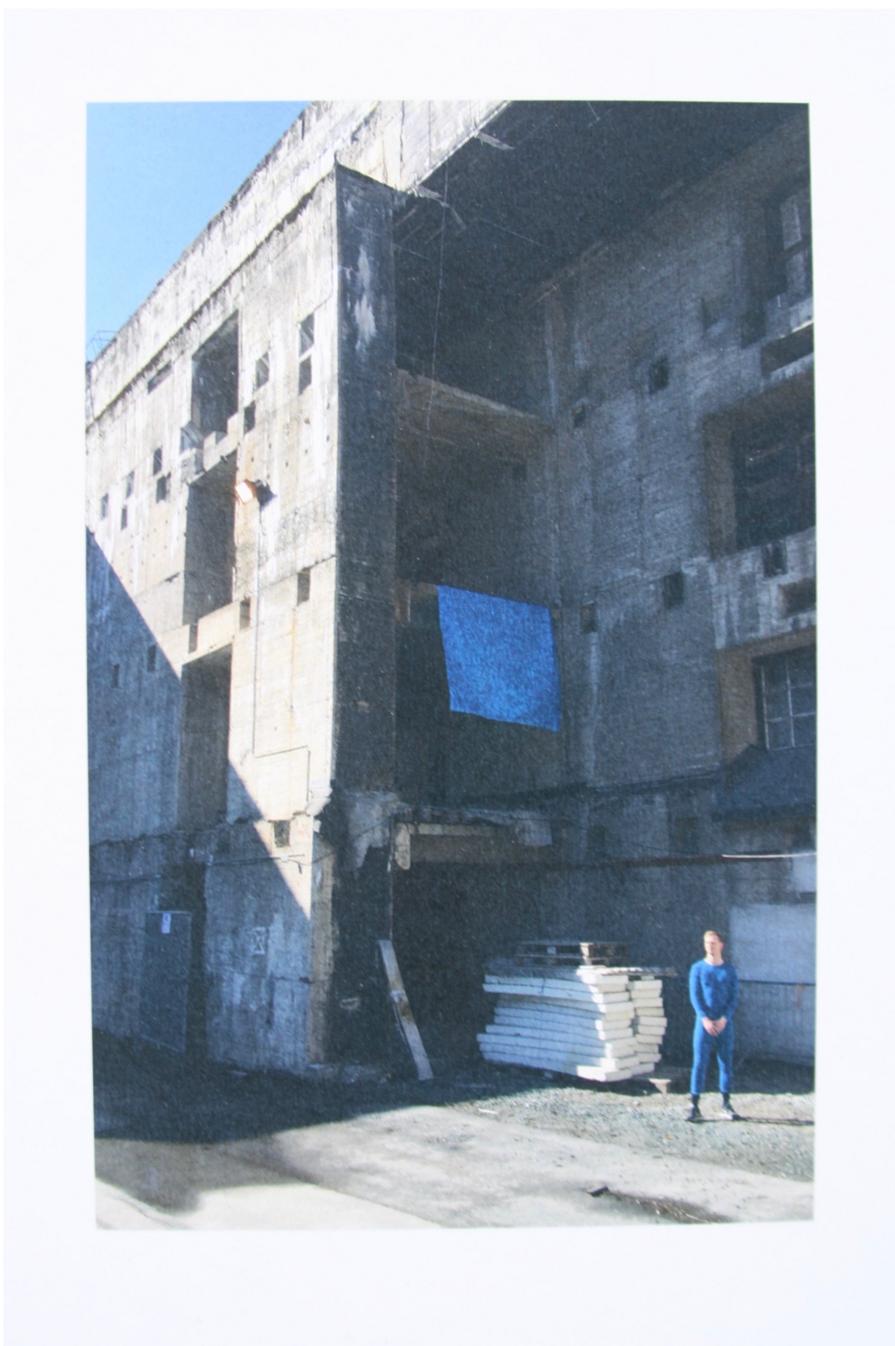


Figure 10 Full-scale intervention in blue at Dora II, as presented in a colarner's process book.

The second learning arena, March 2016:

On mapping

A month into the semester, on 8th March, it is time for the second round of questions to the participants in the case study. This session is designed as a rather informal group discussion in the FormLAB. Nine participants take part in what becomes a tentative collective conversation about *mapping as a way of processing observations and transforming them into sketches for something new*, based on the following two questions:

Question 2.1: How can experiences, registrations and interpretations of the existing (on site, on other sites and from other times) be included in our design process at Nyhavna?

Question 2.2: Which methods were fruitful for you when mapping the existing?

To make the situation more relaxed, the conversation is not audio recorded, but the researcher makes notes and takes photographs of the material the interviewees refer to in the conversation.

We sit around the large table in the FormLAB. As the two questions are repeated to the participants, they go to their desks for collages (Figure 11), models and charcoal drawings that have been important for them during the mapping phase, sit down again and point to these while searching for words to describe what they have learnt during the mapping phase. The conversation is open for follow-up questions or comments from anyone around the table. *They give each other time to formulate and share thoughts about their design processes and the conversation appears as a step towards the establishment of an open culture within the group.*

One of the purposes of introducing ink and charcoal, as Eide Holtan did, is to destabilise the precise and controlled lines an architect more often than not is trained to draw. *The shift from a thin and slow to a rough and fast line* is experienced as radical by several dialogue participants. A couple of them now say that to draw a rough line is a way of synchronising the speed of ideas with that of the hand, while others have experienced the rough as a hindering disruption:

To test new techniques is a way of engaging in the unexpected, yes, but I was annoyed that I so easily – just by changing the tool in my hand – had lost control. (CL10)

Moreover, this participant tells us that he had wanted to talk about the diversity of buildings in the area and brought a composition of red acetone prints of photos of façades at Nyhavna to the interview, but the conversation became useless, he says, when the red colour made an interviewee only want to talk about rusty façade materials. On the other hand, another participant (CL3) says, sighing, to hold interviews with people while showing them a collage of a slightly changed conventional map of Nyhavna was also a waste of time since it had just made interviewees confirm her observations.

Throughout our conversation, the participants try to apply the notions of making and thinking to their own experiences of the different mapping exercises. To draw or make collages upon photographs of the site is described by one participant as a way of letting the hand propose to the mind what might be worth enhancing in the context:

It's fruitful to *just make something*, anything, no matter the technique, because through making something one starts to think of something else, and at some moments what one makes and what one thinks coincide in still another something that might even look like architecture. (CL9)

This approach to mapping, she implies, is opposed to thinking strategically about which aspects of an area to enhance in a map. Another participant (CL13) argues that the open way of mapping risks becoming a disadvantage when she and her fellows are to choose sites for their

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proposals. She thinks that the collage technique in itself fuels confusion, because to make collages is to literally cut up and recompose the given.



Figure 11.1-2 Collages of Transittgata by two colearners.

At some points in the conversation, the participants do not discuss how new techniques enable or hinder project development, but *how the*

techniques introduced have influenced their perception of Nyhavna. Two participants working together (CL5, CL13) tell us how the stories of two interviewees, one man who has worked at Nyhavna since he was six years old and one man who comes to Nyhavna every now and then with goods from Finland, changed their understanding of the context. What first had appeared to the participants as empty land in between buildings became zones in constant transformation, where things and people come and go, where lines are drawn and dissolve, and structures are built up and taken down. And the participants now ask themselves (Figure 12): How could a new structure be designed to follow the existing movements?



Figure 12 Mapping of mobile structures at Nyhavna, by a colearner.

Another participant (CL14), on the other hand, is fascinated by the fact that what initially appeared to him as chaotic in the area turned out, as he spent more time there, to follow strict logistics. He presents a

transparent model in the shape of a strict generic house but filled with a muddle of stuff as a way of thinking about this paradox (Figure 13). The model expresses an idea he wants to take seriously although he doubts he can carry it through in a design proposal. What would it be like, he asks, to track the movements of singular scaffold elements on the scaffold company's premises right next to Fyringsbunkeren over a few months, and then use that mapping to design an architectural proposal with a strict structure but a chaotic expression? *The model as a form of inquiry gives this tentative question material and three-dimensional presence, and is a way of reminding both himself and others in the community of its importance.*

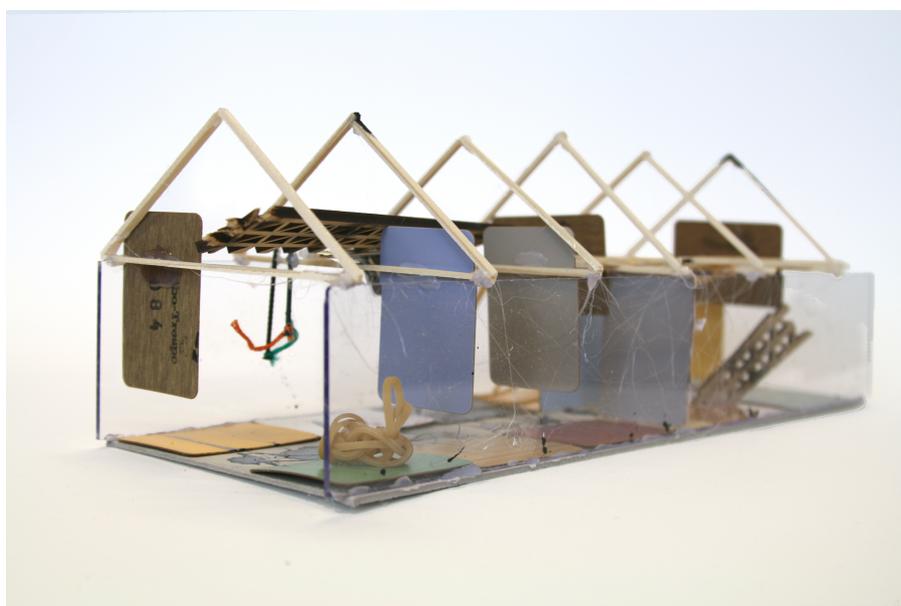


Figure 13 Reminder model, by a colearner: Designing a strict structure with a chaotic expression.

However, models or drawings may also lead to "formal stuckness" or "design fixations." The mapping exercises give a couple of participants difficulties with separating conceptual and formal aspects of registrations. One participant (CL7) aims to work with viewpoints, a concept that allows for many formal answers or design solutions, but is to get stuck in making variations of the shapes of the roofs at Transittgata that caught her

attention at the beginning of the semester. A couple of participants (CL2, CL10), notably with backgrounds from architecture schools with an artistic profile, describe how they consciously handle the course's encouragement to challenge design fixations by first making a lot of things – often in series of models or drawings exploring the same impression, concept or designerly hypothesis – and then trying to structure those things so they can discard or develop them. By contrast, one participant (CL9) reports that she had never before worked with series of conceptual models, but that while doing so *with the others* in her scaffold competition team, she started to think of the heavy character of the existing context and the lightness an intervention could bring, and she says that this contrast is to be the main theme of her own proposal for the area.

Course activities (3): The design phase and the building phase

After a week-long **study trip to Barcelona**, including the task to build interventions in public spaces together with local architecture students as well as visits and lectures concerning, first, the possibilities and effects of cultural and especially theatrical production in the city and, second, how the city's harbour had transformed over time, **the design phase** begins at home.³⁴ The students, worried about their own projects, are now asking for less collective exercises and more time for independent work with design proposals. The original plan for a public exhibition halfway through the semester, where citizens would comment on and interact with the students' sketches, is replaced by **two weeks of desk tutorials** and a **regular mid-term review** in the FormLAB.

After the mid-term review, the tutors want to find ways of encouraging the students to experiment more again. A reference study assignment is introduced by the author, who proposes that students study specific architectural references from different times and places in relation to the proposals presented at the mid-term review. The references include buildings, temporary interventions and ancient ruins, and the students are asked to first analyse these in drawings and then bring out an aspect from



Figure 14.1-6 Samples of colearners' work boxes and process books.



them to include in their own proposals. The aim is to introduce something unexpected and potentially disturbing in their design processes, reminding them to keep the horizons of what architecture can be and do open.

There are two workshops during **the week after the mid-term review**, one with sociologists and one at the theatre. A half-day workshop on making interviews is set up at Sosiologisk Poliklinikk, a sociological arena in the centre of Trondheim.³⁵ The second interview assignment is introduced to the students a week before the workshop. This time, the students are to bring a photograph of the site in its current state and a site model with a sketch of their proposed intervention. The model, like the collage in the previous interview assignment, is supposed to invite interviewees to interact with material forms of inquiry. This time, after learning from the sociologists, the students are asked to make notes or make a recording of the interview, transcribe it and place it in their work boxes (Figure 14).

The interview and reference assignments are made with the intention to provide research data regarding how material projections of designerly concepts and ideas can be used to communicate with others in a design process. Eide Holtan and Sæther set up exercises for testing relations between body, space and object in a one-day workshop inside Cirka Teater's rehearsal space (Figure 15). The workshop, which only half of the students attend, begins with several drawing exercises outdoors. The students then roll out paper on the floor in the rehearsal space, on which they make charcoal drawings with their bodies. In the last phase of the workshop, they are given 30 minutes to make three-dimensional displays by combining their drawings with things they find in Cirka Teater's storage. This workshop, as well as the interview and reference assignments, are intended as rehearsals or "scaled training" for dealing with the complexity and unpredictability that the building phase is to offer.

The workshop just described, set up in a collaboration between a theatre-maker and an architect, makes the researcher speculate about why Eide Holtan's drawing exercises differ from the making of drawings architects are used to. To discuss what it is that differs, it seems possible

to draw on the tension between the permanence of architecture and the momentary nature of theatre, and apply parameters used to understand performance acts. The performance act emerges through bodily actions in the moment; it is unpredictable and yet set within a defined timeframe, in a certain kind of setting, and made according to a specific instruction.



Figure 15.1-2 The second workshop at Cirka Teater: 30-minute exercise with composing exhibition (15.1, above); one of the drawing exercises in the rehearsal space (15.2, below).

From this outset, the researcher begins to understand that the enhancement of embodied action in the drawing exercises in the design course and the raised attention they entail are enabled, first, by Eide Holtan's instructions, which by contrast to taken-for-given conventions are specific and therefore unpredictable or "strange" for the participants, second, by the fact that drawings are made roughly and within certain timeframes instead of being planned and then executed according to standards, and, third, by the fact that the exercises are made in consciously chosen locations which influence the act of drawing and the character of the drawing produced, so that the relation between action and context becomes notable.

Not surprisingly, the students experience an overload of input, and when the design phase ends, thirteen weeks into the semester, they still prioritise staying inside the institution to work on their proposals for the area rather than on the common project. The theatre-makers are disappointed as they have counted on the students spending all their time and energy on the building site when **the building phase**, which is six weeks long, starts.

During the building phase, half of the students are assigned the task to build the exhibition scaffold outdoors, placed on and above the roof of the bunker's ground-level extension, and half of them the task to build the scenography indoors, in the theatre company's spaces. For each design proposal, the students – individually or in pairs – are also to finalise their project presentations for the final examination of the design course on 8th June and arrange their project in the exhibition scaffold for the festival on 11th June. Moreover, each student is to finalise his or her work box and process book.

The scenography inside the bunker is built by architecture students guided by Sæther's instructions. The exhibition scaffold outdoors is built according to the design by and instructions from the students in the scaffold team. Eide Holtan, Rødne, Schmidt and Østlie act as co-builders rather than tutors during this phase. The author is in charge of Making is Thinking's total contribution and moves between the indoor and outdoor group, as coordinator, co-builder and researcher.

In the midst of situations on site, Berger and Sæther realise that their way of working is challenging to others. The building process, Berger points out when interviewed, revealed a gap between reality and conceptuality in the students' design processes. The researcher is thus reminded about the importance of this theme – the distance between concept and realisation, which was implied in the title of the PhD position that made this study possible, and which Rødne and Booker point to as problematic when they talk about how architects are trained to produce according to an efficient norm while the experience of an actual construction often is alien to them.

While Berger himself is used to building, the students' lack of concrete experience made them move too slowly, he claims. The more the students built on site, Berger continues, the more they understood things that were obvious to him: that spaces need to tell a story, mirror human individuals, include some form of poetry. He also realised how well he knows the objects from previous performances. Through building and using them, he has a knowledge about their possibilities – through his body he knows the weight and construction of each object, and he therefore knows what other bodies can do with it – while the students looked at the objects from a distance and therefore, he suggests, were not able to attach to his sketch of the objects in a scaffold construction.

Instead, he argues, they wasted time on conceptual scaffold "dreams" which were over-dimensioned in terms of time, material and money. And then, he continues, when they were to close the gap between concept and reality, "they lost the essence of their sketch proposal, and created a construction based on squares – a typical architect's construction." The challenge for him, he had realised, was to not become authoritarian but to find a balance between setting frames and "having [the students] let go, giving them space to explore ideas and find their own paths" in the gap between concept and built reality. Sæther elaborates on the importance of the balance between encouraging the students to take risks and at the same time providing safe spaces for them:

It is essential that I manage to set up exercises in which [the architecture students] feel safe. And at the same time, I want to show the young that it is necessary to take risks, that one *has to* throw oneself out of one's comfort zone and into the unknown. I think that's probably the most important thing we gave them: the experience of meeting a whole new world one does not understand, and having to let go of control and plans, and then seeing that it worked out anyway – that experience is so important in many aspects of life.

Rather than follow conventions, they "need to go into themselves and nurture what is there," Berger suggests based on what he had seen the architecture students do. While Booker and Rødne were sceptical about discussing personal transformation, Berger sees it as a key to taking a critical stance through an aesthetic practice. When there is a system like the scaffold, he claims, a theatre-maker wants to distort the system and test its limits, while the architecture students were sticking to the scaffold system's given orthogonal structure and then tried to cover that with a secondary structure which was supposed to be a bit "crazy" or decorative.

Let us now take a closer look at the building process outdoors. During the design phase, the trio working with the collective structure (CL7, CL12, CL14) engage in conversations with all the other students around a large model standing in the middle of the FormLAB, showing Fyringsbunkeren with the exhibition scaffold in scale 1:50 (Figure 16). Through conversations and sometimes negotiations, all proposals are assigned a location or "box" in the exhibition scaffold. The theatre scaffold, on the other hand, is set up along Fyringsbunkeren's wall according to a physical model made by Berger and Espen Dekko and kept in Berger's office.³⁶ The three students in the scaffold team had spent a day on the scaffold company's premises testing the principles and possibilities of scaffolding, and could guide the other students and tutors in the outdoor group as they started the heavy and rather monotonous work of laying

out the outlines of the exhibition scaffold, according to the physical model and construction drawings from a digital model.

Orthogonal modules spread across the roof between the bunker's concrete wall and the roundabout, and, in parallel, along the bunker's wall. Objects and machines are mounted in the otherwise bare theatre scaffold. By contrast, the architects emphasise the construction's frame; when the exhibition scaffold is in place with wooden elements forming walkways between and floors inside the spaces (boxes) for the different projects, the students start testing out fabrics to create walls and roofs. Large rolls of white fabric are ordered, and a chain of builders who measure, cut and mount it is organised. Another part of the outdoor group continue with mounting scaffolding in freer compositions upon the orthogonal primary structure. These compositions can be seen as the traces of the conceptual model of a scaffold exploding its own orthogonal logic. In other words, they symbolise the challenges that come with taking material spaces from concept to reality. Busy with setting up the frame of the exhibition, it is only towards the end of the building phase that the students actually start to fill the exhibition scaffold with content. The spaces *contain* rather than express their proposals (Figure 17).

Nevertheless, by inviting visitors to move around in it, the exhibition scaffold in itself literally provides new views towards the reality of Nyhavna, and is, moreover, functioning as a grand stand from which spectators can watch the performances in the theatre scaffold, where the character of Nyhavna is enhanced through theatrical expressions. The scaffold in its entirety is a collective proposal from the theatre-makers and the architects, a giant temporary intervention projecting a possible future theatre environment at the harbour by juxtaposing reality and fiction as well as past, present and future for a day (Figure 19).

We now move indoors. While Berger, when interviewed, expresses his disappointment with the outdoor spaces, he regards the spaces in the indoor scenography to be evidence that architecture students do have the capacity to work with space in what he described as a more poetic way.

On site in the bunker, Sæther instructs the seven students in the indoor group to turn the storage space, which has just been emptied of large objects which are to be placed in the scaffold outdoors, into the main performance space of *Fargene på Nyhavna*, the play she has made for the festival and where she is the Laboratorian.³⁷ She describes the three main characters in the play, the Oyster Lady, the Rust Man, and the Wood Man, and asks the students to create a journey from the street to their worlds, including a moving audience and the mobile laboratory she usually tours from school to school with.

Rather than telling the students what to build, Sæther lets fictive characters and objects guide the way. The fictive characters – and not me – were the students' clients, and the characters kept developing as their spaces emerged, says Sæther in the interview. A central part of her instruction is to show the students around the main storage and other smaller storage areas to point out where different props and materials are to be found (Figure 18). The objects from Cirka Teater's history are to be recycled and composed into something new. As a reminder she posts a list on a pillar: "*Other objects*: Rehearsal space: Large masks w/ writing, Globes, Small watering cans, Box with cubes + cylinders; Kitchen: Masks in cabinet (1st & 3rd shelves); Office: 2 theatre dolls Alfred + Beate (handle with care); In blue bag: 4 lions (handle with care); Office: 2 boxes with small houses."³⁸

Three students decide to work with the Oyster Lady's space, one student with the Rust Man's and another with the Wood Man's. Sæther shows these students what is available in terms of shells and rusty and wooden objects, and she participates in the initial phase of their design processes. At the beginning of the building process indoors, some scaffold elements are brought in and put together as the skeleton of the wall between the entrance end of the storage and the space that is to become the main performance space. The idea is to fill this skeleton with artefacts from the list above, coming together as miniature worlds or scenes representing and recomposing the theatre company's history at the point where the spectators are to enter and exit the main performance space.

Though the learning trajectory of the architecture students is our main concern, we note that the process includes mutual exchanges and

shifts of roles. To invite others into her creative process was new to Sæther, who is used to participatory processes in workshops but not in performances. Making first the architects and then the audience part of the play felt like entering "unstable ground," she says; it was a new way of "opening up the space" between actors and spectators. In other words, Sæther was also taking risks. The process made her interested in the possibilities of learning from architecture, and led her to work as a scenographer for the very first time in her next production:³⁹

I have started to become an architect, while you want to work with theatre.



Figure 16 Building the exhibition scaffold. *This page*: Sketch in a process book (16.1, top left). Models of the scaffolds in the FormLAB (16.2, top right). Sketches in a process book (16.3, bottom). *Opposite page*: The exhibition scaffold while different fabrics are tested (16.4, top). Colearners helping Berger to test the construction for hoisting the mask (16.5, bottom left). The theatre scaffold and the exhibition scaffold a few days before the festival (16.6, bottom right).



Next spread: A tutor and a colearner in the construction in May (16.7, left). The connection between the exhibition scaffold and the theatre scaffold on the festival day (16.8, right).







Figure 17 Exhibition spaces. *This page:* The exhibition is an opportunity for the colearners to observe and interact with visitors and see a “real” result. Entrance to the exhibition scaffold (17.1, top left). Common map and scaffold models (17.2, top right). A colearner gives a guided tour, here in the display of the mobile structure (17.3, middle left). Art space proposal exhibited inside Dora II (17.4, bottom left). The labyrinth proposal (17.5, bottom right). *Opposite page:* Visitors



on the top level of the exhibition scaffold (17.6, top left). In a corner with a view towards Dora I and the building site of a new office building next to it, one colearner asks “Is this what you want for your city?” and visitors draw responses (17.7, middle left). Models in the common space (17.8, top right; 17.9, bottom left). The green space, aiming to communicate the atmosphere of a future restaurant with a greenhouse (17.10, bottom right).





Figure 18 Building process indoors. *Opposite page:* The Rust Man's space (18.1, top). Scaffold wall with worlds (18.2, bottom left). Structure of the Oyster Lady's space (18.3, bottom right). *This page:* Building materials (18.4, top left). Detail of the Wood Man's space (18.5, top right). The Oyster Lady's space (18.6, bottom).

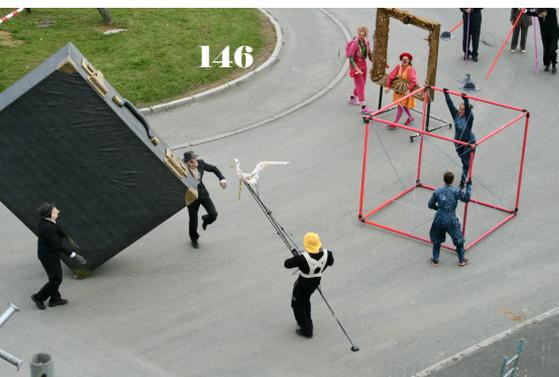


Figure 19 Festival performances. The colearners act as spectators and performers, and the constructions they have worked with come alive. Suddenly, something happens on the ground. Fragments of past Cirka Teater productions appear in front of Fyringsbunkereren. They are playful, and yet they warn us of what might come and what might be lost as Nyhavna changes. *This page*: The Little Grey Ones fall in and out of a giant brief-case filled with formal documents and maps (19.1, top left). The giant Pencils dance along the street in front of Fyringsbunkereren, a street which is shown as a main axis in the new master plan for the area (19.2, top right). And then, the theatre scaffold begins to move (19.3, middle left). Musicians, dancers and architecture students appear in the construction (19.4, middle right). The cog-wheels move and smoke rises from pipes in the construction, the golden clock speeds up, the giant mask is hoisted towards the sky and the outdoor performance is over (19.5, bottom left). Now, actors with red arrows in their hands guide spectators to a door around the corner (19.6, bottom right). *Opposite page*: As we reach the top of the staircase inside the bunker, we stand between a sculpted wall and a scaffold frame filled with props – dolls, violins, shoes, lions, suitcases (19.7, top left; 19.8, top right). We move slowly



between the walls and into a darker passage that leads us to the main performance space. The Oyster Lady and her circular space are elegantly draped in white fabrics. There is sand from the beach far away on her floor (19.9, middle left). The dirty Rust Man frenetically places rusty things he has found at Nyhavna on a table shaped to give the impression that the space is deeper than it is (19.10, middle right). The colearner who designed the space whispers that the actor's presence completely changes it. A child in the audience makes a composition with shells from the Oyster Lady on top of an image from the colour shop (19.11, bottom left; 19.12, bottom right). The composition directs the musician's play and the actors' dance, and thereby the atmosphere of the performance space. When we walk out into the reality of Nyhavna again, we see this reality with new eyes. On the day after we send scaffold elements from body to body, faster and faster until we throw them in between us, as if they were light and soft, and suddenly the roof is empty again. The shifts of perspectives the constructions have given us throughout the process will remain within us.

The third learning arena, May 2016: On including references and conversations in a design process, and on beginning to build

The third learning arena is set up three weeks into the building phase, when we spend most of our time on site at Nyhavna. On 25th May, however, we are gathered in the studio for mandatory tutorials in connection to which interviews are held, with one, two or three participants at a time, depending on if they work individually (seven participants) or in teams (two pairs, one trio) with design proposals for Nyhavna. The **three questions** concern the interview and reference assignments from the design phase and the participants' expectations on the rest of the building phase. The conversations, between three and ten minutes long, are audio recorded.

First question

Question 3.1: About the reference study. Has the reference project you were given contributed to your project work? If not, why? If yes, how?

When the participants describe how they worked with reference studies, **five tendencies** emerge.

1. The reference analysis has helped some participants *to take a distance from and thereby formulate guidelines for their current design processes*. The conversation with the two participants designing a mobile structure provides an example of this tendency. They struggled with representing movement and therefore the author recommended that they study Vladimir Tatlin's Monument to the Third International and Archigram's Walking City.⁴⁰ However, the participants thought these references were idealistic and symbolic rather than realistic and user-friendly. That Tatlin and Archigram had been suggested to them was a sign, one of them (CL5) says, that they had not been able to show what they wanted their proposal for Nyhavna to do. Her partner objects to this statement, though:

Maybe we didn't know really what we wanted . . . and actually the reference study helped us to create the final project, I think. (CL13)

By choosing three other references to study, the two participants have had to explain their choices to each other and to tutors and thereby formulate guidelines for their project. The design they create is to be changeable like a bridge they have seen, must be possible to cut from one piece of material, like a chair they know, and it will interact with people like a pavilion made by students in London.⁴¹

2. At other times, references function as *mediators* – or “*conversation pieces*” – in teamwork, and help two or more designers to *negotiate* – *visually and verbally* – the direction of a design process. At the mid-term review, the trio working with the scaffold structure presented models and discussed different scenarios for how the audience, the performers and the exhibition could be placed in relation to each other, on the ground and in different parts of the structure. Based on this, the author suggested that they look at examples of solutions to these relations in theatre architecture, in Claude-Nicolas Ledoux's Théâtre de Besançon (France, 1775–1784) with a stage fronting an audience seated in rows, Cedric Price's and the theatre-maker Joan Littlewood's project The Fun Palace (London, 1963–1964, never realised), an open structure for leisure activities, and Lina Bo Bardi's version of Teatro Oficina (São Paulo, 1982–1994), where a scaffold structure is placed inside a theatre space and the positions of actors and spectators are decided from production to production.⁴² The trio is interested in Bo Bardi's project, not because of its challenging of relations between participants, but simply because it includes a scaffold structure. It is “inspirational to see that it's possible to make something cool out of scaffolding,” but there is not much more to it than that, one of them (CL14) claims in our dialogue. The trio use the references to confirm that they agree on what they are aiming for in their common project.

3. References also work as *providers of diverse possibilities for how a certain theme or concept can be materialised*. The duo working inside Dora II

aim to let past, present and future coexist in their proposal for ateliers inside Dora II as well as in the exhibition on the festival day. Through studying references they collect different strategies for intervening in and presenting a historically important building such as the bunker. Whenever they are to add something in their design proposal, one of them (CL10) claims, they ask themselves a question stemming from their study of Carlo Scarpa's Museo di Castelvecchio (Verona, 1959–1973): Should it look new or should it look old? Well, his partner (CL4) adds, it is not about choosing either to continue or contrast, but about finding a balance. Hence, reference studies help these participants *to think about what it means to set up spaces or project worlds for future action based on past and present experiences*. In their design proposal, however, they are criticised for copying elements from Scarpa's oeuvre rather than being able to discuss principles for relations between new and old.

4. The act of drawing a reference project influences a couple of participants in their design processes. They talk about different effects of "just drawing" the lines of a reference project's plan or section. To investigate the geometry of a Gothic cathedral by actually drawing it gives a deeper understanding of the construction than one gets by looking at drawings or images, one of them (CL8) reports. While drawing without having to take decisions, the other participant (CL9) says, she can start an open thinking process in which she comes across new ideas. In other words, *the act of using architecture-specific techniques*, for instance to draw, to understand an existing context or construction enables participants to *connect their own practice to the practice of others*.

5. And, finally, the architect may want *to reproduce an experience* of being inside a reference. Rather than conceptual principles, an embodied experience of an atmosphere is then guiding the designer. One participant (CL11) describes how strongly "the low, the low entrance, the low ceiling" of Gunnar Asplund's Woodland Chapel (Stockholm, 1918–1920) has affected him and how he tries to transfer this experience of an atmosphere into the reflection tower he proposes for Nyhavna. A participant in the scaffold trio (CL7) reports that the regularity of the scaffold inside Teatro Oficina had made her question the tilted elements that the trio were sketching in models of the exhibition scaffold. She thereby understood

that they had to get to know how scaffold elements are actually put together, and shortly after the reference study the trio went to the scaffolding company to set up structural prototypes and thus learn about the possibilities and effects of the material.

Second question

Question 3.2: About the interviews. How did you experience making interviews based on visual material and questions? Have you through making interviews found out things which have changed your design process?

When discussing the effects of the interview assignments, several participants enhance what was mentioned on the second learning arena about the eye-opening effect an interview can have.

The two participants with the mobile structure recollect the meeting with the men who made them think of Nyhavna as crowded and in constant transformation. An interview with a metal worker has made the participant with the megastructure (CL1) decide on making a proposal for how industrial activities can remain at Nyhavna. The participant proposing a reflection tower (CL11) claims that interviews and informal chats with workers has made him think of how to best use the waterfront and how to place the tower so that workers would have the time to go there during their breaks. Just like several other participants, he says he finds it both useful and rare to talk to a site's inhabitants while in a design process. An effect of this is that participants *see the relevance of their work in relation to reality and possible users rather than in relation to their own grades*. One of the participants working with Dora II says that the design project, this time more than ever before, is a "networking exercise" (CL4). To actually talk to relevant inhabitants and let what they say influence the design leads to one thing after another in the design process, he continues. By connecting with people, his partner (CL10) adds, our project becomes "bigger than this course," and therefore, he states, the examination of the project is less important than it ordinarily is.



Figure 20 An interview situation at Transittgata.

Several participants claim that the interviews *give them a more comprehensive picture of the context than they were used to having in other courses* (Figure 20). As a rule, one of them (CL7) describes, architects look to "the geography and the physic[al] things but not how people experience the place and I think that's a really important part because we're going to change space in there." Therefore, she claims, interviews could be useful in any design process. Along the same lines, another participant (CL9) says that after holding interviews she is able to see "how people that work there think about the situation and that's very different from how we architects want it to be." Though claiming that this insight hardly influenced her design process this time, she says it probably changed her "way of thinking."

The collages and sketch models made for the interview assignment were not functioning as intended. The participants did not always make collages and models, and if they did, they did not get interviewees to interact with them. Some participants mention reasons why it had been difficult to hold interviews. For instance, someone (CL2) says, it was hard to communicate architectural ideas to industrial workers. One participant (CL6) has some experience of holding interviews using anthropological techniques, but found it difficult to start a discussion based on a collage or

model. The interviewees she met seemed "kind of afraid to say anything because it wasn't their area of expertise," and thus she implies that the collage and model are forms of inquiry alien to non-experts. Another participant (CL8) has experience from designing based on a large amount of analysed interview data and is sceptical about letting only two interviews influence his process. However, he says, this scepticism is probably connected to his own inability to communicate his ideas to others.

Third question

Question 3.3: About the full-scale building. What do you expect to learn from transforming parts of your project into a full-scale exhibition in the scaffolding structure?

A general tendency as we talk about expectations on the rest of the building phase is that *the participants wish to communicate the feeling of their proposals in the exhibition*. Rather than showing "complete projects," they want the visitor to enter an atmosphere. The participant working with a megastructure exclaims:

I aim to take on the challenge to exhibit an idea rather than a project: an idea or a question that people can apply to their city. (CL1)

The placement of his box in the structure allows him to frame the view towards a building site next to Fyringsbunkeren and ask "Is this what you want for your city?" Others are thinking of how they can use the inside of the boxes to mediate the atmospheres of their proposals. The participant with the green space (CL9) wants to "try to make a feeling, . . . the feeling [of a green oasis] that you get when you go into my project." The participant designing a sauna tower (CL6) intends to avoid details and instead create a "big" expression, perhaps with charcoal drawings, to give the visitors the feeling that they actually are inside her proposal.

One participant (CL4) gives a more exhaustive description of the possibilities of reaching out to others through live interactions. Full-scale building is rewarding, he says, because while it is easy to put paper projects behind, "experiences in real life" make one understand what is "actually going to affect people." *To engage with the real through an interview or a temporary intervention like a small exhibition, the participant claims, can have substantial effects:*

To see that something that you have created actually led to something, that it meant something to someone else. I think that's the most rewarding thing in architecture.
(CL4)

On the first learning arena, the participants had expressed their intentions to experiment with new techniques in order to expand their repertoire. In this phase of the process, they witness meeting more or less *resistance when actually experimenting.*

Several participants have now become aware of how controlled and predictable their design processes normally are. This *awareness does not necessarily lead to immediate changes.* One of the participants (CL11), an exchange student from a school where students are taught to become part of an established tradition, says that though he knows the aims of Making is Thinking, he does not trust any reviewer or tutor to actually appreciate that students take risks and fail. To illustrate where he comes from, he says that while others might not even reflect upon the idea that an architect's drawing should be black and white, he has pushed himself to dare to introduce colours in his drawings. He wishes he had experimented more and earlier on in the process, and intends to nurture a questioning attitude in the future. He has talked to Berger about how to turn an exhibition display into an experience and to Kasa about the notion of atmosphere in architectural theory, and is now aiming to let what he learnt in those conversations come through in his proposal. In the end his part of the exhibition becomes rather insignificant, but *the insights that came through conversations with others might yet transform his future practice.*

The general tendency to aim for the creation of atmospheres or experiences never became obvious in the exhibition. If the theatre-makers and the architects had collaborated more closely, Berger suggests when interviewed in 2018, the students could perhaps have learnt to question the given more radically. What happened, he thinks, was that they missed *opportunities to create "spaces that in themselves communicated the essence of their projects" and thereby opportunities to have a wider impact on the image of the architect and what s/he does:*

Imagine if, for instance, the students with the green space and the fractal space had managed to use their concepts to create overwhelming materialities, that would have made people go "Wow! I understand that what they are doing here is important!" Such reactions or experiences would contribute to a trust among citizens in that architectural experiments may be worthwhile.

The architects' view of the exhibition scaffold itself might have limited them from literally breaking the order of the scaffold, because while the theatre group worked with the scaffold as a frame that supported a composition of artefacts and mechanical constructions in line with an idea of turning the theatre's world inside out, the exhibition scaffold somehow revealed that the architecture students thought of the scaffold as the bearing structure of a house or city which contains walled spaces covered by façades, and this implicit understanding of what a construction should do seems to have been contradictory to the idea of creating atmospheres. What would have happened if they and their tutors had been further encouraged by the theatre-makers to think of the construction differently and had more time for experimenting with turning their proposals into full-scale experiences? Would the green space then, as Berger imagined, start to take over the scaffold?

The participants' *new understanding of how to create material space* is reflected in the fact that some participants now find it more relevant to

talk about their work with the scenography than about how they are to exhibit their own work. They point to both benefits and problems with designing in a manner that is, as one of them says, *opposite to what they are used to*. We recognise their descriptions of a *reversed process* from the interviews with Berger, Booker, Rødne and Sæther. It seems to challenge their sense of control:

Although I see the point of what we're doing with the scenography, I'm worried that we're just throwing stuff together randomly, and I'm hoping to be surprised to see that the random looks good and as if it was planned to be random. (CL5)

It is customary among architects, another participant (CL13) explains, to start a design process by planning what to do and then looking for the material needed, but here one has to think "oh, how can I use the material I have here on the site?" Changes during the process can, she continues, be perceived as mere disturbances. The lack of a common plan has annoyed her, for example when she discovered that someone else changed what she did the day before, or when someone suggested changes to something she regarded as finished. Another participant (CL3) experiences the process as both rewarding and demanding, rewarding because the path from idea to result is so short, but "difficult at the same time, because we need to be very creative every single second" and that, she goes on to say, is tiring.

When talking about their expectations for the rest of the building phase, a few participants say that experiences of being on site and in interventions on site, of *working with something that is "really there,"* have the potential to provoke new ways of thinking about and working with the relation between built and represented space. The participant proposing a labyrinth (CL2) describes a *full-scale sketch model as an analytical tool through which her ideas of solutions have been tested in ways scaled models would not allow*. She let a group of children enter a prototype and observed how they interacted with each other and the structure. It

was especially enriching, she says, to be *surprised by seeing that many structural solutions had a different effect than she had imagined before building.*

The trio in charge of the exhibition scaffold also bring up the fact that the making of full-scale tests of scaffold structures gives them *new perspectives on the kind of representations they have previously been trained to work with.* They claim to learn a lot from actually understanding the seemingly obvious fact that there is a difference between a 1:200 model and a full-scale project. In the model, one of them (CL7) explains to the others' amusement, there is always a way of cheating, but the difficult details that can be ignored there have to be solved when something is to be built. It is at full-scale "the problems happen," one of her partners (CL12) fills in, because it is then that clients and others react. Although it is frustrating, he continues, one has to get used to the fact that whatever one has planned will change when it is to be built. At first the trio had been designing both the exhibition scaffold and the theatre scaffold. When Berger suddenly took over the design of the latter, they never made a new common plan, though the trio knew that the grid system he introduced had other dimensions than theirs. The trio now explain that they had been expecting to make large changes on site, and therefore were very surprised when the connection between the two scaffold systems worked out. "I really thought that nothing was going to fit, but it did" and that was "pretty amazing," one of them (CL7) says, smiling. *The experience that things can work out even though one has let go of control,* which Sæther points out as essential, seems to have made a deep impression on the trio, and perhaps they will be more confident going into unknown situations in their future practice.

The fourth learning arena, June 2016: On what a learning situation is, how built and represented space are related and on what is worth remembering

For the fourth and last occasion of our cogenerative dialogue, each participant is interviewed individually. The interviews are held on 9th, 10th and 11th June and last from six to fifteen minutes. They are done on the building site, at Fyringsbunckeren and inside Dora II. This time, **four questions** are asked.

First, the participants are to describe situations in which they got insights about their learning processes. Second, based on the tendency to aim for designing spatial experiences which the replies to the question about the full-scale building in the previous session revealed, the participants are asked to think of if and how methods and techniques introduced during the semester have influenced their understanding of relations between built and represented space. The third question overlaps with the question regarding the reference study assignment in the previous session, but is formulated to trigger further reflections regarding built and theoretical references beyond that assignment, and their impact on the design process. The fourth and last question is formulated to probe the effects of Making is Thinking's overarching ambition to expose students to unconventional ways of approaching a context, and the participants are asked to reflect upon methods and mindsets they wish to take with them from the semester.

The move from a collective state of insecurity at the beginning of the semester to one of pride, confidence and relief during its last days involved an abundance of risks and uncertainties, and the sense of having achieved something important is present in the fourth learning arena. At this stage of the cogenerative dialogue, insights emerge about how *embodied experiences of building can increase architecture students' ability to experiment with and communicate their work*. Several participants seem to have become aware that by leaving the computer, the two-dimensional and the "perfect" to engage in the rough and quick, they can more openly

and playfully communicate with others and also with themselves *and thereby deal with risks and uncertainties*. While a seemingly weird idea can be hidden and forgotten, *the made artefact – the material form of inquiry that is really there – has an impact that is hard to ignore*.

First question

Question 4.1: Which situations during the semester created insights about your own learning process?

When the participants describe situations that have been of special importance in their learning processes during the semester, many of them talk about *situations where they by engaging in teamwork or in new techniques have become aware of their responsibility to communicate with others in and through their practice*. To learn to work intensely together with others is rewarding, one of them (CL11) says, because it forces oneself to push the limits of what is possible. He has been surprised to see that ideas he regarded unrealisable when they were "thrown out in conversations without boundaries" could actually gain life in their collective and to his mind "crazy" project.

It was a new experience to talk to people external to the studio about a project before it was finalised, another participant (CL4) states. To make "negotiations" and "convince people to collaborate" was both fun and demanding, because doing so entailed a new kind of responsibility:

It's [normally] just a responsibility upon yourself to make the project good, but it's been a very... new kind of process for me to have a lot of responsibility towards a lot of other people as well and to be connected into a much bigger setting. (CL4)

Another participant (CL12) reports that to compromise and listen to the opinions of others has been a rewarding exercise for him. The

complexity of reality has made him more humble. Someone else (CL14), by contrast, emphasises that the act of building on site enabled him to leave his usual role of the silent learner for the role of someone that makes things happen. That is, *opening up to others entails possible shifts of roles*.

The way the course was set up, one participant (CL1) points out, meant that individual parts of the semester demanded *an ability to formulate arguments for decisions* so as to guide oneself through an "openness." However, the sense of a responsibility towards others seemed to have increased as the participants took the step from the design phase to the building phase. They were certainly aware of and looking forward to the building process, but most of them had no previous experience of building and several now reported of how *it was only when being in the midst of a situation of actually making something in one-to-one that they truly understood the differences between designing in the studio and building on site*. Among others, the participants in the scaffold trio (now interviewed individually) continue to emphasise the value of having to work out how a design is to actually function. There is a lot to learn from "fac[ing] the real problems of the construction" in a collective process, one of them (CL12) claims, because one then has to communicate and compromise on solutions. One of the participants in the trio (CL14) has struggled to see the relevance of such exercises; to spend time building gave him the feeling that he did not produce a proper project. However, he then started to take a moment here and there to step out of situations to take photos and make notes. When looking at the documentation of the situations he is now convinced that he learnt something through building and, not least, through reflecting upon building. *To document is a way of remembering what happened in a situation, and to remember is a good way to learn*, he says.

Several participants mention drawing exercises as important situations of learning because those exercises *simultaneously made them aware of and gave them the means to challenge the limits of their habitual ways of drawing*. In other words, these situations may be said to have been transformative. This is one of the occasions in our cogenerative dialogue when the participants reveal how conservative their ideas of "architectural representations" had been before they entered the semester. They seem to have become aware of this by *approaching known techniques*, for instance

drawing, *from a slightly different angle*. The making of charcoal drawings and collages in the workshop after Antwerp is mentioned as fruitful. One participant (CL6) says that *by being forced to work roughly, she has become able to translate her thoughts into something workable instead of getting stuck*. Also others are happy to have been pushed to test new drawing techniques:

[It] was very useful for me because earlier in my studies I've been afraid of doing crazy things; I always wanted to do these beautiful, nice, careful drawings, so I had some struggles in the beginning but in the end I could present a lot of things in a rough way and it was very good for me. (CL9)

It may perhaps seem trivial to give such importance to a few experiences of drawing quickly and roughly. However, the same participant describes *the struggle to draw more roughly as a professional, or even personal, crisis*:

[It made me] think about what I'm doing and what I'm studying, and I found out that I really want to be an architect but I had to figure out a way to meet me, or my problems – ha ha, when I'm stuck in projects. (CL9)

While some participants found it relieving to work quickly and without being so concerned about getting a nice result, not all participants see the relevance of the drawing exercises. One of them (CL5) says that the drawing workshops and other activities in the design course still appear to her to be simply about making "childish things" without knowing why. To make things quickly for the sake of speed does not fit her way of working, she claims, because she wants to be in charge of, or at least told about, the decisions behind why something should be made. Nevertheless, the drawing workshops, especially the one given by Eide Holtan and Sæther at Cirka Teater, reappear in the replies to the question

about formative learning situations. One participant (CL13) reports that she there realised that drawing is neither about looking at situations or objects nor about producing nice results, but about understanding them and seeing different aspects of a situation or object. Another one (CL2) says that drawing with her body made her experience something she knows was important but cannot yet give words to. That is, *participants have changed their perspectives on what it means to draw and what a drawing can do.*

The participants who compare the making of conventional architectural drawings to how they drew during this semester seemed to point out *affective and embodied aspects of drawing as different and thereby potentially transformative.* In the workshops with Eide Holtan, we were made "aware of each other and how we get affected by the space we are in," one participant (CL10) explains. The experiences of "dancing and doing strange stuff in space" gave him a new connection to theory too, he claims, as he gained *a deeper understanding* of Maurice Merleau-Ponty's ideas about the body in space.⁴³

The same participant refers to the exercise of quickly composing an exhibition in the rehearsal space as thought-provoking because it made him realise the power of presenting one's work in a "different" or "strange" way. Especially in that exercise, the participants were *practising their understanding of shifts between two-dimensional drawings and three-dimensional installations and how the human body affects and is affected by those shifts.* The following question is intended to make the participants reflect further on this theme.

Second question

Question 4.2: Have the methods and techniques that were introduced during the semester had an impact on your way of understanding relations between thought and represented space versus built and experienced space?

When asked this question, two participants stand out from the rest because they claim that they are used to moving between thought space

and built space. Since we are master's students, one of them (CL5) argues, we already have tools for imagining the spaces we draw while we draw them. However, she continues, models and full-scale exercises enable one to see "really how it works," and one must therefore "*go back and forth*" *between the two-dimensional and the three-dimensional*. In other words, she talks about the importance of moving between concept or representation and realisation or built reality. Well, she adds, this course might have influenced how we start our design processes because "I know that in other course[s] it's really common that we just sit down and then we draw in front of the computer."

The other participant (CL10) says that he is used to and happy with working like we do this semester. He describes this way of going about designing as a combination of working sometimes "like an artist" and at other times in the process "like an architect," a description which is interesting to listen to in relation to Booker's and Rødne's ideas on the potential of introducing artistic rationalities into architectural education. Architects must work like artists sometimes, the participant explains, because the artist *looks at the world differently* and therefore *remains curious* about it. He describes this ability as a key to playing with one's design by moving between perspectives through changing "methods or scales or approaches to architecture." However, when a space is to be built, he adds, proper models, sections and plans, or a "more architectural approach," is needed. Such a description of the difference between art and architecture can be questioned. Nevertheless, *the cogenerative dialogue seems to contribute to participants reflecting upon rather vast issues in relation to their own practice*.

The participants point to different techniques and activities that made them start to think about the relation between built and represented space. The collage was to many of them *an unfamiliar technique* which they think enabled them to *express aspects of the existing* and to *put forward initial ideas* for their proposals. The participant who struggled with drawing roughly describes how the collage fooled her rational self:

I just find different pictures and colours and materials
[and put them together in a collage]. . . . I do it without

thinking, but I think at the same time maybe. And then I can... see what I'm not – what I don't know that I'm thinking! (CL9)

Berger thought, as we have seen, that architecture students need to turn to themselves rather than conventions for answers. The collage may, according to the participant quoted above, function as a material path into oneself. What one makes may surprise oneself, and others' interpretations of what one has made can be surprising, and it seems that *to share "unfinished" products helps participants embrace and make use of what is unexpectedly discovered.*

To make a collage is to communicate what you think, concepts and ideas, in a "simpler and faster and more expressive way" than in a drawing, says another participant (CL1), snapping his fingers. Yet another one (CL6) expresses, charged with emotions, that to work quickly, for instance in a collage, was to her the key to "leap[ing] from what I was thinking to what I was doing." A fourth participant (CL7), who previously mainly designed by drawing in her sketchbook, has discovered the collage as a way of simultaneously testing details and getting an overview of a project.

In addition to the collage, the sketch model and the full-scale intervention are brought up as tools for exploring the relation between built and represented space. To sketch in models instead of in the sketchbook is really useful, says the participant just mentioned (CL7), who previously used models mainly for showing final designs. To build in one-to-one as we do here, another participant (CL13) points out, is different from drawing something on paper. When she was building the scenography for the Oyster Lady, the result and her initial idea came together in a way that is novel to her:

[Ordinarily] when I start a project I think in plan, I just think in plans, and then I have to make façades and then I have to prepare the rooms, and I think – oh, shit,

everything is super difficult, but when you really start to create your space like really *in spaces*, like in three dimensions, then it's easier to understand what you're doing. (CL13)

She states that she will never again start a project by doing sketches in AutoCAD, but instead work with small or full-scale models to sketch three-dimensionally. She is one of several participants who have been struck by how difficult it is to imagine through conventional representations what a lived experience of material space will be like.

The essence of the course was to "make things as you go along," one participant (CL4) states. To plan less and improvise more on site has *turned the focus away from creating final results*, he claims:

When we draw something or when we make a model . . . it's [now] easier to make something out of it, . . . to improvise or "*compose upon the existing*."⁴⁴ (CL4)

In other words, this student describes the course as training in descriptive-projective knowing and making.

At this stage of our dialogue, *the division between lived or real experience and representations of experiences appears to thin out*. The way we presented our work this semester, never in "conventional drawings" but with more concern for "feeling and spaces," was "*more close to reality than the typical drawing we do*," one participant (CL12) reports. What he implies is that *the real involves the emotional*. He now notes that the "conventional drawings" he was taught to do at his previous architecture school, just like the drawings he made at the engineering school he had also gone to, excluded this dimension:

[In those drawings] you don't really feel the space, like you feel the space in section and everything, but still not as much as we did this semester. (CL12)

Far into the semester, this participant claimed that he was "just trying to make something a bit artistic" to please the tutors. However, in the building process at Nyhavna, he seems to have *found his own motives for engaging, and these seem to be linked to having "felt something real."* Also others use the words "real" and "feeling" when discussing the methods and techniques of the course. In other, ordinary courses, one participant (CL4) states, the goal is to end up with a standard poster and a model of a design proposal. This semester is different, he argues, both in terms of methods and results. The target here, he thinks, is to create *"a kind of experience and a real space" by "conveying a feeling" of something to an audience by using "other kinds of methods" than those used in nicely drawn digital presentations.*

Sometimes, the participants *struggle with formulating* what they have experienced; *this may be because they were trying out new ways of working.* They knew how to draw, so they could talk about drawing or building models "otherwise," but to describe what this "otherwise" included appears difficult. However, in moments on the third and fourth learning arenas, the participants are more comfortable than at the beginning of the semester with trying to give words to experiences they recognise as unfamiliar and therefore important. For instance, one participant (CL14) says: "I can't really give a clear answer . . . but I have a feeling that I got to know Nyhavna better because I did activities here and [got to relate] to [the place] in a different way than just seeing it and walking away." A trait in this and other responses at this stage of our cogenerative dialogue is that the participants more or less explicitly reflect upon *how embodied or sensuous experiences enabled through the exercises in the course and the collaboration with the theatre company make them question conventions of how architects should work in existing contexts.*

Third question

Question 4.3: Reference projects and literature have been introduced (in the theory course and the design course). In what ways have they affected your design process?

When asked again about references, a couple of participants claim that studies of references had little impact on their work. However, some participants point to the value of using theoretical references to reflect upon one's own practice, and some describe functions of built references. The participant who talked about guiding oneself through an openness (CL1) claims that theory lectures and literature have *helped him formulate a foundation of arguments* for his design project. The two participants who work inside Dora II (CL4, CL10) explain more thoroughly than the others how they developed their theory essays with their design proposal in mind. They used Foucault's idea of the heterotopia, a space without place which exists in all societies as temporary escapes from everyday reality into other worlds, and ideas on the nature and value of experiences of material space to discuss what Dora II is and may become.⁴⁵ In other words, the theoretical literature enabled them *to think of concepts while studying* built references in drawings and *while designing* their own proposal for Nyhavna, *to connect theory and practice*.

That built reference projects can catalyse discussions and negotiations by providing diverse perspectives on an ongoing design process was confirmed in the third learning arena, by the participants with the mobile structure (CL5, CL13) and the participants in the scaffold trio (CL7, CL12, CL14). They now emphasise the value of using references for setting "frames" or materialising "reminders" in drawings and models enabling them to remember that "crazy" solutions are possible, to stick to certain design choices, and to agree on further decisions.

Fourth question

Question 4.4: In the future, when you are asked to analyse and propose ideas for a given context, which mindsets and methods (if any) will you bring with you from our process at Nyhavna?

Regarding what they aim to take with them from the semester in terms of mindsets and methods, the participants are strikingly attuned. Hence, *the sharing of frameworks on learning arenas and participatory forms of learning seem to have contributed to a movement from individual to shared perspectives.*

Ten of the fourteen participants clearly express that what they find unique with the semester is the way they have approached the site or place. They talk about *the benefit of allowing oneself to spend time on understanding a context*, by being there to follow its fluctuations rather than sticking to one's first analysis of it. Not least, several of them mention *the value of getting in touch with people on site*. One participant (CL7) who was used to analysing a site by reading statistics about it and going there once to take measurements says that the most important thing with being on site repeatedly is that it gives a greater understanding of how people use it. To be at Nyhavna was demanding, the participants report, because attention and patience were required as they re-evaluated their designs in relation to *continuous discoveries* of the place, which suddenly appeared when the snow melted, in an archival image, or when someone shared a memory.

However, this demanding approach made the participants build strong bonds to and start to care about Nyhavna, and *the sense of care contributes to an awareness that they have a responsibility towards the future of the area*. A central challenge then becomes to keep experimenting in a responsible way. A condition for doing so is to find communicative ways of projecting hypothetical effects of design proposals into a context, as we tried in collages, interview assignments, sketch models and one-to-one interventions. Several participants compare these techniques, through which the fact that mapping is to *simultaneously* register and change a context comes through, with the ways of mapping they had previously been used to. As we may remember, Berger pointed to the difficulties with challenging the Cartesian norm. The participants generally use words like "conventional" or "normal" (CL12), "Cartesian" (CL14) and "analytical" (CL6) to describe the techniques they knew from before, and, by contrast, they characterise their recent experiences of mapping as real, intuitive and felt. Hence *the mapping techniques introduced may be understood as a possible path out of an established and normalised oppression of reality's unpredictable*

dimensions. The aim of mapping is often to give an overview of a context, a basis of information and facts upon which designers can base their interpretations of the existing and build up arguments for the changes they propose.

However, the participants are now pointing out that *the sensed and felt* often are excluded in such overviews, and that they here have learnt to relate *understanding or knowing to getting a feeling or sense of a situation through sensual experiences of it*. "Only looking at numbers" is not enough to "understand a site," as one participant (CL7) puts it. Another one (CL1) describes how he once made a "huge analysis" of a site similar to Nyhavna *without getting "the feeling" for and thereby not "really understand[ing]" it*. The mapping techniques we used here took us closer to reality than "normal drawings" do, another one (CL12) explains, because they were "bringing . . . feelings about the site." Yet another participant (CL14) has for a long time been convinced about the importance of "the feelings and the atmosphere of a place," but claims that *this is the first time he was able to map them*. The value of mapping in "a non-Cartesian way" is especially evident, he continues, towards the end of the design process, when one can see traces of the mapping approach in the proposals for Nyhavna. One participant (CL13) emphasises that testing new techniques has forced her *to think independently*. She therefore aims to continue to map by first responding to the question:

What inspires me here, what is the most important or interesting thing for *me*? And then really work with it – not really try to make architecture in the first moment, just try to make things with things you have observed, just try to put on paper what you feel when you look at [them]. (CL13)

Though most participants at this point express their appreciation of the design course, some admit they have doubted the value of its activities. The participant who solved a professional crisis by drawing roughly (CL9) was at times struggling to let go of the control she was used to having in

a design process. Nonetheless, she is now aiming to continue exposing herself to different techniques because by doing so she has become "more creative." Several participants have at times wondered why they should engage in some of the semester's activities. One participant (CL7) says that though she enjoyed the introductory week with Cirka Teater, she doubts that it has been of any use in her design process. The diverse activities during the semester made another participant (CL1) understand the site better, but this is evident to him only now, as he can reflect upon the semester as a whole. He compares his experience of learning with the one depicted in the movie *The Karate Kid*.⁴⁶ In the movie, the master gives his pupil different tasks which to the pupil seem to have nothing to do with what he is there to learn, karate. The Karate Kid is frustrated about having to wax a car, but in the end the movements he used for waxing turn out to be a part of a karate sequence. This participant describes how the group, and *the sense of being involved in a common endeavour, helped him handle the feeling of being lost between unpredictable activities*. We said to each other, he continues, "OK, this is really strange, but let's try to embrace it." The uncertainty made the experience of working as a group become a "dominant part" of the project, and by working closely together and helping each other we have grown, he concludes.

Other participants again stress the importance of continuous exchanges with others, and they now point to this aspect of the semester as something they want to take with them. It was, one of them (CL12) reports, enriching to make compromises with others, "because it's not about what they want or what we want, it's always some kind of talk and going both ways." The group taught me to be open, another one (CL2) states. By following the other students' "broad range of answers" to what Nyhavna needs, she has seen that architecture, for instance, can be a temporary experience instead of a permanent building, and gained access to what she calls a "new . . . world of possibilities to think about architecture." That is, *a broad range of techniques is linked to a broad range of perspectives*.

Again, the participants' responses underline that the rough techniques facilitated both communication within the group and to outsiders. One participant (CL6) claims to have realised that drawings do

not need to be perfect for someone else to understand them. To "create some kind of experience," as one of the participants working in Dora II puts it, is often a more powerful way of "communicating a project" than explanatory words and drawings:

It's one thing to describe something but it's another thing to experience something, so I think that's the most important thing with this course for me: that you get the opportunity to put someone in a space and atmosphere and make them feel it themselves, and not just show them something that you thought of. (CL4)

In the future this participant *aims to communicate by combining "two worlds,"* the "traditional way of designing" with analogue tools and "intuitive methods" introduced during the semester, and he mentions charcoal, ink, performance and one-to-one sketching as such tools and methods.

To be able to move between methods and techniques makes the architect better, the other participant working in Dora II (CL10) claims. When he worked on changing passages through that bunker, he continues, he would easily have turned the passages into monotonous corridors of the worst kind had he not been moving his body in the space and made interventions there. The embodied experiments on site made him want to enhance the existing contrasts of the passages rather than to smooth them out. The essential balance between orderly design principles and improvisation based on the specificity of a situation, its unruly differences, is disturbed if architects stay behind their desks, he explains. They will not be able to create spaces that are "different" and therefore people will not become aware of architectural space. Hence, *embodied experiences seem to have made participants breed an understanding of the ethical dimensions of giving aesthetic or sensuous experiences to others.*

In addition, the participant who realised drawings do not have to be perfect (CL6) now argues, *to experience a site can be a way of making one's mind up.* With an analytical approach – where "the wind, the sun, the data"

are important – one does not have to take any position, she says, "because that's the way it is." By contrast, when making a site analysis based on her own experiences, she was forced to "take a stand," and therefore, she continues, "this course has in a way redirected my way of doing architecture."

The same participant brings up an issue that might seem paradoxical. To produce sketches quickly and on site is intense in another way than working at one's own pace in the studio, and students are likely to feel more in control in the latter situation. This participant, however, says that while she could be paralysed by the pressure to produce in the studio, *the intensity of getting things out through "artistic techniques" evoked a calm that was new to her*. She connects this calm to the semester's structured forms of reflection. For the first time, she claims, *she could relax knowing that the events of the process would actually count in the end*, while other courses claimed to give focus to the process but were in fact focusing on the designed result. The forms of reflection in the course and the cogenerative dialogue reassured her that thoughts about why you do something can be "a part of your project," she says, right before our voices drown in the music from a walking orchestra.

The *value of processing experiences through making things* appears to be something novel to several participants, and something they want to take with them. We might recall how one of them (CL9) described the value of making something while thinking of something else. Another one now talks about "dwelling upon" things and impressions through material projections as essential:

It's very common that we just go [to a site] and take pictures, and we just... think about it afterwards, but this *inbetween process* where we actually produce these images and . . . collages and kind of dwell on the photos and observations that we have done, they kind of go a bit deeper into your mind and so that it's more clear for you what you are going to do, because I guess in previous processes I just... you have all these

observations, but in the middle of the semester you just realise that you haven't paid attention to the observations that you made in the beginning because you just did [them] in a superficial way. (CL5)

To let the observations of the existing context go "deeper into [one's] mind" enables the setting up of priorities and directions for what is important to keep throughout a design process.

The participants' reflections here point towards *the importance of educational spaces that are at the same time uncertain and safe*. When enabled to relax in unstable situations, participants were able to act in and upon those situations, while a sense of implicit demands on "good solutions" or final results made them avoid uncertainty by trying to deliver what they thought was expected of them. We may here remember what Berger and Sæther said about the importance of setting up processes which push architecture students and yet make them feel in charge.

Follow-up question, March 2018:

What remained

Follow-up question: Since the end of the 2016 spring semester, when you are asked to analyse and propose ideas for a given context, which mindsets and methods (if any) have you brought with you from our process at Nyhavna?

In March 2018, the former participants receive an email with a slightly changed version of the last question from our cogenerative dialogue. Eleven former participants answer, and two of them (CL4, CL5) do so at length (800 and 1600 words).

What now becomes clear is that several learning themes from the semester have remained with the former participants.

The value of learning *alternative ways of approaching a site* is brought up as essential still. The former participants now write about how the

mapping exercises had, for instance, made them able to continue tying the new and the existing together. The experiences of dimensions of a context that conventional mapping techniques cannot capture, for instance "feelings and the site's personality" (CL1), remain within them. To enter a site with the openness that comes through movement or poetry is a way of creating "a field of opportunity," one of them (CL2) writes, which she thinks can lead to "more interesting" results.

The former participants stress that they learnt to understand *the importance of continuous making*. The techniques presented in the design course made them understand that *how* something is represented matters and that it is up to the architect based on his or her interpretations of a situation to decide on what to express. The potential of making things as a way of discovering and processing a wider spectrum of possible solutions than one could previously imagine is a recurring theme. Someone (CL8) remembers how he, by just starting to work without a predefined goal, got the chance to return to, frame and work with ideas he had wanted to explore for a long time.

The former participants' desire to *convey possible atmospheres of proposals and set them in relation to their contexts* remains, although none of them now talk about having made new full-scale interventions. The focus on creating real experiences made the course differ from other urban planning courses, one of them (CL4) says. He claims that the Making is Thinking semester transformed his practice and his knowledge about "the subject of the city" and about connections between academia and practice. Moreover, he claims to have gained knowledge about how to create experiences with others, and – not least – "about myself as a person." That is, the engagement in the semester entailed personal transformation.

In addition to techniques for approaching a context, former participants mention that Making is Thinking gave them a rare opportunity not only to explore things but also *to reflect upon their explorations*. A couple of interviewees (CL1, CL4) more or less repeat what was said on the fourth learning arena about how reflecting upon one's own process through introducing written and built references is a way of linking theory and practice which can influence both.

What is most striking, perhaps, is that *the critical function of the methods and mindsets* from our semester seems to have become obvious in their meetings with other educational milieus and professional practice. Even if other processes cannot be totally based on the principle of reversal, the former participants have realised the value of disturbing their own habits by introducing ruptures and/or allowing themselves to build upon something existing rather than trying to come up with something "new."

Paths into professional practice

Three former participants, all working in Norway, write about how they have been able to bring mindsets and methods from Making is Thinking into their professional practice at architectural firms. Making is Thinking seems to *have prepared them for constructively questioning the limitations that often characterise professional practice*. Good solutions come through hard work, one of them (CL8) says; this is a basic principle Making is Thinking taught in an "extremely fun" way, with a "playfulness and open-mindedness" valuable in workshops at the office.

Another one (CL5) describes how at the office, she once set up something which reminds us of what Booker called a "start-space" for iterative experimentation. When she for one project "just produce[d] a lot of things" (diagrams, sketches and drawings at different scales) without "being too critical or thinking too much," "things" which could then be systematised into a "critical selection," she managed to pass by design fixations and "find" rather than "decide upon" criteria for the final building. This is a phenomenon we recognise by now, namely that "*just making*" can let individuals cross norms they have incorporated.

Berger and Sæther as well as Rødne and Booker see a need for pushing students to engage, through their bodies and politically. Though this may be fun, as the interviewee above (CL8) reported, it puts individuals at risk. The former participant with the "start-space" (CL5) now problematises Making is Thinking's intention to encourage students to engage. At the architecture schools she had previously attended, she claims to have learnt how to pragmatically complete a project and at the

same time unlearned how to let thoughts and creations wander freely. Making is Thinking, by contrast, is an environment which convinced her that it is better for architecture if architects continue to explore openly rather than do what someone else regards the "right thing." This conviction was strengthened as she realised, while doing her master's project in another educational milieu at NTNU, how provoking the idea of expressing what is experienced through open exploration was to many architects. Making is Thinking's methods and mindsets collide with prevailing ones and are regarded, she says, as "alternative, even if they shouldn't be."

Nevertheless, while she was fine with presenting pragmatic projects in other courses, to present free drawings in the Making is Thinking environment made her feel uncomfortable because she exposed her "personal impressions and emotions," and this was "painful" because she had been taught to avoid involving her self in her practice. She connects the pain not to choosing between Making is Thinking's "artistic" approach to architecture or the more common "technical" approaches, but to *bridging* these two strands. Thus her example is one of those from which we suggest that to acknowledge and work with *personal dimensions of transformation appear to be essential* for developing the idea of architecture as an aesthetic practice involving double-binds between convention and breaks with convention. This means that both ontological and epistemological dimensions of transformation matter.

Her report also lets us emphasise that trust is a condition for taking risks which can lead to transformations of selves as well as the practice and the education at large. She describes how introducing open exploration to others demands circumstances characterised by trust and participation, as opposed to time pressure. She claims that especially in one project at the office, she has been able to build on her experiences from the Making is Thinking semester to involve colleagues and users in an open design process. To one meeting she took four different sketches of a building which she encouraged the users to move around on the site plan to drive the discussion on outdoor spaces, entrances and light conditions forward. This exercise, she explains, made the users excited and led to "much more productive talks" than she had been part of in other processes.

A link might thus be drawn between a meeting at an architectural firm and interview assignments to which participants brought collages and models in order to engage others, and more generally to the idea of opening up processes of change which is central to Making is Thinking as well as to action research.

Tentative outline of tracks of transformation in the colearners' learning trajectory

Let us, before we move on to the thematic analysis of our cogenerative dialogue in the following chapter, bring out (in order of appearance) the main tracks of transformation in the colearners' learning trajectory.

The tracks of transformation are movements *from* one perspective to another which include constant movements *back and forth*. The learning trajectory was catalysed by oscillation *between* studio (FormLAB) and site (Nyhavna), as well as *between* previous experiences of architectural education and experiences characterised by making and participation in the Making is Thinking course, not by choosing either the studio or other spaces of learning, either familiar (conventional) or unfamiliar (critical) forms of learning and designing, but lingering in liminal spaces characterised by uncertainty *and* possibility. We will argue that the oscillation and its articulation through our cogenerative dialogue were major reasons why, as the responses to the follow-up question show, the impact of engaging in the Making is Thinking course was lasting.

There is an **overarching transformative track** throughout our cogenerative dialogue, from a focus on skills per se towards an understanding that how one makes for instance a drawing can involve gaining new perspectives on architecture. This main track involves

1. going *from analysing sites at a distance towards designing by being in the midst of situations* – by taking the risk, that is, to open up to experiential aspects of learning. Involved in this shift is an increased embodied, emotional and social engagement with reality through rough techniques;

2. focus on *process rather than project*, and therefore on *the individual as part of a collective*. This shift entails a novel awareness of the communicative and negotiative functions of architectural projections (scaled or in one-to-one) which came with the introduction of exercises that opened up design projects to an outside. This heightened awareness of the interdependence between how one registers, interprets or describes a site and how it is perceived and imagined or projected – by oneself and others – involves possibilities to challenge established relations between concept and realisation, represented and built reality. However, accessing those possibilities also demands that architects go into themselves and consciously – and critically – take positions; and

3. an *increased ability at verbal articulation* (which catalysed the ability to take positions). It is significant that the colearners use comparisons between "normal" forms of learning in other courses and the "different" exercises in our design course, for instance to say that the latter allow them to include and share the sensed and felt, while the former aim to be neutral, but there is a movement towards combining and thereby blurring the divide between the two rather than rejecting one or the other. To learn to articulate one's professional identity and position demands the establishment of a trust which make colearners dare to express personal experiences including feelings and thoughts they were previously trained to keep to themselves.

This sketch of **three tendencies in the learning trajectory** will be elaborated on in the following chapter, in the analysis of the participants' loop of learning.

Third chapter

Aesthetic aspects of cogenerative learning

As the teacher or director of the group, I never told anybody why a movement should be or how it should look. In that sense, too, they had to build their own technique. Even now in our company there is no unified look; there's a unified approach but everybody is different in movement.

Anna Halprin¹

Looking to the history of architectural education, we saw a need for blurring the constructed divide between "alternative" educational milieus and a stable tradition of architectural education. We therefore asked: *How can forms of learning that rely on making and participation in contexts outside the design studio contribute to increased abilities for critical reflection on and transformation of habits within architectural education?* The Making is Thinking master's semester of 2016 was chosen as the specific position in the vast field of inquiry, and a case study – described chronologically in the previous chapter – was done there.

This chapter is a **thematic presentation of the outcomes of our cogenerative dialogue** and the structure of the main part reflects the

double feedback loops of the cogenerative model. We introduce the idea that the cogenerative model functioned as an opening to understanding the architect's entanglement in mutual dependencies in relation to the everyday of architectural education because it constitutes a structure for *collective reflection at a distance from everyday educational procedures*. We analyse **the participants' trajectory or loop of learning**, and propose that the scattered themes and the tentative tracks pointed to in the previous chapter allow the researcher to articulate three interlinked tendencies in the colearners' development. *New ways of working with material space* constituted a *reversed or oscillating process* and entailed an *increased critical awareness*. Following a presentation of **the researcher's own learning trajectory**, two steps towards including aesthetic aspects of learning in the cogenerative model are taken. The chapter ends by summarising **four major findings** responding to the research question above as well as summarising **two projections of future research tasks**, which stem from the steps towards aesthetic aspects of learning and are built upon in the fourth chapter.

Overarching benefits of introducing the cogenerative model

All design courses at schools of architecture include potential moments for distancing oneself from habits and current design problems, for example in tutorials, seminars, library visits and reviews.

Our design course made at least **four additional moves** to create such moments. First, it included *given forms of reflection* on and documentation of the process. Second, it was part of an *educational environment* with an explicit interest in learning. Third, the semester was characterised by Making is Thinking's central strategy of setting up *collaborations with other artistic fields* – this time, the theatre – so as to introduce the strange and unexpected and thereby catalyse the challenging of habits. Fourth, the design course had to be combined with a *theory course* in which essays giving perspectives on practice were written. Nevertheless, many everyday situations during the semester

tended to be focused on solving immediate problems as well as on discussing design rather than what it means for an architect to learn to design, and to set up a case study actually seemed to make a difference.

The second chapter showed how the participants in the case study moved between exercises on site and in the FormLAB, intended to disturb their habituated linear process, and the learning arenas in the cogenerative dialogue, intended for reflection upon the effects of the exercises. Based upon what emerged in our dialogue, in this chapter we will argue that the cogenerative model is a valuable form for promoting "enhanced reflection" leading to lasting changes of habits and is therefore worth developing within research on architectural education.

In our case, the model allowed for comparisons between the participants' experiences of designing architecture in Making is Thinking's educational approach and in their previous experiences of architectural education. What we suggest, and will try to bring forward in this chapter, is that the cogenerative model is an example of a form of learning that has the potential to nurture critical reflection within architectural education. **Two traits of the model**, we propose, appear to have been especially important for the catalysation of an experience-based critical awareness among our colearners: its creation of *a distance from everyday educational procedures* and its implementation of *collective reflection*.

A distance to the everyday

To begin with, the position of the cogenerative dialogue at a distance from everyday educational procedures enabled our participants to dwell on critical seeds that emerged through design processes characterised by making and participation. As the four moves articulated above show, the layout of the semester in itself enabled the entwinement of acting or making in a projective manner and looking backwards by reflecting or thinking. The cogenerative model is context-dependent in the sense that it is evolving in relation to as well as affecting the events of the semester. Its emergent nature contradicts the idea of predefined learning outcomes, and supports the notion that participants let, as Making is Thinking

wishes, unexpected phenomena influence their learning trajectory and enable them to articulate what they learn.

However, the model also created an essential distance from the procedures and the examination of the semester, and this distance allowed for critical reflections and comparisons. The introduction of a double-loop structure allowed both for increasing the participating students' ability to express themselves about their experiences of learning to design and for generating findings that can be communicated to an audience of researchers. That is, critical reflections and comparisons could be made on two levels, and the presence of an active researcher meant that the movement between action and reflection was not going on in a closed circle, but generated conclusions and formulations from which the participants themselves as well as other researchers and practitioners or learners can learn.

Collective reflection

Critical approaches were also established because of the cogenerative model's implementation of collective reflection. During our case study, we went from understanding collective reflection as a term among many to gaining lived experiences of what collective reflection can be and do, and we saw that there is a fundamental difference between individual and collective reflections on experiences. The model's rather straightforward instructions for sharing expectations and experiences, i.e. to catalyse collective reflection, enabled us to buttress open relations between individuals with different roles (educator, learner, researcher) in our specific case as well as to respond, on a more general level, to how participatory and making-based forms of learning can be introduced and support critical reflection and transformation of habits both inside and outside the studio. In other words, collective reflection in learning arenas catalyses the movement from the individual's expectation and experience to the researcher's proposals for general theories.

More specifically, our implementation of the cogenerative model's instructions for collective reflection in learning arenas did not mean that

all participants always gathered to reflect on what had happened and agreed on a path forward. However, the second learning arena invited all participants at once, and groups of participants came to the third arena. This meant that the participants shared reflections in the moment. As we have seen in the previous chapter, the exchanges of reflections were verbal and material. A basic effect of sharing reflections was that trust was bred among them and between them and the researcher. This common feeling of trust was required for participants to dare to share their experiences, and thereby give the researcher rich material through which individual responses could continuously be turned into tendencies which steered the direction of the cogenerative dialogue as well as influenced the participants' approaches to the exercises. This is a significant difference between the forms of reflection belonging to the courses; the students rarely read each other's theory essays and the log, process book and work box tended to be rather fragmented and related to the individual student's process. Collective reflection, we argue, contributed to the colearners' confidence in continuing to experiment and that they, towards the end of the cogenerative dialogue, were almost speaking with one voice about what they would carry forward with them from the semester.

The discovery of a catalysation of a nuanced kind of criticality based on collective reflection at a distance entails a necessary discussion about the notion of criticality. To approach this issue, we may think of two opposite types of transformative processes of learning. One is goal-oriented, and one is an inevitable spiral of continuous transformation and relativity. The former establishes habits, while the latter suggests a constant questioning of habits. A goal-oriented process of transformation can be understood as one enacting a predefined critical movement, going against an enemy, for instance the stable tradition of architectural education. A completely unstable state of transformation, on the other hand, lets anything go as new or critical.

During our case study, we came to experience what de Zeeuw, Janssens and Levin proposed, that collective reflection is an opening to combining the opposed types of transformative processes of learning.² Our case, we aim to show, is an example that the cogenerative model allows participants and researchers to actually experience continuous and

unpredictable transformation, i.e. engage in potentially innovative experiments, and at the same time allows for tendencies which may be relevant for architectural education in general to emerge. The understanding of the cogenerative model as one enabling both unpredictable transformation and the emergence of cogenerated and context-dependent goals is valuable against the background of our introductions to the realm of architectural education and the architect's ways of knowing. We have used different perspectives, with Cuff's transfer of Bateson's understanding of the double-bind notion to the field of architecture as a primary point of departure, to bring forward the idea that the architect's practice is characterised by mutual dependencies – between stable and alternative or critical educational milieus, between descriptions and projections, between practice and discourse. We could thereby show that there is a need to make this state of mutual dependence – where binaries are nuanced and negotiated – workable within architectural education.

On an overarching level, we will argue that the cogenerative model, as it was applied to our case, functioned not as a perfect response but as a valuable opening towards implementing the architect's entanglement in mutual dependencies in the everyday of architectural education. In the next chapter, we will suggest directions for researchers of architectural education to continue from this opening. The analysis of our cogenerative dialogue in this chapter will propose that the hypothesis that the cogenerative model could be a relevant structure for research on transformative learning within architectural education was correct, but that the model can be developed further to include aesthetic parameters emerging in our case – parameters which are marginalised within architectural education but which reflection on rough exercises have reminded us about, primarily embodiment as a generator of new perspectives on material space.

The participants' loop of learning: The emergence of three evolving tendencies

The combination of introducing action through rough exercises and reflection through the cogenerative model catalysed an incremental shift from skills to perspectives, tentatively outlined in the previous chapter. With what we have learnt about how architects know in mind, this shift can be thought of as a movement towards including Mode 2 or non-observational forms of knowledge in one's practice. We are now to analyse the colearners' loop or trajectory of learning by suggesting **three tendencies** worth building upon in further research on architectural education.

First tendency: New ways of projecting material space

Towards the end of the dialogue, having gone through moments of resistance and hesitation as well as flow and conviction, the participants pointed to the value of experimental techniques for (a) mapping and (b) creating spatial experiences by being in the midst of situations as two main acquirements they would take with them from the course. Their understanding of why these techniques were valuable was based in the power of the real – of what they had actually, with their bodies and by talking to people, experienced and designed through acting on site. The layout of the semester and the cogenerative dialogue made them process those powerful experiences inside the school.

Embodied, social and affective aspects of communicating and negotiating characterised both (a) and (b) and were bound to the experience of, intervention in and projection of (temporary) material spaces, particularly through drawing and building – in relation to an existing context and to future proposals for that context. That the participants had been practising such new ways of projecting (experiences

of) material space was a condition for the reflections that followed. **This is the first tendency.**

Understanding one's skills as a means for communicating and negotiating with reality, or, the value of talking to others

To further reflect on this tendency, we begin by highlighting that this tendency involves a shift of focus from presentation of final results to communication throughout the process. While architecture students often learn to represent their ideas as descriptions, they were here wishing to set up their ideas as projections to which others can be invited. Our conversations about the reference study assignment and the interview assignments included examples of how material projections can function as mediators supporting communication in a design process and as vehicles for including the strange or unexpected. The reference can work as a common, non-verbal, ground for negotiations within a team of designers. The concrete example, if experienced on site and/or processed in drawings and models, can therefore – if it is shared – support the formulation of principles or concepts. However, to communicate with words in new ways was also striking to the colearners. Even though collages and models of the interview assignments failed to open up conversations, the interview assignments seemed to have given several colearners a most profound insight into the importance of talking to people on site. Specific experiences of talking to others, rather than having a generalised idea about what they need, influenced their choices of what to propose for Nyhavna's future. In other words, drawing on de Zeeuw and Janssens, we may propose that talking to someone else about a context is a way of seeing oneself in the mirror and gaining experiential knowledge that emotions and preferences are an essential part of designing.

Experiences of reality as a force against resistance to learning

In the first chapter, we pointed to the value of taking experiences, including the "softer" dimensions of them, seriously. To introduce and collectively reflect upon rough exercises was a path towards lifting these dimensions. The participants talked about how the mapping exercises in the course had opened up their design processes to influences from the materials and humans in the context of Nyhavna. Although they were aiming to change their habits, moments of resistance against being in the midst of situations appeared as they seemed to experience a fear of letting go of control.³ However, the exercises had given the participants lived experiences – including social and embodied dimensions – which appeared to convince them about the value of opening up design processes to experimentation with the existing context, its humans and materials. Following the descriptions of the architect's ways of knowing in the first chapter, we may say that the new ways of mapping and creating spatial experiences were making tangible the idea of worlding as both analysing and intervening, and gave the participants new knowledge that contexts and actions are mutually dependent. This new knowledge can last, we propose, because it is supported by processual structures allowing for oscillation between action and reflection.

Second tendency: The importance of setting up processes around lived experiences

A condition for the colearners' new ways of engaging was the reversal of their habituated design process, which has, as we have seen, roots extending far beyond the individual contemporary learner. The interviews with Berger, Booker, Rødne and Sæther revealed a shared belief in the "reversed design process" – where making comes together with, and not after, planning or thinking – as a potential move away from Cartesianism among architecture students. The participants in our cogenerative dialogue were also emphasising the importance of the reversed process, though they did not call it that. The participants expressed, on the third and fourth learning arenas, that by making things

along the way, without a proper plan, they had become better at improvising and proposing solutions in the midst of situations.

This was nothing less than a new way of designing to them. One of its essential effects, brought forward through our cogenerative dialogue, was its influence on their understanding of the relation between representation and reality. The participants talked about the importance of "getting ideas out" before thinking too much, and thereby shortening the distance between ideas, flat representations and lived or "real" experiences of material spaces, a distance they reported was maintained in most other architecture courses they had attended. The power of the real, participants noticed, came through in the drawings, models, collages, scenography and exhibitions they made during the Making is Thinking semester, while it was absent in the kind of representations they were used to making. In fact, the entwinement of making and thinking, on the field and in the dialogue, created possibilities to question and experiment with what the notions of presentation and representation hold and how they are at work in design processes.

Towards the end of the semester, some of the participants were able to describe the experiences of experimenting not just as singular situations of "getting ideas out," but also as events that constituted a new kind of process. They characterised the new kind of process as based on *simultaneous* planning and acting (thinking and making), while the processes they described they were used to were of a linear character where projects are planned (designed) and then executed (built). That is, though we shared an agreement on labelling the new process "reversed," it was characterised by simultaneity of making and thinking rather than putting making before thinking. The need to learn to move *back and forth* in the gap between concept and realisation, which Berger, Booker and Rødne point out as urgent for architecture students, is thus brought up by the participants too.

The development from reflecting on singular occasions to discussing common traits may be understood as part of the formation of the "local theory" the cogenerative model prescribed. Against the background of the introduction and the first chapter, this finding is interesting, because the conventional process does not require

engagement but can be based on observations only, while the new kind of process is an example of how descriptive–projective ways of knowing can be implemented in architectural education. As we have seen in the second chapter that the reversed or oscillating process can also happen inside the studio, we propose that its introduction has the potential to change the ingrained idea of the design studio as a space where masters teach apprentices that to design is to make scaled representations in drawings and models.

The design process in the theatre–architecture boundary zone (a discursive and physical zone outside mainstream architectural education) where making and thinking were simultaneous seemed to give students a better possibility to understand and play with architectural space and the relations between built reality and representations than design processes they had previously been involved in. Consequently, the idea of the architectural drawing or model as a mediator for mutual exchange between the built and the drawn as well as between individuals, rather than a (seemingly) complete representation produced prior to the building process, was further established in the group. This insight, if applied to the architectural practice in general, makes it possible to question the prevalent idea that architects design in drawings and models (representations) that are miniatures of the products of their design process, miniatures made before the product is built. This means that our case can be seen as an in-practice example of Cuff's proposal that the reintroduction of the one-to-one mode, which since the early Renaissance has been seen as the craftsman's and not the architect's realm, can contribute to lasting changes to the stable tradition of architectural education.⁴

Taking the strange embodied experience into the studio

Our case shows that to understand lived experiences and set up processes around them makes it possible to move forms of learning that rely on making and participation in and out of the studio. It is *how* learning happens rather than whether learning happens in the studio or not that matters. A central point of access to the new design process appeared to

be that the rough techniques made the body more active than it generally is. The participants' experiences of physically engaging on site seemed to have been a condition where they became aware of the power of projecting future spaces or ideas through simultaneously experiencing and acting in them. As early as on the second learning arena, an initial common awareness of the potential of including one's own and thereby possibly also other colearners' and citizens' embodied and affective experiences in the design process emerged based on lived experiences of how making on site can open up one's design process. The participants talked about designing by "throwing ideas out there" when talking, building, drawing and dancing together, and it was obvious that to work roughly demands other moves than drawing thin lines.

The smooth transition between inside and outside was entwined with the transition between representation and projection or simulation, and these transitions can be seen as reflections of design course exercises as well as learning arenas being set up on site as well as in the FormLAB. For instance, the conventional separation of representations and lived experiences was questioned in the exercise when the students were given 30 minutes to make an exhibition by combining their own drawings with objects from the theatre's storage. Towards the end of the semester, the participants seemed prepared or at least eager to try to share such experiences with a public audience, as they aimed to create atmospheric exhibition spaces rather than conventional displays of architectural projects. The participants thus continued to experiment with how to communicate and negotiate architecture, this time through setting up full-scale spaces. The making of affective spatial experiences became a key element of our process, which seemed bound to corporeal experience. To know the facts about a context is one way of knowing, but the students were implying, on the fourth learning arena, that only through getting a feeling of or a sense for a context could one "actually" know it. While Rødne mentioned that full-scale building is a way of understanding construction principles through one's body, the participants' focus on the potential of creating atmospheres in the one-to-one mode resembled Sæther's and Berger's approach to space: to tell a story or express content through relating bodies and matter. We have seen, via Asplund and Dyrssen among others, that architects can use materiality as a means of

setting up and communicating experiences through which humans learn about or know the world. However, this is a trait of the architect's practice which often remains silently taken for given. At this point in the analysis of our case, we begin to see that the theatre company's ways of working with materiality were absolutely essential to the participants' understanding of the importance of the embodied experience of materiality.

The awareness of the architect's possibilities to communicate his or her proposals in inclusive ways became related to movements between making representations to scale and working in the one-to-one mode. Such movements were made during all the phases of the semester but most importantly during the building phase. The movements between the scaled representation and the full-scale material space was enabled through the use of rough or "body-activating" techniques in a new kind of design process. **This is the second tendency.**

The tension between safety and risk: The cogenerative dialogue as a catalyst of trust and the theatre's strangeness as a catalyst of courage

To further reflect on the second tendency, we bring forward the balance between risk-taking and safety: the resistance against engaging, the theatre's push and the cogenerative dialogue's safety. The course initiators Rødne and Booker argued that architects need to learn to deal with disruptions – the unexpected or strange – and that artists may show them how to do so. We began to see the effects of Cirka Teater disrupting the participants' habits above, and we may recall that Sæther emphasised the importance of young people taking risks and learning to cope with the unpredictable. The participants pointed to both the importance of and the frustration with continuously experimenting within the reversed design process. To let go of control and yet be ready to make something was demanding, they thought. What they expressed, we suggest, was an experience of a dependence between safety and risk-taking. A sense of being safe is a condition for daring to act without a plan, for instance when sharing ideas with others through material projections on the go. To dare

to share – the personal, embodied, subjective – seemed to be dependent on the colearners having trust in each other (in the collective) and the situation at large. The cogenerative dialogue contributed to establishing a shared understanding that failures or unexpected effects of new ways of working with material space could be more interesting than predictable results. Hence, the cogenerative dialogue and the collective reflection contributed to the participants relaxing and continuing to engage in the new and unstable – and thus risky – ways of projecting material space.

However, without the theatre company, the participants would probably have been less courageous. The Making is Thinking tutors and the introduction to the course had encouraged the students to experiment with presentation formats. The colearners were, in different ways and especially in their responses to the follow-up question, stating that being pushed into "just making" had helped them break free from limiting conventions and enter into negotiations with the actual circumstances of the context of Nyhavna. The course aimed to facilitate situations which were transformative in the sense that the resistance against exploding habits could be overcome and the students thereby actually learn something new. The theatre company's influence appeared increasingly decisive throughout the semester because it forced the architects (students and educators) to question their design habits, not least when the semester was coming to an end and a desire for "good stuff for the portfolio" emerged. Their presence in the course as demanding and encouraging collaborators and clients introducing fictive clients, and our opportunity to work in their spaces with techniques that made students, though reluctantly, put their bodies in relation to each other and in relation to objects in space gave the course its particularity in comparison with other experimental, live or full-scale studios. If Making is Thinking's approach in itself encouraged students to test new things, it seems that talking to and working with the theatre company in many cases was what actually convinced students to engage in new procedures. They saw possibilities in making material space that would never have appeared reachable without the precedent work of and the guidance from Sæther and Berger and their colleagues.

The creation of material space at the theatre is characterised by making and participation, and "the theatre's push" therefore helps us respond to the research question. The participatory, immediate and temporary ways of making at the theatre, and the will to find strong expressions, to include the affective, may be seen as a sort of extreme training for architecture students, educators and researchers who want and need to be disturbed in their habitual divide between the represented and the experienced. As the theatre-makers described when interviewed, this is a divide that architects can uphold but that decreases the awareness of the power of one's design actions. The theatre-makers and their world pushed the participants to engage in embodied forms of inquiry, an engagement which at first appeared as strange to them but which in turn strengthened their social and creative courage. The introduction of such forms of inquiry estranged the architects' habits, i.e. made them aware of their habits, thereby able to reflect upon their habits in the reflection formats of the courses and in the cogenerative dialogue, thereby able to change their habits. Again, unfamiliar exercises were also introduced by the Making is Thinking tutors, but we still argue that the presence of the theatre-makers was pivotal for the effects of the introduction of estrangement techniques in our case.

Third tendency: A critical awareness of a responsibility to create aesthetic experiences

In the chronological story of our case we saw that, towards the end of the semester, the students expressed a greater understanding of their responsibilities to others. We know from the introduction that an awareness of political and ethical dimensions of the practice is seen as typical for "alternative" educational milieus, while the stable tradition of architectural education is criticised for excluding these dimensions. This difference is not clear cut but it is difficult, as Rødne also reported of this challenge, to find a well-functioning balance between teaching students the complex and time-consuming task to design structures which can be built and at the same time introduce them to social, political and ethical

dimensions of building, which entail questions risking undermining their will to design at all as they regard why, how and for whom architecture is made. An interesting result of our introduction, both inside and outside the studio, of exercises characterised by making and participation combined with structures of reflection is therefore that colearners report how they have become able to and wish to continue combining "conventional" and "alternative" or "artistic" ways of working. Characteristic of our process is that the participants rarely speak in terms of the social, the political, the ethical – they do not use these labels to define their work as innovative, but the awareness of these dimensions of the practice emerges from embodied experiences of making material space and, not to forget, the collective reflection upon those experiences in the cogenerative dialogue. As we proposed in the first chapter, to start from experiences is a possibility to reach beyond established understandings of convention and breaks with convention.

When talking about what they would take with them from the semester, many participants mentioned the benefit of allowing oneself to spend time understanding a context by being there repeatedly. They pointed to situated techniques for mapping and for creating spatial experiences as main approaches they would keep, because these had enabled them to include affective and social aspects of a context while those aspects had been marginalised in the design processes they were used to, which focused on designing rather than learning. We know from the introduction that design courses tend to focus on turning students into attractive employees and that since the affective and social are seen as peripheral in a majority of architecture firms, they are peripheral in many educational milieus too. To go through a process where the relation between their proposals and the existing context were continuously put to the test, the colearners' reflections show, made them build strong bonds to Nyhavna, and this contributed to an awareness that they had a responsibility towards the future of the area.

What one has experienced, one wants to give to others

The participants described how they aimed to take this responsibility forward by continuing the process of giving and being given feelings, ideas, experiences that had made up the core of the semester. This process was, as we have seen, based upon having and setting up embodied and affective experiences of material spaces – based on the notion that "something really is there" which provokes new ideas, questions and feelings. Such a process is risky because the architects must let go of the control they are used to having when making "paper projects," and inviting people into material spaces is likely to cause unexpected reactions which may include wonder, admiration and compliance, and debate, critique and conflict too. Towards the end of the semester, the students were reflecting upon this effect of the exercises in the course.

That reflections upon the techniques for working with the concrete and material were central in the cogenerative dialogue was according to plan. However, less predictable were the participants' reports of how these techniques evoked an affective engagement which led to profound insights of the power of architectural space and, consequently, the responsibility towards others when proposing future interventions. This is a valuable and alarming effect, since it suggests that there must be architecture students who graduate without a deeper understanding of how or even that their designs will influence the lives of others. Our participants spoke in terms of negotiation, compromise, feeling and understanding towards others. Moreover, they constantly linked these terms to what an architect can do with them, how they can become manifest in and influence the making of material spaces and projections or representations of material spaces. We argue that the constitutions of these links was enabled by our implementation of the cogenerative model and that they are pivotal because they suggest how the responsibility towards others can be included in practice.

Perhaps the most prominent of the effects of the semester's ways of interpreting and intervening in a context was that the participants reported that the affective that came with engaging in the material and social was new to them and had an impact on their practice which some

of them talked of as transformative, though not using that word. The affective got under their skin, and they were eager to try to describe how the real and felt made them think about their own habits and, consequently, about the discourse and practice of architecture in a wider perspective. This effect – the access to an ethical dimension of designing – was new to them, and not something conventional techniques allowed for.

The embodied experiences made students aware of the power of spatial experiences, and increased their sense of responsibility towards others, a critical awareness of an ethical responsibility to give them aesthetic or sensuous experiences, and thereby disrupt their habitual understanding of the world, i.e. allow *them* to take a critical stance towards the given. **This is the third tendency.**

Reinforcing the value of combining continuous reflection with "just making something"

To further reflect on this third and last tendency, we emphasise that the participants expressed that this critical awareness was based on, on the one hand, an allowance for uncertainty and imagination, and, on the other hand, forms of communication. Since the material projections or remains of a design process have agency and communicative potential, the participants had come to realise that the architect is responsible for the effects of designerly actions in the contexts and processes in which s/he participates. This insight means there are no neutral positions or techniques, but the architect has to choose how s/he sets up and acts in a design process. This is a kind of critical awareness based not on being in opposition to a fixed status quo but on being able to imagine and project a multitude of solutions or worlds.

Communication and negotiation is then embedded in the design process, not a consequence parallel or subsequent to it, and can be verbal or non-verbal/material. Rather than present a complete project or plan, the architect who engages in the reversed or oscillating process changes his or her plan over and over again, in relation to what emerges along the way. An ability to continuously evaluate and reflect upon the changes of

direction in the process is therefore highly valuable, and the participants expressed the value of externalising reflections through formulating them in material projections, i.e. through designing, and/or in words. This time, the cogenerative dialogue was the structure that allowed for this.

We saw, when summing up the follow-up question, that the impact of the Making is Thinking course lasted. Based on their experiences at Nyhavna, the former participants seemed to have established a resilient habit of questioning habits – an intellectual scepticism or "resilient critique" – which is not about throwing away all conventions, but about having techniques for challenging anything that appears as given. To stand up for their "alternative" or critical point of view demands courage in a discourse and practice where efficiency and strategic thinking rule. That is, the cogenerative model enabled us to respond to our research question, to how forms of learning that rely on making and participation can contribute to increased abilities for critical reflection on and transformation of habits within architectural education.

Hence, the researcher was presented with a major challenge: to process the tendencies of the participants' loop into formulations of findings and to give something – if not a "general theory," at least a few proposals for further research – back to our field of inquiry, architectural education, and thereby possibly also contribute to general theories of education.

The researcher's loop of learning: Reflecting upon the participants' learning trajectory and proposing paths ahead

Three interlinked main tendencies emerged in the participants' loop:

First, the participants described new ways of processing and projecting (experiences of) material space, characterised by embodied, affective and social engagement, and,

second, these new ways were constitutive of a "reversed" and continuously rehearsed process, pushed forward by the theatre company and the cogenerative dialogue and including situations enabling them to question relations between real and represented material space, and,

third, the striking experiences of those situations made them breed a critical awareness that as an architect, one has possibilities and an ethical responsibility to give sensuous or aesthetic experiences to others.

In other words, a design process where "making" came before or rather simultaneously with "thinking" enabled architecture students to realise the power of spatial aesthetic experiences and triggered them to experiment with how to communicate and negotiate in and with material spaces, something which in turn led to an increased critical awareness of the architect's possibilities and responsibility to set up inclusive design processes.

The significance of these tendencies are further dwelled upon from the researcher's perspective, in her loop, with the intention to make both *the cogenerative model in itself* and *the effects of our specific process* possible to discuss and transfer to other situations in the field of inquiry.

Changing direction: The power of aesthetic experiences of reality

The researcher's initial framework, with which she entered the cogenerative dialogue, rested on an interest in the "activation" of architectural history in relation to the architect's design process. A central idea was then to investigate if hands-on exercises outside the design studio and reference studies involving the making of architectural drawings could contribute to making architecture students more consciously relate their proposed interventions to the existing architecture on a given site and/or to historical works of architecture in other places.

However, as the semester started, the exercises in the design course revealed how exceptional forms of inquiry including social interaction and

the activation of the body were to the colearners. There were, as Gilles Deleuze puts it, encounters with the unknown which made us think:

Something in the world forces us to think. This something is an object not of recognition but of a fundamental *encounter*.⁵

The challenge to first make (and thereby experience) and then think was tough for architecture students used to planning ahead. Over and over again, the participants in the cogenerative dialogue reported of how concrete and sometimes seemingly non-sensical activities in the design course caused reactions within themselves and from others that they were not used to. The continuous making and experiences of real situations, the repeated acts of encountering and having to include in one's design process something or someone that was "really there," something or someone that offered a resistance against one's plan – a stranger on site who gave an unexpected picture of what Nyhavna needs, an intervention on site that failed, a strange thing from Cirka Teater's storage which had to be integrated in a composition, a charcoal sketch that could not be ignored because it expressed an idea precisely though it was disturbing because it did not express it with the kind of precision one had been taught an architect should foster – these encounters and the actions and reflections following on from them stand out as the fundamental core which made the process at Nyhavna different from other educational experiences the participants had had.

As the researcher, on her own and in conversations with peers, began to think about how the embodied, social and affective engagement that characterised the experimentation in the design course and fuelled a critical awareness could be further investigated, the activation of architectural history in relation to design processes turned out to be only one possible application of the more fundamental effects which had emerged throughout our cogenerative dialogue. To expand their repertoire by becoming aware of what they regarded as normal through encountering things otherwise, in "strange" ways, made the students pose

fundamental questions to their practice. This development called for a change of research focus, towards the possible wider effects of experiential and potentially transformative processes of learning to design.

We have seen, in the introduction, that there is a mainstream of architectural education which is resistant to lasting change. The researcher was, in spite of knowing this, struck by the participants' surprised reactions to the exercises in the design course. Their understanding of what an architect does was limited and those exercises could have remained singular instances of doing something "strange" or "artistic," had the cogenerative structure for collective reflection not been there.

As the semester unfolded, it became more and more evident that the collaboration with the theatre company – implemented through the company's repeated presence throughout the semester and through the major common task of building for the festival – was essential for the students' movement towards including what had initially appeared as other as an expansion of their own repertoire. Enhanced collective reflection through the cogenerative model, on the one hand, and the intensification of making through the collaboration with Cirka Teater, on the other, seemed to create distances for self-reflection, and for conceptualising and experimenting with architectural education.

Based on this insight, the theatre's role in the process was brought up in the interviews held in 2018 with the founders of Cirka Teater and the initiators of Making is Thinking. As mentioned, Berger, Booker, Rødne and Sæther all emphasised the importance of preparing architects for design processes that include the unexpected and in which one therefore has to act on or solve problems as they emerge. They all – the visual artist, the architect and the theatre artists – expressed, from their shared point of view as aesthetic practitioners, that encounters with material objects and spaces can lead to transformations of how one knows the world and one's role in the world, and they agreed that artists are trained to handle such encounters while architects are stuck in solving problems functionally. More specifically, they all thought that theatre, and especially Cirka Teater's experimental approach to theatre, can help architecture students to break, at least temporarily, the limits of functionality by letting them engage in a "reversed" design process where spaces for iterative

experimentation are central. As we have seen, this was a major idea in the participants' loop of learning too – and it appeared based on their own experiences of and their shared reflections on making rather than because someone explained the idea of a reversed process to them.

The presence of and encouragement from the theatre company, which we got a sense of in references to the interviews with Berger and Sæther in the second chapter, pushed architecture students to question their own practice of designing material spaces, and to stick to the new kind of design process. It also pushed architecture educators and the researcher to develop their practices. Though architectural thinking, as we saw in the first chapter, has a material spatial core, it seemed as if the intense and repeated input from the theatre on how to create spatial or aesthetic experiences was needed to open the eyes of the architects to this core and its transformative potential.

Letting the aesthetic experience meet the cogenerative model

We introduced, in the first chapter, the idea that aesthetic practitioners can learn from each other. How could the insight of the theatre company's importance in our case – its exemplification of the value of introducing a distance to one's own (aesthetic) practice by collaborating with a practice with which one shares interests and notions but not processual habits – be framed from an action research perspective? Experiential knowledge, engaged forms of inquiry and participatory processes are fundamental to the action researcher, and as the case study was undertaken, the researcher realised that the theatre functioned as a catalyst for her to think of those fundamentals in terms of space, body and materiality, i.e. from an aesthetic point of view which includes both theatre and architecture as spatial practices. To look into how the material-spatial aesthetic aspects of cogenerative learning which emerged in our case could be further digested and communicated seemed relevant. Therefore, in addition to literature on learning and education (in general and regarding the field of architecture more specifically), the researcher began to look into other examples of theatre–architecture collaborations and theories of performance and theatre.

Letting practice influence analysis

The researcher was consciously letting practice interrupt the period when the case study was analysed. As mentioned in the first chapter, though this thesis is text-based, not only literature read in relation to the emerging findings but also experiences of teaching influenced the researcher's direction towards the material and performative. After the summer of 2016, the author represented Making is Thinking in the educational project The Power of Experiment, a workshop for sharing experiences between Portuguese and Nordic educational environments set up within the Lisbon Triennale by Ana Jara and Lucinda Fonseca Correia from the architectural firm Artéria: Humanizing Architecture in collaboration with the architect and educator Alberto Altés.⁶ The workshop, which included full-scale building, exercises with the dancer and choreographer Clara Andermatt, and conversations about concepts which the participating environments had brought with them resulted in an exhibition and the book *The Power of Experiment*, to which Rødne and the author contributed with the article "Forms for Sharing." Moreover, the author got acquainted with a diverse range of experimental pedagogies at the International Design Workshops week at the University of Antwerp, in which Making is Thinking participated in 2016, 2017, 2018 and 2019 (the author in 2016 and 2018). To experience and discuss Making is Thinking's educational approach in relation to arrays of international approaches to architectural and design education, for instance through learning about the artist Sarah Westphal's techniques for making architecture students work with performance and light or engaging in conversations with José Capela about the relation between theatre and architecture, was essential for the researcher to understand and formulate the characteristics of her case.⁷ Another promising exchange of approaches began in 2019, when Making is Thinking initiated contact with and visited Situated Practice at the Bartlett School of Architecture, a master's programme run by James O'Leary and Jane Rendell, including work with "site-related" interventions, methodologies for artistic research and theories regarding criticality, performativity and textuality.⁸

We summed up the main tracks of transformation in the participants' learning trajectories in the end of the previous chapter. Looking to the researcher's learning trajectory, we have seen that her lived experience of actually acting and reflecting collectively as well as of seeing the difference between how theatre-makers and architects engage their bodies in the making of material space gave her a deeper understanding, impossible to ignore, of the transformative power in introducing forms of learning that rely on participation and making. Entailed in these shifts was a move from being sceptical of the necessity to discuss personal transformation as a part of professional education to an understanding that to learn through aesthetic experience involves being changed as an architect, educator or researcher and as a person.

Let us now propose **two steps towards further research**. The first one regards the inclusion of *materiality* as a parameter of transformative experiences of learning within architectural education. The second regards the application of *performative perspectives* for understanding that materiality further.

Material transformation: Two steps towards developing the cogenerative model

As mentioned in the first chapter, the cogenerative model's acknowledgement that the physical/spatial circumstances of the learning arena have an impact on learning processes was an essential condition for choosing this model. We have seen that architects are trained to move between and merge immaterial and material constructions, concepts and buildings. Among others, the architectural theorists Manfredo Tafuri and Adrian Forty have warned architects against simplifying the relations between concepts and concrete works, or using theory and history as it suits them in specific projects.⁹ In spite of this danger, which should not be underestimated, we took the learning arena – a place where local frameworks or theories are negotiated and constructed through communication – towards architectural education. The case study was

designed to focus on how visual and material artefacts work as means of communication on this physical arena (the arena as background).

First step: The learning arena as a transformative and material space of learning

Throughout the process, however, the initial interest in the cogenerative model's acknowledgement of the importance of the physical circumstances of the learning arena was developed into a focus on the constant material-spatial changes of the learning arenas themselves that our process involved. When the cogenerative dialogue as a reflective structure was combined with active forms of inquiry, such as interviews and interventions, a movement that blurred the divisions between active (making) and reflective (thinking) modes of knowing the world was constituted. This movement left material traces in forms of changes of the physical circumstances of the spaces of the design course. The accumulation of material artefacts made during the process influenced the dialogue and led to essential shifts between imagining, projecting and experiencing changes at Nyhavna. With time, the material space in itself became a form of inquiry as the interweaving of the design process and the cogenerative dialogue was materialised incrementally throughout the semester, as collages, models, scaffolds and scenography accumulated around us and changed the FormLAB and the site. The material spaces that emerged can be described both as common design projects and as learning arenas, or in short as spaces of learning.

At first the things through which we communicated were in front of us, in between us on a table, and then they surrounded us. We went from working with objects of mediation to constructing, or cogenerating, communicative material spaces. Our participatory process of learning can be seen as one where relations between the thought and the made were continuously established and changed in representations and interventions. The movement between the active (and risky), enhanced by the theatre, and reflective (and safe), enhanced by a model for processing experiential learning, continued throughout the process and it was into spaces of learning rather than to an exhibition of finished design proposals

that the public was invited at the end of the semester. From being *about* sensual experiences on site, the learning arenas *became* sensual experiences on site and in the FormLAB. Our learning arenas were not stable platforms where communication happened, but material spaces in the making. These material spaces of learning are, we propose, possible to frame as evolving aesthetic experiences.

They not only allow for communication, transformation and cogeneration, but are also communicative, transformative and cogenerative in themselves and by aesthetic means in the sense that they include materiality and embodied experience of materiality. In other words, they materialise a mutual dependency between the learner and the context s/he learns in.

This is a thought that demands further reflection and contextualisation in relation to existing research. To begin with, we suggest that to think of the learning arena as a pre-existing container or platform for learning experiences was no longer possible; rather, our learning arenas were materialising along the way. Thereby, the idea that expectations are expressed in words on one learning arena before one goes out into the field to engage through making and that the engagement then is reflected upon in verbal exchanges on the next learning arena soon became irrelevant in our cogenerative dialogue – words and materials appeared both in the dialogue and the field. That is, a material interlacement of the design process and the cogenerative dialogue occurred.

What the researcher experienced and wishes to frame is that content, methods and material space of learning influence each other. This is not to say that the studio must be left behind; our case shows that content and methods can be introduced so that the studio or any other spatial container can be transformed from within.

That spatial settings and educational instructions influence each other is a thought brought up by Janssens too, in an introduction to a set of papers on "collective sense-making for change," where she develops the idea of the "instruct" as material:

The materialised instruct (the spatial setting) and the instructions (which can be rules of conduct, guidelines, methods...) reinforce each other to create situations in which individual experiences can be shared, common experiences can be generated, their quality can be examined and situated knowledge can be gained.¹⁰

Having acknowledged this thought, the idea of the learning arena as a potential merger of spatial and methodological design arises, and the relevance of developing the cogenerative model as a structure for architectural research increases. The learning arena as material space of learning where internal and external interests are negotiated can be seen as a response to the double targets of Making is Thinking, described by Booker and Rødne in the previous chapter. What became clear in the interview with them is that Making is Thinking aims, on the one hand (in what can be thought of as an internal loop), to offer architecture students possibilities to explore the inventive and subversive potential of such spaces, threatened by increasing instrumentalisation, and, on the other hand (in an external loop), to reach outside the architecture faculty with research-based arguments for why architectural education must have (material and intellectual) spaces for experimentation and reflection. The challenge of developing teaching while defending one's relatively expensive educational approach is recognisable to many architecture schools. That the cogenerative double-loop structure allows for internal reflection which does not reduce the architect's ways of knowing *as well as* for developing general theories which can be spread to other academics and university administrators should therefore make it attractive to other milieus than ours.

The tension between risk and trust from the researcher's point of view

We have seen that predictability and trust were conditions for colearners daring to engage in new ways of processing material spaces. Let us look to the balance between safety and risk-taking in our case, from the researcher's point of view.

The reference study, the interview assignments and the acquaintances with full-scale building were enabling situations, the participants in our cogenerative dialogue claimed, through which they trained themselves to include the unexpected in their design/learning processes, for instance in the form of a non-architect's point of view or the material available on site. Those forms of inquiry were not set up by the theatre company, and yet we saw that the company's impact made the participants engage in them more intensely than they had otherwise done. Some of the most striking reflections from the participants reveal a sense of presence – what we propose calling a "risky presence" – stemming from the fact that the designing happens on the spot in a reversed design process, without prior planning.

The risky presence involved the experience of facing a "real problem," a problem one can literally sense, emotionally and physically, and appeared as needed to shake the students in their presumptions about how architects should project their ideas. For example, the drawing exercises set up by Eide Holtan can be described as such risky presences. We have also seen, in the interviews with Berger and Sæther, that this is something actors know: how to work with space in the moment. Although the participants were all, according to what they said before the semester began, looking forward to being challenged in their way of working, it was not, it seemed, until they had stood in the midst of a troublesome situation, come out of it and been encouraged to reflect upon its implications that they were convinced about the value of questioning habits. What they then did – when making a blind drawing, a collage under time pressure or a composition of a wall with found objects – was to improvise, in the sense that they, like improvising actors or musicians, used their professional training to act on unpredictable input.¹¹ Such input came

from other humans, and from materials, and it was triggering transformations. One participant (CL13) said that the line in the drawing had become a way of seeing – that is, in the moment – rather than a way of representing something seen; one participant (CL12) talked about the feeling of making something "real" when building; one participant (CL9) said that a collage surprised her as she could suddenly see what she had not been able to think or plan through conventional design techniques; and one participant (CL4) said that to design on the go, with the material available, enabled him to think of design as continuous composition rather than final result. This development appeared as absolutely essential to the researcher, since new perspectives on the world were opened up by twisting rather than rejecting the architect's techniques, letting learners redescribe their tradition from within.

A challenge for the architecture tutors as well as the theatre-makers was to set up exercises or situations which although they were unfamiliar to the learners would trigger them to engage in immediate experimentation rather than get stuck in resistance. The establishment of a collective through participatory exercises was in our case a key to establishing an atmosphere of trust which we may call a "processual safety" since it was based on repeating exercises and opportunities for reflecting on exercises within a semester-long framework. This safety, which grew slowly and demanded patience, in the end led to the participants taking their own and other's "strange" experiences seriously. As we may recall from the previous chapter, quite a long way into the semester, one participant (CL12) was still arguing that he was "just trying to make something a bit artistic" to please the tutors, but he was then sucked into engagement with building the exhibition scaffold, worked together with Berger and became one of the performers at the festival, and another participant (CL1) likened himself to the Karate Kid, who "gets it" only at the end of the process. The latter participant was asked on the fourth learning arena about why he thought there was, as one external reviewer had remarked, a coherence between the proposals for Nyhavna presented in the course. He suggested that a central reason probably was that since the beginning of the semester the group had been "a close group in between, not only inside but also outside" the courses. The individuals in the group had "grown" by helping each other in dealing with what

appeared strange, he argued. The emphasis on the participatory in the design course – as well as the fact that the group met after school – was, in other words, a condition for entering in and maintaining what can be called zones of uncertainty or potentially transformative situations, where the participants rather than being in control, as they described they had been trained to be in courses taken before and after this one, began to open up their professional routines to unexpected or strange experiences and dared to use forms of inquiry that were new to them.

To balance between safety and risk seemed to sharpen the architect's critical ability. From being interested in expanding their skills, the participants described how they moved towards the objective of sharing spatial experiences with others. They had come to experience material space and how material space can be worked within and with, and based on these aesthetic experiences they came to question their own professional identity. The embodied and emotional experience was a condition the students needed to sustain in the uncertain and transformative, because by having felt the importance of something through making it rather than thinking of it, they became prepared to struggle against resistance within themselves, from others and the material context. The affective engagement provoked by active experiments with design habits came to involve empathy, self-reflection and hesitation. To sense the limits of their habits and then in the cogenerative dialogue formulate this experience seemed to make the colearners humble in the sense that they understood the relevance of working with those limits rather than leaving everything they knew from before behind. Hence, the cogenerative model supported a nuanced approach to the established divide between the "stable" and the "alternative."

Towards material cogeneration

We will now argue that since lived experiences when processed through our cogenerative dialogue catalysed criticality, and since the architect's lived experience generally includes materiality, the cogenerative model should be expanded to include materiality.

The hands-on or lived experience is at the core of most design-build studios. Discussions about the effects of this experience often include arguments regarding the usefulness of understanding construction principles and the educative function that architecture students become responsible citizens who use their professional skills and knowledge for the public good. These arguments were presented by the initiators of Making is Thinking too. Our initial question included the idea that exercises outside the studio characterised by making and participation has critical potential that should be nurtured. The participants' reflections demanded the researcher to go deeper into the question of what this critical potential can include because here the critical awareness of a responsibility to share architecture with others involved an understanding that the one-to-one mode and rough exercises can open up to fundamental – beautiful, overwhelming, vicious, vague, disruptive – experiences of what it means to experience the world as material space. This development can be seen through Shklovsky's idea that the function of art is to make the familiar strange and thereby prolong the process of perception. Richard Shusterman argues that the heritage of estrangement as described by Shklovsky lives on in contemporary aesthetics, and that strangemaking then and now entails a risk of alienating art (or architecture) from the everyday.¹² This is a theme we will bring up again in the following chapter.

Our participants' new experiences of reality entailed questions that went beyond common agreements among architects about what the useful, appropriate or critical is (agreements touched upon in the introduction to the motifs behind Making is Thinking in the second chapter). However, we saw that the cogenerative model as a structure for reflecting on the strange, which often appeared in the one-to-one mode on site, contributed to the colearners' ability to link elements of the practice they were unfamiliar with to familiar elements, so that the strange became a key to building upon the everyday of their practice rather than alienating them from it. Moreover, Making is Thinking is characterised by conscious tactics for letting the experiences of reality come through in architectural representations made on site or in the studio, and it is obvious in the reflections from the colearners that the drawing and model as they knew them were estranged. This is an essential finding since it points to how the

architect's representation can express the lived experience, and thereby, as Latour says (in the introduction to this thesis), include the contradictory and controversial. That is, the introduction of forms of learning characterised by making and participation allows for critical reflection and transformations of habits within architectural education.

Our case in itself, because of its roots in a department of artists and because of the collaboration with the theatre company, was different from other design-build studios and a fertile ground for strong experiences. However, without the learning arenas in the cogenerative dialogue, the effects of the hands-on experiences would have remained less articulated. That is, the combination of participatory and engaged forms of inquiry that facilitated embodied and material-spatial experiences (including making and catalysed by the exercises in the course) and forms of reflection (catalysed by the cogenerative model) constituted our learning arenas. The combination was an opening to further discussions on how to set up and represent or project spaces of learning that both acknowledge the power of materiality and sustain evolving states of uncertainty.

To work on a combination of materiality and uncertainty appeared to be valuable because in our case such a combination had led to a criticality based on lived experiences and mutual exchanges with a context rather than predefined ideas of what the socially engaged architect should do. This finding appeared to the researcher as central not least because it involved both built and represented material space, and the understanding of architecture as an aesthetic practice emerged as a key for discussing it further. Based on this finding, we propose that the inclusion of materiality in our process should be discussed in terms of an expansion of the cogenerative model and its learning arena.

To begin with, we may think of how materiality can be included in the diagrams of the cogenerative model (Diagrams 1–4). Instead of relating to, as in the extreme case of the stable tradition, a master through representations, the individual student was in our case relating actively to other students, to several educators, to the inhabitants of the site (theatre-makers and other citizens), and to the researcher. In most courses today, architecture students relate to several tutors and other students. That is, the meetings with a researcher and inhabitants was what was new to our

participants. From a methodological point of view, we may think of the interactions between these three actors – students, researcher, users/inhabitants – as a triangulation which drove the cogeneration of local and general theories forward. Moreover, our findings enhance the importance of the actors relating to materiality on site and in exercises activating their bodies, i.e. moving beyond conventional architectural representations. As we, in the first chapter, adapted the cogenerative model to our case in diagrams, the physical context (including inhabitants) appeared in the participants' loop, and the discursive context (including scholars outside the case) in the researcher's loop. To illustrate the importance of materiality, we may imagine how the learning arena and the "testing through collective action" in the diagrams become three-dimensional structures in which actors move. More accurate, however, is perhaps to think of materiality (physical contexts as well as drawings, models and full-scale interventions) not as a background or three-dimensional frame, but as a fourth actor in the cogeneration, which was – just like the interactions with the researcher and the inhabitants – rare and formative, and which affected both our loops of learning.

Summing up the first step forward, we have argued that in our case a theatre company and a model for cogenerative learning enabled the construction of material spaces of learning – spaces for action and reflection which evolve in relation to actions and reflections – outside and inside the design studio, in which transformations were catalysed and given words. The understanding of the learning arena as an evolving cogenerated space which changes both learner and context appeared as one through which we could think of spaces of learning as transformative, liminal, unstable and at the same time material.

We initially asked: *How can forms of learning that rely on making and participation in contexts outside the design studio contribute to increased abilities for critical reflection on and transformation of habits within architectural education?*

The analysis of our process showed that the cogenerative model, in our case, increased abilities for reflecting on differences between new and

familiar ways of designing and thereby supported transformations of habits, and we began to think of how to expand the model to include architecture-specific (material) understanding of what a cogenerative-transformative experience of learning can be.

The analysis of our cogenerative dialogue therefore makes us ask: *With the cogenerative model as a point of departure, how can material and transformative spaces of learning be developed within architectural education?*

Second step: Looking to the transformative experience's materiality through performative perspectives

The idea of a transformative space of learning with an evolving materiality produced through embodied experiences and actions appeared as central in the analysis of our case. We looked to educational research with this idea in mind and found that educational spaces, when they were described, often came in conceptual terms or as given types of rooms (classroom, seminar room, studio), i.e. they were either immaterial or had a fixed materiality. For instance, action researcher Stephen Kemmis proposes conceptual spatial models through which embodied and situated aspects of educational spaces can be brought to light, yet conventional school architecture appears to remain unquestioned when he discusses concrete examples.¹³ Overlaying the outcomes of our case study with what we knew about the architect's ways of knowing in general, Janssens's material instruct functioned as an igniting spark and we realised that architects were probably fit to contribute to what a space of learning can be, to how immaterial structures of learning can merge with material space. More specifically, our process – where material spaces of learning evolved both inside and outside the school – appeared as an opportunity to propose perspectives on spaces of learning in architectural education without getting stuck in the design studio, in "alternative" milieus external to institutions, or in conceptual models parallel to the educational everyday.

Making is Thinking's ways of working with material space included the body as a primary (and estranging) tool which catalysed our

participants' critical awareness of their own habits. This function of the body was enhanced by the theatre company's presence and made the researcher introduce performance and theatre theories into her loop. Attempts at framing the new "body-activating" ways of working with space and the "aesthetic experience" as "performative" were initiated. For instance, as described in the second chapter, it seemed possible to apply parameters used to discuss and experiment with performance acts to describe why drawing exercises set up by Eide Holtan differed from the making of drawings the participants were used to. We began to think that we could expand the cogenerative model to include material cogeneration, and thereby perhaps contribute to new understandings of spaces of learning and, in turn, change the stable tradition of architectural education from within.

The transformative had been central to TRANSark and Making is Thinking, while performance and performativity were more or less unspoken of before the interview with Booker and Rødne, where they talked about the body and performance only when asked about these notions. By contrast, Berger and Sæther accentuated the importance of the body in processes of creating material space. That is, while the interviews with the representatives of Making is Thinking and Cirka Teater mostly were in tune, a tension which caught the researcher's attention emerged here, and she continued to test the relation between performance and transformative experiences of learning, because it appeared as a possible key to a nuanced criticality based on lived experiences in and of architecture.

When interviewed, Berger and Sæther described how the embodied experience of material space opens up paths inwards and urges the individual to follow his or her own will rather than rely on conventions. The paths inwards give access to emotional and poetic aspects of material space, aspects which the theatre-makers in turn linked to the political motivation of their own work as well as the political state of theatre in general: unexpected emotional and embodied experiences (through theatre) may change how one views and acts in the world (outside the theatre). This is something architects may learn from, Sæther and Berger continued, because architects could then open up their processes and

create material spaces through which others would understand the value of their work less in terms of function and more in terms of aesthetic experience. This would, Berger implied, be a possibility for closing the gap between concept and realisation in the architect's practice.

Looking to architectural theory with Sæther's and Berger's thoughts in mind, we see that architects since Vitruvius and his time have developed a variety of ways of including the body in their practice.¹⁴ Yet, architects continue to idealise bodies and this influences how they think of the people they design for and, in turn, the spaces they design.¹⁵ Our introduction suggested that mainstream architectural education favours the intellectual architect and contributes to the idealisation of the body, and that research on architectural education has reinforced this tendency by not reflecting the actual diversity of architectural education. Our case study points out that the theatre as an aesthetic practice which has kept the body at its core can remind architectural educators of the possibilities with deconstructing this idealisation.

Yet, the researcher's performative framing began reluctantly, because the notions of performance and performative aesthetics, not unlike those of transformation and transformative learning, are risky. The performative has become a trendy label used to signal "alternative" and interdisciplinary approaches within architectural education. Sam Vardy and Julia Udall in fact claim that there is an alternative history of spaces of learning which are performed or staged through embodied, collective, critical and imaginative actions and negotiations.¹⁶ However, the fact that performance can be applied across discursive fields and practices meant that the notion of performance was an opportunity for theatre, education and architecture to meet and exchange ideas.¹⁷ Before deciding to look to such connections in the fourth chapter, we searched for ideas on if and how performative perspectives could inform architectural education by building on, instead of cutting off, existing methods taught to architecture students and the spaces where they train themselves in using those methods.

Can the cogenerative model take care of the radical effects of architecture students' performative exploration of real space?

The established divide between the mason as body and the architect as mind is reflected in the focus on representations rather than practical experience in the design studio. The reintroduction of the one-to-one mode is, as Cuff proposes, an opening to challenging the idea that the architect only works with representations at a distance from real-world situations. In many design-build studios, however, the body is present but its presence is not reflected upon and representations of the built remain the same. Our case is an example that the reintroduction of the one-to-one and other body-activating exercises can influence how contexts and proposals are communicated, i.e. how drawings and models are made. Hence, the Making is Thinking exercises with a performative character have the potential to change conventions of representation which have been (as the introduction displayed) maintained at schools of architecture and in architectural practice since the early Renaissance. In other words, following Berger, we may say that our colearners were trained to move between concept and realisation. We know from the second chapter that such training is essential according to the Making is Thinking initiators and a point of departure for this research project.

That performative perspectives can support architecture students' movements in the conventional divide between real and represented space is an idea supported by other contemporary scholars and educators of architecture. Beth Weinstein has recently proposed that the inclusion of the body and "a more nuanced understanding of performance, drawing from performance studies" can be a path towards changing the fact that architects are taught to draw and model at a distance from reality while "tools to directly explore human performances in, of and with space are largely absent in architectural pedagogy."¹⁸ Rodrigo Tisi has also experienced that the performative, with its focus on how the body moves in space, can be an opening through which architecture students can question the idea that representation and reality are separate:

As a presentational device, performance provides a guiding paradigm for testing and evaluating the architectural object from conception to production. . . . Through the lens of time, performance influences the presence and behavior of the body within specific spaces and challenges the "materialized project" through the feedback of people interacting with it.¹⁹

Our study can be seen as a path towards framing the tools for human exploration of space in time that Weinstein, Tisi as well as Making is Thinking develop. We have seen that the introduction of a structure for collective reflection was essential for making transformative experiences of relations between concept and realisation, i.e. thinking and making, last. Moreover, the application of the cogenerative model and its learning arenas enabled us to understand the space of learning itself as a materialisation of this movement.

Towards making the dependence between material and discursive space workable for educational purposes

The discussion of evolving material spaces of learning and the hypothesis that architects have a knowledge of material space which educational research can gain from can be seen as branches springing from never-ending discussions within architectural theory and historiography regarding the notions of space, matter and their relations in time.²⁰ A defining trait of architecture is, as we saw in the first chapter, that it includes materiality and spatiality as sources and projections of knowing. Aware that architects tend to be attracted to confusions of the notion of space as philosophical and worldly constructions, we propose that the cogenerative model and its learning arena can be developed to allow architectural educators to consciously work with relations between material and immaterial spatial constructions.²¹ Our focus on *material* space is chosen to attach weight to our investigations that, though they

point to the dependence between the material and the immaterial, begin in tangible real-world situations within the Making is Thinking semester. By applying the cogenerative model and its learning arena to those situations we can depart from them towards conceptual constructs, keeping in mind that the conceptual should in our case support learning. This is where we, in our case, see that the immaterial and material are intertwined, because learning is to us both a meta-process and a process profoundly bound to the tangible in the practice of designing.

As we propose that performative perspectives could reinforce a development of the cogenerative model, we take into account that not all applications of the performative mean an increased focus on architectural materiality and aesthetic experience. Performative perspectives on architecture have in fact often remained at a distance from the practice and actual material spaces of architecture.²² One reason for this is that architectural theory and practice often form parallel tracks, not least within architectural education. Another reason is that the link between architecture and performance has often been language-based.²³ A third reason that performance and materiality have been kept apart is that architects have learnt from postmodern and post-structural thinkers to see architecture as reflecting, supporting or subverting social structures.²⁴ This way of thinking lets the division between architecture as solid and performance as actively transforming remain. However, an inclusion of the sensuous and experiential – i.e. of knowledge that comes from within the individual and his or her body – has since the 1960s made architects introduce ideas on space as produced through social and embodied actions and thereby ask more nuanced questions about how architecture can transform social orders.²⁵ Architectural theorists have used different lenses to look at these ideas, for instance those of phenomenology, French spatial theory and feminist philosophy.²⁶ The ways in which practitioners like Bernard Tschumi, Lina Bo Bardi and the Situationists have worked with challenging the stability of architectural space and architects' conventional interpretations of reality are well known.²⁷ Still, architects and not least educators need to continue to develop ways of connecting the performative to the materiality of the practice.

Following our experiences of how the transformative power of embodied experiences of reality can give much-needed new understandings of the relation between conceptualisation and realisation of architecture, we propose that architects (although they will continue to make representations) can learn from non-representational perspectives on performance to understand architecture as one of several aesthetic practices where making and knowing are related and bound to materiality as it emerges in the present. Non-representational thought lets us attend to relations between material and discursive space, as well as to concrete suggestions about how academics and architects can rediscover those relations by returning to materiality via collaborations with the performing arts.

Architects can, for instance, learn from philosopher Karen Barad's ideas on how discursive practices have reduced matter, together with language and visualisations, to representations of reality and thereby made matter a mediator of knowledge, while matter instead should be acknowledged as a force beyond human control.²⁸ Barad's thought has been applied to architectural education by Alberto Altés and Oren Lieberman.²⁹ Nina Lykke suggests architects may use Barad to move beyond performativity in terms of language and discourse, towards materiality, and thereby develop architecture-specific ideas on performance from which others can learn. From her "outsider" point of view as a scholar of gender studies who has collaborated with architects, Lykke emphasises that the architect's context is both discursive and physical. By listening to Barad, Lykke argues, the architect may understand the discursive and the material as intertwined and thereby become able to nurture the fact that architecture and spatial practices are "arenas, where it seems indispensable to reflect on the constraints and potentials of materials and material space, and their interrelations with discourse."³⁰ Lykke's suggestion allows us to emphasise that physical experiences of spatial materiality can have effects on the individual practitioner's process, and that these effects can – if they are given words to – influence the individual's critical awareness and, in turn, the larger discourse of architecture.

The fact that experiences of material space can lead to critical reflection on and transformation of design habits was strongly illuminated in exchanges with Cirka Teater during the Making is Thinking semester of 2016. Non-representational geographer Nigel Thrift, who has himself collaborated with dancers, shows that our case is not unique in this sense.³¹ He argues that scholars who introduce performance to their disciplines by turning directly to the performing arts have greater chances to stay in touch with materiality and, in turn, to challenge their own ways of working.³² The materiality of space is, according to Thrift, a concern common for architects and performance scholars because they share an instinctive understanding of space as a "sense of concreteness and materiality of the situation."³³ That is, Thrift allows us to contextualise the idea at the core of Making is Thinking: architects can learn to question their design habits by testing how other aesthetic practitioners work with material space. The concrete materiality of the situation is often ignored within academia but can catalyse critical thinking, Thrift argues, and spaces set up within performative practices are especially fit to do so since their intensity is so strong it cannot be ignored – they are "fireworks inserted into everyday life" that force individuals to question that which they are used to.³⁴ That is, they have an estranging function. The body that dances or builds, says Thrift, is not expressive in order to signify or represent a certain meaning, but uses intuition as "thinking in-movement" to create space.³⁵ A consequence of this movement is, he says, that the division between "real" and "represented" is blurred.³⁶ Moreover, Thrift argues that the form of knowledge that performing arts provide, where sense and intellect are combined, does not tell people what to think but invites them into situations which trigger their imagination and willingness to play.³⁷ This is a sequence we recognise: our colearners' actual engagement in strange exercises was followed by the questioning of relations between reality and representation and, in turn, a critical awareness of the architect's responsibility to take a stand beyond agreed positions and give aesthetic experiences to others.

Let us sum up the second step forward. While the corporeal was implicit in the preparations of the case study, it emerged as absolutely central with

the lived experiences in it, where architecture met theatre. The participants and the researcher were transformed by this insight and it is one we must bring with us in the discussion on spaces of learning. We began to look at what we could gain from framing our colearners' embodied experiences in and of material space as performative. The performative-material experience of learning appeared as a potential catalyst of transformative spaces of learning, which could undermine the division between the studio and other spaces of learning as well as the traditional division between material space and conceptualisation of material space (which is reflected in how architectural proposals are represented), and which could trigger critical reflection on habits. Lykke's overarching and Thrift's more concrete proposals for how architects can use performative perspectives to work with relations between material and discursive space with a focus on materiality convinced us to continue in this direction, towards proposing possible expansions of the cogenerative model in the fourth chapter. A sub-question therefore becomes: *Given the importance of the embodied experience in our case, how can performative perspectives on the idea of transformation in and of material space inform the setting up of spaces of learning within architectural education?*

Recapturing, before moving on

The initial question, posed prior to our case study, was: *How can forms of learning that rely on making and participation in contexts outside the design studio contribute to increased abilities for critical reflection on and transformation of habits within architectural education?* With this question in mind, we engaged in and analysed our case. Let us recapture the major findings of our cogenerative dialogue, which are our **attempts at answering the research question**, and the paths forward they anticipated.

Finding 1: To introduce a safe structure promotes risk-taking

We found that the cogenerative model, with its double loops and learning arena, allowed us to become aware of and work with the problem of a

constructed divide between convention and breaks with convention in architectural education, because the model created

- a *distance to the everyday* of the education, and
- opportunities for verbal and non-verbal *collective reflection (articulation)*, which promoted openness between individuals with different roles.

A central effect of these features, we found, was

- an atmosphere of trust, or a "*processual safety*."

When the cogenerative model was applied to our case, where risk-taking in the moment or "risky presences" were promoted, we found that

- a *tension between safety and risk* appeared, and that this tension seemed to be essential for the generation of and reflection upon transformative experiences of learning.

That is, responding to the research question, the structure made participatory (collective) and making-based (non-verbal) forms of learning workable, and supported the transformation of habits through collective (and critical) reflection.

Finding 2: Reality presents architecture students with strangeness

As we then looked to what characterised the risky situations in our case, we found that they were based on intensely encountering (by contrast to taking a distance from) reality. However, we saw that such situations did not have to be localised on site but could be set up inside the FormLAB. The exercises which presented our colearners with uncertainty and strangeness and thereby seemed to trigger transformative experiences of learning involved

- *the corporeal as a primary strangeness* which, when it was engaged in rough exercises, opened up to new perspectives on material space, including social and affective dimensions which were unfamiliar to

the colearners, or which they had been aware of but unable to include in their practice.

That is, the real was strange to the architecture students and forms of learning relying on making and participation had the critical function to give access to the real, especially because they include the body. We also learnt that such forms of learning did not have to belong "in contexts outside the design studio," as the research question says, but could enter the studio.

Finding 3: Twisted exercises trigger transformations

Regarding the effects of engaging in "just making" – i.e. in exercises which challenged the familiarity of the architect's skills and techniques, by twisting (strangemaking by composing upon given conventions) what it means to project experiences of reality in, for instance, a drawing – we found that our colearners went through two major and interlinked transformations:

- they started to question and experiment with *the divide between concept and realisation* and its reflection in the divide between representation and experience of architecture, and
- by doing so, they gained *an open kind of critical awareness* of the value of knowing how to, as an architect or aesthetic practitioner, invite others into aesthetic experiences and thereby into one's design process.

That is, forms of learning relying on making and participation inside *and* outside the studio triggered questioning of principal habits as well as a criticality with personal and ethical dimensions.

Finding 4: To make strange encounters part of the processes deepens the effects of transformative learning

We found that

- it was pivotal that the exercises with a transformative potential were part of a "*reversed*" or *oscillating process*, based on moving between making and thinking.

The idea of a "reversed process" was introduced by Making is Thinking and Cirka Teater but we realised that the presence of the action researcher and her implementation of the cogenerative model and the presence of the theatre company were essential for its catalysation of transformative experiences of learning with a liminal or in-between character. A major finding was therefore that

- the fact that the exercises were part of both the "reversed process" on the field *and* the dialogic process next to the field – the cogenerative dialogue – seemed to increase the possibility that the colearners took what they learnt with them to their next project, i.e. that the transformative experiences of learning would have *lasting effects*.

That is, if forms of learning that rely on making and participation are to contribute to lasting increased abilities for reflecting on and transforming habits, it is essential that they are implemented as parts of processual structures.

Those were our findings and our answers to the initial research question. Let us now recapture the two proposed projections and the questions they entailed, before we, in the following chapter, suggest a few directions for developing those projections.

Projection 1: To understand spaces of learning as material aesthetic experiences is a key to promoting critical reflection from within the architect's practice

At a point in the researcher's loop, we realised that the learning arenas of the cogenerative dialogue and the material outcomes of the process, for which the theatre company's presence was essential, merged into "material spaces of learning." Space, method and products were related,

and this circumstance was not dependent on being either inside or outside the studio. From that insight, we could stake out the relevance of developing perspectives on spaces of learning as aesthetic experiences which are material and transformative in themselves and which are part of as well as generate participatory processes. We found that it could be relevant to think of the learning arena as a material space of learning, and the idea of an evolving aesthetic experience was likely to give opportunities for developing how aesthetic techniques, for instance strangemaking, can be introduced into architectural education, and for further discussing the critical ability which we had found could emerge from educational experiments.

Based upon the analysis of our cogenerative dialogue, we therefore asked: *With the cogenerative model as a point of departure, how can material and transformative spaces of learning be developed within architectural education?*

Projection 2: Performative perspectives on the transformative experience of learning as an aesthetic experience

Embodied experiences, enabled through the exercises in the course and fuelled by the presence of the theatre company, were pivotal for the evolving transformations of learners and material spaces in our process, and we therefore began to think of the aesthetic experiences that catalysed transformative learning as performative. The researcher introduced performance and theatre theories and practices into her loop of learning. We found that it could be relevant to discuss the notion of performance as one through which theatre, education and architecture can meet and learn from each other.

Based on the need for understanding the embodied experience as a key to transformative experiences of learning, a sub-question became: *Given the importance of the embodied experience in our case, how can performative perspectives on the idea of transformation in and of material space inform the setting up of spaces of learning within architectural education?*

Fourth chapter

Possible continuations

The imaginative endures because, while at first strange with respect to us, it is enduringly familiar with respect to the nature of things.

John Dewey¹

The cogenerative model's learning arena is a social and material construction which is cogenerated through feedback loops and is thus transformative in itself. Based on our application of the cogenerative model to Making is Thinking and the findings which came through that application, we will now continue the researcher's loop of learning from the previous chapter and **build on our proposed projections** by turning to the fields of education and theatre to suggest directions for developing spaces of learning with an evolving materiality. That is, we intend to briefly contextualise our findings as well as elaborate on how our projections can be developed so that aesthetic aspects of cogenerative learning can be more consciously worked with in the future, by researchers and educators in different fields. In other words, we aim to sketch possible answers to these two questions:

With the cogenerative model as a point of departure, how can material and transformative spaces of learning be developed within architectural education?

Given the importance of the embodied experience in our case, how can performative perspectives on the idea of transformation in and of material space inform the setting up of spaces of learning within architectural education?

We do so by making a **selection of perspectives, examples and models** through which we can learn more about material spaces that are transformative in themselves and have an educational function, and based on our findings we pay special attention to *how strangemaking as an aesthetic key to critical reflection* can be made operative as an element of learning processes *without directing learners towards predefined goals*. Our selection is not a set of final destinations but possible *beginnings* for educators and researchers to set up participatory processes and engaged forms of inquiry which start in the individual learner's aesthetic experience and nurture an open kind of criticality through *material cogeneration*. The selection forms a path from our case towards *new perspectives* on architectural education, because literature on evolving material spaces, primarily by performance scholars, is "largely overlooked" by architects.²

An essential motivation behind investigating how the cogenerative model more consciously can include materiality is to make educators of architecture and other aesthetic practices embrace their role as dual professionals. They are likely to become less sceptical to pedagogical models if those models build upon their practice. The most central motivation behind expanding the cogenerative model is nevertheless the possibility for enabling more learners to nurture the connection between aesthetic experience and verbal articulation. Architects need to practise how to talk about what they do.

The steps taken in this chapter

Our proposed development of spaces of learning begins in **the cogenerated learning arena**. We set our learning arenas in relation to Schön's categorisation of the design studio as a **reflective practicum**, and can thereby point out that the design studio comes with problematic marginalisations of real risk as well as of safe opportunities for articulation, while the learning arena's evolving spatiality supports these crucial aspects of becoming an architect.

Risk-taking catalyses articulation and in our case included *the body*. Embodied engagement had an estranging function which opened up new

perspectives on material space, as our second finding shows. This circumstance is relevant to linger on, not only with our case in mind, but because *there is a general lack of bodily perspectives within architectural education*. Including the body is a point of departure for discussing both how material transformative spaces of learning and performative perspectives on the idea of transformation can be developed within architectural education. We turn to the wider field of education and primarily to performance pedagogy to show how the understanding of educational space in relation to the body, or aesthetic experience as a source of knowing, can be rethought. Consequently, dangers and possibilities related to our third finding of how embodied experiences can lead to critical awareness can be discussed. We can also, in the wake of our fourth finding, begin to think of the space of learning as a shared **performance context** or a **liminal space** *belonging to a process* which can be thought of as a stabilising performative trajectory.

The educational perspectives selected provide approaches to materiality and the understanding of materiality as being formed in relation to processes of learning. They also involve the idea that learning and criticality can stem from encounters with unfamiliar phenomena. However, educational perspectives on the notions of performance and transformation in and of material space tend to remain intangible. Continuing the researcher's loop and picking up the thread from Thrift, *we turn to the field of theatre and performance for more direct access to transformative materiality*. We briefly introduce ideas on *what architects can learn from the theatre* and a few examples of *how architects and theatre-makers have collaborated on creating material spaces with educational functions*, with a focus on how such experiments have led to both directed transformations and possibilities for unpredictable change.

We introduce three spatial models which are basic in performance studies: **Plato's *chōra***, Friedrich Schiller's **play space** and Victor Turner's **liminoid space**. They all describe *space as generated through tension* and form a foundation for working with the cogenerative learning arena as a material space which challenges binaries, and thereby prepares for nuanced criticality. We then lift three models – Arnold Aronson's **environmental scenography**, Jacques Rancière's **sensorium** and Erika

Fischer-Lichte's materialised liminal space – and attempt to show how these models (which can be seen as continuations of the basic models mentioned) could enable developments of different aspects of our findings without forcing learners to transform in any given direction.

Each model could be used to reflect on many aspects of the findings, but we choose to focus on the following connections. Aronson's environmental scenography provides, through principles and examples, a range of techniques for spatial organisation through which experiments with rough exercises, a condition for our second finding, could be taken further. Rancière's sensorium is a space in which the principles of juxtaposition and rupture enable critical and yet constructive distances between the existing and the new to be set up, therefore allowing us to develop our third finding, to enable further tests with the divide between concept and realisation and the open kind of critical awareness it entailed in our case. The liminal space as materialised and put into unpredictable staging processes by Fischer-Lichte gives us input to develop both our second and fourth findings, to enhance the value of embodied experience and suggest how its transformative potential can be planned for without being forced. That is, we begin to answer the questions connected to our projections, regarding how material spaces of learning can be developed. Our first finding, of the benefits of the cogenerative model, is both a basis for and a receiver of our hypotheses, because it points to how this model could be developed. However, to take our projections into the everyday of the education through course designs remains a future task.

Opening up the design studio to real risk and opportunities for articulation

Schön describes the design studio as an intermediate space localised between the realms of the everyday, practice and academia, and belonging to a category he calls reflective practica.³ The reflection going on in there has "critical" and "restructuring" functions.⁴ However, as we have seen, his work has directly and indirectly contributed to a reinforcement of the stable tradition of architectural education. It is relevant to return to the

reflective practicum, not to target Schön, but because the model is probably the most well-known conceptualisation of the design studio and is therefore suitable for rebuilding the existing rather than proposing strictly new or other spaces of learning. Two differences between his and our studies are openings to such rebuilding. First, we point to a difference regarding the introduction of *real risk*. Second, we point to a difference between how *opportunities for reflection and articulation* are implemented. We argue that *the differences are bound to understandings of what a space of learning can be*. Because, while Schön's understanding of architectural education is reflected in and supported by the studio as container space, the basic idea that methods and spaces of learning are mutually dependent triggers us to imagine spaces of learning that materialise the tension between transformative meetings with reality and structured collective reflection on these.

We have seen that to include embodied and social *meetings with reality* (i.e. an emphasis on *making-based forms of learning*) is challenging and therefore especially rewarding. The reflective practicum can be understood as a space where transactions with reality are made.⁵ Schön launches the studio as a collective space and virtual world that should replace the master–apprentice model and in which tools and appreciations are shared instead of given.⁶ However, the fact that he focuses on the architect as a studio-based designer of *representations* of physical objects that occupy space suggests that the architect's transactions with reality are made at a distance from reality.⁷ In fact, Schön enhances the value of that the reflective practicum is freed from the risks of the real world, so that the educator can shape the level of risk by either emphasising the rules of inquiry or letting the students "develop new rules and methods on their own."⁸ Nevertheless, his work reduces risk as he repeats one primary example of interaction between the educator Quist and the student Petra, which follows a traditional pattern where techniques and procedures for designing or learning to "think like" an architect are handed down from a master to an apprentice who is expected to unlearn what s/he knew before entering the studio.⁹

Based on our findings, we know that the fact that Schön stayed outside real situations of architectural education, i.e. he did not expose

himself as a researcher to risk, is a fact likely to have contributed to his maintenance of established agreements on what architects do and how they learn. Moreover, his division between reality and virtuality reduces the complexity and uncertainty which he claims to understand as essential. When Quist, as Schön says, "conducts his experiment in the virtual world of the tracing paper," the drawing might be enough for him and other experienced architects to feel as if they move through space.¹⁰ However, we argue, when the learner imitates the master's way of making a drawing, the essential connection to the lived experience, which involves taking real risks, is lost, and the learner is decontextualised so that s/he can become part of an established context. If Quist "had to experiment by shovelling dirt on the site, the process would be impossibly long and expensive!," Schön exclaims, and this might be true, but our cogenerative dialogue shows that the learner's own embodied experience of material space is essential.¹¹ If learners actually engage in physical actions, they might question if the right way to project or represent their experience is at all to draw or make a model to scale, and such transformative experiences of learning appear to be keys to changing architectural education from within. In other words, to move in and out of the studio is valuable.

Schön highlights the conversational nature of learning in the studio and the value of reflection-on-action but focuses on the master's voice and actions, while we have seen that the implementation of a form of collective reflection (i.e. an emphasis on *participatory forms of learning*) – the cogenerative dialogue – enables learners to *articulate and thereby criticise habits*.

The practitioner, by contrast to the scientist, experiments in relation to a moving target and thereby actively transforms the situations in which s/he engages, says Schön.¹² That is, problems and solutions change throughout design processes, and the kind of objectivity that can be reached is always relative to the designer's appreciations. This is where the academic rigour of reflective practice lies, and it is therefore crucial, Schön argues, that designers train themselves to express their tacit knowledge, why and on what grounds they make their decisions.¹³ This is a reasoning we can follow with our findings in mind.

However, while Schön sees a new "epistemology of practice" as the goal of articulating how practitioners know, we propose, based on our methodological discussion and case study, that it is crucial to include also ontological dimensions of knowing, as for instance the threshold concepts framework does and the cogenerative model allows for.¹⁴ Entailed in the epistemological approach is the idea that articulation can lead to practitioners becoming aware of their own ability to convert messy situations to "well-formed problems" which they solve by applying established techniques.¹⁵ By contrast, our cogenerative dialogue shows that reflection can be an ongoing negotiation of what is known, including, as we have seen, embodied, affective and social experiences that are hard to frame as epistemological. Schön's epistemology is one of tacit knowledge, and Polanyi's concept – as slippery as it is common – lives on among architectural educators. For instance, when Booker and Rødne were to describe the aims of *Making is Thinking*, the idea of understanding and communicating the architect's tacit knowledge appeared, and Salama describes the tacit as an element of "making knowledge."¹⁶ Listening to, among others, Klaus Nielsen, we become aware that the use of the term tacit knowledge contributes to keeping transformative risk and articulation outside architectural education, because either, if seen as mysterious, the tacit will be impossible to talk about, or, if seen as established conventions which can be made explicit in an epistemology, tacit knowledge distances itself from any call for change.¹⁷ That is, the notion of tacit knowledge risks contributing to the stagnation of architectural education, and new articulations and spaces for articulation of how architects learn and know are needed.

Outlines for working with our projections

We turn to the fields of education and theatre respectively to point to how our two projections may be developed and how new possibilities for articulation might emerge.

Educational perspectives: Performative critical spaces of learning

In the tradition of experiential learning, learning signifies a process where individuals *through reflection transform* concrete experiences or actions into the conceptual realm of knowledge.¹⁸ This is a basic principle in our study as well as in the work of Schön. In particular, the work of Dewey on experience-based learning was foundational to Schön's research on architectural education.¹⁹ However, based on our case and the idea that the mutual dependencies of the architect's practice should characterise architectural education, we point out that Dewey and Kolb see learners and their contexts as dependent on each other in processes of transformative reflection, while Schön (and thus many architectural educators) tends to present the architecture student as someone who adapts to a given context.

An experience "is always what it is because of a *transaction* taking place between an individual and what, at the time, constitutes his environment" – a situation and the individual's interaction with it cannot be separated, Dewey says, because individuals live in the world.²⁰ And, Kolb continues, learning is a process in which experiences are transformed into knowledge and the transformations involve the learner, his or her internal reflections and the context/situation s/he belongs to and manipulates.²¹ That is, experiences consist of transactions which in turn can lead to the transformation of the individual *and* his or her intellectual, social and/or physical environment. Since experiential learning in the spirit of Dewey and Kolb prepares learners for acting in democratic societies, learners are encouraged to leave the isolation of the institution and the established knowledge perspectives fostered there to act in the

real world and thereby realise that there are other perspectives.²² In turn, Dewey and Kolb allow us to depart from the architect as maker of representations in the studio and think that architects know by making transactions with reality as they move between studio and reality, representation and experience. The idea of "mutual transformation" is thus a basic idea of experiential learning. It aligns with Bateson's double-bind theory and Levin's description of the learning arena as one for mutual learning, and it supports the understanding – expressed in our second and third findings – of real experiences as transformative sources of knowledge. Consequently, we suggest that the cogenerative model is worth developing as a structure which makes this idea workable within architectural education.

Performance with or without bodies

That sensuous experience is a key to knowing the world differently is foundational to aesthetics. As Alexander Gottlieb Baumgarten, who first expressed the modern understanding of aesthetics, stated, "die Ästhetik . . . ist die Wissenschaft der sinnlichen Erkenntnis."²³

Our case study shows that embodied experiences can function as estranging openings towards experiencing reality anew (Finding 2). The body remains peripheral not only in Schön's work but generally in research on architectural education.²⁴ For instance, though Salama talks of the spatial experience as the architect's primary source of knowledge, his perspective on architectural education does not give any particular attention to the actual experience of space, the embodied and material, *the aesthetic experience in itself* – which in our cogenerative dialogue emerged as a pivotal catalyst of new knowledge. We also know from the interview with Booker and Rødne that the body and the performative were implicit rather than explicit to Making is Thinking. Thus, it becomes more relevant to develop, as our projections propose, perspectives on architectural spaces of learning which include the body and materiality.

Themes regarding lived dimensions of learning, such as liminality and uncertainty, are increasingly central in contemporary educational

literature. For instance, Ronald Barnett discusses the value of "a pedagogy of strangeness" and of "mutual risk."²⁵ Such foundational concepts of contemporary educational theory become related to the body and materiality in *performative perspectives on education*. To open up for such perspectives in mainstream architectural education, we begin with Schön's understanding of the professional practitioner's "artistry" as performance, which arguably has influenced many architectural educators' identity.²⁶ He uses performance to set the architect in relation to both other aesthetic practitioners and academia. However, his understanding of this notion reflects his exclusion of real risk and learners' opportunities for articulation, for instance when he describes how the master's demonstration becomes meaningful to the student when she follows his performance.²⁷ What he thereby does is to use the notion of performance to enhance the idea that there is a stable context to which the learner adapts.

At the same time, Schön argues – just like *Making is Thinking* – that practitioners can learn to challenge their professional norms by looking to other traditions of education for performance as well as to other modes of designing within the design field and (other) fields of art.²⁸ The architect could then become less focused on products and more focused on process, and the architectural educator could, in turn, make students see their learning process as one of continuous reconstruction.²⁹ Such an argumentation echoes that of Rødne and Booker, and we have seen how the cogenerative model supported a focus on process rather than product. Moreover, as mentioned in the first chapter, Schön's reflection-in-action involves both making and participation, it seems, as it implies having a "conversation with the materials of a situation."³⁰ In fact, he uses performative terms to describe this non-verbal conversation as one in which the more or less predictable "projected moves"³¹ of the participants form an ongoing "collective performance"³² of designing. Accordingly, to create a drawing can be thought of as a performance rehearsal in which the architect, similarly to a performer who improvises on a stage, experiments with aspects of reality.³³ Nevertheless, again, the drawing or model as mediator in a conversation in the studio takes a step away from performance in real space, i.e. real risk, as Schön talks about the drawing

as an efficient tool for communication and forgets the body and the emotions of the one who draws.

Elizabeth Kinsella suggests, and we agree, that though Schön moves towards the aesthetic experience, he maintains a Cartesian separation of body and mind which hinders him from embracing its power.³⁴ We saw that by introducing the embodied experience as strangemaker and pairing it with collective reflection, ethical dimensions of the architect's practice became accessible to our colearners. This chain of findings align with another point Kinsella makes. She states that a consequence of Schön's focus on the mind of the individual learner is that he, by contrast to Dewey, excludes the Other and thereby the ethical dimension of practice, which includes an understanding that not just social relations but also the material outcomes of a practice depend on social, cultural and historical circumstances.³⁵ Kinsella yet sees seeds for embodied reflection in Schön's work, and she proposes that further investigations into the aesthetic dimension of the experience of practice can challenge epistemic and instrumental narratives of practice. This proposal is a springboard for the rest of our discussion.

Elyse Lamm Pineau, a central scholar of performance pedagogy, points to how educational theorists following Dewey tend to reduce the notion of performance.³⁶ Dewey's idea of how aesthetic experiences in education could be "peak experiences" catalysing learners' ability to use their imagination and sensibility has been used to "play out the metaphor of teacher as artist."³⁷ Her critique makes us see that the way Schön uses the notion of performance primarily to enhance teacher-centred instructional communication reduces the idea of educational experience as aesthetic communication. While we have seen how the body is marginalised in the studio, Pineau states that the inclusion of *the body as a medium for aesthetic communication* is the fundamental reason that performative approaches allow for new ways of knowing.³⁸ As an alternative to putting the body on display, Pineau suggests that the body can be a "medium for learning" used to explore real and imagined experiences through sensory and kinaesthetic enactments of those experiences.³⁹ Such "exploration-through-enactment" can be set up as a series of workshops in which learners experiment with how to

characterise experiences.⁴⁰ Pineau proposes that isolated educational exercises can be thought of as performances, i.e. acts or events set up in *and* activating a specific situation, and that movement between action and reflection in educational settings can be thought of as a performative discursive "trajectory" or "stabilising process" to which performance acts belong.⁴¹ Hence, with our fourth finding in mind, regarding the value of the processual, we may think of the activities in the design course as a series of performances forming a learning trajectory in which our colearners, by reflecting upon their experiences, started trusting what they learnt *through* their bodies.

A risky combination: Critical and performative pedagogy

We have seen that embodied exercises can function as estranging keys to transformative experiences of learning, and that the cogenerative dialogue as a stabilising structure of reflection made the critical effects of these experiences last, and in turn functioned as a path towards verbal articulation of discourse (Findings 1 and 4).

Pineau gives a fruitful perspective on this insight as she says that performance is a method for transformation through engagement with the unfamiliar, and its transformative potential lies in the fact that learners engage their bodies and then reflect upon their bodily experiences and thereby become able to break through habitual patterns of thought.⁴² That is, Pineau's performance pedagogy allows us to further understand the relation between embodied experience and critical awareness in our case (Finding 3). However, the necessity of reflecting upon the notion of criticality itself is actualised as we see how educational scholars suggest that experience-based learning should be combined with perspectives from within critical pedagogy and critical theory, perspectives which risk leading to directed rather than open kinds of transformations. When we argue for the value of the cogenerative model, we must be aware of the risks of upholding a criticality based on binaries as well as of proposing yet another conceptual model parallel to the everyday practice of education.

Like Dewey, critical pedagogues such as Paulo Freire and Henry A. Giroux hold that if citizens are educated to be aware of their possibilities to think and act critically in order to influence society's development, pedagogy can transform societies from within. The idea of transformation is here associated with a kind of criticality enhancing the learner's ability to change the situation s/he is in by going against a prevailing power, while affective and uncertain dimensions tend to be reduced.⁴³ We know from the introduction that this is a problematic kind of criticality architects often practise. Such convictions may trigger educators and learners to action. However, they could, if communicated to learners, reduce rather than support their ability to think independently. Thus, it appears potentially troublesome in the light of our findings that, among others, Pineau and Salama bring forth critical pedagogy. Salama suggests that spatial practitioners could develop the heritage from Dewey in another direction than Schön did by drawing on Giroux's idea of transformative pedagogy and its inclusion of relations between design solutions and values, and thereby become "well-informed critical thinkers" able to reflect on their responsibilities.⁴⁴ Pineau proposes that a combination of performative pedagogy with critical pedagogy can support the importance of critical reflection within the former and expand the possibilities for pragmatic engagement in the spirit of Dewey and Freire in the latter.⁴⁵

In the first chapter we described action research as a platform upon which mixed approaches to method coexist. Action research – and thus the cogenerative model – includes an understanding of personal dimensions of transformative learning in the tradition of Mezirow. Moreover, experiential learning and reflective practice hold values action researchers should be able to transfer into interventions *and* research.⁴⁶ To introduce performative perspectives for making interventions with a transformative potential on this platform can thus be seen as a logical step. As we develop our projections, however, we must also deal with critical pedagogy as one element, because action researchers' understanding of transformative learning as leading to critical reflection includes the heritage of Freire, and especially the idea, recognisable in the cogenerative model, that new knowledge can be shared and participants empowered in dialogues characterised by "conscientization" involving transformations

of habits and roles.⁴⁷ Consequently, the idea of making students act "with the better of society in mind," which Rødne and Booker expressed and which is indeed embedded in action research too, must be accompanied by a questioning of *what* is better for society, and if change is always needed.

As we saw in our case study, the experience of meeting reality and the opportunity to reflect on that experience made learners breed an independent kind of criticality – one based on lived experience and not on the idea of taking a stand for the sake of being critical or being transformed for the sake of transformation. Rather than becoming well-informed critical thinkers who act with a societal and environmental conscience, the students in our process were describing how embodied experiences enabled them to understand the architecture-specific potential of material space and to question the foundations of what it means to design, namely the core of their own discursive context. Actual experiences of making and being in a space of learning were to the architecture students a powerful source of knowledge and articulation which should be given attention in itself, we came to see, and this finding appeared as a possible path beyond the cliché of the socially engaged architect who claims participation as an ideal. Could a performative expansion of the cogenerative model support this line of thought?

Yes, Pineau opens up to such possibilities. She argues that the terrain between performance studies and critical pedagogy is fruitful because it combines the idea that critical interventions are needed with the idea of renewal.⁴⁸ That is, learners and researchers can contribute to change (or decide not to do so), not only call for it. Moreover, the safe frame of the performative instruction, says Pineau, can enable learners to bring up sensitive issues and has made her as a researcher question if isolated instances of democratising exercises could revolutionise the existing education system.⁴⁹ In other words, as we have seen in our case too, a nuanced criticality stems from embodied engagement. Pineau suggests that the space of learning can foster such criticality if the educator, instead of thinking of himself as a master performer, thinks of the classroom as a "performance context" including communicative interactions between everyone present there.⁵⁰ The teacher who leaves his

or her physical position at the front of the classroom opens up for the possibility to enter a liminal space, she claims, an "uncertain, magical space of personal and communal transformation."⁵¹ Hence, with her we can begin to think of the material space of learning as a liminal space.

Pineau allows us to understand kinaesthetic movement between representation and experience as creating a space *inside* the classroom or studio. Another performance pedagogue, Mady Schutzman, describes how kinaesthetic perspectives can influence spaces of learning by revealing relations between educational content and structure as well as "the movement hidden in seemingly static aesthetic representations of the real."⁵² Consequently, pedagogical spaces can be changed to support the transitional nature of learning, and taken to its extreme, the space of learning stops being a container of or reflection of a learning process and becomes a mode of thought.⁵³ That is, she allows us to continue from Janssens and Lykke in the framing of the idea that our learning arenas went from being *about* sensuous experiences to *being* sensuous experiences.

There is to architects, as brought up in the third chapter, a potential in introducing performative perspectives that enable them to play with relations between the space of learning and the representations and projections made in there. Performative perspectives can influence the architect's habits of designing through representing at a distance. Several contemporary scholars elaborate on this possibility. The practices of Weinstein and Tisi, mentioned in the previous chapter, belong to a contemporary tendency of using performative perspectives to *move away from ideology* and into practice.⁵⁴ Keeping in mind our case as well as Cuff's and Latour's proposals for the transformative potential in expanding the conventional techniques architects use to represent their designs, this tendency has the potential to affect the stable tradition from within. Just like Schön but with an awareness of the body, among others Dyrssen and Weinstein propose that architects can think of themselves as performers.⁵⁵ To do so, says Dyrssen, allows for understanding how the staging of situations (actions) and construction of frameworks (instructions for actions) is simultaneous in descriptive–projective knowing and thereby for blurring "the boundaries between representation, conceptualization,

and modelling tools."⁵⁶ Staging, a notion to which we return below, thereby both prepares those involved for surprises and promotes surprise.⁵⁷ That is, estrangement techniques can affect the traditional core of the architect's practice, the conventional divide between representation and reality. Weinstein refers to Pineau when she argues that to design by moving between the "imagined space in formation" and scaled representations can give architecture students an understanding of their bodies as media integral to the design process which phenomenological and other common reflections on the body in architecture cannot give.⁵⁸ She has, just like we have, seen how the introduction of *material surprises* can interrupt solution-oriented and habituated architecture students. When she asked architecture students to construct spaces without a plan but through movement and with random donated materials, they reported that the open-ended way of designing was unfamiliar to them, and that even other design-build courses tended to favour predefined solutions.⁵⁹ From Weinstein we and other educational researcher-practitioners could learn how to develop our reversed process, *also within* container spaces.⁶⁰

Architecture meets theatre: Aesthetic spaces of learning

The educational perspectives mentioned open up to transformative materiality. Yet, we turn to the theatre to build upon our projections because here we can learn to *actually* experiment with transformative relations to reality in material space. As Katarina Bonnevier says, "[t]heatre is a representational form that realizes the dream of transformation."⁶¹ We know by now, from our case and from Thrift among others, that such realisation of dreams has the potential to challenge architects in their understanding of what architecture can do.

The literature on performative space is, as mentioned above, unexplored by architects. However, the idea that architects can learn from theatre-makers to rediscover the power of aesthetic experience is expressed by several contemporary scholars concerned with both fields.⁶²

For instance, Chris Salter describes how architecture and performance share interests because they work with transforming materiality through movements and actions in events with different durations, but that "architecture seems to have historically needed the theater to assist in pushing conceptual and structural boundaries" and that the theatre functions for architects as "a laboratory for exploration and as a staging ground for the fantastic and the visionary."⁶³ The idea of theatrical space as a "wake-up call" is also put into practice in educational milieus, for instance in the project "Le Théâtre des Négociations," a workshop run by Latour, raumlaborberlin and the Theatre of Nanterre-Amandiers in 2015, where students were invited to use theatrical techniques of representation to set up "negotiative spaces" for a fictive climate conference.⁶⁴

Connections between theatre and architecture have existed for a long time. We saw the value of Cirka Teater's push when our colearners involved bodies and feelings in spatial experimentation and we will mention a few other examples of educational theatre–architecture projects below. However, against the background of our case, in particular the first and fourth findings which emphasise the importance of safe structures and organised processes, we see a need for more – and *more institutionalised* – intense experiments. That is not to say that theatre-makers always have to be involved. Rather, architects could learn from other aesthetic practitioners' ways of working with material space and include these as elements of their repertoire, and thereby make, for instance, the shock and wonder of the theatre an *established* possibility for breaking up habitual patterns. There is a paradox embedded in this proposal, because is the institution not bound to suffocate shock and wonder? Our study shows that this does not have to be the case; Making is Thinking was able to challenge conventions from within. In fact, we saw that applied research contributed to the milieu being forced to continuously rethink itself.

Basic models of material spaces enabling, not pushing for, transformation

We have proposed that understanding spaces of learning as material aesthetic experiences can be a key to critical reflection, and that performative perspectives on such spaces may inform architectural education (Projections 1 and 2). Attempting to address these proposals, we begin to look at the learning arena through three well-known models for performative understandings of space, which twist the architect's habitual understanding of space as stable container. These models – Plato's *chōra*, Schiller's play space and Turner's liminoid space – have in common that they describe space as continuously generated through tension.

The Greek word *theatron* means "a place for viewing," and theatre thus "indicates not just an art but also a place and a space."⁶⁵ The stable theatre house may come to the architect's mind, but based on our case we suggest that it is the space generated between actor and spectator, inside and outside, illusion and reality s/he needs to know more about. *Chōra*, says Plato in *Timaeus*, is a space without characteristics which receives and is formed by the actions and things it is surrounded by, and its transformative appearance has the potential to strike humans with amazement.⁶⁶ This notion – made graspable as the space of dance in classical Greek theatre by Aristotle and described by Nietzsche as *choros*, the "participatory space" in between the *theatron*, the space of the audience, and the *skene*, the space of the performers – has been brought up as one through which architects can learn to think of space as a between in becoming.⁶⁷ Alberto Pérez-Gómez even argues that the tension between form-geometry-idea and matter-body-reality, which is fundamental to architecture and to our study, has its most original form in the *chōra*.⁶⁸ Here, we will look to Aronson's environmental scenography as an archive of principles and examples which can make the basic idea framed by the notion of *chōra* workable.

The idea of the aesthetic experience at the theatre as one which can cause wonder has famously been described as educational by Friedrich Schiller. The tension between reason (form) and senses (matter) is articulated and played with in aesthetic experiences and these experiences

can therefore have either the function to form good citizens according to given templates or an emancipatory function through which individuals can be transformed to think independently. Schiller himself moves between preferring the former and the latter function, while the idea of the aesthetic experience as emancipatory has been developed by contemporary scholars, most explicitly by Rancière, to whom we will return below.⁶⁹ To engage in aesthetic experiences, says Schiller, can be a way of training one's ability to relate to others and to alien situations because in this between one will stumble upon "phenomena that our prejudice has caused us to ignore."⁷⁰ Thus, we see that the element of strangemaking, recognisable from Shklovsky's as well as Berger's descriptions of how aesthetic experience can lead to the challenging of habits, reappears through history.

We have brought up the notion of liminal space here and in previous chapters, not least to describe the transformative experience of learning as having a liminal or in-between character in our case (Finding 4). This notion is often used to frame immaterial aspects of performance. We have seen how this is done by threshold concept scholars.

Dyrssen and Weinstein lift the liminal as something additional to architectural materiality. "Apart from investigating materialities, spatial thinking in modelling and experimentation can . . . stage . . . *liminal states*," says Dyrssen, and Weinstein holds that to design on the go is to enter a "liminal space-time that opens up to unknowns" where process rather than material space is the object of design.⁷¹

Moreover, the liminal space is often associated with linear transformation from one state to another. To instead *materialise the liminal space as between rather than passage* we begin in Turner's distinction between rituals with three linear liminal phases from "liminoid" social dramas.⁷² Here, we will point to Fischer-Lichte's model for materialised liminal space *as a continuation of the liminoid* and as a possible path towards research in the wake of our study. Turner's differentiation of the liminal and the liminoid is essential to us since the former is a path towards becoming one with a culture, i.e. adapting to an established context, while the latter either reinforces or undermines prevailing orders, for instance by composing the familiar in unfamiliar ways so as to enable new

perspectives on the world.⁷³ Just like our conversations in the cogenerative dialogue, social dramas are staged on "arenas" and Turner materialises the arena when he describes it as "a scene for the making of a decision" which can, for instance, be set up in the streets of the city or at the theatre.⁷⁴ It is also important, in relation to our case, to note that Turner describes the theatre as having an educational function in the sense that it can express institutional structures in novel or unexpected ways, a function which before the Industrial Revolution was assigned to law and religion.⁷⁵ Both citizens and academics can learn to question given positions and institutionalised structures by going to and/or working with experimental theatre, says Turner, who himself was a researcher in Richard Schechner's experimental theatre company, the Performance Group. Performance and drama can, he states, make pedagogy come alive because to enact a lived-through experience is a way of learning.⁷⁶

We described the basic idea of space as continuously generated through the three models above. We have learnt that spaces in becoming can be used to form humans. This is an essential reminder to us as we develop the cogenerative learning arena. We will now display a few more concrete examples of theatre–architecture experiments which illustrate the coexistence of emancipatory and disciplinary potential entailed in materialisations of spaces of learning.

Trial balloons to learn from

The models above describe the space in tension as one unit, often placed inside the theatre house. Architects and theatre-makers have collaborated on experiments by multiplying and fragmenting such units in different locations. Our case therefore sits in a long tradition of theatre–architecture experiments. The idea of inviting others to physically take part in spatial experiences rather than sit still in front of a finalised presentation and to, as Berger described, see scenography as movement, central in our case, can be traced back for instance to Baroque theatre,⁷⁷ where the central perspective was exploded into representations of the world as in movement and as an environment in which humans move, and to avant-garde experiments where architects and theatre-makers collaborated with

the total experience of the *Gesamtkunstwerk* as a point of departure for spatially distorting established relations and phenomena.⁷⁸

The avant-garde architecture–theatre experiments often had an educational function in the sense that they enacted imagined futures. According to Dorita Hannah, especially the avant-garde work of the Bauhaus and the Russian Constructivists offered momentary alignments between architects and theatre-makers.⁷⁹ For instance, Vsevolod Meyerhold collaborated with the architect El Lissitzky and the stage designer Lyubov Popova in Constructivist stagings with mechanical installations placed on and off stage with which actors could interact, so that the spatial design went from being a backdrop to influencing the production. Meyerhold's early work, before 1917, was characterised by a distance between reality and representation where the agency of the city, just like in Bertolt Brecht's plays, interrupted the performance space and thus undermined the idea of the performance space as a passive container.⁸⁰ Reality was thus intensified, and this effect was increasingly used for political purposes after 1917. At the early Bauhaus, the avant-garde connections between theatre and architecture were brought into architectural education by among others László Moholy-Nagy, who investigated space as a dynamic material which can be sensed and shaped in processes of *Raumgestaltung*, and Oskar Schlemmer, in charge of the theatre workshop between 1923 and 1929, who saw the function of performance within an educational setting as a "trial balloon" for architecture.⁸¹ As mentioned in the introduction, the playfulness of this trial balloon between concept and realisation was marginalised when the Bauhaus more explicitly took on the task to improve society. In fact, most modernist architects refrained from experimentation, for instance through collaborations with theatre-makers, and focused on making things work in the wake of wars and industrialisation.⁸²

As we now know, the focus on being functional or "realistic" – a focus we have seen in fact leads to architects turning away from the real – dominates architectural education before and after the avant-garde. We have seen that forms of learning that rely on making and participation can reintroduce reality. We are not at all the first to make this point. In fact, performance art, as it emerged in the United States during the 1950s, as

well as the reconceptualisation of performance to include non-artistic events,⁸³ made possible through the work of Turner and other social scientists during the 1970s, influenced architectural practice and education.⁸⁴ This is a development the authors within the Spatial Agency and Radical Pedagogies projects as well as Vardy and Udall have paid attention to.⁸⁵

One of the most prominent examples of a theatre–architecture space with an educational function from this era is based on Brecht's spatial strategies for doubling fun and estrangement. The Fun Palace, an unbuilt "university of the streets" where "knowledge will be piped through jukeboxes," was designed by the architect and educator Cedric Price and the theatre director Joan Littlewood during the 1960s.⁸⁶ It is worth highlighting as an entertaining and thought-provoking illustration of risks with strangemaking, not least because it was introduced to our colearners. The estranging interruption of the performance space practised by Meyerhold was most famously developed by Brecht. His spatial strategies of estrangement are, according to Schutzman, one source of inspiration for educators who want to activate learners by constructing unstable grounds which catalyse movement between perspectives.⁸⁷ Hearing this proposal and looking to The Fun Palace, we must remember that it is widely debated if and how Brechtian techniques of strangemaking contribute to directed critique based on political convictions or open critical thinking.⁸⁸ The unbuilt palace is an illustration of this dilemma. Its design is reminiscent of ours, a giant scaffold where "architectural" stable elements and "theatrical" ephemeral elements are combined,⁸⁹ but it was made as an explicit protest against the British education system.⁹⁰ The Brechtian inspiration comes through in the fact that elements of the scaffold were to be programmed to change according to needs and desires. Though entertaining and perhaps emancipating in a paper project and in a temporary theatre space, such a spatial strategy risks making a built urban structure a machine with spaces for educating "good" citizens.⁹¹

It seems more productive for us to look to the educational work of the dancer, choreographer and educator Anna Halprin and her husband, the landscape architect Lawrence Halprin. Choreographic singular exercises and processual structures are here set up so that habits can be

questioned through embodied actions. Anna Halprin developed her instructions for dancers and other students in relation to her own transformations with the intention to avoid getting stuck in predictable cause–effect patterns,⁹² and Lawrence Halprin transferred choreographic notation principles to his architectural design processes.⁹³ Just like many of their contemporaries, the Halprins were driven by goals of emancipation, but their work can be seen as an enacted continuation of their educational background in the traditions of Dewey and the Bauhaus, where the political is bound to questions of what it means to be human, explored through challenging relations between individuals and collectives, insides and outsides of the theatre house, dancers and architects.⁹⁴ They show *how* the body, in architecture and dance as aesthetic practices, can be a key to going beyond predefined divisions and to literally move in "betweens" where concepts – verbal articulations for communicating between disciplines – are shared and formed in collaborative milieus rather than applied from ready-made theories. We can learn from their handbooks where workshop experiences and processes are documented. For instance, we could look to our case through the filter of the "RSVP cycles," a theory and model described after the "Experiments in Environment" workshop in 1968.⁹⁵ Our oscillating process then becomes a cycle where we worked with available Resources, or all the known quantities in a situation, and Scores, or instructions through which educators can adjust the level of risk or strangeness to each learner, and thereby catalysed Valuation, or constructive evaluation or reflection upon *how* the activities (drawing, model-making and building in our case) were carried out or Performed. That is, the RSVP cycle offers us a starting point for naming and categorising through which we can communicate and negotiate essential elements of architecture as an aesthetic practice in which human experience is included.

Zooming out from the examples again, we repeat the importance for educators to know the difference between open and directed opportunities for transformation. Theatre scholar Matthias Warstat warns against "applied theatre," a category of processes with political and pedagogical aims set up outside theatre institutions – for instance in educational milieus – which promises to support academics who, like we do, turn to performances as participatory processes prompting "reflection

on their own material preconditions."⁹⁶ Warstat states that theatre as a promise of reflection within education often is founded on radical ideas from theatre-makers like Brecht but risks serving neoliberal demands on individual progress, especially if the focus lies, rather than on aesthetic expression, on enabling participants to process problems through transformative situations taking them closer to a predefined goal.⁹⁷ We must therefore look for paths forward without forgetting that to understand the space of learning as *aesthetic* experience means that transformations *can* occur, not that they have to.

Possibilities for expanding the cogenerative model: Three aesthetic models

Engagement in theatrical space involves a risk of getting detached from reality. However, as our findings show, it also has a potential of twisting and thereby making it possible to question the given. How can we create estranging intensity without forcing transformations upon learners or disconnecting them from the conventions of their practice?

Based on our analysis of our field of inquiry, architectural education, and our case study in that field, we have come to see the idea of building upon the existing as central, and we will now point to Aronson, Rancière and Fischer-Lichte to briefly propose spatial models which can help architectural educators do so. The models fend off – or at least give instructions for avoiding – risks of that the embodied, affective and social are used for purposes of entertainment without any transformative intent, or that false promises of transformation and real participation, which tend to follow from aesthetic theories concerned with socio-political content rather than with aesthetics, are given.⁹⁸ Such risks, which we recognise from the discussion of the avant-garde notion in the introduction, come not least with the festival or "city staging."⁹⁹ Or, as Warstat pointed out, when theatre is applied to education.

Composing relations between models

By setting the aesthetic models in relation to the cogenerative model, we wish to draw on and solidify our findings regarding the power of aesthetic experience so that *this power in itself is taken care of within educational settings*. The cogenerative model is an example of a structure which can *frame* these aesthetic models so as to make them workable in educational settings. It then functions more or less as it did in our study, as an educational, immaterial construction which triggers articulation. However, when we now talk about *expanding* the cogenerative model, we depart from how the learning arenas materialised in our case and the circumstance that the aesthetic models exist in both conceptual and tangible realms to propose that the learning arena can be made workable as an immaterial *and* material construction. Consequently, we propose that it could be fruitful to compose the relation between the cogenerative model and the aesthetic models by placing concepts and principles of the aesthetic models *on top of* the cogenerative model to bring out the material dimensions of its elements, the loops and the arena.

The environmental

As mentioned above, we focus on our second finding when we look to Aronson's environmental scenography. His principles and examples of spatial organisation could, we propose, be used for further experiments within architectural education, also without the presence of a theatre company.¹⁰⁰ Foundational to Aronson is the idea that though some might think that spatial reorganisations at the theatre can materialise revolutions or other unifying goals, the eternal motivation of theatre-makers is the impossibility of bridging the distance between actor and spectator.¹⁰¹ With the notion of *chōra* in mind, we may understand this distance as an evolving and context-dependent space. Aronson's work could function as an archive of different ways of concretely experimenting with this "between" space, thereby allowing us to position our case as well as point ahead.

Ritual performances, outdoor stagings in eighteenth-century France, street theatre, political demonstrations, avant-garde theatre, postmodern dance (for instance the work of the Halprins),¹⁰² site-specific theatre and immersive theatre can all gather under the environmental umbrella, says Aronson, because they are characterised by experimentation with spatial organisation and involve the interaction between the physical space and the spectator in that space.¹⁰³ To include spaces of learning under this umbrella appears possible, especially since Aronson provides a link between the foundational idea and the concrete examples by categorising different principles for how environmental spaces can be arranged, and though they simplify reality, they are possible to work with as starting points for architectural experimentation which begins in the human individual and his or her experience of space.¹⁰⁴ If we do so, we may learn from Weinstein who has drawn on Aronson to set up a course and a methodology for combining intellectual and embodied forms of learning and thereby enabled students to engage as whole persons as well as redefine their professional roles.¹⁰⁵

Aronson's examples and principles could be used to set up risky situations to be reflected upon through the frame of the cogenerative model. Or, we may place the foundational idea of environmental theatre as a filter on top of the cogenerative model. Just like the cogenerative dialogue begins in the expectations of those who participate and evolves in relation to the events on the field, there is neither play nor performance space prior to the collective creative process behind an environmental production, and changes of design and construction occur at any stage in the environment which is a process that starts with rehearsals and continues during the performance so that the line between process and result is dissolved.¹⁰⁶ This is how the space of the theatrical event is to Aronson, as Hannah says, "a 'transformational agent' through the built environment itself as an enveloping scenography."¹⁰⁷ Looking to the cogenerative model through this filter, we can lift the material dimensions of cogeneration which were essential in our case and begin to think of the learning arena as an environmental space where relations between educator and learner, school and reality are tested through rehearsals.

The juxtaposed

Rancière's sensorium lets us develop our third finding because it emphasises that nuanced criticality can stem from aesthetic experiences, and it does so by spatialising a divide.

Rancière draws on Schiller to argue for the emancipatory function of aesthetic experience as he describes the event or modelled future as a staging of *dissensus* in a *sensorium*, a space where rules are suspended.¹⁰⁸ He strives for an aesthetic revolution, and yet he claims there is no predefined consensus on causal relations between artistic intention and political subjectivation in aesthetic experience – it makes you think, but does not tell you what to think.¹⁰⁹ Whether he holds his promises has been questioned by Aronson who problematises Rancière's idea of the emancipated spectator.¹¹⁰ However, Rancière is attractive to architects since he encourages the translation of spatial concepts into real spaces because matters of space and place are "crucial to today's issues of power and community."¹¹¹ This is a thought the architectural educator and theorist Keller Easterling has developed.¹¹² She proposes that architects can learn from the theatre and especially from Rancière to expand their "repertoire of political activism" and play with dominant orders (rather than either going against or avoiding them) by learning to use performative techniques so that they can work with architecture as active form instead of using static geometry to represent architectural stable space as if in motion.¹¹³ They should, in other words, learn new aesthetic techniques for negotiating with reality and be able to articulate how and why they do so. Though Rancière's proposal, and in turn Easterling's, entails risks of politicising education, we argue that the sensorium is, together with the liminoid space as well as Foucault's heterotopia, a spatial model which is valuable because it points to the potential of enacting critique of the status quo not by turning one's back on it but by *juxtaposing* reality as we know it with imagined futures.¹¹⁴

The benefit of introducing juxtaposition is that if the event is presented as a momentary rupture in the existing which holds something totally new or unexpected, there is a risk for a simplifying dualism between the existing and the new.¹¹⁵ Learning from the theatre to create

experiences which avoid this dualism is tricky because theatre, Rancière argues, has been "caught between two types of pedagogy" since the avant-garde, namely a traditional one of representational mediation to passive spectators and one which strives for ethical immediacy through activating spectators in a certain direction of thought. Both these "theatrical pedagogies" miss out the idea that critique means "separation" and that critical art should enact an aesthetic distance which gives the spectator opportunities to move between engagement/participation and reflection, says Rancière and points to the sensorium.¹¹⁶ The sensorium forces a gap (or "between") between ways of doing (*poiesis*) and interpretations of and affective reactions to what was done (*aisthesis*), while these two overlap in spaces characterised by consensus.¹¹⁷ That is, it *spatialises Shklovsky's prolonged perception*. Looking to our case, the tension and movement between the engagement in the exercises and the reflection in the cogenerative dialogue as well as between the site and the proposals for the future were in our findings conditions for transformed understandings of relations between how things are done and what reactions they cause. With Rancière we can argue for the importance of this tension through which criticality (hopefully nuanced) emerges, and, in turn, suggest that the cogenerative model is valuable as a concrete means for upholding it in aesthetic education. More specifically, we can point out that the principle of juxtaposition, which also characterises the bricolage approach of Making is Thinking, is relevant to keep in mind when designing material spaces of learning.

The material liminal

We introduced Turner's liminoid as a point of departure for understanding how the liminal space can be materialised as an oscillating between of learning. The liminal space as described by Fischer-Lichte gives us input as to how to develop the relation between the intense moment of embodied experience (Finding 2) and processes enabling such moments and making their effects last (Finding 4). Fischer-Lichte's liminal space can be seen as a continuation of Turner's liminoid because she

describes the aesthetic liminal experience as always liminoid to its nature, while non-aesthetic liminal experiences lead into this or that.¹¹⁸

On an overarching level, Fischer-Lichte's realm of "transformative aesthetics" presents itself as relevant to architects because it is placed in a tradition where theatre is spatial rather than textual. She understands the fleeting yet material space of performance as related to stable "architectural-geometric" space, and claims that the history of architecture and stage design should include both.¹¹⁹ In addition, she provides a range of historical and contemporary examples through which, among other things, the relation between architectural and performative space can be discussed.

Moreover, Fischer-Lichte's aesthetics offers two sub-levels for building upon our findings. First, she describes a set of concepts and principles for materialisation of transformative experiences and processes which can be attached to the cogenerative model. This set can support further discussions of how material spaces for cogenerative learning can be arranged. Second, her work embraces what we saw at the core of our study, namely that aesthetic experiences stemming from concrete processes characterised by participation and making can open up to deep dimensions of what it means for humans to belong to, know and change the world. That is, she prepares the ground for *rethinking aesthetic experience* as a source of critical reflection and ethical awareness within educational milieus. This makes her work especially relevant to us and our description of the architect as an aesthetic practitioner.

Although Fischer-Lichte claims that no representation can substitute the lived experience of performance, she states that descriptions and categorisations must be made because they enable discussions and comparisons between examples of experimentation with performative materiality.¹²⁰ She implies that processes based in aesthetic experiences must include structures for talking about those experiences if what one learnt through one case is to be spread to other cases. This is something we already know and can take further through her descriptions of how the materiality of liminal aesthetic experience is produced. We found that encounters with reality and primarily embodied such catalysed negotiations of habitual roles and procedures which influenced the

direction of our feedback loops and our learning arenas. These negotiations can be seen through Fischer-Lichte's understanding of the materiality of the performance as unpredictably emerging, i.e. undergoing continuous transformation, in feedback loops set in motion by "bodily co-presence."¹²¹ In this materiality, binaries are blurred and roles reversed, so that for instance the relations between actor and spectator, production and reception, presence and representation can be experimented with. By defining *corporeality*, *spatiality* and *tonality* (and *temporality*, the definition of a timeframe, as a basic condition) as *strategies* for such experimentation, she prepares the ground for us to meet other aesthetic practitioners, researchers and educators in performative perspectives on spaces of learning.¹²² For instance, we can transfer the binaries she mentions to our learning arenas, and thereby frame our negotiations of relations between educator and learner (actor and spectator), making and experience (production and reception), reality (presence) and representation as dependent on an evolving materiality.

In addition to letting us understand the space of learning as a material process in itself, Fischer-Lichte provides a foundation for discussing it as belonging to *processes stretched out in time which involve reflection*. Staging is, as she states, the process including rehearsals of aesthetic experiences with transformative potential. This is a tangible process, because the aesthetic experience is in fact very down-to-earth; it is the individual's perception of "the sum total of material, forms, devices and means applied by an artist in bringing forth an artwork/event."¹²³ Throughout the rehearsals, Fischer-Lichte's strategies of experimentation can support tests with and discussions about what that sum total should be. The now of the theatre – or the embodied experience of learning, we propose – can thus be taken into reflections on and projections of past and future spaces and processes. Yet, she argues, staging must leave "space to play with the un-planned, the un-staged, the unpredictable."¹²⁴ It must always take into account that the unpredictable is inherent in staging because the real experience of material space cannot be controlled and feeds reflection on its own limits, and thereby catalyses the process. The notion of staging thus appears as an entrance to further enhancing and *putting into practice* the value of combining reversed processes of designing with structures of reflection so as to take seriously and nurture the effects

of strange or unexpected experiences, which our fourth finding pointed to.

On the basis of the transfers of concepts proposed above, which admittedly entail risks of instrumentalised and forced comparisons, we can move to the second sub-level and look to Fischer-Lichte's understanding of the aesthetic experience's critical function.

In the American tradition of performance, performance art and Deweyian pragmatism are paired, and transformation is therefore understood from a social science perspective. Turner, Schechner and also Schön belong to this tradition. We have seen how scholars call for revisiting Schön's idea of aesthetic experience. To turn to Fischer-Lichte is another option. Her search for the meaning or purpose of performance in what she calls its specific materiality relies on aesthetics.¹²⁵ To illustrate the *difference* between social science and aesthetic perspectives on transformation – and thereby *reinforce the value of adding aesthetic perspectives to action research* procedures which risk becoming goal-oriented – we note that while Schechner draws on Turner to "educate the public" and create permanent transformations through theatre,¹²⁶ Fischer-Lichte argues that it is crucial to see that transformations through art differ from linear transformations – they are not automatically irreversible.¹²⁷ That is, as we know from our study, the aesthetic experience includes a potential for unpredictable and temporary transformation.

Fischer-Lichte draws on Nietzsche's Dionysian intoxication (*Rausch*), an element of experience which blurs boundaries between spectator and artwork until the idea of the artwork as thing with stable meaning becomes impossible and the performance must be understood as event.¹²⁸ Such events, which we have seen stem from very concrete processes of composing materials, can entail a profound experience of belonging to and understanding the world anew, which she calls *enchanted transformation*.¹²⁹ In fact, Fischer-Lichte's enchantment can be seen as a continuation of Shklovsky's estrangement because though Shklovsky talks of art works and Fischer-Lichte events, they share, according to performance theorist Marvin Carlson, an understanding that the function of art or aesthetic experience is that it allows for sensing things *as they are*

and not as they are known or represented; it breaks habits by making the ordinary unfamiliar *without* aiming for any defined "critical goal."¹³⁰

The notion of enchantment is one we would have refrained from at the beginning of our learning trajectory, but which makes sense as we have experienced how deeply embodied forms of inquiry changed us. To think of our colearners' experiences of making transactions with reality as sometimes so overwhelming that they could be characterised as not just strange but also intoxicating or enchanting is now feasible, and we can agree with Warstat, who points out that the aesthetic state of intellectual and sensory "profound confusion" which Fischer-Lichte describes is one that educators could learn from.¹³¹ It is a confusion enabling transformations without forcing learners in any predefined direction.

Possible continuations, so far

We have made a selection of spatial perspectives, examples and models – from Schön's to Aronson's, Rancière's and Fischer-Lichte's – which enable contextualisations of our findings and elaborations on our projections, and consequently possibilities for expanding the cogenerative model to include embodied – and in turn ethical, political, social and affective – dimensions of knowing. A central theme has been that the aesthetic, embodied (human) experience is an unpredictable counterforce to any predefined ideas regarding both goals of transformation and representational conventions, and that it therefore should be made workable in educational settings. The selection offers starting points for doing so. The material and yet transformative spaces it includes can give new perspectives on architecture, architectural education and educational spaces. We have argued that to establish structures and spaces that support risk-taking and articulation can be a path towards continuous questioning of and experimentation with how architects are taught to work with the relation between representation and reality. That is, towards loosening up habits at the core of their practice.

Conclusion

The researcher makes a difference

We responded to the main question – *How can forms of learning that rely on making and participation in contexts outside the studio contribute to increased abilities for critical reflection on and transformation of habits within architectural education?* – by applying the cogenerative model for action research to the 2016 Making is Thinking semester.

The case study allowed us to blur the *constructed divide* between convention and critique within architectural education, a divide which hides dependencies – between theory and practice, mind and body, representation and reality – and maintains criticality as negation rather than negotiation. We came to know that *making-based* and *participatory* forms of learning can give valuable *access to reality* (real risk) and – if combined with a stabilising structure of reflection – longed-for opportunities for architecture students to practise *verbal articulation*. Our combination of engagement and reflection led to an increasing awareness that *practising* involves *ethical, political and social dimensions*, and, in turn, to the emergence of *a resilient kind of criticality*. That is, there was an overarching learning trajectory from skills to perspectives, through which architecture students were trained to destabilise habits. Two circumstances were decisive for this development. First, Making is Thinking was a well-chosen case to study because the milieu allows for moving between more and less conventional locations and forms of learning. Second, the cogenerative model buttressed the nature of the case

because it relates transformative actions in specific situations to the creation, through collective reflection, of local and general theories that can be shared within established realms of academia.

The idea of the architect as an *aesthetic practitioner* was central in our cogenerative dialogue. The cogenerative model cultivated critical reflection stemming from practice, and more specifically from *aesthetic experiences of material space*, and was also reaching back into the realms of practice, to experimentation with how material space is *perceived and communicated*. The experiences were enabled through exercises set up by architectural educators and theatre-makers, exercises which had an *estranging function* because, to a larger extent than our participants were used to, they included the corporeal, affective and social. In a concrete sense, the "twisted" exercises triggered transformations of design habits by making learners question conventions for representing architecture in drawings and models. Also, the movement towards connecting skills and perspectives involved a greater understanding that questions regarding what it means to be human can be asked through aesthetic experiences of material space. Our colearners became aware of the potential that lies in *giving experiences of architecture to others*. Moreover, they realised that what one proposes as an architect *builds upon the existing* physical and discursive context in which one acts. That is, the inclusion of the ethical, political and social stemmed from reflections on lived experiences of and experiments with architecture (rather than from standardised views on what it means to be a conscious practitioner).

Our way of applying research to educational practice made a difference in the everyday of architecture students (and educators); experiences that could otherwise have dispersed because they were unfamiliar and hard to articulate were now captured and their importance revealed. This should inspire architectural educators to invite researchers and/or use principles developed through applied research to develop pedagogical interventions. Moreover, looking beyond our field of inquiry, our findings and the methodological approach enabling them can be a point of departure for future research on the education of architects and of other (aesthetic) practitioners.

We have seen that if architects are going to be able to share what they know, there is a need for methodological structures which recognise *how* they know. The cogenerative model, with its double loops around a learning arena, functioned as such a structure in our case. Through it we saw that the *space of learning* notion is one architects can develop by using their knowledge of material space. This insight came when the transformative exercises of the design course and the learning arenas of our cogenerative dialogue merged into material spaces of learning, built through mutual transformations in the double learning loops (and therefore in becoming, or transformative in themselves).

With our findings and the idea of the learning arena as a material space in mind, we projected ideas for future research on developing the cogenerative model to better support aesthetic dimensions of learning. Performative perspectives had emerged through the researcher's loop of learning and were now lifted as meeting points for architecture, theatre and education. We looked to educational and theatre-based ideas on how processes where material space emerge can be set up to strangemake habitual perspectives and routines, for instance regarding the relation between representation and reality. We became aware of risks of directing learners towards predefined goals. At the same time, we saw possibilities for making material spaces of cogenerative learning workable and yet unpredictable, by understanding them as generated through the aesthetic experience of materiality and its transformative potential.

Appendix I

Interview guide: Booker and Rødne

Rødne and Booker received the researcher's fourteen questions, see below, a couple of weeks before the interview. We followed the interview manuscript rather strictly. However, the responses have been edited in accordance with themes rather than question by question. The interview was done in a mix of English, Norwegian and Swedish (where Rødne is quoted, it is through the author's translation from Norwegian to English).

- Q1: What was the starting point for initiating Making is Thinking, when did the discussion about Making is Thinking start and who was involved in that discussion?
- Q2: Who formulated the formal course description and learning goals of the course AAR4611?
- Q3: What is the background to the name "Making is Thinking"?
- Q4: How would you describe the relation between TRANSark and Making is Thinking? Did the focus on transformative learning come before or after the initiation of Making is Thinking?
- Q5: What kind of reflections regarding the theoretical implementations of Making is Thinking's approach – within the field of architecture and/or the field of education – were brought up when the project began?

The notions of "design fixation" or "*Einstellung* effect" and "threshold concepts" are used in descriptions of Making is Thinking.

- Q6: From where do the educational theories and terms used to describe Making is Thinking come?

The AAR4611 master's course aims (at least it did so in 2016) to "explore and develop different tools relevant to enriching the exploration of the overlap between artistic and architectural methods."

Q7: How were differences and overlaps between "artistic" and "architectural" discussed when this aim was formulated?

Not only professional or academic knowledge and skills will be gained, but also tacit knowledge possibly changing the student deeply, claims the course description.

Q8: How have different kinds of knowledge been discussed internally, and how have "academic knowledge" and "skills" been thought of in relation to each other?

Q9: Why should an architectural education aim at changing students deeply?

The following questions concern some of the learning goals of Making is Thinking's master's course, 2016. (*Italics* = text from AAR4611 syllabus 2016.):

"This course aims to:

... – enable form and structure experimentation as a methodology, integrating material, space, light and aesthetic motivations."

Q10: How would you define the notion of experimentation in the context of Making is Thinking?

Q11: How has the notion of methodology been discussed in the context of Making is Thinking?

Q12: Could you say anything about the meaning of "aesthetic motivations" here?

"... – to make creative use of, and appreciate the unusual, the strange and the unexpected ..."

Q13: What was/is the purpose of introducing the notions of the strange and the unexpected, and why were they initially thought of as important to acknowledge?

"... – challenge prevailing design habits and design preconceptions in order to reveal new possibilities"

Q14: From where is the notion of "design habits" borrowed? Why should design habits be challenged? Are there any political motives behind this challenging?

Appendix II

Interview guide: Sæther and Berger

An interview conversation with Sæther was held in Cirka Teater's kitchen on the morning of 4th April 2018. An interview conversation with Berger was held in the outdoor area of the pub Ramp, Svartlamon, Trondheim, on the afternoon of 15th May 2018. Their responses are interlaced in the thesis. The languages used were Swedish and Norwegian, here translated into English. The interview guide functioned as a conversational background to which we returned in order to remind ourselves which topics to cover.

An introduction to the thesis and five questions were sent to Sæther and Berger beforehand, in December 2017. Here is a shortened version of the email to them, December 17, 2017, translated from Swedish to English: "Hi Anne Marit and Gilles! My thesis considers our collaboration at Nyhavna during spring 2016. In the thesis I discuss differences and similarities between how spatial constructions (their methods, ideas, traditions) are worked with within the fields of architecture and theatre. It's mainly about what architectural education can learn from theatre, but also about theatre's effects in public space and politics. To place *Hendelser på Nyhavna* in a historical context within the field of theatre I look to avant-gardists such as Meyerhold, Piscator, Brecht, to medieval market plays, to Roman festival constructions, political theatre, Schechner's 'environmental theater,' and more. I look for examples that challenge the boundaries of the theatre house, examples that open up between actors and spectators, where body and space are as important as manuscripts/instructions. However, as the theatre field is enormous, I would like to interview you in order to direct my speculations."

About your references and in which theatre tradition you want to place Cirka Teater:

Q1: What other theatre companies and productions (historical and contemporary) do you think of as role models for your work generally and for the festival Events at Nyhavna specifically?

I would like to hear you say something (again) about aims with and expectations for Events at Nyhavna, from your point of view:

Q2: How did you in 2016 and how do you now think of the temporary construction (scaffolds and indoors) in relation to a possible future theatre house?

Q3: How was it to include architects in the process? Through which methods could we create mutual understanding? Which elements of the process were fraught with conflict?

Q4: Can you say something about creating theatre in the city (in public spaces) in comparison to creating theatre inside a theatre house? (Which of your own previous productions do you regard as especially important for Events at Nyhavna?)

About understanding place. With the students, I talked about how the history of the place (Nyhavna) can be interpreted within and "translated" to architecture. One could see the scaffold wall and The Colours of Nyhavna (with the Oyster Lady, the Rust Man, the Wood Man, the Little Grey Ones, the Workers in the Cog-wheels...) as interpretations or staged layerings of Nyhavna's character and Cirka Teater's history:

Q5: How has Nyhavna as a place influenced Cirka Teater's expression throughout the years?

Appendix III

Interview guide: Cogenerative dialogue

The first learning arena, February 2016:

- Q1.1: What do you expect to learn during this semester, through the courses "AAR4611 – Making is Thinking" and "AAR4909 – Aesthetics, Theory and Practice in Architecture"?
- Q1.2: What do you know about Nyhavna now, before the courses begin?
- Q1.3: Thinking about your expectations regarding the semester courses (AAR4909 and AAR4611) and the area we will work in (Nyhavna), can you mention any urban planning and/or architectural reference projects you come to think of? If so, please tell how and why they matter to you.

The second learning arena, March 2016:

- Q2.1: How can experiences, registrations and interpretations of the existing (on site, on other sites and from other times) be included in our design process at Nyhavna?
- Q2.2: Which methods were fruitful for you when mapping the existing?

The third learning arena, May 2016:

- Q3.1: About the reference study. Has the reference project you were given contributed to your project work? If not, why? If yes, how?
- Q3.2: About the interviews. How did you experience making interviews based on visual material and questions? Have you through making interviews found out things which have changed your design process?
- Q3.3: About the full-scale building. What do you expect to learn from transforming parts of your project into a full-scale exhibition in the scaffolding structure?

The fourth learning arena, June 2016:

- Q4.1: Which situations during the semester created insights about your own learning process?
- Q4.2: Have the methods and techniques that were introduced during the semester had an impact on your way of understanding relations between thought and represented space versus built and experienced space?
- Q4.3: Reference projects and literature have been introduced (in the theory course and the design course). In what ways have they affected your design process?
- Q4.4: In the future, when you are asked to analyse and propose ideas for a given context, which mindsets and methods (if any) will you bring with you from our process at Nyhavna?

Follow-up question, March 2018:

- Q5.1: Since the end of the spring semester 2016, when you are asked to analyse and propose ideas for a given context, which mindsets and methods (if any) have you brought with you from our process at Nyhavna?

Notes

Introduction, pages 1–39

1. Blake, "All Religions Are One," first lines, 73.
2. In this thesis, "we" is used because although there is one author the nature of the work is collaborative. Moreover, the "we" is directed to the reader, intending to enable his or her engagement in the text.
3. Vitruvius, *Ten Books on Architecture*, 5.
4. Hearn, *Ideas that Shaped Buildings*, 32.
5. Vitruvius, *Ten Books on Architecture*, 5.
6. Vitruvius, *Ten Books on Architecture*, 6.
7. Mewburn, "Constructing Bodies," 21.
8. When writing about modern times, we will acknowledge that both men and women are active in our field of inquiry. However, until relatively recently only men were allowed. In fact, the notion of a master commonly implies a male person.
9. Alberti's treatise was written in Latin and given to Pope Nicholas V in 1450, but not many architects could read it before 1550, when it was published in Italian.
10. Vasari, *On Technique*, 205.
11. Vasari, *On Technique*, 205–206.
12. Vasari, *On Technique*, 207.
13. Vasari, *On Technique*, 207. Comment in footnote by Baldwin Brown.
14. Hearn, *Ideas that Shaped Buildings*, 32.
15. Mewburn, "Constructing Bodies," 25–29. Cf. Salama, *Spatial Design Education*, 60–63.
16. Mewburn, "Constructing Bodies," 28–29.
17. Mewburn, "Constructing Bodies," 24.
18. Cuff, *Architecture: The Story of Practice*, 81.
19. Vesely, *Architecture in the Age of Divided Representation*, 134.
20. Hearn, *Ideas that Shaped Buildings*, 7–8.
21. Vesely, *Architecture in the Age of Divided Representation*, 235–237. Pérez-Gómez, *Built upon Love*. For a recent discussion (in Swedish) on the nuances of Descartes's philosophy and the impact of his work on contemporary society, see Bornemark, *Det omätbara renässans*.
22. Mewburn, "Constructing Bodies," 23.
23. Salama, *Spatial Design Education*, 60–63.
24. Pérez-Gómez, *Built upon Love*, 63.

25. Picon, "From 'Poetry of Art' to Method," 23, 49.
26. Picon, "From 'Poetry of Art' to Method," 1, 42.
27. Durand, *Précis of the Lectures on Architecture*, 52–53.
28. Durand, *Précis of the Lectures on Architecture*, 77.
29. Picon, "From 'Poetry of Art' to Method," 32.
30. Pérez-Gómez, *Built upon Love*, 166.
31. Picon, "From 'Poetry of Art' to Method," 54.
32. Picon, "From 'Poetry of Art' to Method," 53.
33. Pérez-Gómez, *Built upon Love*, 63.
34. Pérez-Gómez, *Built upon Love*, 199.
35. Hearn, *Ideas that Shaped Buildings*, 13–14.
36. Hearn, *Ideas that Shaped Buildings*, 32–33, 179–189.
37. Viollet-le-Duc, *How to Build a House*, 174, 186–187.
38. Viollet-le-Duc, *How to Build a House*, 39–59.
39. The term tacit knowledge refers to non-verbal knowledge and was coined by Michael Polanyi; see Polanyi, *The Tacit Dimension*.
40. Viollet-le-Duc, *How to Build a House*, 84.
41. Viollet-le-Duc, *How to Build a House*, 84 (original emphasis).
42. Schön discusses the architect as reflective practitioner in three works: *The Reflective Practitioner*, *The Design Studio* and *Educating the Reflective Practitioner*.
43. Schön, *The Design Studio*, 60.
44. Schön, *Educating the Reflective Practitioner*, 31, 33–35. See also Schön, *The Design Studio*, 7, 18, 62.
45. Schön, *The Design Studio*, 6.
46. Schön, *Educating the Reflective Practitioner*, 310–312.
47. Cuff, "Architecture's Double-Bind," 386.
48. Webster, "Architectural Education after Schön," 63. Schön's presentation of the reflective practitioner has also been called "the most dominant theory of the design studio" (see Mewburn, "Constructing Bodies," 48) and "the most influential works produced in professional education in recent years" (see Kinsella, "Practitioner Reflection," 37).
49. Webster, "Architectural Education after Schön," 65.
50. Salama, *Spatial Design Education*, 309–332.
51. Salama, *Spatial Design Education*, 304.
52. Colomina and Kotsioris, "The Radical Pedagogies Project," 2. See also the Radical Pedagogies website, <https://radical-pedagogies.com>.
53. Awan, Schneider and Till, *Spatial Agency*, 46.
54. Awan, Schneider and Till, *Spatial Agency*, 46.
55. Awan, Schneider and Till, *Spatial Agency*, 29.
56. Awan, Schneider and Till, *Spatial Agency*, 29.

57. Awan, Schneider and Till, *Spatial Agency*, 31–32. See also Giddens, *The Constitution of Society*, 5.
58. Awan, Schneider and Till, *Spatial Agency*, 46, note 24. Salama, *Spatial Design Education*, 127–129.
59. Salama, *Spatial Design Education*, 265–267, 303.
60. Awan, Schneider and Till, *Spatial Agency*, 46.
61. Mewburn, "Constructing Bodies," 37.
62. The preliminary courses included studies of materials and industry visits, weaving, drawing, colour theories and theatre. See, e.g., Salama, *Spatial Design Education*, 64–67; and Wick, "Three Preliminary Courses: Itten, Moholy-Nagy, Albers," <http://www.bauhaus-imaginista.org/articles/5176/three-preliminary-courses-itten-moholy-nagy-albers>.
63. Salama, *Spatial Design Education*, 63–64. See also Hannah, *Event-Space*, 181.
64. Hannah, *Event-Space*, 180–194.
65. Awan, Schneider and Till, *Spatial Agency*, 46.
66. See, e.g., Frampton, *Modern Architecture*, 126–127.
67. See, e.g., Hearn, *Ideas That Shaped Buildings*, 28–29.
68. Schnaidt, *Hannes Meyer*, 57. Schnaidt shows that Meyer changed his mind over time. In 1938, he stated that the training of the architect should take into account collective action and intuitive decision-making.
69. See, e.g., Halprin and Burns, *Taking Part*.
70. On "Civic Classrooms," see Bader et al., "Spaces of Learning," 64. On "AS/IF Installations," see Bader and Talevi, "Explorations in Urban Practice," 21.
71. Janssens, "Collective Sense-Making for Change," 151.
72. She does so in *Architecture: The Story of Practice* as well as in "Architecture's Double-Bind."
73. Cuff, *Architecture*, 63. Cuff, "Architecture's Double-Bind," 386.
74. Cuff, Keynote talk at the Making Effect Symposium, Stockholm, September 15, 2017.
75. Cuff, "Architecture's Double-Bind," 385–386.
76. Cuff, *Architecture: The Story of Practice*, 4. That studio education "emphasizes . . . individual work over collective action" is also pointed out in Cuff, "Architecture's Double-Bind," 386.
77. Cuff, "Architecture's Double-Bind," 388.
78. Cuff, "Architecture's Double-Bind," 388.
79. Bateson, "Toward a Theory of Schizophrenia," 206–208.
80. Bateson, "Double Bind, 1969," 278.
81. Bateson, "Comment on Part III," 338.
82. Cuff, "Architecture's Double-Bind," 388.

83. Cuff, "Architecture's Double-Bind," 389.
84. Cottington, *Avant-Garde*, 3.
85. Cottington, *Avant-Garde*, 119.
86. Calinescu, *Five Faces of Modernity*, 105–106.
87. Cottington, *Avant-Garde*, 3. Cf. Calinescu, *Five Faces of Modernity*, 104.
88. Calinescu, *Five Faces of Modernity*, 103–104.
89. Calinescu, *Five Faces of Modernity*, 96–97.
90. Cottington, *Avant-Garde*, 120.
91. Cottington, *Avant-Garde*, 120. Calinescu, *Five Faces of Modernity*, 120–125.
92. Heynen and Wright, "Shifting Paradigms and Concerns," 51.
93. Heynen and Wright, "Shifting Paradigms and Concerns," 49, 55.
94. Latour, "A Cautious Prometheus," 163.
95. Such possibilities have been discussed by Yaneva. See Latour and Yaneva, "Give Me a Gun"; and Yaneva, "From Reflecting-in-Action Towards Mapping of the Real."
96. Cuff, "Architecture's Double-Bind," 385.
97. Cuff, "Architecture's Double-Bind," 386.
98. Salama, *Spatial Design Education*, 114–115.
99. Salama, *Spatial Design Education*, 217–218, 224.
100. Salama, *Spatial Design Education*, 119.
101. Eikseth, "Arkitekter i emning," 142–143. The quote is a translation by the author of this sentence in Norwegian: "den prosjektbaserte studioundervisningen fra akademitradisjonen, kombinert med eksperimentering og 'learning by doing' fra Bauhaus-tradisjonen."
102. On Hansen and BAS, see Eikseth, "Arkitekter i emning," 154–160; and Gutierrez and Kędziorek, "Participative Educational Democracies: Oskar Hansen."
103. Eikseth, "Arkitekter i emning," 147.
104. Eikseth, "Arkitekter i emning," 148–149.
105. TRANSark, "TRANSark – Centre for Development of Emerging Pedagogies – NTNU," <https://www.ntnu.edu/transark>.
106. The threshold concepts protagonist Ray Land was invited to the faculty and discussions with him influenced the development of TRANSark.
107. Rødne in Booker and Rødne, "Making is Thinking," interview, March 13, 2018.
108. Juhani Pallasmaa in Orstadius and Mujezinovic, "An interview with Juhani Pallasmaa," 6. Quoted by TRANSark, "TRANSark – Centre for Development of Emerging Pedagogies – NTNU," <https://www.ntnu.edu/transark/about>.
109. Hokstad et al., "Transformative Learning in Architectural Education," 331.
110. Hokstad et al., "Transformative Learning in Architectural Education," 331.

111. Cuff, "Architecture's Double-Bind," 388.
112. *Hendelser på Nyhavna* has been held in different forms in 2017, 2018 and 2019. See *Hendelser på Nyhavna*, "Hendelser på Nyhavna." KORØ, Kunst i offentlige rom / Public Art Norway, sponsored the first festival and presented an art programme for the area in 2019. An international architecture competition about the public spaces at Nyhavna was held during 2019 and resulted in proposals partly contradictory to the master plan for the transformation of the area.
113. About the process and the festival in 2016, see Gullberg, "The Things We Made at the Harbour." See also videos by Wormdahl, "Making is Thinking"; and Langset Hustad and Sæther Berger, "Making Is Thinking 2016 NTNU."
114. Salama, *Spatial Design Education*, 114–115, 256.
115. Koskinen et al., *Design Research Through Practice*, 23, 40, 82–84.
116. Levin and Martin, "Praxis of Educating Action Researchers," 225.
117. On the cogenerative model see Elden and Levin, "Cogenerative Learning"; Greenwood and Levin, "Social Science Research"; and Levin, "Co-Generative Learning."
118. Morten Levin is a Professor of Organisation and Work Science at the Department of Industrial Economics and Technology Management, NTNU.

First chapter *Methodology*, pages 41–85

1. Arendt, *The Human Condition*, 95.
2. The notion of simultaneity refers to phenomena occurring at the same time and has been adopted from complexity theory to an educational context by Brent Davis. See Davis, "Complexity and Education: Vital Simultaneities."
3. We primarily look to research made in the Nordic countries and in Belgium, two geographical areas where the development of milieus for practice-based research for architects has been progressive.
4. Dyrssen, "Navigating in Heterogeneity," 224.
5. Dyrssen, "Navigating in Heterogeneity," 229.
6. Dyrssen, "Navigating in Heterogeneity," 224.
7. Dyrssen, "Navigating in Heterogeneity," 224.
8. Dyrssen, "Navigating in Heterogeneity," 224.
9. Dyrssen, "Navigating in Heterogeneity," 224.
10. Dyrssen, "Navigating in Heterogeneity," 226.
11. What in Swedish would be "*föreställningsförmåga*" is here described as "the ability to imagine futures"; Rosengren says: "*Som människa har jag kapaciteten att skapa genom att föreställa mig, inbilla mig, fantisera.*" See Rosengren, *Doxologi*, 45.
12. Rosengren draws on Ludwik Fleck's notion of "thought collectives" (*Denkkollektiv*) and Cornelius Castoriadis's notion of "radical imagination"

- (*L'imagination radicale*) to describe this tension and the transformative potential of the imagination. See Rosengren, *Doxologi*, 35–53.
13. Asplund, *Hur låter åskan?*, 20–21, 40.
 14. Asplund, *Hur låter åskan?*, 40, 61.
 15. Tzonis and Lefaivre, *Classical Architecture*, 277.
 16. Heynen and Wright, "Shifting Paradigms and Concerns," 45.
 17. Kasa, "Arkitekturens estetiske kvalitet," 143–145.
 18. Tzonis and Lefaivre, *Classical Architecture*, 276.
 19. Tzonis and Lefaivre, *Classical Architecture*, 278.
 20. Shklovsky, "Art as Technique," 22.
 21. Shklovsky, "Art as Technique," 22 (original emphasis).
 22. Shklovsky, "Art as Technique," 22.
 23. Shklovsky, "Art as Technique," 22.
 24. See, e.g., Feyerabend, *Against Method*; Haraway, "Situated Knowledges"; and Nietzsche, *On the Genealogy of Morality*.
 25. See, e.g., Dunin-Woyseth and Michl, "Towards a Disciplinary Identity"; and Dunin-Woyseth and Nilsson, "Building (Trans)Disciplinary Architectural Research."
 26. Gibbons et al., *New Production of Knowledge*, 1–16 (Introduction), 167–168 (Glossary).
 27. Alvesson and Sköldberg, *Reflexive Methodology*, 11.
 28. Alvesson and Sköldberg, *Reflexive Methodology*, 13.
 29. Alvesson and Sköldberg, *Reflexive Methodology*, 13–14.
 30. Dunin-Woyseth and Nilsson, "Building (Trans)Disciplinary Architectural Research," 89.
 31. Doucet and Janssens, "Transdisciplinarity," 2–4. They refer to Cross, "Designerly Ways of Knowing."
 32. Doucet and Janssens, "Transdisciplinarity," 1.
 33. Dyrssen, "Navigating in Heterogeneity," 238.
 34. Riessman, *Narrative Methods*, 8–9.
 35. Riessman, *Narrative Methods*, 105–140.
 36. Janssens and de Zeeuw, "Non-Observational Research," 154.
 37. Janssens and de Zeeuw, "Non-Observational Research," 154.
 38. Janssens and de Zeeuw, "Non-Observational Research," 154, 156.
 39. Janssens and de Zeeuw, "Non-Observational Research," 152, 156.
 40. Janssens and de Zeeuw, "Non-Observational Research," 152, 156.
 41. Goodman, *Ways of Worldmaking*, 22.
 42. Tzonis and Lefaivre, *Classical Architecture*, 278.
 43. Goodman, *Ways of Worldmaking*, 7–17.
 44. Dyrssen, "Navigating in Heterogeneity," 226.

45. Koskinen et al., *Design Research Through Practice*, 42–44, 46, 140, 168.
46. Janssens and de Zeeuw, "Non-Observational Research," 152.
47. Janssens and de Zeeuw, "Non-Observational Research," 157.
48. Doucet and Janssens, "Transdisciplinarity," 4.
49. Salama, *Spatial Design Education*, 45–46, 321–322.
50. Janssens and de Zeeuw, "Non-Observational Research," 152.
51. Schön, *Educating the Reflective Practitioner*, 4.
52. Schön, *The Reflective Practitioner*, 307–325. Schön's critique of positivist ideas of technically rational knowledge is a point of departure for Nigel Cross's influential idea of "design thinking," see Cross, "Designerly Ways of Knowing."
53. Schön, *Educating the Reflective Practitioner*, 3–21.
54. Salama, *Spatial Design Education*, 302. On how architects can change their ways of knowing through encounters outside academia, see also Lahoud, "Rearticulating the Problem."
55. Bader et al., "Spaces of Learning," 65–66.
56. Bader et al., "Spaces of Learning," 65–66.
57. In addition to Dewey and Kolb, Jean Piaget and Kurt Lewin are major scholars on the field of experiential learning. See Kolb, *Experiential Learning*, 1–19.
58. Salama, *Spatial Design Education*, 164–165, 265–267.
59. Salama, *Spatial Design Education*, 164–165.
60. Salama, *Spatial Design Education*, 302.
61. Salama, *Spatial Design Education*, 266.
62. Salama, *Spatial Design Education*, 263–267, 304.
63. While Mezirow says "transformative learning," threshold concept scholars use the term "transformational learning." We use the former term.
64. The notion was introduced by Mezirow in *Education for Perspective Transformation*. See also Mezirow, "Learning to Think Like an Adult."
65. O'Sullivan, Morrell and O'Connor, *Expanding the Boundaries*, 11. Quoted in Land, Meyer and Baillie, "Threshold Concepts," xiii.
66. Land, Meyer and Baillie claim that while Mezirow's understanding of transformations is rational, the threshold concepts framework aims to include affective aspects of being transformed. See Land, Meyer and Baillie, "Threshold Concepts," xii–xiii.
67. Meyer and Land, "Threshold Concepts and Troublesome Knowledge (2)," 384.
68. Land, Meyer and Baillie, "Threshold Concepts," ix–xii.
69. Land, "Toil and Trouble," 21.
70. Land, Meyer and Baillie, "Threshold Concepts," ix–xi.
71. Meyer and Land, "Threshold Concepts and Troublesome Knowledge (2)," 376.

72. Dyrssen, "Navigating in Heterogeneity," 230.
73. Cousin, *Strategies for Researching Learning*, 136.
74. Meyer et al., "Case study," 196–197.
75. Meyer and Land, "Threshold Concepts and Troublesome Knowledge (2)," 373, 377.
76. Osmond and Turner, "Threshold Concept Journey in Design," 351–354.
77. Alvesson and Sköldbberg, *Reflexive Methodology*, 85. Grounded theory has been used for practice-based architectural research at the Sint-Lucas School of Architecture in Belgium, as presented by Johan Verbeke and PhD candidates from that school in a seminar at NTNU in 2016.
78. On the basics of actor–network theory, see for instance Latour, *Reassembling the Social*.
79. Awan, Schneider and Till, *Spatial Agency*, 32–33. Dyrssen, "Navigating in Heterogeneity," 226.
80. Yaneva, "From Reflecting-in-Action Towards Mapping of the Real." Mewburn, "Constructing Bodies."
81. Our "platform" is inspired by Reason and Bradbury's description of action research as a methodological "umbrella." See Reason and Bradbury, "Introduction," 1.
82. See, e.g., de Zeeuw, "Research to Support Social Interventions." De Zeeuw here argues that with an increase in research on education, a variety of activities have been labelled "research," with the consequence that the power of research has weakened.
83. Koskinen et al., *Design Research Through Practice*, 83.
84. Salama, *Spatial Design Education*, 256.
85. Salama, *Spatial Design Education*, 114. He also calls the approach "Human Dialogue Approach" and "Community Design."
86. Salama, *Spatial Design Education*, 256–257.
87. de Zeeuw, "Research to Support Social Interventions," 7.
88. Elliott, "Building Educational Theory."
89. Alvesson and Sköldbberg, *Reflexive Methodology*, 9.
90. Elliott, "Building Educational Theory," 28–29, 33.
91. On the ethical dimensions of the architect's choice, see also Till, *Architecture Depends*.
92. Reason and Bradbury, "Introduction," 1.
93. Action researchers Heron and Reason point to presentational knowing, propositional knowing and practical knowing as kinds of knowing through which experiences as a fundament of knowledge can be processed. See Heron and Reason, "Extending Epistemology."
94. Reason and Bradbury, "Introduction," 1.
95. Reason and Bradbury, "Introduction," 1 (original emphasis).
96. Reason and Bradbury, "Introduction," 6–7.

97. de Zeeuw, "Research to Support Social Interventions."
98. de Zeeuw, "Research to Support Social Interventions," 10.
99. Elden and Levin, "Cogenerative Learning," 131.
100. Levin, "Academic Integrity in Action Research."
101. Levin and Martin, "Praxis of Educating Action Researchers," 226.
102. Elden and Levin, "Cogenerative Learning," 135–137.
103. Elden and Levin, "Cogenerative Learning," 128.
104. Elden and Levin, "Cogenerative Learning," 132. On cognitive maps, they refer to Eden, "Cognitive Mapping."
105. Elden and Levin, "Cogenerative Learning," 133–137.
106. Elden and Levin, "Cogenerative Learning," 137–138.
107. Bateson, "Double Bind, 1969," 274 (original emphasis).
108. Bateson, "Double Bind, 1969," 274 (original emphasis).
109. Bateson, "Comment on Part III," 338 (original emphasis).
110. Bateson, "Double Bind, 1969," 276.
111. Bateson, "Double Bind, 1969," 276–278 (original emphasis).
112. Bateson, "Double Bind, 1969," 272–273.
113. Levin, "Co-Generative Learning," 109 (emphasis added).
114. Levin, "Co-Generative Learning," 112.
115. Levin, "Co-Generative Learning," 112.
116. Bateson, "Double Bind, 1969," 277.
117. Felten, "On the Threshold with Students," 7.
118. Carless, "Trust and Its Role in Facilitating Dialogic Feedback," 90.
119. Levin and Martin, "Praxis of Educating Action Researchers," 224.
120. Levin and Martin, "Praxis of Educating Action Researchers," 224.
121. The diagram layouts have been slightly modified and turned black/white for this chapter. Text in mindmap diagram (Diagram 4) has been shortened.
122. See, e.g., Gayá Wicks, Reason and Bradbury, "Living Inquiry"; and Heron and Reason, "Extending Epistemology."

Second chapter *Case study*, pages 87–178

1. Nietzsche, *On the Genealogy of Morality*, 3 (original emphasis).
2. Berger, "Cirka Teater," interview, May 15, 2018.
3. Sæther, "Cirka Teater," interview, April 4, 2018.
4. Berger, "Cirka Teater," interview, May 15, 2018.

5. In 2018 the former storage was turned into a permanent low-cost performance space, and Cirka Teater will for the first time be able to invite spectators to Fyringsbunkeren.
6. Rødne is in charge of Making is Thinking and is since 2015 the leader of TRANSark. She began teaching at the Department of Architectural Design, Form and Colour Studies in 2003. Booker began teaching at the same department in 1996. Booker did not take part in the process of our case.
7. Quotes from the author's application to the position, 2014.
8. For Edward de Bono's presentation of the term "lateral thinking," which describes a movement between solving problems step by step and having many ideas without managing to implement them, see de Bono, *Lateral Thinking*. See also Rødne and Gullberg, "Forms for Sharing," 181–182.
9. Rødne in Booker and Rødne, "Making is Thinking," interview, March 13, 2018.
10. Until the year 2000, mainly artists were employed in this department. In 2017, it was fused with other departments into the Department of Architecture and Technology, where the introduction of artistic elements into architectural education is one task among many.
11. Brockmann, *Malerne på Gløshaugen*.
12. These sketches got the working title "Composition and Communication of Space" and were in turn based on a course called "Visual Communication" given at the department before the year 2000.
13. Booker based this idea on his own experience of teaching product design students, on his discussions with the British architect and educator Christopher Pierce, and on a conversation with a senior partner at Foster & Partners, who told him that what newly graduated architects must know is not a given set of skills, but to think in ways that differ from those of established architects.
14. Booker here refers to Hans-Georg Gadamer's hermeneutic idea of solving problems without a known horizon. To understand this idea in relation to architecture, see, e.g., Kidder, *Gadamer for Architects*, 39–42 ("The Idea of Horizon"), 89–92 ("Design as Horizon").
15. Rødne has been in charge of the first year programme in architecture at NTNU.
16. See Goffman, *The Presentation of Self*. Erving Goffman, Dwight Conquergood and Victor Turner were three of many scholars to initiate transfers of performance notions to academia. Cf. this note to note 83 to the fourth chapter, on reconceptualisation of performance.
17. The replies from Sæther and Berger are interposed here. They were given in Norwegian and have been translated into English by the author.
18. Cirka Teater, <http://cirkateater.no>, the production called "Den femte årstid."
19. The actor, director and mime artist Jean-Louis Barrault's work was an inspiration for all the teachers Berger and Sæther had.
20. Sæther mentions the Norwegian groups Tramteatret and Saltkompaniet and the Swedish group Friteatern. On Norwegian radical theatre groups

- (including Cirka Teater), see Buresund and Gran (eds), *Frie grupper*. Friteatern, see <http://www.friteatern.se>.
21. Générík Vapeur, see <https://www.generikvapeur.com>. Royal de Luxe, see <http://www.royal-de-luxe.com>. Ilotopie, see <http://ilotopie.com>. On Ilotopie, see also Heilmann et al., *Les utopies à l'épreuve de l'art: Ilotopie*.
 22. "Og så kom fyren" is a play with words meaning "and then came the guy, heat or lighthouse," or "and then the oven."
 23. See "Musika Mobile" and "Mekatonia" on Cirka Teater's website, <http://cirkateater.no>.
 24. On the Bologna process, see "European Higher Education Area and Bologna Process," <http://www.ehea.info>. For a problematisation of the agreement in relation to arts education, see Kälvemark, "University Politics," 7–10.
 25. This was an outset for the symposium *Transvaluation: Making the World Matter*, Chalmers University of Technology, September 2015. For a paper presented by the author at the symposium, see Gullberg, "Daring the Uncertain."
 26. From the syllabus of the course "AAR4611 – Making is Thinking," as it was formulated in 2016.
 27. Especially Nadja Sahbegovic, architect at Trondheim municipality.
 28. Rødne planned the course and was involved in the initial planning of the festival, but had to step back at the beginning of 2016 and could only engage fully during the last part of the building phase. The author therefore stepped in as coordinator of the course.
 29. Eide Holtan, Rødne and Schmidt represented the staff in the examination procedure on 8th June 2016, with architect Sevrin Gjerde as external reviewer.
 30. For more information about the FormLAB, see "Form Lab – Making is Thinking," *Making is Thinking*, <http://makingisthinking.net/form-lab>.
 31. About the heritage classification of the bunkers, see Trondheim municipality's description of the master plan for Nyhavna (Nyhavna Planbeskrivelse), November 2014. "Nyhavna Planbeskrivelse," Trondheim kommune.
 32. The reflections collected in the work box, process book and log were included in the requirements for the examination of the design course.
 33. "International Design Workshops (IDW)," University of Antwerp, <https://www.uantwerpen.be/en/projects/international-design-workshops/>.
 34. With lectures and guided tours by, among others, Zaida Muxí, Barcelona School of Architecture (ETSAB); Éthel Baraona Pohl and César Reyes Nájera, dpr-barcelona; Eva Prats and Ricardo Flores, Flores & Prats Architects; and Guillermo López, MAIO.
 35. The workshop was set up in collaboration with the sociologists Lisbeth Levang, Marianne Skaar and Aksel Tjora. Sosiologisk Poliklinikk, founded

- in Trondheim in 2014, is a collective of sociologists and an arena for academic and non-academic sociological events and projects.
36. Berger built the theatre scaffold together with, among others, Espen Dekko, Dag Nygaard, André Sæther Berger, Ina Sæther Berger and Paal Viken Bakke.
 37. "Fargene på Nyhavna" could be translated as "The Colours of Nyhavna."
 38. Translated from Norwegian by the author: "Andre objekter: Prøvesal: Store hvite masker m/ skrift, Globuser, Små vannkanner, Kasse med kuber + sylindre; Kjøkken: Masker i skap (1. & 3. hylle); Kontor: 2 teaterdukker Alfred + Beate (handle with care); I blå pose: 4 løver (handle with care); Kontor: 2 kasser med små hus."
 39. The next production was *Veien mellom huler og tårn* (2017). "Veien mellom huler og tårn" could be translated as "The Path between Dens and Towers."
 40. Tatlin's monument, set up in Petrograd in 1919, was designed to speak a "revolutionary formal language," aiming to express the dynamism of the Soviet state; see Stokstad, *Art History*, 1075. *The Walking City*, by Ron Herron, England, 1964, was a critique of contemporary transportation systems between and inside cities; see Chalk et al., *Archigram*, 48.
 41. The bridge was designed by Heatherwick Studio and the folding chair by Robert van Embricqs.
 42. The Fun Palace project had also been presented by Østlie to all Making is Thinking students, based on Mathews, "The Fun Palace."
 43. See, e.g., Merleau-Ponty, *The Phenomenology of Perception*.
 44. The term "kompenere videre på" (in Norwegian) is here translated as "compose upon the existing." It could also be expressed as "compose by continuing on something."
 45. On the notion of heterotopia, see Foucault, "Different Spaces."
 46. Avildsen, *The Karate Kid*.

Third chapter *Findings*, pages 179–225

1. Anna Halprin in Rainer and Halprin, "Yvonne Rainer Interviews Ann Halprin," 143. Anna Halprin has been called Ann Halprin. We use Anna in the main text, also when the source referred to uses Ann.
2. See de Zeeuw, "Research to Support Social Interventions"; Janssens and de Zeeuw, "Non-Observational Research"; and Levin, "Academic Integrity in Action Research."
3. The phenomenon of resistance to learning appears here and at other places in the thesis. For a discussion on this phenomenon, and how resistance is stronger if new knowledge is to replace rather than be added to old ("supplative" as opposed to "additional" learning), see Atherton, "Resistance to Learning."

4. Cuff, "Architecture's Double-Bind." We introduced this proposal in the introduction.
5. Deleuze, *Difference and Repetition*, 176 (original emphasis).
6. "The Power of Experiment," http://www.arteria.pt/portfolio/the-power-of-experiment_53.html.
7. Sarah Westphal, <http://sarahwestphal.com>. José Capela and Malavoadora, "a theatre company that programs," <https://malavoadora.pt>.
8. "Situated Practice MA," The Bartlett School of Architecture, <https://www.ucl.ac.uk/bartlett/architecture/programmes/postgraduate/ma-situated-practice>.
9. See, e.g., Tafuri, *Theories and History*, 141–163 ("Operative Criticism"); and Forty, *Words and Buildings*, 63–85 ("Language Metaphors"). See also Gullberg, "Voids and Bodies."
10. Janssens, "Collective Sense-Making for Change," 155.
11. The architectural educator and theorist Ruth Morrow has discussed how architects can learn to improvise. See Morrow, "Rock, Paper, Scissors."
12. Shusterman, "Back to the Future," 111.
13. On the school as given background, see the conclusion regarding "site based education," in Kemmis et al., *Changing Practices*, 217–221. For conceptual spatial models, see Kemmis, "Critical Theory," on Jürgen Habermas's idea of "communicative space," and Kemmis et al., *Changing Practices*, on Theodore Schatzski's notion of "activity timespaces."
14. For the body in Vitruvius, see e.g. Vitruvius, *Ten Books on Architecture*, 14, 19, 292; and McEwen, *Vitruvius*. For an entrance to ways in which architects deal with the body, see Heynen and Wright, "Shifting Paradigms and Concerns," 50–51.
15. See, e.g., Heynen and Wright, "Shifting Paradigms and Concerns," 51.
16. Vardy and Udall, "How Do We Know?," 47–48.
17. For an introduction to ways of applying the performative to academia, see Thrift and Dewsbury, "Dead Geographies." Heynen and Wright use "Dead Geographies" to discuss architectural theory and performance; see Heynen and Wright, "Shifting Paradigms and Concerns," 53–54.
18. Weinstein, "Bringing Performance into Architectural Pedagogy," 187.
19. Tisi, "Six Ways," 69.
20. For one description of how architects use the notion of space, including understandings of the relation between space and materiality, see Forty, *Words and Buildings*, 256–275.
21. On the ambiguity of space as both conceptual and tangible construct, see Forty, *Words and Buildings*, 256.
22. On the idea that architects, rather than relying on outsider perspectives, still need to return to the architect's ways of knowing, see Stieber, "Space, Time, and Architectural History." Heynen and Wright say that if social scientists talk about how bodies and subjects exist and are made through social and spatial relations, architectural theorists can contribute with "a more specific analysis of how spatial articulations contribute to this making

- of subjects"; see Heynen and Wright, "Shifting Paradigms and Concerns," 51.
23. Jacques Derrida's linguistic approach to performance, based on the linguist John L. Austin's idea of the utterance as an action, has been especially important. See, e.g., Hannah and Khan, "Performance / Architecture," 4.
 24. Manfredo Tafuri and Michel Foucault are among those thinkers.
 25. On the shift from post-structuralist reflection to understanding of architecture as socially operative in itself, see, e.g., Stieber, "Space, Time, and Architectural History."
 26. Any selection of names will be reductive; however, among internationally influential Nordic scholars who have adopted phenomenological perspectives are Juhani Pallasmaa and Christian Norberg-Schulz; Henri Lefebvre and Michel de Certeau are two French spatial theorists who have had a significant impact on architectural theory; and Judith Butler and Karen Barad belong to the American feminist philosophers whose work has been adopted by architectural theorists.
 27. For examples of their techniques, see, e.g., Tschumi, "The Manhattan Transcripts"; de Oliveira, *The Architecture of Lina Bo Bardi*, especially 161–194; and Sadler, *The Situationist City*, especially 15–22, 76–95, 105–110.
 28. Barad, "Posthumanist Performativity," 801, 827. For an attempt to set Barad in relation to Deleuze and Ingold, see Gullberg, "Frames for Learning."
 29. Altés Arlandis and Lieberman, "Immediate Architectural Interventions," 35–36. They propose that architecture students can learn from Barad that there is no world "out there" to intervene in but that architects' actions "intravene" in a context they form and are formed by.
 30. Lykke, "Anticipating Feminist Futures," 27.
 31. On working with dancers, see Thrift, "The Still Point."
 32. Thrift, *Non-Representational Theory*, 14, 125–138.
 33. Thrift, *Non-Representational Theory*, 16.
 34. Thrift, *Non-Representational Theory*, 4, 12.
 35. Thrift, *Non-Representational Theory*, 14.
 36. Thrift, *Non-Representational Theory*, 124–125. The understanding of the creation of meaning as processual and thereby without any given border between the realms of the real and the represented is, says Thrift, a main reason that the metaphor of performance has been popular among human scientists.
 37. Thrift, *Non-Representational Theory*, 12.

Fourth chapter *Projections*, pages 227–258

1. Dewey, *Art as Experience*, 280.
2. Hannah, *Event-Space*, 6.

3. On reflective practica, see Schön, *The Reflective Practitioner*, 76–104; Schön, *The Design Studio*; and Schön, *Educating the Reflective Practitioner*, 37, 41–156.
4. Schön, *The Design Studio*, 25.
5. Schön draws on Goodman to say that the representation is a virtual world within the world of the reflective practicum where experiments with constructing new worlds through transactions with the real world of practice can be made. See Schön, *Educating the Reflective Practitioner*, 4, 36.
6. Schön, *Educating the Reflective Practitioner*, 36–40. On virtual worlds, see Schön, *Educating the Reflective Practitioner*, 75–78.
7. Schön, *Educating the Reflective Practitioner*, 41.
8. Schön, *Educating the Reflective Practitioner*, 39.
9. Schön repeats the Petra-Quist example in *The Reflective Practitioner*, *The Design Studio* and *Educating the Reflective Practitioner*. Several scholars have criticised his use of this example, most striking of which is perhaps Mewburn's critique of Schön's interpretation of research data generated by Roger Simmonds; see Mewburn, "Lost in Translation," 53–55. On thinking like an architect, see Schön, *The Design Studio*, 64; and Schön, *Educating the Reflective Practitioner*, 39.
10. Schön, *The Design Studio*, 51.
11. Schön, *The Design Studio*, 51.
12. See, e.g., Schön, *The Reflective Practitioner*, 141–156; and Schön, *Educating the Reflective Practitioner*, 68–75.
13. Schön, *The Design Studio*, 85.
14. See, e.g., Schön, *The Reflective Practitioner*, 21–69.
15. Schön, *The Design Studio*, 89.
16. Salama, *Spatial Design Education*, 46, figure 2.9.
17. Nielsen, "Tacit Knowledge: A Critique," 12. For critiques of Schön's epistemological approach, see also Dyrssen, "Navigating in Heterogeneity," 228–230; and Kemmis, "Knowing Practice." Schön himself claims that practitioners should strive to express the tacit, but he does also say that the practitioner's "intuitive" ways of knowing will always be richer than any description of them can be; for the latter standpoint, see Schön, *The Reflective Practitioner*, 276–277.
18. Kolb, *Experiential Learning*, 38.
19. Schön wrote his PhD dissertation on Dewey's theory of inquiry; see Schön, *Educating the Reflective Practitioner*, 5. The idea of the reflective practitioner stems from Dewey.
20. Dewey, *Experience and Education*, 41 (emphasis added).
21. Kolb, *Experiential Learning*, 38.
22. Dewey, *Experience and Education*, 48.
23. Baumgarten, *Ästhetik*, 11. "Die Ästhetik . . . ist die Wissenschaft der sinnlichen Erkenntnis" could be translated to "Aesthetics . . . is the science of sensuous knowledge."
24. See, e.g., Mewburn, "Constructing Bodies," 48.

25. Barnett, *The Ecological University*, 114 (pedagogy of strangeness), 117 (pedagogy of mutual risk). On uncertainty, see also Land, "Toil and Trouble."
26. Schön, *Educating the Reflective Practitioner*, 210.
27. Schön, *The Design Studio*, 62, 64.
28. Schön, *The Design Studio*, 30, 97.
29. Schön, *Educating the Reflective Practitioner*, 210–211, 311.
30. Schön, *Educating the Reflective Practitioner*, 42.
31. Schön, *Educating the Reflective Practitioner*, 42.
32. Schön, *Educating the Reflective Practitioner*, 31.
33. Schön, *Educating the Reflective Practitioner*, 77; and Schön, *The Design Studio*, 65.
34. Kinsella, "Practitioner Reflection," 41, 48.
35. Kinsella, "Practitioner Reflection," 48–49.
36. Pineau, "Teaching is Performance," 7–8.
37. Pineau, "Teaching is Performance," 7.
38. Pineau, "Critical Performative Pedagogy," 52.
39. Pineau, "Critical Performative Pedagogy," 50.
40. Pineau, "Critical Performative Pedagogy," 50.
41. On this aspect of Pineau's work, see also Alexander, "Performance and Pedagogy," 253–254.
42. Pineau, "Critical Performative Pedagogy," 51–52.
43. Among others, Jan H. F. Meyer and Ray Land criticise critical pedagogy for excluding affective and uncertain dimensions of learning; see Meyer and Land, "Threshold Concepts and Troublesome Knowledge (2)." C. Greig Crysler has warned against critical pedagogues who predefine what architecture students should be critical against; see Crysler, "Critical Pedagogy."
44. Salama, *Spatial Design Education*, 310–312, quote 311.
45. Pineau, "Critical Performative Pedagogy," 42–43. On critical pedagogy as connector of pedagogy and performance, see also Alexander, "Performance and Pedagogy."
46. Levin and Martin, "Praxis of Educating Action Researchers," 220, 226–227.
47. Levin and Martin, "Praxis of Educating Action Researchers," 226. They refer to Freire, *Pedagogy of the Oppressed*.
48. Pineau, "Critical Performative Pedagogy," 41–42.
49. Pineau, "Teaching is Performance," 11–12, 15.
50. Pineau, "Teaching is Performance," 6.
51. Pineau, "Teaching is Performance," 21.
52. Schutzman, "Ambulant Pedagogy," 279.
53. Schutzman, "Ambulant Pedagogy," 291–292.

54. Apart from Weinstein and Tisi, see also Brejzek and Wallen, *The Model as Performance*, for a discussion of the use of models across the fields of theatre and architecture.
55. On educator as choreographer, see also Mewburn, "Lost in Translation," 374–377.
56. Dyrssen, "Navigating in Heterogeneity," 227.
57. Dyrssen, "Navigating in Heterogeneity," 232.
58. Weinstein, "Bringing Performance into Architectural Pedagogy," 190, 192, 198.
59. Weinstein, "Bringing Performance into Architectural Pedagogy," 194–198.
60. See descriptions of workshops in Weinstein, "SHiFT"; and Weinstein, "Bringing Performance into Architectural Pedagogy."
61. Bonnevier, *Behind Straight Curtains*, 265.
62. In addition to Salter, see Böhme, "Urban Atmospheres," 45–46; and Hannah, *Event-Space*, xv, xviii, 311.
63. Salter, *Entangled*, 84.
64. "Le Théâtre des Négociations," Raumlabor, <http://raumlabor.net/le-theatre-des-negociations/>.
65. Wihstutz, "Introduction," 2.
66. Plato, *Timaeus*, paragraph 50, see Plato, *Timaeus* and *Critias*, 41–43.
67. On the notion of *chōra* in Plato, see paragraphs 47–52 in *Timaeus*, in Plato, *Timaeus* and *Critias*, 37–46. On *chōra* and architecture see, e.g., Pérez-Gómez, *Built upon Love*, 44–51; Hannah, *Event-Space*, 63, 226; and Grosz, *Architecture from the Outside*, 91–105.
68. Pérez-Gómez, *Built upon Love*, 44–51.
69. In "The Stage Considered as a Moral Institution" from 1784, Schiller presents theatre as a tool for correcting morals and political opinions of citizens in a state. In *On the Aesthetic Education of Man* from 1795, he instead describes the ideal experience of a work of art as one that leads to freedom and autonomy. See Wihstutz, "Schiller's Transformative Aesthetics," 112–114.
70. Schiller, *Aesthetic Education of Man*, 47–48 (in note).
71. Dyrssen, "Navigating in Heterogeneity," 230. Weinstein, "Bringing Performance into Architectural Pedagogy," 202.
72. On Arnold van Gennep's (*The Rites of Passage*, 1909) description of rites as linear transformations in three phases (separation, transition, incorporation) as a main reference for Turner, see, e.g., Carlson, *Performance*, 16. See also Turner, *From Ritual to Theatre*, 24–25; and Turner, *Dramas, Fields, and Metaphors*, 13.
73. On the distinction between "liminal" and "liminoid," see Turner, *From Ritual to Theatre*, 28–44, 53–55. See also Carlson, *Performance*, 18–20.
74. Turner, *Dramas, Fields, and Metaphors*, 135.
75. Turner, *From Ritual to Theatre*, 29–33.

76. Turner, *From Ritual to Theatre*, 89–91, 94, 104.
77. On links between avant-garde theatre and Baroque theatre, see Tafuri, "Theatre as a Virtual City," 33. On Baroque theatre and representation of space, see Vesely, *Architecture in the Age of Divided Representation*, 176–226.
78. For nuanced descriptions of relations between the *Gesamtkunstwerk* and avant-garde experiments, see Koss, *Modernism after Wagner*; Salter, *Entangled*; and Hannah, *Event-Space*.
79. Hannah, *Event-Space*, 167.
80. Hannah, *Event-Space*, 175–178. See also Meyerhold, *Meyerhold on Theatre*; Aronson, *Environmental Scenography*, 83; and Salter, *Entangled*, 18.
81. Hannah, *Event-Space*, 184. Also, Walter Gropius himself and his successor Hannes Meyer were engaged in the art of theatre. On Gropius's and Moholy-Nagy's famous explorations of the idea of total theatres which would surround spectators and turn them into participants, see, e.g., Salter, *Entangled*, 37–44. Meyer had been engaged in the cooperative theatre project "Das Theater Co-op" between 1924 and 1926; see Schnaidt, *Hannes Meyer*, 21.
82. Hannah, *Event-Space*, xvii, xxi, 1, 167.
83. On reconceptualisation of performance, see, e.g., Salter, *Entangled*, xxiv–xxv; Carlson, *Performance*, 11; and Thrift and Dewsbury, "Dead Geographies."
84. On performative architecture practices such as Haus-Rucker-Co, the Situationists, Archigram, see, e.g., Salter, *Entangled*, 92–99, 338.
85. Vardy and Udall, "How Do We Know?," 47–48.
86. Price and Littlewood, "The Fun Palace," 130.
87. Schutzman, "Ambulant Pedagogy," 85.
88. See, e.g., Eco, *The Open Work*; Benjamin, *Understanding Brecht*; Jameson, *Brecht and Method*; and Koss, *Modernism after Wagner*.
89. On combining the theatrical and architectural, see Price and Littlewood, "The Fun Palace," 132; Salter, *Entangled*, 310; and Mathews, *From Agit-Prop to Free Space*, 73.
90. On their critique of the education system, see Mathews, *From Agit-Prop to Free Space*, 68, 198–200.
91. On social control, see Salter, *Entangled*, 311–312; and Mathews, *From Agit-Prop to Free Space*, 69.
92. Rainer and Halprin, "Yvonne Rainer Interviews Ann Halprin," 142–144.
93. On Lawrence Halprin's notation system, see, e.g., Merriman, "Architecture/Dance," 435.
94. On the backgrounds of the Halprins and the relevance for spatial practitioners and educators to study their work, see Merriman, "Architecture/Dance"; and Ross, *Anna Halprin*.
95. Merriman, "Architecture/Dance," 438. The "Experiments in Environment" workshops, held in California in 1966 and 1968, belong to the core of the

Halprins' œuvre and were based on the idea that dancers and architects can exchange spatial knowledge because dancers know how to tell stories through moving in space and architects know how to build spaces around the movement. On Halprins' workshop methods, see the "Take Part Process Handbook" in Halprin and Burns, *Taking Part*, 266–325; and Halprin, *The RSVP Cycles*.

96. Warstat, "Applied Theatre," 174.
97. Warstat suggests that educators could use aesthetic frameworks such as those of Rancière and Fischer-Lichte to bring out the aesthetic potential of applying theatre and thereby become able to invite participants/learners into spaces that allow for engagement and reflection. See Warstat, "Applied Theatre," 184–185.
98. Regarding risks of spatial interventions becoming pure entertainment or ideological brainwash, see, e.g., Thrift, "Intensities of Feeling"; Tafuri, "Theatre as a Virtual City"; and Aronson, *Environmental Scenography*, 203–205, 212, 215.
99. On city stagings as forms of engagement with different purposes and effects, see, e.g., Fischer-Lichte, "Policies of Spatial Appropriation"; Aronson, *Environmental Scenography*, 21–33; and Hannah, *Event-Space*, 238–239.
100. The notion of "environmental theatre" was coined in 1968 by the theatre director and performance theorist Richard Schechner, who wished to place his own work in a context of non-frontal stagings outside the institution of the theatre house. See Schechner, "6 Axioms"; and Aronson, *Environmental Scenography*, 7.
101. Aronson, *Environmental Scenography*, 216.
102. Aronson on Anna Halprin, see *Environmental Scenography*, 142–143.
103. Aronson, *Environmental Scenography*, 7–19.
104. We must however remember what Aronson himself notes: his take on environmental scenography in the first edition of the book (1981) suffers from two major drawbacks: there is a lack of "theoretical, social and political implications" of environmental scenography and a too rigid belief that organisations and properties of singular concrete examples could be placed into categories based on the relation between audience and performance. See Aronson, *Environmental Scenography*, 1.
105. See Weinstein, "SHiFT."
106. Aronson describes Schechner's "Six Principles of Environmental Design" from 1971; see Aronson, *Environmental Scenography*, 165–166.
107. Hannah, *Event-Space*, 7.
108. On *dissensus* and *sensorium*, see, e.g., Corcoran, "Editor's Introduction," 2–5.
109. Rancière, *Dissensus*, 148–149. On the idea of an aesthetic revolution, see Corcoran, "Editor's Introduction."
110. Aronson, *Environmental Scenography*, 203–205.
111. Rancière, *Dissensus*, 157.

112. Easterling's thoughts sit in an anthology edited by Dana Cuff and Roger Sherman and her article can be seen as a response to their overarching proposal that applied research, by contrast to theoretical research, can contribute to projecting design methods which actually let architects move "away from the easy but false choice of the top down versus the bottom up, toward the creation of urban experiences that are familiar yet projective, popular yet critical, and informal yet orchestrated." See Cuff and Sherman, "Introduction," 25.
113. Easterling, "Active Forms," 210–211.
114. Dyrssen proposes, next to liminal states, the heterotopia as a spatial model that art-based researchers can develop; see Dyrssen, "Navigating in Heterogeneity," 230. Wihstutz says the heterotopia's transformative potential can be likened to that of the liminal space; see Wihstutz, "Other Space or Space of Others?," 187.
115. The problem with the idea of the event as something completely "new" or "unexpected" and thereby impossible to predict has been central to recent debates within continental philosophy and political theory regarding how something with the potential to transform situations can appear in the world. See, e.g., Bassett, "Event, Politics, and Space."
116. Rancière, *Dissensus*, 145–146.
117. Corcoran, "Editor's Introduction," 11.
118. Fischer-Lichte describes the performance act as an event which is liminal "insofar as it presupposes a phase of separation in which the participating subjects leave behind their daily contexts" and although the effects of an aesthetic experience, by contrast to those of a ritual passage, may not last, Fischer-Lichte prefers the "liminal" to the "liminoid," because the "definition of aesthetic experience encompasses the possibility of undergoing a transformation without determining its nature." See Fischer-Lichte, "Transformative Aesthetics," 2.
119. Fischer-Lichte, *Transformative Power of Performance*, 107. Fischer-Lichte (just like Schechner) belongs to a tradition where theatre is primarily a spatial art, and has ties to Victor Turner and to Max Herrmann, pioneer of theatre studies, or *Theaterwissenschaft*, in Germany during the 1920s; see Carlson, "Perspectives on Performance," 3–4.
120. Fischer-Lichte's focus on presence can be problematic for the architect who cannot only work in one-to-one but also has to represent or project material spaces outside the given moment. For a problematisation of Fischer-Lichte's and many other performance theorists' focus on presence only, see Schneider, *Performing Remains*.
121. Fischer-Lichte, *Transformative Power of Performance*, 38–39, 55, 162–165, 205–206 (on feedback loops), 38–74 (on shared bodies and spaces).
122. For a glimpse of how the author tested this in a workshop in the course Exploring Fieldwork, 2015, with the graphic designer Inês Veiga and the architect Sahar Rabadi, see Gullberg, "Frames for Learning."
123. Fischer-Lichte, "Transformative Aesthetics," 1.
124. Fischer-Lichte, *Transformative Power of Performance*, 187.

125. Carlson, "Perspectives on Performance," 6, 8–9. Fischer-Lichte herself points out that her view of performance as collective temporary confusion differs not only from Americans but also from Schiller and Brecht who encouraged spectators to act after leaving the theatre house, while she focuses on interactions during the play itself; see Fischer-Lichte, *Transformative Power of Performance*, 171.
126. Schechner, *Performance Theory*, 121–122.
127. Fischer-Lichte, *Transformative Power of Performance*, 179.
128. Fischer-Lichte, "Transformative Aesthetics," 1. Also Hannah takes Nietzschean perspectives on space, see Hannah, "What Might Be a Nietzschean Architecture?"; and Hannah, *Event-Space*, 313–319.
129. Fischer-Lichte's aesthetic approach to transformation allows for the inclusion of experiences of belonging, or, as Carlson says, "deeper experience[s] of being in the world and of becoming newly conscious of that being"; see Carlson, "Perspectives on Performance," 6.
130. Carlson, "Perspectives on Performance," 6–7.
131. Warstat, "Applied Theatre," 185.

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