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Science Fictioning Participatory Design

Laplace, Ricelli; Letkemann, Joel Peter Weber

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Science Fictioning Participatory Design

Ricelli Laplace

RL3: Radical Sustainable Architecture, Aarhus School of Architecture, Aarhus, Denmark, rlr@aarch.dk

Joel P.W. Letkemann

RL2: Technology, Building Cultures, and Habitation, Aarhus School of Architecture, Aarhus, Denmark, jl@aarch.dk

ABSTRACT

This paper proposes two allied approaches to participatory design and architectural pedagogy: Responsible Architecture is attentive to multiple ecological actors and behaviour change in value-led PD, and science fictioning addresses how narratives of the future are constructed in architectural pedagogy.

We developed three frameworks for pedagogy in a PD course: 'authorship' invited students to consider how their values might be productive as they construct their practice, 'collective storytelling' included actors who otherwise would not be represented – community stakeholders and non-human ecologies on site – and 'translation' negotiated community values with the material reality of an architectural project.

We conclude that these methods rooted in shared values can help a project respond to the long-term ambitions, ecological worldviews, and social-environmental responsibility of a community of stakeholders. The workshop revealed to students how choices in design could never be innocent, but a response aligned with values and future hopes in architecture.

KEYWORDS

Science fictioning, participatory design, responsible architecture, architectural pedagogy, ecological worldview

1   Introduction and Theoretical Framework

This paper describes a workshop in participatory design (PD) within architectural education. The workshop was based on two methodologies developed in the authors' PhD research. "Responsible Architecture" [1] is a methodology concerning value-led participatory methods to encourage people's sustainable behaviour and ecological values. The second methodology is "science fictioning" [2], developed for architectural pedagogy and here extended to include participatory strategies.

Between these approaches, we developed specific pedagogical methods that introduce participatory practises to architecture students and community stakeholders in a co-creation process. We describe these methods under the headings of authorship, storytelling, and translation. Combined, these approaches produce a different framework to talk about future hopes and ambitions in PD, with a focus on the ecological values of social-environmental responsibility.

This paper describes part of a long-term participatory project between several stakeholders in a gentrified area in Aarhus, Denmark. The participatory project is staged in a series of workshops happening between 2020-2023, and this paper describes one of these practice-based experiments. In the first section of this paper, we will unfold the two theoretical frameworks. Then, we will explore the experiment and the specific pedagogical methods that we developed. Using students' design processes and results, an analysis of student and stakeholder records of the process, and reflection on the results, this paper will describe pedagogical and PD methods informed by our respective research.

1.1 Responsible Architecture (*respondere*)

Responsible Architecture (RA) is a methodology based on value-led participatory learning experiments to define ecological values and methods and their implications to inspire sustainable behaviour in design. In contrast with the notion that people's decision making and behaviour are based on facts, knowledge, and reason, research has been shown that they are actually highly impacted by emotions, identity, and values [3, 4, 5] . These can be intrinsic values based on individual life stories and experiences, but are also connected and influenced by external enabling factors like social, economic, and institutional norms of the cultural context [6].

This methodology invites participants to co-create shared values related to an ecological worldview, with the goal to engage with people's current values system to enable personal and cultural transition towards this worldview. Beddoe *et al.* argue that in order to move towards a sustainable future, there is a need for a cultural transition in the worldview of individuals and institutions, rather than for mere technological fixes [7]. Our values, worldviews, and behaviour are interlinked and influence each other. Therefore, a change in people's worldview means a change in values [8] and can impact behaviour.

RA derives an ecological worldview from long standing Indigenous [9], [10], and spiritual worldviews who recognize notions of holism, interconnectedness, and constant change. These worldviews find resonance in the more recent philosophical tradition of

systems theory [11, p. 491], that shows complex, non-linear relationships not only between the material and biological systems of the biosphere [12], but also including the mental and social domains of human culture [13]. These worldviews bring systemic societal behaviour change by undoing the dichotomy between environmental and social issues, recognizing their interconnectedness [14]. For example, the perspective of holism describes the world as an interconnected, interdependent whole characterised by nonlinear dynamic relationships between unstable actors across all scales. From this perspective, sustainability in architecture is not only about sustaining the environment but is tightly bound to the interconnected and continued workings of other social-political structures [15].

The field of social justice shows how the improvement or impoverishment of the environment happens with the improvement or impoverishment of human societies [16]. This was recognized during the 60s and 70s when more socially oriented approaches to design and architecture started to emerge, like in Jan Gehl's cities for people [17] and Victor Papanek, who encouraged designers to exchange "design for profit" in favour of a more compassionate approach [18]. More recently, in Fowles's synthesis of participatory and ecological design, he calls for a transformative architecture that incorporates "community participation in the design and development process, whilst at the same time embracing an ecological agenda, there evolves a strengthening of social sustainability as well as increasing sustainability in the physical environment." [19]

RA advocates for greater attention towards the interconnectedness between these social structures and a network of actors that includes humans, but also a range of biotic and abiotic non-human actors; flora and fauna, or the systems of the water cycle or tectonic action. RA responds to recent concerns in PD to address the broken relationships between human and non-human elements by questioning singular worldviews, and instead attending to more-than-human and spiritual dimensions [20]. Non-humans can mediate human behaviour and therefore the construction of an ecological worldview is an important mechanism to make the invisible more visible, making PD process more democratic [21]. Incorporating non-humans as equal stakeholders of a project produces positive impacts for all ecological actors.

Lastly, to answer the complexity of structures and actors in constant change, rather than trying to predict or provide final responses, RA argues that architecture should both become a process of ongoing co-creation – even after construction, the designed object should remain open to the ever-changing nature of communities and ecosystems. This is related to the notion of "continuing design," that proposes a more inclusive approach relying on temporally open-ended activities and long term perspectives required for sustainable collaborative development, blurring the lines between use, design, implementation, modification, maintenance [22]. In this ever-changing context of interconnectedness, there is no immutable or final answer for sustainable design, and thus there is no final answer for RA, but a path that is constantly being unfolded and created collectively.

Therefore, RA explores how to translate these concepts of an ecological worldview to architecture by using different participatory methods. PD can offer ideal conditions for the co-creation of shared values and problem solving [23], [24], and to encourage participants to be a collective of action-taking individuals, to put into practice their responsibilities and abilities to respond to local ecological issues[19]. Value-led PD processes can have material outcomes as the design product and also immaterial outcomes, helping transformations of the participant's ways of thinking [25].

In this context, the word 'responsible' implies the Latin verb *respondere* – it is about cultivating a capacity to respond. RA invites different stakeholders; both human and non-human actors are seen as co-creators responding to ecological issues in a PD project, where design emerges from collective dialogues between the architect and other agencies. In the following experiments, we explore responsibility in architecture, its meanings, values, and methods related to this ecological worldview.

The series of workshops within the RA project include several stakeholders: architecture students, a local community, municipality, and non-human stakeholders (local fauna and flora represented by biologists and other specialists). This paper will explore the second workshop of the series, called 'Materializing Collective Futures,' where RA intersects with the methodology called science fictioning.

1.2 Science Fictioning

Science fictioning explores speculative potentials within architectural design and pedagogy. As a methodology, it shares affinities with longstanding practises in architectural design codified in the 1970s as Experimental Architecture [26], [27]. Later practises such as Design Fiction [28], and Speculative Design [29] make more explicit reference to science fiction (SF). While each of these explores the benefit of speculative storytelling devices for design, none of them develops far beyond a popular understanding of SF. In recent architectural discourse, this is somewhat rectified in work by Butt [30], Clear [31], and Fortin [32], and the present work builds upon this more critical reading of SF's affordances for design, as well as from speculative currents in philosophy and feminist scholarship. In particular, this methodology develops the unique qualities of authorship that are involved in SF as the futures imagined in SF are elaborated in the discourse between multiple works and with the reader. The method also de-emphasizes the object of design in favour of the worldbuilding narratives communicated by design, and to the critical encounters afforded by continuing to read design as science fiction, even after it has become 'fact.'

One affordance of reading SF and architecture together is how it suggests how we can adapt ideas from SF to challenge given categories within architectural pedagogy. For example, adapting elements from SF short fiction can both provide a new impetus for ideas and also can form critical questions about how we make architecture now – what we can ask architecture to do and what lifestyles it should support [33]. Understanding architecture *as* SF makes us pay special attention to how appropriating methods

and concerns from SF storytelling and scholarship is beneficial to thinking about how we tell stories about the future in architectural practice: the futures of specific projects and the 'fictions' we construct around the figure of the architect and the discipline.

The use of the verbal form science fiction-*ing* is heavily influenced by Jessie Beier's formulation [34]. Citing Vilem Flusser, Beier argues that a subject's attempts to describe their world are a fiction assembled from their experience of the world, often congealing into consensus realities – 'common sense' perspectives that are sometimes productive, sometimes stupefying in that they preclude other ways of knowing the world. The special strength of science fictioning is first as a perpetual inducement to keep reading the 'fact' of consensus reality as fiction. Science fictioning is an incessant imperative to "defamiliarize the given," [35, p. 158] – offering the chance to "fiction another world" from the material of the present [34, p. 377].

Science fictioning is also about the future as a fiction. Expecting that the future will unfold according to present-day knowledge puts limits on what can be imagined according to contemporary cognitive paradigms, what Frederic Jameson calls a project to "colonise the future" from the perspective of the present [36, p. 228]. Therefore, rather than trying to know the future, science fictioning is a practice in not-knowing. For Emma Cocker, not knowing is productive as a condition of expectation, anticipation, and an openness to a "desirable indeterminacy." "Not knowing," she writes, "is not experience stripped clean of knowledge, but a mode of thinking where knowledge is put into question, made restless or unsure" [37, pp. 127, 131].

The complexity of an ecological worldview requires those who intervene in the world to be open to multiple, competing perspectives from a wide variety of participating actors. Not knowing is not a call to ignorance but rather a call to acknowledge the limits of one's knowledge – both as a student, and importantly, as a teacher. It is important that any prospective architect become aware that their 'professional expertise' is a form of knowledge that closes some perspectives as it opens others. Haraway reminds us that our politics and epistemologies are the result of embodied positions and optical devices – where we are, and how we look at the world [38]. Rather than the privileged knowledge of the teacher, not-knowing in architectural education puts the student in a position of authority equal to other storytellers. Highlighting students' authorship has a special resonance within this PD project as they are first taught to articulate their subjective position, and second to invite other, diverse storytellers into a dialogue about the future.

Rather than the certainty of a singular future imagined as an extended present, SF is a tool to explore multiple futures. Building upon the SF practice of worldbuilding, Haraway's worlding reminds us that construing the world in whatever capacity is a way to change the way we think about the world and to share that with one another [39]. It is in this way that worlding is not only a tool to describe fictional worlds, it also suggests that the ways we view 'reality' are also fictions; these worldviews are contingent and changeable, and structure our experience of the 'real' world. The practice of sharing stories about the future with one another is a chance to test these futures together, to understand how they might generating the potential for worlding practises in the present and for the future.

Not-knowing also underscores the importance of reminding students that actively constructing the discipline is an inevitability for practice. Teaching students to become storytellers reframes their agency in relation to the future, from one they endure passively to one they are active in constructing. We don't yet know what the future will be like, but more importantly for architectural pedagogy, we don't yet know what architecture can be, nor an architect. This being the case, to affirm 'architecture's' instability is to resist the closure of the term, making (re-)construing the discipline a necessity and ethical prerogative for practice.

Science fictioning as a figure, then, is there to remind us to resist the closure of the 'future,' and of 'architecture,' and instead to remind us to continue telling stories. The question of storytelling is also a question of authorship. Part of being a storyteller is knowing one's authorial voice, that it comes from a unique, situated perspective, and knowing which other voices to include in a chorus of the future. Science fictioning asks all present and future architects to become active and conscientious storytellers alone and in concert with others – fully aware that, in Donna Haraway's invocation, "stories make worlds." [39, pp. 11, 12]

2 Workshop Structure and Context

In this paper, we describe a two-week participatory design workshop for 2nd-year architecture students titled Materializing Collective Futures. This module was the students' only task, and had students' full-time participation for 37 hours per week. Half of this time was allocated to group activities – stakeholder meetings, lectures, and tutorials, while the other half was set aside for work. Due to Covid restrictions, the workshop was online. Using the proposed PD methods, the students were challenged to co-design proposals for a shared site between several stakeholders. The design should be the result of a negotiation of future visions between participants, their different values, and well as a collective vision for the future usage of the site. This starting point of understanding shared values and of building a site-specific ecological worldview is the basis for stakeholders to work together in later immediate design proposals for the site.

2.1 Site

The site is located in Godsbanen, a contested and rapidly gentrifying community in Aarhus, Denmark. Around the year 2000, after the closure of Aarhus' rail terminal, the abandoned buildings were occupied by a cultural community calling themselves Institute for (X). Later, in 2009, they were given a temporary lease for the buildings by Aarhus municipality. With the city

expanding, the majority of the former terminal has become the Godsbanen Cultural Production Center [40]. Much of the adjacent land is being developed into offices and housing, and Institut for (X) is slowly being squeezed into the remaining vacant land. While their position is still uncertain, Institut for (X) has become a visible fixture in the city's cultural community, currently hosting several hundred members in over 100 small businesses, creative enterprises, community organisations, and cultural events [41]. There is a general consensus that Institut for (X) provides a vehicle and critical mass for cultural production and experimentation that enriches the city of Aarhus, and is therefore valued by both members and the thousands of visitors who frequent the community [42, p. 28].

Our workshop took place as Aarhus School of Architecture was preparing to move into its new building in this fraught territory. The project area for the workshop is the space now owned by Aarhus School of Architecture, but which is immediately adjacent to Institut for (X), and straddles a corridor connecting each institution to the city on one side and to the still undeveloped landscape on the other [fig. 1].

As well as the human inhabitants, the site is also home to a collection of plant species that are not otherwise found in the Jutland peninsula. The industrial past of the site has left an artificial post-human landscape condition behind, harder, drier, and warmer than it would otherwise have been. As a terminus in a rail network that criss-crosses the European continent, the site now hosts a unique ecology of plant organisms. As this new urban quarter develops, the New LAArch has the ambition to maintain this unique ecology as a landscape laboratory [54]. Together, Aarhus School of Architecture[1] and its student body, the Institut for (X), the non-human environment on site, and the broader community of the Godsbanen area form a networked ecology of interconnected actors with an influence on the site and each other. We use this specific locus of actors to develop ecological values from the situated perspective of our site.

Figure 1: **Aerial view of Aarhus School of Architecture adjacent to Institut for (X), project area noted in red. (Images courtesy of Aarhus School of Architecture)**

2.2 Workshop Structure and Data

The workshop is organised into 3 phases: Aligning Futures, Worlding Futures, and Building Futures. Each phase had a duration of 3-4 days. The methods described in the following section roughly corresponding to each phase: authorship and participation (first phase), storytelling (second phase), and translation (third phase). This division, however, is accumulative rather than discrete and aspects of each method are explored throughout the workshop.

To analyse how the methodologies affected learning, we collected data including: students' production, a reflection-logbook, conversation with participants and observation of students-stakeholders interactions. We also observed and took notes from several meeting sessions between students and stakeholders, and complemented this data with individual conversations with participants.

The students daily logbook was developed from a time-geographical diary method[41]; every day they answered structured questions related to each method they were learning, to allow comparison and consistency. We did a qualitative analysis[2] of the images, collages, and diagrams that were produced, and also text analysis from the logbooks and conversations. We analysed the

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[1] Aarhus School of Architecture was represented by prorector Kristine Leth Juul and exhibition coordinator coordinator Karen Kjærgaard. The Institute for (X) was represented by day-to-day manager Mads Peter Laursen, although students also sought out informal consultations with community members. The non-human ecology of the site was represented by Associate Professor Stefan Darlan Boris.

[2] NVivo software was used to process the qualitative analysis, collecting and structuring text in themes and patterns: https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home

texts looking for patterns and themes that emerged from the data; the quotes shown in this paper were chosen because they represent the themes that students were expressing in their reflection well. These logbooks served not only to our record and analysis of the workshop, but were also an invaluable tool for students' reflection on the process.

3   Pedagogical Methods and results

3.1 Authorship

Who gets to tell the story of the future? What is an architect's authority in a project, how do they exchange this authority for authorship, and how do we invite others to tell the story? In order to probe these questions with students, we construct the following stages of authorship in the project: the tutors as authors of the project, student's individual authorship, and group authorship with other students and stakeholders. While practitioners are already engaged with values as their main concern in PD [43], this phase engages with values explicitly, using intrinsic and collective values as the engine that drives our decision making and design efforts in our PD project and pedagogy.

At the beginning, we as tutors have to acknowledge our own authorship in this process, as initiators and stakeholders who bring our own values to the discussion. We are not neutral and do not intend to be. Our values are based on an ecological worldview, and include a commitment to social and environmental wellbeing, diversity and inclusion, and a desire for continued re-evaluation of the discipline we find ourselves in. Throughout the workshop, we presented three lectures based on our own research and values – these are inextricably linked, and we felt it is important to represent our subjective positions as clearly as possible. In this way, we are clear about the decisions we made as we designed the workshop – the degree of authorship we assume and what we leave available to the participating stakeholders. In the exercises of our authority – for example, in setting up the framework for discussion – we tried to act as facilitators through the process and not interfere too much, though we were occasionally asked to respond to ongoing work.

We began the first phase highlighting the interdependence of social and environmental issues in sustainability and introduced students to concepts of RA and PD. It is important that students understand their responsibility in telling a story of a collective future, most importantly in the sense of *respondere* outlined above. The first thing we do is we construct the image of the author. While each student is an individual, the workshop asked them to understand how storytelling happens in conversation. Starting in the first phase "Aligning Futures," but continuing through the workshop, we asked students to consciously be aware of how they were constructing this figure of the author/architect in their project through dialogue, negotiation, and mutual understanding.

3.1.1   Intrinsic values: Individuals and Groups

In the first phase, students were divided into 5 groups, each with 3 or 4 members. Their first task was to articulate the values that inform each one's individual personal and professional lives. We did this by asking them to first reflect individually with their logbooks, and later share their values with their peers. This exercise helped students to identify for themselves where they can activate their values and have an impact on the world, both as individuals and as professionals. Within the framework of Critical Pedagogy [44], empowering students' subjectivity allows them to see themselves as political agencies, as an individual part of an active political body. This sense of agency is connected to the psychological concept of locus of control, where people are more likely to change if they feel their actions can have an impact, rather than action coming from external factors only [45], [46].

Focusing on values can enhance student's sense of responsibility and desire to respond to the ecological issues in the project. The logbooks revealed that students' values were already strongly influenced by sustainability and community, both of which were mentioned by a majority of the class, as well as an appreciation of history and context. In their logbook, students wrote:

> "My determination is to help people through the art of building and sustainability... equality and non-discrimination are an important aspect of my life and my way of thinking... In order to have a future we need to incorporate and preserve our surrounding environment and make it the core of our designs."
> "Architecture should be both socially and environmentally responsible. It should collaborate with the original and given context and have respect for the locals already living in the area."

Therefore, this exercise helped students to articulate how these values drive their practice, and to be aware of which motivations come from outside and which from themselves. Psychology research highlights people's need to be consistent, wanting to align their behaviour with their values [47]. The research also shows that reflection on intrinsic values can increase people's well-being [48], triggering people's emotions and motivations to change [49]. This was the first time these students were doing a PD project, and despite initial confusion expressed by them at the beginning of the first day, we believe that the values exercise contributed to increase student's engagement and motivation:

> "... it was interesting to see everyone's presentations today and see how different and at the same time similar our directions are, even though we work from different values. I have become more involved in the project and look forward to seeing what happens…"

This exercise took students out of their comfort zone as they started the workshop talking about something seen as 'personal' and not 'professional.' Nevertheless, it helped to reveal the unconscious processes involved in how values that arise from their life experiences and passions are connected to their professional and design practises:

"In the beginning of the day, I was a bit sceptical as it all seemed a bit personal talking about our personal values (…) later it made sense in regards to our way of thinking in a design process."

"…when forming an actual company or entering a company with aspirations and values, one ought to decide if they coincide or not, because it must be rather difficult to work together but in different directions."

"…personal and professional values matter just as much as mutual respect in a professional relationship."

After reflecting upon their nascent architectural practice emerging from personal values and not only disciplinary norms, we looked at how they could begin to collaborate. We asked them to express their values in relation to peers in their work group. After sharing their values with one another, they should then develop a common identity by naming their group. This self-naming exercise was important in establishing shared group identity, but also in negotiating how one's individual values intersect with other people's values. Some names were rather directly taken as synthesis of group professional aspirations, for example, the "Ethical Environmentalists," or "Contextual Pragmatism." Other groups were based on a more abstract set of shared values, such as "Con-Pro-Con," from the Latin *confido*, *probitatis*, *consideratio* (trust, honesty, consideration). The personal values and group naming exercises took up the first morning of the workshop.

3.1.2 Towards Collective Values

After we facilitated this first exercise between students, we asked them to do the same with their stakeholders. As a first step, students and stakeholders shared their values as a way to help the negotiation process, and understand other stakeholder's values and motivations. The stakeholders participated in various modes: formal presentations, shared and one-on-one discussions, and informal conversations and visits on site. Students were also encouraged to think of themselves as stakeholders and active in the collective future of their school's surroundings, speaking both for themselves and for future generations of students.

In order to relate to the work that had gone into the project in prior participatory processes with other stakeholders on site, we assigned each group a main theme from 5 values that stakeholders identified earlier in the project: Architecture of Equality, Tangible Architecture, Lasting Architecture, Architecture of Togetherness and Architecture of Common Ground. Each theme produced a perspective on the practice of architecture, however they were not intended as an explicit directive to overrule the groups' self-articulated value. Rather, they were to function more as an "optical device" following Donna Haraway, an instigation to thought or a way to see differently than the perspective afforded by one's own situation[25], to help students to approach these communities primed with their assigned theme as a starting point for building a shared worldview.

The theme 'lasting architecture,' for example, came to mean something very different than durability. As this group developed their shared values with the stakeholders, they came to understand that adaptability in response to the community was more important to 'lasting architecture' than a lasting materiality. Therefore, they included 'lasting relationships' as a main goal of lasting architecture, and explored how spaces could be designed in a way to ensure longer term relationships could develop between people and with non-human actors on the site.

Starting the course in PD with a collective value sharing and goal-setting exercise proved to be challenging. At the beginning, some students were frustrated because of the "…difficulties connecting all our values." But this deep listening became essential to understanding the stakeholders and the site, and achieving a result where stakeholders and students felt that the design was made in a conscious, thoughtful, and 'responsible' way:

"…I´ve learned that even the smallest interventions require a lot of analysis and consideration for the stakeholders."

"How important it is to make an overview of our values and intentions and how it could influence the design, which we always could return to and make sure we are heading in the direction we wanted to."

This interaction also showed where deep listening was difficult. In the case of the non-human stakeholder of the site, students realised the challenge when it comes to involving the local nature as a decision maker, and they had to strategize different methods to deal with this communication issue:

"The concept of stakeholders made sense immediately, and also the concept of the silent stakeholder, nature. But I couldn't make sense of having nature as a stakeholder in a city."

"I imagined nature as a person, and how that person might have some values they stand by… Nature is everchanging. It is important to give it space."

"We mostly tried to discuss the potentials of the nature for the other stakeholders and not trying to personify the nature as its own stakeholder"

3.2 Storytelling

In the second phase, we used storytelling to negotiate longer-term ambitions rather than short term instrumental futures. These were captured in what we called the 'article of hope,' a utopian document which collects stakeholders' hopes and worldviews, but in dialogue with the intention of open-ended design, an articulation that is always aware that utopia is a practice, not a declaration of finality [50].

3.2.1   Article of Hope

The 'article of hope' exercise developed a vision of the site as it could be in 50 years' time. The word 'article' is used to avoid limiting the range of expression; it can be any articulation that contains elements of future imagination – drawings, diagrams, collages, and texts. This exercise relies on modes of expression that are explicitly science fictional, and like other works in that genre, makes a future become visible and thinkable to others in the conversation between stakeholders. The article of hope is produced by students over several iterations in dialogue with other stakeholders, as a way to share hopes for the future, but also to probe the potential consequences of the world implied by each suggestion. The article of hope is a way to refocus the attention from immediate needs of individuals to the longer term hopes that can bring a community together.

As a strategy to balance the competing demands from different stakeholders, Con-Pro-Con started by producing an intensified article for each stakeholder individually. These intermediate images show the site variously as: an Edenic paradise where non-human stakeholders take over, a proliferation of Institut for (X)'s characteristic container and shed architecture, and as a dystopian inversion of the first two images [fig. 2]. These images formed a point of discussion for stakeholders, imagining how their ambitions might support or conflict with one another. The articles of hope developed from this strategy articulated the tensions between stakeholders, but the exercise also suggested to the students that there may be a pre-existing power imbalance, and that an architecture of equality must ensure that each agency is equally represented, which became the key driver of their later intervention [fig. 6]. One member of this group's logbook asked:

> ''if it is possible to make the huge school less dominating and let the nature at the site and the Institut for (X) have an important voice?''
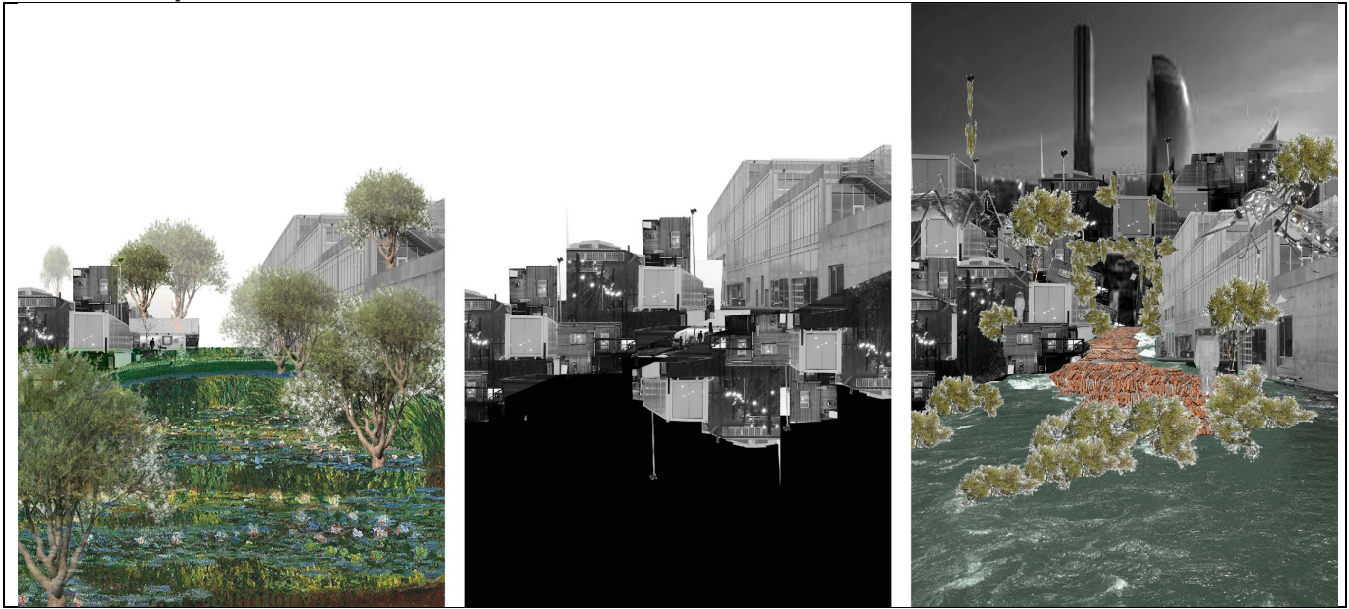

Figure 2: **collages for discussions with stakeholders, from "Con-Pro-Con" (Karoline Bonde Larsen, Magnus Lynge Damgaard, Kasper Carlsen)**

As a part of this phase, we described the relationship between science fiction and worlding. Like works of SF, the articles of hope produced by the participation of stakeholders not only imagine the site differently, but they contain an imagination of the world differently; the images contain implications that reach well beyond the confines of the specific project, helping the reader imagine the consequences of specific design decisions.

One challenging aspect of this project of worlding is to avoid the accusation of escapism usually directed at fantasy, and, following Donna Haraway, 'stay with the trouble' in acknowledging the historical and material condition of the project[39]. To this end, we suggested how the site and the city will change over the next few years, and that we might consider this as inspiration rather than threat. Some examples of possible changes to the site that we presented to students were: increased water on the site due to climate change and sea level rise, a corresponding change in habitats for flora and fauna, demographic and cultural changes due to increased immigration and an ageing population, and in a more abstract sense, changes in technology and infrastructure.

Perhaps the most striking images we presented were of potential flooding on the site. These images, culled both from real data and from popular culture, seemed to dominate the attention of the students, possibly because the sea level rise constitute a measurable change to the site, rather than the more abstract cultural or social shifts that will impact the ecology of the site. While the coming change in sea level acknowledges the issue of the site being a drained wetland and of the proximity to the sea, we found that this kind of emphasis had the potential to dominate many imaginations to the exclusion of other possible avenues of exploration.

Nevertheless, even the images that focus on the imagination of a changed climate contain the seed of much more interesting possibilities for the site. For Group1, the possibility of rising sea levels led at first to a radical consideration of the site as water, rather than land, with the different buildings on site becoming islands in a new sea [fig. 3]. While it was difficult at first to see the gesture as utopian, the creation of this article enabled them to talk about 'bridging' in literal and metaphorical terms as they continued developing their ambitions for the site. Their final proposal included a gallery space as a "bridge," physically and metaphorically a shared space between Institut for (X) and the school of architecture.
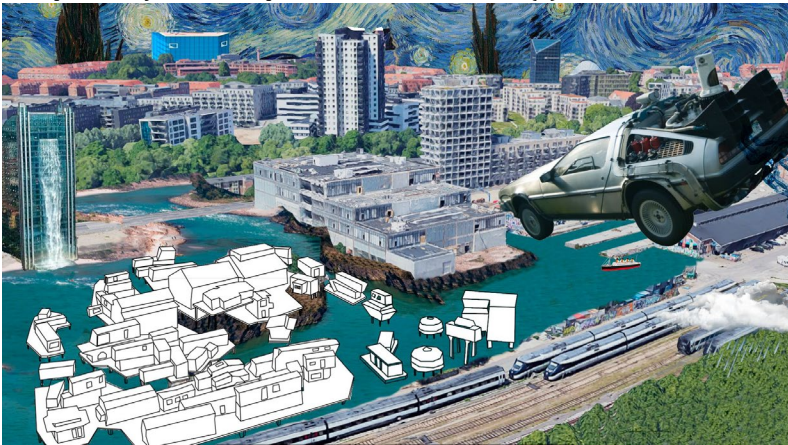

Figure 3: **Article of hope, Group 1 (Viktor Lindegren Jakobsen, Oliver Juul Jensen, Ida Leonhardt Jespersen)**

As much as it reveals how much global issues impact upon local design decisions, this attention to worlding also reveals how changes in the smaller scales can accumulate into change on a global scale. One student's logbook noted with reference to worlding:

> "I felt less afraid of the future and the challenges we will be facing, because for a minute I saw how we are able to change the course we have set for ourselves and build a world that is better than today if we are willing to finally take action to do so rather than keeping on a direction where we are not actually interested in the destination."

In preserving the article of hope's adaptability, its capacity as guide rather than blueprint, we stressed that the article of hope is never finished, and is rather a document under constant revision. Students continued to develop the article of hope as the conversation with stakeholders continued and the demands of the project became more apparent.

3.3 Translation

After the article of hope synthesized the long-term ambitions of the stakeholders, the work of design began. We asked students to suggest a first step toward the environment implied in the article of hope, describing the material consequences of the values and hopes developed in the previous phases. We proposed an exercise which helped them focus their design decisions according to the values of the community, they began the process of design in the last half of the workshop. This time was quite short in comparison with other design exercises, but in spending the first half of the workshop understanding the perspective of the stakeholders in detail, they were able to arrive at design proposals in which each stakeholder could see their ambitions reflected.

In this phase, we asked students to suggest a first step toward the environment implied in the article of hope, describing the material consequences of the values and hopes developed in the previous phases. However, recognizing that no work of architecture is ever finished, we encouraged students to consider maintaining openness and contingency in the project, leaving space for the continued development as futures are imagined and reimagined together by a community.

3.3.1   Value-Action-Design Response

We started this phase with an exercise we called Value-Action-Design Response (VAR) exercise. Based on Homer and Kahle's value–attitude–behaviour cognitive hierarchy model from 1988, this model proposes that cognitions are organised ranging from more abstract cognitions (values), to mid-range cognitions (attitudes), and eventually to specific behaviours. Consistent research indicates the validity of this model [51], [52], highlighting that environmentally responsible behaviour emerges from a foundation of ecological values and attitudes [53]. Because a big challenge when it comes to pro-environmental behaviour is the gap between an individual's values and potentials for action, efforts to overcome this gap have been getting attention in many disciplines[6], but this has been less explored in architectural learning. As we noted before, pro-environmental values were already strongly present among the students. This exercise was developed to assist students to strengthen the link between the individual and shared values created in phase 1, ideas of futurity from phase 2, and their design proposal in phase 3. In the VAR exercise, students divided their work into 3 columns [fig. 4]. The first column included the values that emerged from their dialogues with stakeholders.

Students choose keywords that best represented those values, and also produced a short text explaining each key word's meaning. In the second column, they had to think about the attitudes and actions they wanted their design to promote if they wanted to respond to the values. In this case, the attitudes and actions cultivated within the articles of hope was a means to promote this conversation and mutual understanding for the second phase. In the third column, students began to speculate about how design ideas can respond to each action: depending on the desired action, the design response could be references, sketches, or text, but emphasised more concrete responses.
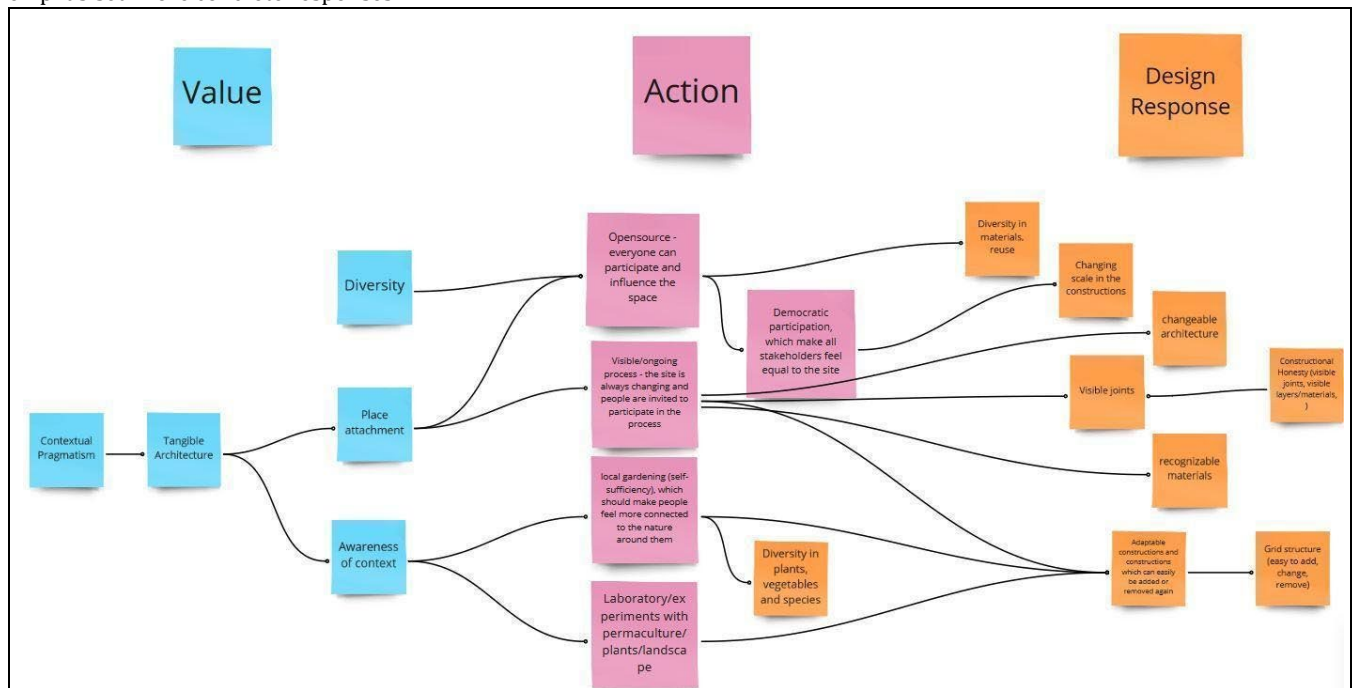

Figure 4: **VAR Exercise from the group named Contextual Pragmatism (Anne Kristine Haagen, Khoshal Arghestani, Mathias Vang Christensen)**

This exercise is an experiment to help 'materializing' conceptual ideas, a translation of the speculative story to another media – specific programmatic elements, spaces, materials, or tectonic articulations. It proved to be a useful tool to connect the phases of the workshop, and helped students to link their design proposals to the challenges and values that they had defined for their specific project:

> "How important it is to make an overview of our values and intentions and how it could influence the design, which we always could return to and make sure we are heading in the direction we wanted to."

Often in PD projects, many things can get in the way of the collective 'vision' what was set up, due to technical contingencies, changes in priorities, and more. Leong and Iversen argue that a PD process where people are engaged in dialogue about their values throughout the design enables them to discover meaning alternative future outcomes with respect to their current practice[25]. In this sense, the VAR joins the article of hope as a useful tool to maintain attention on stakeholders' values and visions as they iterate through the design proposals, and keep track of how and why decisions are made.

3.3.2   Overview and Final Designs

In order to see provide an overview of the workshop, and the implication of the two methodologies, we now examine the process of two groups through all three phases of the workshop. Using the VAR exercise to guide them with regard to stakeholders' hopes and values, students made decisions about the spatial requirements, material systems, assembly methods, and architectural functions of their proposal.

From the first phase, the group calling themselves "Contextual Pragmatism" identified the intrinsic values: honesty, communication, and community. After the collective values discussion with stakeholders focused in the theme 'tangible architecture,' they added the concepts of diversity and place attachment, and understood that in that context, tangible architecture would mean using materials that are easily manipulated and found locally, with easy building techniques, so that it would be possible for diverse and unforeseen people to build or modify it, creating new place attachments.

In the second phase, they identified a concern with sustainable food production, self-sufficiency, and user collaboration, and were able to find similar motivations from the point of view of other stakeholders. They used their article of hope to explore how the shared spaces between the Aarhus School of Architecture and Institute for (X) could be used by urban farmers in the community, proposing open kitchens and dining areas for food culture exchange. This exercise helped them to articulate how the

values like place attachment, for example, could be used to transform the neighbourhood into a food-producing garden, with architectural interventions constructed to care for the gardens, and for neighbours to share meals together.

Finally, during the VAR exercise, they translated ideas to design choices that reflect the values of tangible architecture. They opted for simplicity over elaborate geometries, focusing on a landscape and an architecture which is legible and manipulable by stakeholders for now and future users, calling this "constructional honesty." Rather than a specific architecture, they proposed a building module based on the dimensions of commercially-available materials, setting up an assembly method and several suggested uses which remains open to future development by all members of the community [fig. 5].
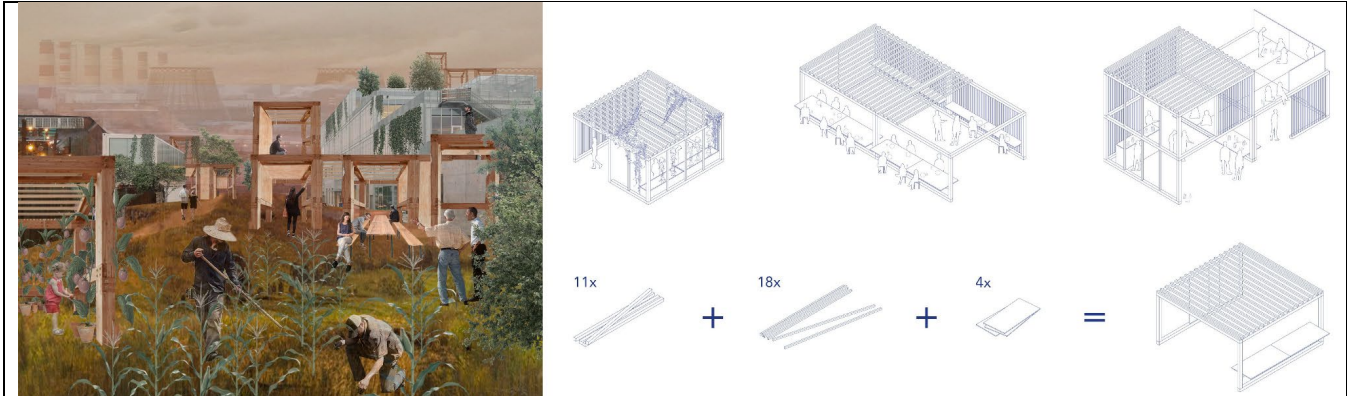

Figure 5: **"Contextual Pragmatism's" proposal a tangible, community-oriented building method (Anne Kristine Haagen, Khoshal Arghestani, Mathias Vang Christensen)**

When exploring stakeholders values, the group ConProCon realised that there may be a pre-existing power imbalance on site, where non-human stakeholders are spatially under-served. One of their values is consideration, by which they understood that this stakeholder deserved a greater focus:

"If we work against nature, we work against ourselves. It is a stakeholder without a "voice" plants, trees and the nature communicate indirectly. Nature has rights like the human rights.''

In doing the article of hope [fig. 2], they found that an architecture of equality must ensure that each agency is equally represented:

"nature gives equality – it is there for you no matter who you are. For example, to sit under and get a hug from the tree. That is a nice way to think of equality at our site – that nature could give this place equality – it is for everybody."

With the VAR exercise, they suggested design responses to balance this idea of equality for non-human stakeholders with the other stakeholders. They imagined that nature as a stakeholder could play a 'equalising' role between the two institutions, connecting them with a lightweight structure that allows the organic growth of the plants.

Their design proposal began by literally lifting up the ground, creating a space for the sensitive plant species on site. This gesture leveraged the non-human stakeholder as the organising principle behind the intervention, defining the scale and the criteria of materialisation. Later, they proposed a wooden framework for collaboration which gives prominence to the ecology of the site, and which grows according to the ongoing maintenance of that ecology [fig. 6]. This space becomes a 'landscape laboratory,' with each stakeholder responsible to maintain and utilise the space. They propose a structure that evolves as the needs change, preserving two distinct ecological zones above and below, even when flood waters threaten to overwhelm the site. This work shows traces of a post-human social contract when it identifies the non-native plants as the most vulnerable stakeholder and places them atop the mechanical infrastructure maintained by the constant diligence of the other stakeholders.
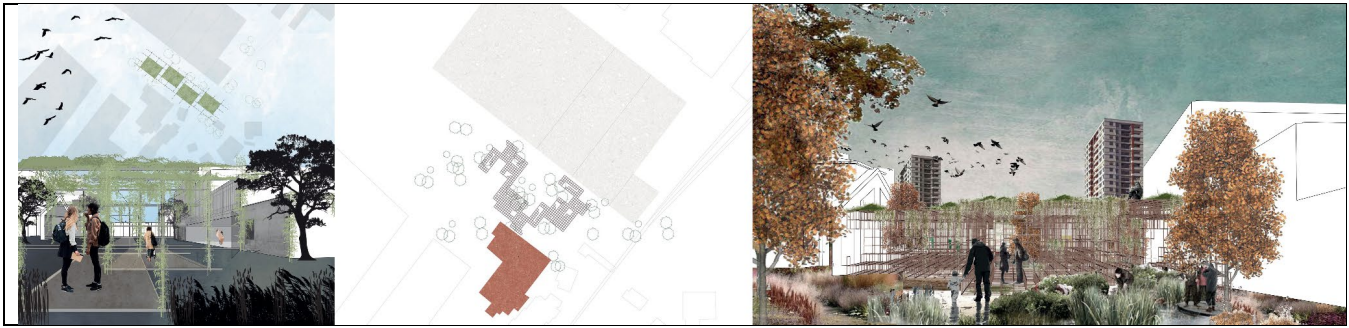
Figure 6: **Intermediate article of hope and 50-year speculation, from "Con-Pro-Con" (Karoline Bonde Larsen, Magnus Lynge Damgaard, Kasper Carlsen)**

In the examples from both groups, we see that the progression of exercises and knowledge through the workshop helped each group maintain a focus on the values guiding their project. They were able to develop ways to share ideas with the stakeholders in such a way as to always be able to speak both to short term consequences, but also with an eye to the long term ambitions of the community. Each group found a way to balance the diverse demands of the project with a specific architectural system appropriate for the present, but also adaptable enough for the future.

4   Conclusion

This paper proposes two allied methodological approaches of teaching PD in architectural pedagogy: *respondere* – a process of co-creation of design responses that are attentive to multiple ecological actors, shared values, and behaviour change – and science fictioning – where students explore their hopes for the future of the site with one another and with stakeholders. These methodological frameworks were combined into a course of architectural learning, uncovering three concepts that guided the pedagogical methods of the workshop: authorship, storytelling, and translation from community values to the material reality of an architectural project.

In the first phase, students explored authorship and the many authors (human and non-human) that can produce a work of design, as well as power dynamics in design decision making. From the personal, intrinsic values of each participant, we developed into conversations with stakeholders which asked to create shared values as the starting point of the participatory process. These exercises allowed people to be explicit about their values and worldviews, and articulate common values as their baseline for collaboration.

From an analysis of their self-reported logbooks, we believe that these exercises helped students in understanding their own motivation and agency in the project and increased their engagement in the process. It helped to reveal the often unconscious processes through which one's own values are connected to one's design practice, and how this might be productive in one's professional life. Finally, we observed that these exercises enhanced student's individual responsibility and desire to respond holistically to issues in the project, and to develop empathy and an awareness of how others are implicated in the design process.

In the second phase, students were able to propose future visions that remained open to continued change together with the ecology of actors on the site. We used science fictional storytelling as a way for stakeholders to communicate their long-term hopes and aspirations for the site. The article of hope that stakeholders create together acts as a guide to future action and decision making. We encourage future research to further explore storytelling media such as VR, film, or illustration in order to engage stakeholders in imagining future ecological scenarios.

The attention to futures meant that each stakeholder's immediate needs and demands were subordinated to farther-ranging hopes for the future that could be imagined together. These hopes became the basis for continued conversation and collaboration between stakeholders. In this way, the article of hope further developed an empathetic relation between stakeholders as they shared future ambitions. The unique possibilities of speculative storytelling are a way to include actors who otherwise would not necessarily be represented, from the 'silent' voice of non-human ecologies on-site to actors on a global scale, such as climate change. Recognizing students' general difficulty during the workshop in including nature as stakeholder, we suggest that future research could explore more methods to include a greater agency from non human stakeholders in PD and document its impacts for design.

Finally, the course closed with a translation of values and hopes into design proposals for the site. We tested the Value-Action-Design Response exercise, which showed to be a valuable guide to design decision making, revealing to students how choices in design could never be innocent, but a response aligned with values and future hopes in architecture. While most students were successful in translating values to designs choices aided by the VAR exercise, further critical exploration and development of this method is needed in order to facilitate continued stakeholder reflection on materializing conceptual ideas into design choices.

These methods are part of ongoing research, we have already noted several beneficial outcomes for PD and design pedagogy. Further study is needed in order to understand the long term pedagogical effects of the methodologies, especially how it impacted students' future projects and design practice. However, we found that staging exercises in order to probe each stakeholder's deeply held values and imaginations for the future developed empathy between actors and provoked shared decision making, becoming the impetus to bridge local and global ecological demands and different worldviews, and translate abstract ideas to the specifics of design. While we have documented these methodologies in an educational setting, further research could explore how they impact upon participatory decision making in practice.

REFERENCES

<bib id="bib1"><number>[1]</number>R. Laplace, "Responsible Architecture: participatory learning for sustainable behaviour in design," PhD Dissertation, Aarhus School of Architecture, Aarhus, Denmark, 2023.</bib>
<bib id="bib2"><number>[2]</number>J. P. W. Letkemann, "Elaborate Strategies of (In)Direction: Science Fictioning Architectural Pedagogy," PhD Dissertation, Aarhus School of Architecture, Aarhus, Denmark, 2022.</bib>
<bib id="bib3"><number>[3]</number>S. H. Schwartz, "Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries," in *Advances in Experimental Social Psychology*, vol. 25, Elsevier, 1992, pp. 1–65. doi: 10.1016/S0065-2601(08)60281-6.</bib>
<bib id="bib4"><number>[4]</number>E. van der Werff, L. Steg, and K. Keizer, "The value of environmental self-identity: The relationship between biospheric values, environmental self-identity and environmental preferences, intentions and behaviour," *J. Environ. Psychol.*, vol. 34, pp. 55–63, Jun. 2013, doi: 10.1016/j.jenvp.2012.12.006.</bib>
<bib id="bib5"><number>[5]</number>P. Wesley Schultz and L. Zelezny, "VALUES AS PREDICTORS OF ENVIRONMENTAL ATTITUDES: EVIDENCE FOR CONSISTENCY ACROSS 14 COUNTRIES," *J. Environ. Psychol.*, vol. 19, no. 3, pp. 255–265, Sep. 1999, doi: 10.1006/jevp.1999.0129.</bib>
<bib id="bib6"><number>[6]</number>A. Kollmuss and J. Agyeman, "Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behavior?," *Environ. Educ. Res.*, vol. 8, no. 3, pp. 239–260, Aug. 2002, doi: 10.1080/13504620220145401.</bib>
<bib id="bib7"><number>[7]</number>R. Beddoe *et al.*, "Overcoming systemic roadblocks to sustainability: The evolutionary redesign of worldviews, institutions, and technologies," *Proc. Natl. Acad. Sci.*, vol. 106, no. 8, pp. 2483–2489, Feb. 2009, doi: 10.1073/pnas.0812570106.</bib>
<bib id="bib8"><number>[8]</number>C. Du Plessis, "Using the long lever of value change," in *Motivating change: sustainable design and behaviour in the built environment*, R. Crocker and S. Lehmann, Eds. London: Routledge, 2013, pp. 124–140.</bib>
<bib id="bib9"><number>[9]</number>G. Cajete, *Look to the mountain: an ecology of indigenous education*, 1st ed. Durango, Colo: Kivakí Press, 1994.</bib>
<bib id="bib10"><number>[10]</number>M. N. Tom, E. Sumida Huaman, and T. L. McCarty, "Indigenous knowledges as vital contributions to sustainability," *Int. Rev. Educ.*, vol. 65, no. 1, pp. 1–18, Feb. 2019, doi: 10.1007/s11159-019-09770-9.</bib>
<bib id="bib11"><number>[11]</number>G. Bateson, Steps to an Ecology of Mind: Collected Essays in Anthropology, Psychiatry, Evolution, and Epistemology. Chicago: University of Chicago Press, 2000.</bib>
<bib id="bib12"><number>[12]</number>J. Lovelock, *Gaia: a new look at life on earth*. Oxford ; New York: Oxford University Press, 2000.</bib>
<bib id="bib13"><number>[13]</number>F. Guattari, *The Three Ecologies*. London ; New York: Bloomsbury Academic, 2014.</bib>
<bib id="bib14"><number>[14]</number>T. Forsyth, "Political ecology and the epistemology of social justice," *Geoforum*, vol. 39, no. 2, pp. 756–764, Mar. 2008, doi: 10.1016/j.geoforum.2006.12.005.</bib>
<bib id="bib15"><number>[15]</number>D. Hes and C. du Plessis, *Designing for Hope*, 0 ed. Routledge, 2014. doi: 10.4324/9781315755373.</bib>
<bib id="bib16"><number>[16]</number>R. Beltrán, A. Hacker, and S. Begun, "Environmental Justice Is a Social Justice Issue: Incorporating Environmental Justice Into Social Work Practice Curricula," *J. Soc. Work Educ.*, vol. 52, no. 4, pp. 493–502, Oct. 2016, doi: 10.1080/10437797.2016.1215277.</bib>
<bib id="bib17"><number>[17]</number>J. Gehl, *Cities for people*. Washington, DC: Island Press, 2010. Accessed: Oct. 18, 2021. [Online]. Available: http://site.ebrary.com/id/10437880</bib>
<bib id="bib18"><number>[18]</number>V. Papanek, *Design for the real world: human ecology and social change*, 2nd ed. London: Thames & Hudson, 2011.</bib>
<bib id="bib19"><number>[19]</number>B. Fowles, "Transformative Architecture: A Synthesis of Ecological and Participatory Design," in *Ethics and the Built Environment.*, W. Fox, Ed. Hoboken: Taylor and Francis, 2012, pp. 118–130. Accessed: Oct. 18, 2021. [Online]. Available: http://grail.eblib.com.au/patron/FullRecord.aspx?p=168505</bib>
<bib id="bib20"><number>[20]</number>Y. Akama, A. Light, and T. Kamihira, "Expanding Participation to Design with More-Than-Human Concerns," in *Proceedings of the 16th Participatory Design Conference 2020 - Participation(s) Otherwise - Volume 1*, Manizales Colombia, Jun. 2020, pp. 1–11. doi: 10.1145/3385010.3385016.</bib>
<bib id="bib21"><number>[21]</number>L. Rice, "Nonhumans in participatory design," *CoDesign*, vol. 14, no. 3, pp. 238–257, Jul. 2018, doi: 10.1080/15710882.2017.1316409.</bib>
<bib id="bib22"><number>[22]</number>H. Karasti, K. S. Baker, and F. Millerand, "Infrastructure Time: Long-term Matters in Collaborative Development," *Comput. Support. Coop. Work CSCW*, vol. 19, no. 3–4, pp. 377–415, Aug. 2010, doi: 10.1007/s10606-010-9113-z.</bib>
<bib id="bib23"><number>[23]</number>C. Spinuzzi, "The Methodology of Participatory Design," *Tech. Commun.*, vol. 52, no. 2, pp. 163–174, May 2005.</bib>
<bib id="bib24"><number>[24]</number>J. Gregory, "Scandinavian approaches to participatory design," *Int. J. Eng. Educ.*, vol. 19, no. 1, pp. 62–74, 2003.</bib>
<bib id="bib25"><number>[25]</number>T. W. Leong and O. S. Iversen, "Values-led Participatory Design as a Pursuit of Meaningful Alternatives," in *Proceedings of the Annual Meeting of the Australian Special Interest Group for Computer Human Interaction*, Parkville VIC Australia, Dec. 2015, pp. 314–323. doi: 10.1145/2838739.2838784.</bib>
<bib id="bib26"><number>[26]</number>P. Cook, *Experimental architecture*. New York: Universe Books, 1970.</bib>
<bib id="bib27"><number>[27]</number>R. Armstrong, *Experimental architecture: designing the unknown*. London ; New York: Routledge, 2020.</bib>
<bib id="bib28"><number>[28]</number>J. Bleecker, "Design Fiction: A Short Essay on Design, Science, Fact and Fiction," p. 49.</bib>
<bib id="bib29"><number>[29]</number>A. Dunne and F. Raby, *Speculative everything: design, fiction, and social dreaming*. Cambridge, Massachusetts ; London: The MIT Press, 2013.</bib>
<bib id="bib30"><number>[30]</number>A. Butt, "'Endless forms, vistas and hues': why architects should read science fiction," *Archit. Res. Q.*, vol. 22, no. 2, pp. 151–160, Jun. 2018, doi: 10.1017/S1359135518000374.</bib>
<bib id="bib31"><number>[31]</number>N. Clear, "Refreshingly unconcerned with the vulgar exigencies of veracity and value judgement: The Utopian visions of Iain M. Banks' The Culture and Constant's New Babylon," *Des. Ecol.*, vol. 3, no. 1, pp. 34–63, Jun. 2013, doi: 10.1386/des.3.1.34_1.</bib>
<bib id="bib32"><number>[32]</number>D. T. Fortin, "Indigenous architectural futures: Potentials for post-apocalyptic spatial speculation," in *Beyond Architecture: New Intersections & Connections*, University of Hawai'i, Honolulu, United States, 2014, pp. 475–483.</bib>
<bib id="bib33"><number>[33]</number>J. P. W. Letkemann, "Science Fictioning Architectural Pedagogy," in *Strategies of Design-Driven Research,* C. P. Pedersen, T. Zupančič, M. Schwai, J. Van der Berghe, and T. Lagrange, Eds. Aarhus, Denmark: Aarhus School of Architecture/ARENA/EAAE/ELIA, 2021, pp. 364–383. [Online]. Available: https://ca2re.eu/wp-content/uploads/2021/09/202108144_CA2RE_STRATEGIES_SCREEN.pdf</bib>
<bib id="bib34"><number>[34]</number>J. L. Beier, "Dispatch from the Future: Science Fictioning (in) the Anthropocene," in *Interrogating the Anthropocene*, J. Jagodzinski, Ed. Cham, CH: Springer International Publishing, 2018, pp. 359–400. doi: 10.1007/978-3-319-78747-3_16.</bib>
<bib id="bib35"><number>[35]</number>J. L. Beier, "Close Encounters of the Pedagogical Kind: Science Fictioning a Curriculum-to-Come," in *Provoking Curriculum Encounters Across Educational Experience: New Engagements with the Curriculum Theory Archive*, T. Strong-Wilson, C. Ehret, D. Lewkowich, and S. Chang-Kredl, Eds. Routledge, 2020, pp. 147–159. doi: 10.4324/9780429058110.</bib>
<bib id="bib36"><number>[36]</number>F. Jameson, Archaeologies of the Future: The Desire Called Utopia and Other Science Fictions. London: Verso, 2007.</bib>
<bib id="bib37"><number>[37]</number>E. Cocker, "Tactics for not knowing: preparing for the unexpected," in *On Not Knowing: How Artists Think*, R. Fortnum and E. Fisher, Eds. London: Black Dog Publishing, 2013.</bib>

<bib id="bib38"><number>[38]</number>D. Haraway, "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective," *Fem. Stud.*, vol. 14, no. 3, pp. 575–599, 1988, doi: 10.2307/3178066.</bib>
<bib id="bib39"><number>[39]</number>D. J. Haraway, *Staying with the Trouble: Making Kin in the Chthulucene*. Durham: Duke University Press Books, 2016.</bib>
<bib id="bib40"><number>[40]</number>"Godsbanen," Godsbanen, Apr. 14, 2021. https://godsbanen.dk/english/ (accessed Apr. 14, 2021).</bib>
<bib id="bib41"><number>[41]</number>"Institut for (X) | Culture, Business & Education at Godsbanen, Aarhus," Institut for X, Apr. 14, 2021. https://institutforx.dk/ (accessed Apr. 14, 2021).</bib>
<bib id="bib42"><number>[42]</number>L. Kielgast, "Innovative erhvervsmiljøer i Aarhus," p. 28.</bib>
<bib id="bib43"><number>[43]</number>O. S. Iversen, K. Halskov, and T. W. Leong, "Values-led participatory design," *CoDesign*, vol. 8, no. 2–3, pp. 87–103, Jun. 2012, doi: 10.1080/15710882.2012.672575.</bib>
<bib id="bib44"><number>[44]</number>P. Freire, *Pedagogy of the Oppressed*, 50th Anniversary Edition. New York: Bloomsbury Academic, 2018.</bib>
<bib id="bib45"><number>[45]</number>A.-K. Engqvist Jonsson and A. Nilsson, "Exploring the Relationship Between Values and Pro-Environmental Behaviour: The Influence of Locus of Control," *Environ. Values*, vol. 23, no. 3, pp. 297–314, Jun. 2014, doi: 10.3197/096327114X13947900181752.</bib>
<bib id="bib46"><number>[46]</number>K. S. Fielding and B. W. Head, "Determinants of young Australians' environmental actions: the role of responsibility attributions, locus of control, knowledge and attitudes," *Environ. Educ. Res.*, vol. 18, no. 2, pp. 171–186, Apr. 2012, doi: 10.1080/13504622.2011.592936.</bib>
<bib id="bib47"><number>[47]</number>L. Steg, "Values, Norms, and Intrinsic Motivation to Act Proenvironmentally," *Annu. Rev. Environ. Resour.*, vol. 41, no. 1, pp. 277–292, Nov. 2016, doi: 10.1146/annurev-environ-110615-085947.</bib>
<bib id="bib48"><number>[48]</number>N. Lekes, N. H. Hope, L. Gouveia, R. Koestner, and F. L. Philippe, "Influencing value priorities and increasing well-being: The effects of reflecting on intrinsic values," *J. Posit. Psychol.*, vol. 7, no. 3, pp. 249–261, May 2012, doi: 10.1080/17439760.2012.677468.</bib>
<bib id="bib49"><number>[49]</number>S. H. Schwartz, "An Overview of the Schwartz Theory of Basic Values," *Online Read. Psychol. Cult.*, vol. 2, no. 1, Dec. 2012, doi: 10.9707/2307-0919.1116.</bib>
<bib id="bib50"><number>[50]</number>R. Levitas, *Utopia as method: the imaginary reconstruction of society*. Houndmills, Basingstoke, Hampshire ; New York: Palgrave Macmillan, 2013.</bib>
<bib id="bib51"><number>[51]</number>T. L. Milfont, J. Duckitt, and C. Wagner, "A Cross-Cultural Test of the Value-Attitude-Behavior Hierarchy: VALUE-ATTITUDE-BEHAVIOR MODEL," *J. Appl. Soc. Psychol.*, vol. 40, no. 11, pp. 2791–2813, Nov. 2010, doi: 10.1111/j.1559-1816.2010.00681.x.</bib>
<bib id="bib52"><number>[52]</number>P. M. Homer and L. R. Kahle, "A structural equation test of the value-attitude-behavior hierarchy.," *J. Pers. Soc. Psychol.*, vol. 54, no. 4, pp. 638–646, Apr. 1988, doi: 10.1037/0022-3514.54.4.638.</bib>
<bib id="bib53"><number>[53]</number>A. Grob, "A structural model of environmental attitudes and behaviour," *J. Environ. Psychol.*, vol. 15, no. 3, pp. 209–220, Sep. 1995, doi: 10.1016/0272-4944(95)90004-7.</bib>
<bib id="bib54"><number>[54]</number>"Vi vil bevare Godsbanens vilde arter," *Arkitektskolen Aarhus*, Oct. 27, 2020. https://aarch.dk/vi-vil-bevare-godsbanens-vilde-arter/ (accessed Mar. 29, 2021).</bib>