Evolving Education

A Manifesto to Reimagine Higher Education

Edited by
Juliana Gonçalves
Trivik Verma
Jing Spaaij

TU Delft OPEN Publishing

Colophon

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Keywords: Open Education, Higher Education, Reflexivity, Transdisciplinary, Equity & Justice, Access & Inclusivity, Pedagogy Innovation

Published by:
TU Delft OPEN Publishing
Delft University of Technology
The Netherlands

DOI: https://doi.org/10.59490/mg.223
ISBN/EAN: 978-94-6518-209-4

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Electronic version of this book is available at:
https://books.open.tudelft.nl

Cover Design:
Nazanin Karimi

Interior Design:
Jing Spaaij

Copyright Clearance:
TU Delft Library copyright team.

Conflict of Interest:
No conflict of interest to disclose.

Funder Statement:
This book was funded by the TU Delft Open Science programme, Branch Open Education.

Data Access Statement:
This book brought together existing research data obtained upon request and subject to licence restrictions from a number of different sources. Full details of how these data were obtained are available in the reference list at the end of each chapter.

Peer Review clearance:
This book has been peer reviewed. The peer review was open. The Editors would like to thank the reviewers for their time and effort.
Reviewers are listed in the section “Commentators”.

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Editorial

Dare to Evolve / Dare to Become:

From Knowledge Production to Producing Knowledges

Juliana Gonçalves, Trivik Verma, & Jing Spaaij

Higher education has always evolved, though not always consciously, to meet the demands placed upon it by society. It has adapted to technological revolutions, economic restructurings, and cultural shifts. Universities today, however, face a more complex and unsettling horizon. Climate change, widening social inequalities, ecological degradation, food insecurity, and political polarisation collectively threaten the stability and well-being of communities worldwide. At the same time, universities themselves are under pressure: budgets cut in the name of austerity, the erosion of public trust in expertise, accusations of being "out of touch", "woke", or "too political", and the emergence of new technologies – especially AI – that unsettle established modes of teaching, research, and knowledge production.

Despite being accused of wokeness, higher education is a space of privilege. In the words of the feminist sociologist Victoria Reyes, the academy is overwhelmingly white, wealthy, and Western. For all the rhetoric of inclusion and global citizenship, structural barriers remain: access to elite institutions is still tied to financial resources and social capital; research agendas often marginalise knowledge traditions outside the Euro-American canon; and curricula rarely centre plural voices and approaches, particularly excluding those from Indigenous

communities and historically oppressed groups. In this sense, higher education has been complicit in reproducing exclusions and oppression, rather than dismantling them. If universities are to play a meaningful role in addressing today's crises, they must confront their own histories of exclusion and make space for plural ways of knowing and being.

Perhaps paradoxically, alongside budget cuts and decreased public trust, universities, academics, and students are pressured with increasingly complex and demanding tasks to address societal challenges. Many of these challenges cannot be understood - let alone addressed - from within the silos of traditional disciplines and within the frameworks and ideologies that have caused them in the first place. Climate change, for instance, is not only an environmental process but also a political, social, and ethical one. Technical universities, however, insist on making it a design challenge for bachelor's and master's students, training them to become technophiles instead of understanding the state of the world. Addressing environmental, political, social, and ethical challenges requires transdisciplinary approaches that bring together and closer to students not only multiple academic fields but also knowledge from communities and practitioners. Ethical review boards, originally designed for biomedical research, also often struggle to accommodate participatory, community-based, or Indigenous methodologies in both research and education, limiting the transformative potential of these practices.

The procedures that govern universities often do not fit the kind of research and education we urgently need, stretching the current institutional fabric, which remains structured around departmental boundaries, quantitative metrics of research productivity, and competitive funding models. Bureaucratic metrics, audit cultures, and rankings all reward individual achievement, short-term outputs, and prestigious publication numbers, rather than collaboration, long-term engagement, or social impact. Teaching practices remain oriented toward credentialing rather than cultivating the imagination, empathy, and critical thinking needed to navigate the real world. To transform themselves, universities will need to rethink not only what they teach and research, but also how they assess value, accountability, and impact.

It is tempting to imagine that universities can respond to these pressures with incremental adjustments. Think of revising curricula, embracing digital platforms, or launching new interdisciplinary programmes. But the challenges we face demand more than adaptation. They call for transformation. The ways in which higher education teaches, assesses, and governs itself are deeply entangled with the very systems that have produced today's crises. Universities frequently replicate extractive logics – privileging certain forms of knowledge while erasing others, celebrating

neutrality while ignoring positionality, producing linear approaches to issues that are inherently complex. As we are writing this editorial, the University of Oxford announced unfettered access to OpenAI's ChatGPT Edu license for all students and staff, becoming the first in a long list of universities in the United Kingdom (UK) that are expected to follow suit. During a crisis in the higher education sector in the UK, axing social science and humanities programs and simultaneously setting a precedent for uncritically adopting AI technologies[1] is causing a wider rift in our social fabric. If left unchallenged, these logics will continue to reproduce the inequalities and environmental damage they claim to address.

This requires our community – academics, teachers, students – to delve into the pressing issues facing higher education today and take an active role in reshaping the learning landscape at universities. Evolving Education: A Manifesto to Reimagine Higher Education responds to this imperative from the premise that higher education must learn to evolve differently. Evolution here is not a matter of survival through competition like the recent neoliberalisation of the academy has us thinking, but of re-imagining purpose, cultivating reflexivity, and embracing pluralism. Here, teaching and learning practices become spaces where complexity is acknowledged, not simplified; where collaboration across disciplines is not an exception but a necessity; where justice, inclusion, and care are not add-ons to DEI (Diversity, Equity, and Inclusion) roles for promotion but commitments of accountability from top management and leadership teams. At its core, Evolving Education is a call to action - a collective manifesto that dares us to dream big, to think creatively, and to imagine a future where "education is freedom", as advocated by the Brazilian educator and philosopher Paulo Freire.

The book is a peer-enriched and edited volume of manifestos written by academics, students, and education professionals to reimagine higher education in a bold exploration of the future of learning. Embracing critical insights from a diverse range of disciplines and perspectives, the manifestos explore innovative perspectives, transformative strategies, and bold visions that can redefine the role of higher education in fostering critical thinking, justice, and societal impact. The book is not only inspirational and reflective but also provides actionable insights.

The chapters in this book assert the role of universities as catalysts for social transformation, not just the production of scientific knowledge. Key themes include decolonisation, inclusivity, and justice in educational systems; shifts from traditional, hierarchical pedagogies to collaborative, reflexive, and student-centred learning; and the integration of transdisciplinary, practice-based, and community-engaged approaches. Authors emphasise the need to bridge academia with real-world societal and environmental challenges, especially through ethical, localised, and

[1] Guest, Olivia, et al. "*Against the Uncritical Adoption of 'AI' Technologies in Academia.*" (2025). https://doi.org/10.5281/zenodo.17065098

politically aware education. They also advocate for rethinking the role of technology, embracing epistemic diversity, and developing critical, adaptive, and imaginative skills in response to crises like climate change, inequality, and systemic oppression.

Why frame the volume as a collective manifesto? Because manifestos are twinning spaces of discomfort and action. They get us to think outside the box without the bounds of academic peer review. We believe writing is a formative process, a space to articulate deep ideas, values, feelings. Writing down our intentions and views on paper gives us a sense of concreteness, reinforcing our commitments to the ideas we lay down. Yet, despite this concreteness, we think manifestos should be open to reflection. Related to what Roberto Rocco and Caroline Newton describe in the opening chapter of this book, writing a manifesto is an exercise of *becoming* – for students, in their case, but also for educators and other professionals involved in higher education. We are all evolving.

We therefore see manifestos not as texts that provide definitive answers to complex questions, but as instruments that sketch pathways towards alternative approaches to higher education. They open space for hope and collective imagination in the face of complex and wicked situations. They signal both a critique of the present and an invitation to envision different futures. Writing and reading manifestos cultivates the courage to imagine and pursue alternative trajectories together, mobilising communities. To us, manifestos are a powerful and inspiring practice of imagination, without claiming to be final or complete (always evolving).

“Collective” in this book is enacted through three modes of collectiveness. The first refers to a workshop held at TU Delft in September 2024 to collect perspectives on education from TU Delft academics, educators, students, and alumni. The central theme revolved around the concept of “open education”, sparking dynamic conversations about what it truly means for education to be “open”. Participants were invited to dream big and think out of the box. As we discussed our biggest ideas for higher education, we also identified a host of practices we are already doing and examples from elsewhere that foster these dreams. The conversations were not about textbooks or lectures but about the emotional, social, and caring side of teaching and learning: how education needs to be attentive and patient in relation to our lives now and in the future. The insights from the workshop are presented in the chapter *Big dreams, Everyday acts: A Manifesto from the Evolving Education Workshop*.

The second mode of collectiveness refers to collective authorship, where manifestos are composed by a team of co-authors. These account for the majority of the chapters, with 19 out of 24 being produced collectively. The individually written manifestos are no less significant. We commend and celebrate our brave single authors for being equally bold in their

declarations. Writing alone can be a vulnerable and deeply personal act. These voices complement the collective manifestos, ensuring that the volume captures both the energy of shared commitment and the intensity of personal convictions.

The third mode refers to our unique review process, designed to foster dialogue and learning. Instead of using a conventional review process, where reviewers have to choose between major/minor revisions or rejection, we implemented a "commentator" process based on a tip-top feedback process. The TOP served to provide highlights of the manifestos, and the TIP for suggestions for further development. Commentators include academics, educational support staff, as well as students and PhD candidates. We provided clear guidelines to commentators to provide constructive feedback to either improve readability or deepen the ideas in the manifesto. This was to move the review process away from "what are the flaws of this manuscript?" toward "how can I help make these ideas stronger and more accessible?". Selected testimonies of the reviewers are added to the book to illustrate what they learn from the manifestos they reviewed. Select comments of the chapter authors reacting to the feedback are also added at the end of each chapter. The process was well appreciated by both authors and commentators.

Organising the chapters of this book proved to be a challenging task. Each contribution addresses critical issues from complex and overlapping perspectives, making it difficult to draw clear boundaries between them. We begin with a set of manifestos that call us back to the deeper purpose of education. These pieces invite us to reflect on how higher education can nurture our shared humanity, foster values-based learning, and serve society in ways that go beyond narrow performance metrics. They include: *Embracing our Humanity: a Manifesto for Higher Education* by Robbert Winkel, *Learning in Uncertainty: Towards a Values-based Education* by Olga Ioannou, *Exploring the purpose of what it means to be human to understand the purpose of education* by Angela Rout and Saba Hinrichs-Krapels, and *Between a rock and a hard place: Reflecting on and reimagining PhD processes* by Caiseal Beardow and Laura Barendregt.

From purpose to pedagogy, the next set of chapters highlights the importance of imagination, adaptability, and responsibility in shaping curricula that can meet both present and future challenges. Together, they illustrate how education can be re-envisioned to expand what counts as expertise, support student identity development, and create spaces where diversity and collaboration are embraced as essential to learning. These contributions include: *All Hail the Imagination! Expanding Notions of Engineering Expertise in Technical Higher Education* by Roy Bendor et al., *Reshaping Engineering Education* by Emma Crichton et al., *Transforming Higher Education Today to Shape Education for the*

Future by Juri Mets and Erna Engelbrecht, *Change to Care: Transforming Our Education and Focus on Students' Identity Development* by Steven Flipse et al., *Facilitating Safe and Reflective Environments to Approach, Analyze, and Act Upon Diversity in (Engineering) Education* by Juliette Cortes-Arevalo and Camilo Benitez-Avila, *Reflective Collaboration* by Annie Aggarwal and Katie Barry, and *Rethinking Architectural Education: Towards a Transformative and Emancipatory Pedagogy* by Mehmet Ali Gasseloğlu and S. Zeynep Yılmaz Kılıç.

We then move on to transdisciplinarity in practice. In these manifestos, transdisciplinarity is understood not only as a method of combining fields but also as an orientation toward multiplicity, civic engagement, and social responsibility. These contributions include: *Bridging the Gap: Transformative Higher Education through Blended Learning* by Akruti Murhekar et al., *Frugal Innovation Research Event (FIRE) Program: Igniting Human Ingenuity via Co-creation* by Christopher Adlung et al., *Learning in the Field for Responsible Design* by Diwen Tan and So Yeon Park, *Realizing the Promises of Transdisciplinarity* by Wander M. van Baalen et al., *Promoting Civic Engagement through Transdisciplinary Education* by Dieudonné Elohym, and *Towards a Humanitarian Engineering Paradigm* by Rhys Evans et al..

Subsequently, we turn to chapters focused on inclusion, justice, resistance, and decolonial practices. These manifestos confront the exclusions and silences that persist within educational institutions, while also grappling with the role of education in times of crisis and conflict. They show how education can widen its horizons to honour diverse ways of knowing and being. These contributions include: Reimagining Global Education: *A Call for Queer Inclusivity in 21st Century STEM Curricula* by Ajayshankar Jagadeesh et al., *Land, Music, Stories, and Embodiment Learning as Pedagogies* by Fatima Delgado Medina, *On the Architecturing of Destruction: Building Space Within Academia for Difficult Discussions During an Unfolding Genocide* by BK Scholars for Palestine, *Breaking the Silence: A Manifesto for Justice, Inclusivity, and Decolonization in Higher Education* by POLIS, *Resistance by Research and Design: Challenging Academic Neutrality and Epistemic Hegemony in Design Education - Six Actions of Resistance in Conflict Zones Within Oppressive Regimes* by Marh Echtai and Johnathan Subendran, and *Hacking Spatial Design: An Educational Opportunity* by Irene Luque Martin.

Finally, the book closes with the manifesto *Dear University, A Manifesto* by Wander van Baalen, Joseph Catlett, Tamara de Groot et al., addressed directly at the university as an institution. Written collaboratively by artists, scholars, educators, and students, it offers a multivocal reflection that speaks from within the everyday spaces of the university. Structured as a cascade of questions, it holds the university to account while also

reminding us that we are all part of its ongoing becoming.

As such, the book addresses a broad range of challenges in higher education related to the following: What should be the overarching purpose of higher education in the 21st century? How can institutions create more inclusive environments that embrace and celebrate diversity and foster belonging? How can teaching and learning practices be reimagined to cultivate essential skills such as adaptability, collaboration, critical thinking, and resilience? What innovative curriculum models can prepare students for the challenges of an ever-changing world? What ethical considerations must be taken into account when integrating technology into teaching and learning? Transdisciplinary Education: How can transdisciplinary education break down silos and foster a critical understanding of societal challenges? How can we challenge power dynamics and colonial structures in higher education? Readers looking for answers to these questions may not find them in this book, but will certainly find pathways for exploration. Our collective exercise in knowledge production is a testament to what it means: a *verb* producing plural knowledges than a *noun* of capitalist production where knowledge is transferred for some gain.

Acknowledgements

This project could not have come together without the generosity, energy, and powerful insights of all the authors and commentators who joined us on this journey. Each contribution during this process, whether a chapter, a comment, a provocation or a conversation, enriched the book and challenged us to think more openly, critically, and creatively. We are deeply grateful for the time, care, and commitment that went into this shared effort.

We would also like to thank TU Delft Open Science and Education for providing the funding that made this project possible. Their commitment to open education has not only supported this work but also inspired us to reflect on what it means to make knowledge genuinely accessible. A heartwarming thanks to Marcell Várkonyi, a sincere supporter of this project from the very beginning and throughout. We also thank the TU Delft Library and the TU Delft OPEN Publishing, particularly Frederique Belliard, Juliana Costa Pitanguy, and Rixt Tuinstra, for their support in publishing the book.

As editors, we affirm our shared belief in the values of openness, inclusivity, critical thinking, and collaboration. This book is both a product of those commitments and, we hope, a contribution to the ongoing work of making higher education more just, open yet connected, as well as responsive and responsible to the world around us.

Editors' Biographies

Juliana Gonçalves is an Assistant Professor in the Department of Urbanism at the Faculty of Architecture and the Built Environment at TU Delft. Her work spans three interconnected fields: (spatial) critical theory, participatory planning, and socio-technical studies. By engaging with questions at the intersection of these domains, she examines how space, knowledge, and technologies co-produce social realities and shape possibilities for just futures. With a transdisciplinary and justice-centred approach, Juliana's pedagogy encourages critical reflection and engaged education. She advocates for education as an awakening and empowering experience rather than a process of passive knowledge transmission. Her teaching invites students to grapple with real-world challenges, engage with people and communities, and question dominant narratives in spatial planning and development.

Jing (Hongjing) Spaaij is a recent graduate from the MSc Urbanism program at TU Delft and former board member of POLIS 24'-25', a study association for master students specialising in Urbanism and Landscape Architecture. Her academic interests focus on biodiversity, citizen engagement, and addressing social-spatial stigmas in superdiverse neighbourhoods. Jing is part of the TU Delft Citizen Voice indicative, where she contributed to the development of three digital citizen engagement tools under the Bio-CiVo and CIVILIAN projects. She was also part of a multi-disciplinary student team, Space Oasis 1, a TU Delft's Dream Team, contributing to the design of a lunar village.

Trivik Verma is a Professor of Just Urban Futures at the department of Geography and environment at Loughborough University, UK. His works centres on various challenges of urbanisation, such as segregation, inequities in access and wellbeing, transport and energy poverty, climate-related vulnerabilities, and social justice. He recently launched Urban Futures Collective with the aim of intervening in the decline of public services in global cities, building capacity through transformative education and research practices with a variety of relational partners in society, and building a network of cities in the Majority World who are willing to undertake a different pathway than unabated economic growth and social decline. Trivik's commitment to empowering and relational learning extends beyond the classroom. As a National Geographic Teaching Fellow, he has instructed expeditions for high school students covering issues of conservation, climate change, anthropology, and rural life. These experiences allow students in formative years, age group 12-18, to have the opportunity to deeply reflect on the careers they want to pursue.

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Prologue

When Manifestos Do Not Manifest:

On Voice, Critical Consciousness, and the Pedagogical Journey

Roberto Rocco & Caroline Newton

Since 2020, the Manifesto for the Just City workshop has brought together students and educators from over one hundred universities worldwide in an act of collective reflection and hopeful projection. In its five editions to date, over 2,500 participants have engaged with the concept of spatial justice through public lectures, collaborative learning, and the writing of manifestos, a form that oscillates between declaration, critique, and desire.

The workshop is hosted by the **Centre for the Just City**[1] at TU Delft and co-organised with institutions in the Netherlands, the United States, South Africa, the UK, India, Bangladesh, Brazil, and beyond. It culminates in the co-authoring of short manifestos, each an attempt to name injustice and reimagine the city as a space of equality, inclusion, democracy, and care.

Why use the manifesto form? What happens when manifestos don't manifest anything? These are not idle questions. They touch on the pedagogical, ethical, and political heart of our project. In what follows, we offer a reflection on the role of manifestos in higher education and in the lives of students, drawing not only from the experience of the *Manifesto for the Just City* but also from broader engagements with participatory planning, spatial justice, and Freirean critical pedagogy.

[1] https://just-city.org

1. Why Do Manifestos Matter?

Manifestos are tools for making the implicit explicit. They are formats of urgent thinking, where intention meets collective authorship, and where critique must be rapidly followed by vision. For centuries, manifestos have been written at moments of rupture and disillusionment: by political movements, avant-garde artists, and anti-colonial thinkers. They matter not because they always succeed in their aims, but because they insist on the possibility of another way. In this sense, manifestos are closely entangled with acts of (spatial) imagination: they gesture toward (material) worlds not yet built, sketching out the ethical and political contours of spaces and places that could exist. As Beatriz Colomina has argued, even buildings can be manifestos, as structures that speak back to their time, encoding a political or ethical position (Colomina, 2014).

In the *Manifesto for the Just City* workshops, we invite students to write not just about problems, but about alternatives. We ask them to imagine cities where justice is expressed in the fair distribution of resources (distributive justice), in inclusive decision-making (procedural justice), and in the recognition of diverse experiences, trajectories and identities (recognitional justice) (Fraser, 2000, 2010; Soja, 2010). We want to foster not only critical thought, but also political imagination. And crucially, we do so in a collaborative environment where authorship is shared, negotiated, and often messy.

As a pedagogical tool, manifestos hold a special status: they are serious yet playful, structured yet open-ended. They demand clarity without finality. Writing a manifesto is not the same as writing an essay. It is a declaration of values and a projection of the self into public life. In this sense, it is formative. It helps students begin to understand themselves as civic actors, as people who can name and shape the urban worlds they inhabit. For many, it is the first time they are asked not only to analyse the city, but to envision what a just city could look like.

2. How Can Manifestos Materialise into Action?

The question of materialisation is not straightforward. Manifestos are not blueprints. They are not policy documents or strategic plans. But they can catalyse action by clarifying values, galvanising community, and orienting pedagogical practice. Their power often lies in this prefigurative dimension, in the capacity to make emerging collective imaginaries tangible, not only in language but through different practices and social relations they may set in motion. The *Manifesto for the Just City* is not a one-off writing exercise. It is a process. It begins with a four-week lecture series, where students engage with scholars and activists, people like Faranak Miraftab, Mona Fawaz, Mariana Fix, Vanesa Castán-Broto, and Suraj Yengde, who speak not only from theory, but from situated struggle.

After the lectures, students meet in groups to draft their manifestos. They share, revise, disagree. They argue about what justice means. They struggle to articulate collective positions across cultural and disciplinary differences. And in that struggle, they learn to inhabit the uncomfortable space between critique and proposition. The manifestos they produce are then published in Open Access (Rocco, 2023; Rocco & Newton, 2022; Rocco et al., 2021; Rocco et al., 2025).

Manifestos matter not only when they produce policy change, but when they transform the person writing them. Here we return to Paulo Freire's concept of **conscientização**, a process of becoming aware of the structures that shape our lives, and recognising ourselves as subjects capable of acting upon the world. For Freire, education must be liberatory: a dialogical process through which learners develop critical consciousness and agency (Freire, 2018).

The variety in educational traditions, backgrounds, nationalities, genders, and disciplinary standpoints yields a diverse collection of manifestos, some bold and radical, while others are cautious and searching. This plurality is not a flaw but a strength. It reflects the fact that students are at different stages in their intellectual and political journeys and have access to different material, educational and affective resources. Some are just beginning to name the world; others are already fluent in the languages of critique and proposition. What matters is that all have been invited to participate, to reflect, and to speak.

Writing a manifesto, in this sense, is not a performative gesture, but a pedagogical one. It is not a simulation of action, but a stage in the formation of a public subjectivity. It enables students, especially those still finding their voice, to *start somewhere*. And that starting point, even if clumsy or incomplete, can be transformative. This is why all manifestos submitted are published, after a few rounds of editing. Some students are still struggling to find their voices, while others are more seasoned. Those still struggling deserve a chance to have their voices heard.

3. What If Manifestos Do Not Manifest Anything?

Truth be told, many manifestos written by students are not always revolutionary or groundbreaking. They contain contradictions. They are sometimes vague, or accept tropes of 'development' and 'efficiency'. They express longing more than strategy. But perhaps that is precisely their value. They signal a willingness to speak, however tentatively, in a world that increasingly demands silence, compliance, or cynicism.

In educational spaces, we must allow for unfinished thoughts, for partial visions. Not all manifestos will move mountains. But they move the students who write them. They allow students from all over the world to say: *I see injustice, and I want to say something about it*. That moment of articulation, of refusing to remain neutral or indifferent, is politically meaningful.

Moreover, manifestos expose us, the educators, to what students see and feel. They reveal their desires, frustrations, hopes and sometimes their limitations and biases. They hold up a mirror to our pedagogies, our institutions, and the worlds we prepare students for. In this sense, even a 'failed' manifesto, one that does not 'manifest' in the conventional sense, is a vital political object.

We might even ask: what do we mean by *manifestation*? Do we expect impact to be measurable in conventional terms? Or do we allow for slow impact, for the kind of intellectual fermentation that might not bear fruit for years?

According to Faranak Miraftab (2022), we face a **crisis of imagination**, where our minds are colonised by the epistemologies and rationalities of neoliberal modernity, particularly those rooted in the logic of market, technocratic governance, and Western-centric developmental paradigms. That mental colonisation narrows our capacity to envision alternative futures grounded in solidarity, care, and collective emancipation.

To the crisis of imagination, we can add a **crisis of hope**, in which the structural violence of neoliberalism, systemic inequality, ecological breakdown and now mindless war and genocide erode people's belief in the possibility of transformative change, replacing political agency with resignation, cynicism, or retreat into individualised survival strategies. This loss of hope undermines the affective and moral foundations necessary for collective action and democratic renewal. Again, Faranak Miraftab reminds us of hope as a political practice, not as naïve optimism, but as a disciplined, daily act of resistance rooted in collective care and a refusal to surrender to despair. Drawing on the praxis of abolitionist thinkers such as Mariame Kaba, Miraftab reframes hope not as an emotion, but as a conscious, situated choice to believe in the capacity of ordinary people to build emancipatory alternatives, even in the midst of devastation (Miraftab, 2022). This conception of hope resists both fatalism and utopianism. It insists that change is always possible when people organise, care, and imagine together. In this sense, the writing of manifestos, even when uncertain or partial, is not a frivolous act, but a necessary practice in the cultivation of political agency and the restoration of collective horizons.

To those two crises, we add a **crisis of recognition**: a failure to see the epistemic and political value of marginalised voices and alternative imaginaries (Gonçalves, 2025; Gonçalves, 2026). Manifestos, especially those authored by students from the Global South, by women, by queer and racialised students, force us to pay attention. They do not only reconfigure discourse; but can unsettle and reimagine the social and spatial order itself, signalling other ways of organising and inhabiting the world. They challenge the norms of who is allowed to speak and in what ways. And they do so within a pedagogical structure that affirms pluralism, contestation, and care.

4. The Role of Educators: Making Space for Voice

If manifestos are to matter, they must be supported by pedagogies that make space for voice, doubt, and growth. This is a challenge. In an academic system increasingly governed by instrumental logics, assessment rubrics, learning outcomes, and employability metrics, there is little room for ambiguity. But ambiguity is where learning happens.

In the *Manifesto for the Just City*, we deliberately avoid ranking or grading the manifestos. We affirm that every attempt to articulate a vision of justice is valuable, even when imperfect. This is a radical gesture rooted in our refusal of meritocracy in favour of **recognition**. It aligns with the idea of the university as a space not only of knowledge transmission, but of ethical and political formation.

Freire teaches us that consciousness is not something educators 'give' to students. It emerges through dialogical encounters. Manifestos, in this sense, are tools for encounter. They bring students into relation with each other, with the city, with the idea of justice.

5. Conclusion: On Soup and Slow Cooking

The *Manifesto for the Just City* brings together voices from across the world and asks them to sit together and share words, ideas, frustrations, and visions. Some of these words may be forgotten. Some may ferment quietly. Others may spark movements. But all contribute to the long, unfinished process of imagining and building more just cities and more just forms of education.

As we confront climate breakdown, democratic backsliding, and social fragmentation, we need not only new policies but new *possibilities*. And manifestos (modest, plural, imperfect as they are) can help us rehearse them.

Writing a manifesto is an act of engagement. It allows students to externalise their values, test their assumptions, and project themselves into public life. Even when the visions remain tentative, they signal a refusal to accept the world as it is. They affirm that imagining just futures is a political act in itself, one that demands courage, clarity, and care.

In this sense, the *Manifesto for the Just City* is not only a pedagogical exercise. It is a form of practice: a small rehearsal for democratic life, a method of civic engagement, and an invitation to collective transformation. The manifestos may not always lead directly to action. But they offer a beginning. They cultivate the capacity to dream beyond the present, to question what is, and to ask what could be. And that is, in itself, a form of justice.

References

Colomina, B. (2014). *Manifesto architecture: The ghost of Mies*. Sternberg Press.

Fraser, N. (2000). Rethinking recognition. *New Left Review, 3*, 107–120.

Fraser, N. (2010). *Scales of justice: Reimagining political space in a globalizing world*. Columbia University Press.

Freire, P. (2018). *Pedagogy of the oppressed*. Bloomsbury.

Gonçalves, J.E. (2025). A crisis of imagination or a crisis of recognition? The role of prefigurative planning in fostering alternative imaginaries. In R. Rocco, C. Newton, & J. Gonçalves (Eds.), *A Manifesto for the Just City: Volume 4* (pp. 14-23). TU Delft OPEN Publishing.

Goncalves, J. E. (2026). Climate change as a crisis of recognition: Prefigurative politics of socio-ecological movements for food sovereignty in Brazil. In S. Sareen & S. Juhola (Eds.), *Societal transitions to sustainability: The prefigurative politics of present transformation*. Palgrave-MacMillan.

Miraftab, F. (2022). Insurgent practices of hope and care for humane urbanism. In R. Rocco & C. Newton (Eds.), *Manifesto for the just city: Volume 2*. TU Delft OPEN Publishing.

Rocco, R. (2023). Manifestos as exercises of hope and care. In R. Rocco & C. Newton (Eds.), *A manifesto for the just city: Volume 3* (pp. 8–24). TU Delft OPEN Publising.

Rocco, R., & Newton, C. (2022). *A manifesto for the just city: Volume 2* (Vol. 2). TU Delft OPEN Publishing.

Rocco, R., Newton, C., D'Alençon, L. M. V., Watt, A. V. D., Babu, G., Tellez, N., Subendran, J., Caradonna, G., Gioia, L. D., & Pessoa, I. T. (2021). *A manifesto for the just city*. TU Delft OPEN Publishing. https://doi.org/10.34641/mg.14

Rocco, R., Newton, C., & Gonçalves, J. (2025). *A manifesto for the just city: Volume 4*. Delft Open Publishing. https://doi.org/10.59490/mg.142

Soja, E. (2010). *Seeking spatial justice*. University of Minnesota Press.

Authors' Biographies

Roberto Rocco is trained as an architect and spatial planner with a master's in planning by the University of São Paulo, a specialisation in urban management tools by the Ecole d'Urbanisme de Paris (former Institut Français d'Urbanisme) and a PhD by TU Delft. He is committed to understanding the relationships between society and the production and governance of the built environment. This means that he investigates how actors and institutions from the public sector, the private sector and civic society interact in planning, designing, governing and inhabiting the built environment, both formally and informally. These basic but foundational ideas explain much of his actions as an educator and researcher.

Caroline Newton is an urban planner, an architect, and a political scientist. Her work and research focus on the social and political dimensions of design. She is the Van Eesteren Fellow at TU Delft's Faculty of Architecture and the Built Environment's Department of Urbanism. She advocates for revitalised urban professional participation and the reintroduction of advocacy to the forefront of planning and spatial practices. She advances a critical and engaged approach to strategic planning, presenting planning techniques as acts of resistance, as enablers of alternative spatial possibilities and imaginations.

Opening Event
September 16, 2024

TU Delft workshop
September 18, 2024

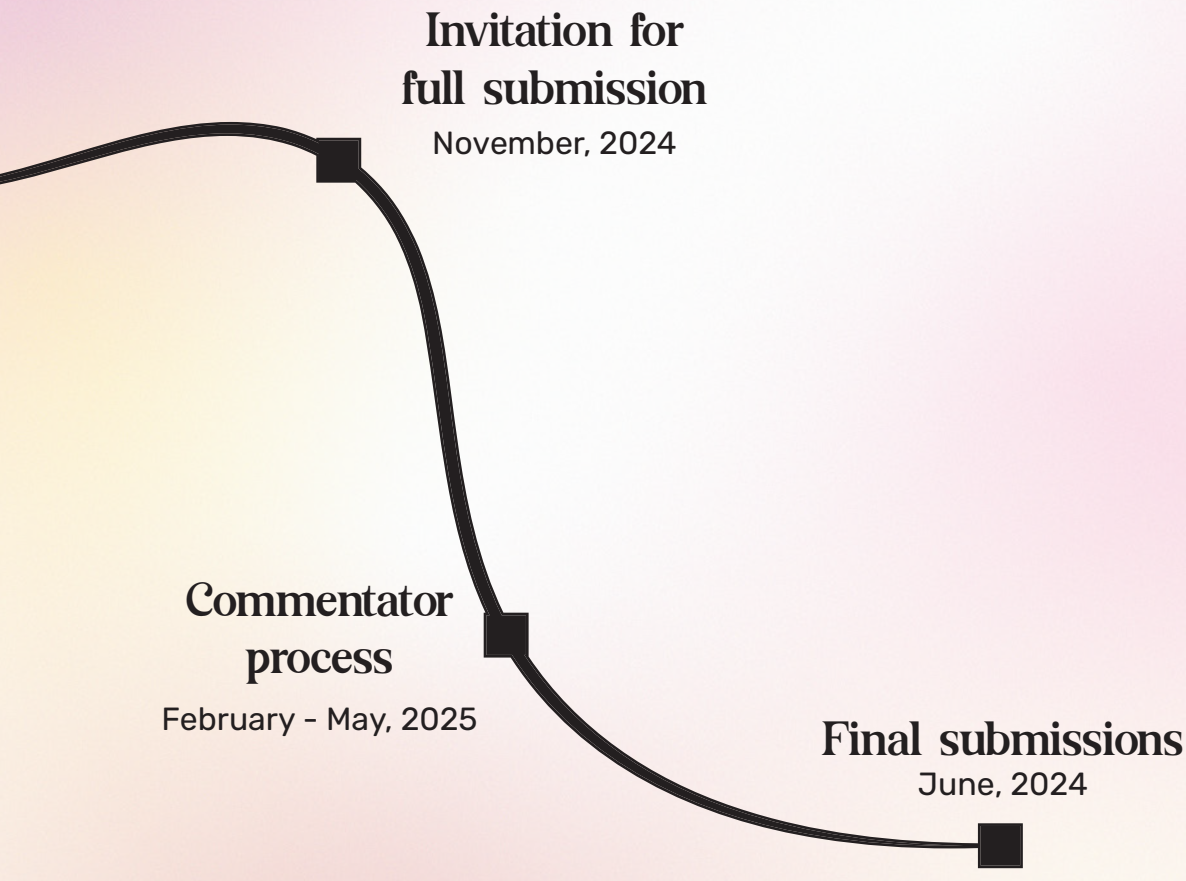
Call for abstract
September -October, 2024

This book is the result of a collective journey as part of the Third Citizens Collective on Evolving Education. Initiated at TU Delft, and shaped by a network of educators, students, and collaborators, the project brought together diverse voices with a shared ambition: to rethink higher education through manifesto writing.

The process began in September 2024 with an online Opening Event, with presentations from Juliana Gonçalves, Trivik Verma and our colleagues Caroline Newton and Roberto Rocco from the Centre for the Just City. This session served as both a conceptual starting point and a moment of collective orientation. Participants explored the purpose and potential of manifestos in the context of education: why write a manifesto, and how can such a format express educational critique, imagination, and hope? The event set the tone for an invitation to engage not only with ideas, but with the form and politics of articulation itself.

The Process Behind Evolving Education

Shortly after, an in-person workshop was held at TU Delft, bringing together students, alumni, and staff for a deep and open conversation. This session focused on the concept of "open education," a term often celebrated but rarely interrogated in all its complexity. Participants were encouraged to reflect critically: What does it mean for education to be open? Open to whom? Under what conditions, and at what cost? The dialogue uncovered multiple interpretations of openness (technological, institutional, epistemological, and ethical), thus enriching the thematic foundations for the manifestos to come.



Following this exploratory phase, we launched a public call for abstracts, inviting contributions from teachers, education professionals, and students from a wide range of disciplines and contexts. The call was open to both individual and collective authorship, and encouraged bold, creative approaches. We received approximately thirty submissions, each offering a distinct perspective on what it means to reimagine higher education today.

Contributors whose abstracts were selected were then invited to develop their ideas into full-length manifestos. To support this process, we shared a template and a set of writing guidelines, while also making clear that this was not a traditional academic publication. The manifesto format allowed, and encouraged, experimentation, personal voice, and critical positioning. Contributors were asked to write not from a neutral standpoint, but from a place of engagement and commitment.

In the spirit of dialogue, each manifesto was reviewed through a process of open, constructive feedback. We adopted a TIP/TOP framework, in which commentators were invited to highlight the strengths of a text (TOP) and offer thoughtful suggestions for deepening or clarifying its ideas (TIP). Unlike academic peer review, this process was intentionally transparent, relational, and non-hierarchical. The goal was not to judge but to engage, and to support authors in developing their work further.

Once feedback was shared, authors submitted final versions of their manifestos, along with a short reflection on the process. These reflections addressed not only the development of the text itself, but also the experience of engaging with commentary from peers. Some of these reflections are included in this book to shed light on the collaborative and iterative nature of manifesto writing.

Rather than producing a single, unified vision, this process has yielded a polyphonic collection of manifestos. Each manifesto stands on its own, yet collectively speaking to a shared desire for transformation. The project did not aim to establish consensus, but to open a space in which multiple visions of higher education could coexist, collide, and converse.

This book is one outcome of that process. But more than that, it is a gesture toward a broader, ongoing conversation. We hope that the manifestos presented here will inspire readers to reflect, challenge, and perhaps write their own. Education, after all, is never finished. And neither is the work of imagining what it could become.

Commentators

Remon Rooij
Associate Professor Remon Rooij is both an urbanist with a specific interest in the strategic spatial planning of sustainability transitions and an educationalist, a passionate lecturer, scholarly university teacher, coach, course and curriculum designer, education innovator, educational policy advisor, and pedagogical researcher in planning, design, and engineering education. He is particularly interested in engaging and healthy-challenging pedagogies that stimulate students' intrinsic motivation, responsibility, and professional compass. Remon is the scientific lead of the 4TU Centre for Engineering Education, Education portfolio lead of TU Delft's Climate Action Program Board, and TU Delft's lead of the global CDIO initiative.

Johnathan Subendran
Johnathan Subendran, a Canadian-born Eelam Tamil spatial designer and Gluon PhD researcher in the Urban Design section at TU Delft. His work explores urban designers integrate knowledge in complex collaborations through a lens of justice, ethics, and critical reflexivity. Grounded in anti-colonial, errant, and critically reflexive values, Johnathan challenges dominant design and academic norms. He is co-founder of Justice by Design, an initiative that fosters justice literacy and critical awareness among spatial designers. As an aspiring educator, Johnathan is committed to rethinking how we teach, practice, and imagine design especially in contexts shaped by oppression, conflict, and structural violence.

Juliette Cortes Arevalo
Assistant Professor at the Techonlogy, Policy and Management faculty. Juliette is a civil engineer, with an MSc in Hydro informatics and a doctoral on the participatory inspection of hydraulic structures. She co-designs (online) tools that facilitate knowledge exchange between research, government, and local communities for managing water in an integrated way. Juliette bridges expert and local knowledge by experimenting with visual storytelling, serious games, and any other participatory methods such as citizen science in engineering education and practice.

Bob van Vliet
After an uneventful and sheltered childhood, Bob came to Delft to study Industrial Design and never really left. Although his is always happy to imagine radical change, both socially and personally, in practice he tend to stay put. Bob has worked as an independent product, graphic, and interactive designer, but always alongside teaching at TU Delft – at Industrial Design, Architecture, and Mechanical Engineering. His expertise is design education and pedagogy. He is continually disappointed by universities' failure to live up to their promise and responsibilities, and always looking for ways to smuggle some of that critical engagement into his own teaching.

Gamze Dane
Gamze Dane is an Assistant Professor at the Department of Built Environment of Eindhoven University of Technology (TU/e). She has an interdisciplinary background with a Ph.D. in “Urban Planning” and a MSc. in “Geographical Information Systems (GIS) and Decision Making”. Gamze believes that to enable sustainable urban transformations, cities should be seen as socio-technical systems and therefore can be addressed with citizen-centered and data-driven approaches. At the intersection of complex interactions between citizens, technology and artifacts, she is passionate about integrating citizens in the decision-making process of urban transformations via digital tools and (big) data.

Jakob Pesendorfer
Jakob studied Spatial Planning at TU Wien and obtained study visits at the Technical University of Munich. Following professional experience in international Architecture and Urban Design offices in Vienna, Zurich, and Munich, he graduated with a Master’s in Architecture, Urbanism, and Building Sciences from TU Delft. Alongside his studies, he worked as a Teaching Assistant and served as Co-Chair of Polis, the student association for Urbanism at TU Delft. His research interest lies in exploring the intersection of urban design and planning, with focusing on systemic thinking and spatial practices that can support circular societies and regenerative territories.

Ramón Spaaij
Ramón Spaaij is Professor of Sociology in the Institute for Health and Sport at Victoria University, Australia, and Global Chair at Manchester Metropolitan University, UK. He is also Visiting Professor at the Utrecht University School of Governance and Research Fellowin the Centre for Sport Leadership at Stellenbosch University, South Africa. Ramón investigates complex social problems, finding solutions that create and sustain thriving communities. He further explores how conflicts and inequities that threaten social cohesion can be transformed toward more harmonious community relationships.

Aditi Natarajan
Aditi Natarajan is a doctoral researcher at the Faculty of Architecture and the Built Environment, Delft University of Technology, Netherlands. Her research explores the role of spatial production on collective action in cities, with a particular focus on imaginaries and everyday practices. She investigates how shared expectations of the future emerge from embodied, everyday encounters and influence citizen-led lake restoration efforts in Bengaluru, India. By bridging practice theory, imaginaries, feminist philosophy and spatial theory, her work seeks to advance more inclusive approaches to urban transformation and climate adaptation.

Rhys Evans
Rhys Evans is a data scientist specialising in climate resilience and sustainable urban development. He holds an MSc in Engineering and Policy Analysis from TU Delft and a BSc in Data Science and Artificial Intelligence from Maastricht University. His work combines stakeholder engagement, geospatial analysis, AI-driven modelling, and community-based resilience initiatives, which he applied to climate adaptation projects with the United Nations Human Settlements Programme in Lao PDR. He conducted his MSc thesis research as an internship at the Dutch Ministry of Infrastructure and Water Management. He also volunteers with Engineers Without Borders NL, supporting monitoring, evaluation, accountability, and learning.

Marcell Várkonyi
Marcell Várkonyi works as Project Leader for Open Education at Delft University of Technology. His work centers around incorporating values of openness into education, and strives to make the learning experience of students, and the teaching practices of teachers, more inclusive and accessible. He provides practical advice to teachers pertaining to Open Educational Practices, contributes to the development of the necessary technical and support infrastructure within the university, and partakes in the devising of a new open education strategy for the university.

Mahaa Ejaz
Mahaa Ejaz is an urban designer from Karachi with a background in architecture and an MSc in Urbanism from TU Delft. She is interested in where water, ecology and urbanisation intersect - and how the absence of care often reflects deeper forms of systemic neglect. Her work explores how design can navigate and challenge these gaps by grounding itself in reciprocity, local knowledge, and adaptive, nature-based approaches. Mahaa is drawn to the idea of building more collective futures by staying with complexity - and creating space for care to take root within design.

Jing Spaaij
Jing (Hongjing) Spaaij is a recent graduate from the MSc Urbanism program at TU Delft and former board member of POLIS 24'-25', a study association for master students specialising in Urbanism and Landscape Architecture. Her academic interests focus on biodiversity, citizen engagement, and addressing social-spatial stigmas in superdiverse neighbourhoods. Jing is part of the TU Delft Citizen Voice indicative, where she contributed to the development of three digital citizen engagement tools under the Bio-CiVo and CIVILIAN projects. She was also part of a multi-disciplinary student team, Space Oasis 1, a TU Delft's Dream Team, contributing to the design of a lunar village.

Shahryar Ershad Sarabi
Shahryar Ershad Sarabi is an Assistant Professor in the Department of Built Environment at TU Eindhoven. He has a background at the intersection of urban planning and information systems. His work focuses on designing and developing digital tools to support planning Nature-Based Solutions in cities.

Mehmet Ali Gasseloğlu
Driven by a commitment to spatial justice and collective agency, Mehmet's work aims to challenge the disciplinary boundaries of architecture. He engages in collaborative practices that center lived experience and informal spatial strategies, reimagining public space as a site of resistance and transformation. His research critically engages with the socio-political production of space, exploring how spatial practices are entangled with power, resistance, and transformation in contested urban environments. Through both research and pedagogy, Mehmet aims to cultivate transformative design approaches that subvert dominant systems and support the emergence of just urban futures.

Juli Osusky
Juli is a recent graduate of the Masters of Urbanism at TU Delft, and served as the co-chair of the Urbanism and Landscape Architecture student association POLIS. Identifying as a nonbinary white European, knowing both privilege and discrimination, they are passionate about building community and empowering the unheard, claiming agency in the culture and politics that surrounds us.

Geertje Slingerland
Dr. Geertje Slingerland is an assistant professor at the Faculty of Architecture and the Built Environment. Her expertise includes co-design, participatory design, urban communities, place-making, qualitative research, research-through-design, citizen empowerment and engagement. In her research, Geertje explores how methods from design practice and co-design approaches can help residents understand and engage with local transitions, for example related to biodiversity or climate change. She investigates playful, creative and digital approaches to involve different types of residents in the (major) challenges of their neighborhood and city.

Roberto Rocco
Roberto Rocco is trained as an architect and spatial planner with a master's in planning by the University of São Paulo, a specialisation in urban management tools by the Ecole d'Urbanisme de Paris (former Institut Français d'Urbanisme) and a PhD by TU Delft. He is committed to understanding the relationships between society and the production and governance of the built environment. This means that he investigates how actors and institutions from the public sector, the private sector and civic society interact in planning, designing, governing and inhabiting the built environment, both formally and informally. These basic but foundational ideas explain much of his actions as an educator and researcher.

Ganesh Umasankar
Ganesh Umasankar is a Master's student in Urbanism at TU Delft, with a background in Architecture from Anna University, India. He believes education and knowledge sharing are vital for building a healthy society. Starting his journey in architecture with a focus on designing spaces for human habitation, his perspective evolved towards urbanism upon recognizing how access to public commons regardless of gender, demographics, or race is shaped by the design of our cities. His current work focuses on creating resilient urban spaces that serve diverse communities, with research centered on fostering synergies in urban development amidst the challenges posed by climate change and its impacts on both built and social environments.

Feline Kaaij
Feline is a recent graduate of the MSc Urbanism program at TU Delft, where she explores how cities can adapt to future crises and a rapidly changing society through sustainable design. Her thesis examined how high-rises can become part of the public realm rather than isolated giants, drawing inspiration from public life in Hong Kong and testing these ideas in the context of Rotterdam. She is particularly interested in how closer collaboration between urban planning, design, and management can lead to more resilient, inclusive cities. Beyond her thesis, she has contributed to projects on exhibition design and researched privately owned public spaces for youth. Guided by a fascination with how built form shapes collective life, Feline seeks to expand the role of urbanism in building sustainable and socially responsive environments.

Paula Hueso Espinosa
Paula Hueso Espinosa trained as an Industrial Design Engineer at the Polytechnic University of Catalonia before pursuing a Master's in Design for Interaction at TU Delft. There, she discovered how insights from psychology and human needs can shape better products and experiences. Driven by a passion for education, she has contributed to the redesign of TU Delft's Design Master's programs, played a key role in the Reflective Engineer team, and now serves as a Project Lead at the TU Delft Teaching Academy. Her work now focuses in engaging and connecting people and initiatives across TU Delft's educational community, striving towards brighter educational futures.

Big dreams, Everyday acts:

A Manifesto from the Evolving Education Workshop

The Evolving Education workshop, held on 18 September 2024 at TU Delft, brought together educators, students, and alumni in a well-attended and highly engaging event that explored the futures of higher education. The central theme of the workshop was open education, which served as a catalyst for critical reflection and dialogue on the implications of openness in teaching and learning.

The success of the event was grounded not only in the exchange of ideas but also in the sense of community that emerged. The atmosphere of mutual respect, attentiveness, and collaboration contributed substantially to the workshop's impact and to its participants' shared vision of a more open and inclusive educational future.

The event was structured around three guiding questions:

- What does open education mean to you?
- What are our big dreams for higher education?
- What small actions or practices can we implement here and how to embody these big dreams?

These questions framed a series of discussions that encouraged participants to articulate their big dreams for higher education while also identifying existing practices and concrete examples that already embody these aspirations, both within TU Delft and in broader educational contexts.

The discussions extended beyond traditional considerations of curricula and pedagogical formats, emphasising instead the affective dimensions of education. In particular, participants highlighted the importance of attentiveness, patience, and care within the learning process. Another key moment of the workshop was the collective reflection on power relations within education. Rather than reproducing hierarchical dynamics between teachers and students, participants highlighted the value of more egalitarian models in which "we are all learners". This emphasis on reciprocity and shared responsibility resonated strongly across the group.

The workshop culminated in the co-creation of two collective outcomes presented in this chapter: a set of principles for open education in a critical sense and a map-based manifesto that captured both the participants' aspirational "big dreams" and the "everyday acts" that can help realize them. These outcomes show the value of open education not as a technocratic approach based on open access but as a lived practice grounded in reciprocity, inclusivity, and collective responsibility.

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Maurits Ertsen
Trivik Verma
Jing Spaaij
Juliana Gonçalves

Open Education Principles



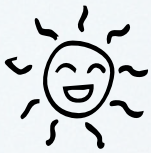
Inclusive and accessible education

- Open education aims to be accessible to all, regardless of location or background.
- It promotes inclusivity, diversity, and equity in learning opportunities.
- Openness extends to non-experts, citizens, and learners of all ages.



Empowerment through open learning

- Open education empowers individuals by providing freedom to choose courses, tools, and methods.
- Learners have the autonomy to decide the length, program, and institution for their studies.
- It emphasizes self-directed, autonomous learning and encourages responsibility and accountability.



Joyful exploration of knowledge

- Open education fosters joy in learning by offering fair and equal opportunities for growth.
- It encourages brave exploration, critical thinking, and creativity in a democratic and free environment.
- The focus is on redistributing power, amplifying collective joy, and building knowledge collectively.



Flexible and decentralized learning

- Open education promotes flexibility, autonomy, and fluidity in learning pathways.
- It advocates for decentralized education, where learners have control over their learning trajectory.
- Educators serve as facilitators and learning coaches, supporting personal goals and fostering exploration.



Relational and collective knowledge building

- Open education values relationality, embodied knowledge, and lived experiences in shaping learning.
- It emphasizes building knowledge collectively, beyond traditional boundaries of science and beliefs.
- The approach focuses on shaping minds, critical thinking, and learning through trial and error.

What are our big dreams for higher education?

What are small actions/practices can we implement to achieve these big dreams?

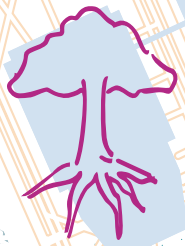


Organize student lectures on various topics and life stories

Empowerment & Autonomy

Openness extends to non-experts, citizens, and learners of all ages

Provide easy transitions and incentives for lifelong learning





Education as a public good

Fluid learning pathways

Inclusive & accessible education



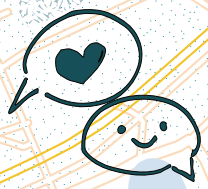
No fixed roles, No rubrics

Design classrooms with no titles, just learners.

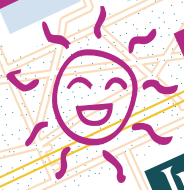
Assess students through dialogue, not essays



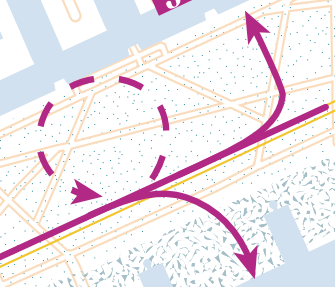
Knowledge built through relationships



Joy of learning



Collective joy



Incorporate emotional sensitivity and empathy in the curriculum

Establish diverse labs and explore experimental pedagogy



Emotional sensitivity & well-being



A safe space

Embracing our Humanity: a Manifesto for Higher Education

Written by:

Robbert Winkel

Abstract

By making schools smaller, decentralized, and local, we can create classes where everyone knows each other and learns together. Especially the educators. And in these small classes, we can use truly active learning and do away with grades and exams, as we can *see* growth. By removing artificial restrictions on when and how quickly students learn, education can become more flexible, resilient, and accessible to people of all ages. And by replacing hierarchy with consensus, we can work together to minimize our tendency to abuse power.

Keywords: communities, flexibility, power

When walking around a university, it is easy to forget what a deeply human endeavour learning actually is. Thousands of students, packed together anonymously in lecture halls, waiting for that one chance to show they know how to be a professional, by marking some boxes. Educators that teach a course together but have never actually spoken to one another. Young people everywhere, but hardly an older person who can afford to study, or study again. And a small group of people who, for some reason, hold so much power over so many, without any meaningful accountability.

Humans flourish in small communities. Humans make mistakes. Humans desire freedom, but also love power and should be protected from it. These universal truths we have known for millennia, yet we often fail to act accordingly. Higher education will only truly be a space for learning if it embraces and reflects these universal truths.

I am enamoured with the ideas for a better society shared in the seventies and this manifesto is strongly inspired by them, mainly by The Tyranny of Structurelessness by Jo Freedman and The Courage to Create by Rollo May. Furthermore, the section about learning by doing has been heavily influenced by the ideas presented in Make Space by Scott Doorley and Scott Witthoft of the Stanford d.school. The structure of the text and the idea of a school in every street are based on the book A Pattern Language by Christopher Alexander et al, in hopes of capturing ever so slightly the clarity with which they present their ideas.

Let us start by dividing big institutions into schools, and making each school small;

Small communities

Our institutions for higher education have grown far beyond human scale. Learning is better, more effective, and more fun, if we learn together and look after each other. After all, nothing is more human than wanting to be truly seen by others. This can only happen in small communities, where people know each other by name and have a chance to bond. Therefore:

Make classes of around 20 students the building blocks of a school, with schools having no more than six classes.

To support these classes, we need educators that are properly prepared for teaching. University educators, however, generally start without any training or receive only a crash course that barely covers the basics. This is not enough. Teaching is a skill and an occupation by itself and should be treated as such. Educators, like students, benefit from learning together, receiving regular feedback, and supporting each other. Therefore:

Treat teaching as a team effort. Create dedicated, close-knit teams of educators and support staff. Give them responsibility for each other,

their students, and their school. Guide them well before and after they start teaching, and organize regular trainings, feedback sessions and social gatherings to connect and improve their skills.

Educators, however, cannot create communities all on their own. An intermediary who knows each student and educator personally is needed to connect students to the larger community. Like the jovial barista at your favourite coffee place who knows your name and makes you feel at home, this person does not judge, but creates an optimal learning environment and looks after the wellbeing of each student. Therefore:

Provide each class with a dedicated tutor. Someone who is naturally social and is also properly trained to deal with wellbeing issues. Give them the time and resources they need to truly care for the students assigned to them. Keep them free of teaching responsibilities so they can stay on equal footing with their students.

To support learning in these small communities, we need courses that are active and flexible;

Learning by doing

Lecturing is generally known not to be the best way to teach anything, but it is still the norm. For learning to be effective, it needs to be active and — even better — playful and creative. The more often students can practice on lifelike assignments the better, especially when they receive a lot of feedback from both educators and peers while they do so. Therefore:

Make learning active, creative, and realistic. Provide frequent feedback from both educators and peers.

This way of learning needs courses that are equally flexible. After all, no two humans are alike, so why should courses be the same for everyone, where you start here and end up there in exactly ten weeks? Effective courses — humane courses — require the flexibility to support the progress of each individual student. Like Dutch swimming courses, where students progress to the next level not in a fixed amount of time, or together with the rest of the class, but when the educators see a student has mastered a clear set of learning goals. Not by taking an exam on paper, but in practice, by showing their mastery in the pool. Therefore:

Divide programs into levels with clear goals to master. Let students demonstrate their mastery when they are ready, and allow them as many resits as needed. For the most effective assessment, keep it as close to real-life as possible.

These courses should not be narrowly focussed on educating people in their late teens and early twenties. All people like to learn, not just young people. And not all people can study full-time during the day or part-time during the night, or can afford to pay unsubsidized fees. If you want to

switch careers in your forties, you should be able to do so. To this end, a school should make learning as accessible as possible. Therefore:

Make access to a school as affordable and accessible as possible, both in time, place, and fees. Be flexible in your offerings — so people can also sign up for just one course — and lean in your finances — so you can keep costs low.

These close communities and flexible courses need spaces, for both education and relaxation, spread out all over town;

A school in every street

Concentrating all students at one place distances students from society and vice versa. Schools should not be a bastion at the edge of town. They should be integrated in the fabric of the city and be an active part of it. Let the location of schools reflect flexibility and resilience. And, when possible, let the learning take place where it happens. Therefore:

Distribute schools all over town.

These schools should not look like typical schools with typical classrooms, featuring identical tables and chairs in neat rows facing the educator. Active learning requires a different space to learn in, a playground, that adapts to support the learning activity taking place there. Students and educators should be encouraged to create, adapt, and modify this space, and indeed the school itself, to fit their needs. Therefore:

Create learning spaces with flexible walls and furniture that can be moved around where possible. Give students and educators responsibility and ownership for the school. Allow them, and help them, to create a place that feels like home.

Learning is difficult. Teaching is hard. Both become harder in a place where you feel like you don't belong. So to make a school really feel like home, the building itself should also support working alone, relaxing, and socializing. Sit quietly by yourself. Hang-out with friends. Work quietly in a private office. Have a drink with your colleagues. Therefore:

Create dedicated places in the school for both being alone and being together.

And then, who would be in charge of these places and spaces? For humane learning, the power in each of these schools should be distributed as equally as possible;

Distributed power

The way we have organized universities makes them extremely vulnerable to the abuse of power. Power corrupts, whether we want it or not, leading to bad decisions, unnecessary friction, stress and pain in organizations that should be about progress. We can and should prevent this from happening, and protect people from the effects of acquiring too much power, or holding on to it for too long. Therefore:

Remove all hierarchy from the school and replace it with other forms of organisation that distribute power among all. When it is absolutely necessary to give people power over others, do so for a limited time only and have the group hold them accountable.

By making schools smaller, decentralized, and local, we can create classes where everyone knows each other and learns together. Especially the educators. And in these small classes, we can use truly active learning and do away with grades and exams, as we can *see* growth. By removing artificial restrictions on when and how quickly students learn, education can become more flexible, resilient, and accessible to people of all ages. And by replacing hierarchy with consensus, we can work together to minimize our tendency to abuse power.

This will not be easy. Finding common ground amongst educators is a challenge. We tend to stick with what we have, because we cannot seem to agree on something better. And it is all too human to resist change and cling to a position of power. Some bold, humane ideas, and the resulting friction, might be the only way to move, slowly but meaningfully, to a better university for all.

If we can embrace our humanity, education can indeed be freedom. Let us make it so!

Author's Biography

Robbert Winkel is a maker, educational adviser at the Blended Learning Team of TU Delft, and a former teacher. This manifesto represents his personal opinion, for now ;)

Comments by author

on the process of writing this manifesto:

It was really great to put my thoughts into writing and reflect on them. I care deeply about education but find it difficult to find a time and place to discuss the bigger ideas in my day-to-day work. This manifesto provided a great opportunity for doing so.

on the received comments:

I found the comments very valuable. I personally would have loved to sit down with the commentators and discuss their thoughts at length, perhaps with some drinks and snacks, but I realize this would have been difficult to organize ;)

This manifesto inspires me because it envisions education really as a form of care. It offers a hopeful vision for how education can support learners not just intellectually, but emotionally and socially as well. I hope these ideas reach a wider audience and inspire more thoughtful conversations about the purpose of education.

Comments by

Jing Spaaij

Learning in Uncertainty: Towards a Values-based Education

Are we human, or are we dancer?
The Killers*

Written by:

Olga Ioannou

* “Human” is a song written by “Killers”. The lyric was inspired by a disparaging comment made by Hunter S. Thompson, who stated that America was “raising a generation of dancers, afraid to take one step out of line”. The ‘s’ in ‘dancer’ is deliberately omitted.

Abstract

Our ability to respond to the current climate challenges is surrounded by uncertainty. The complexity of said issues disempowers us, it makes us undecisive. Modernity responded to uncertainty with objectivism, elevating science as the sole source of truth while marginalizing other ways of knowing. This has led to the fragmentation of knowledge, the creation of disciplinary silos, and our current overreliance on predictive tools that often give a false sense of control. The specialization of knowledge also deepened the divide between material and social worlds, masking the socio-political roots of environmental crises. In response, this manifesto revisits the notion of values and valuation as a means for rethinking the world and navigating uncertainty. It also reconsiders the position of the university as a safe space for performing these values and further advocates for a Values-based Education (VbE) as a means for fostering critical reflection, systemic thinking, and affective learning. VbE reframes education (in this case architectural and engineering education) as a space for ethical inquiry, collective valuation, and civic action. And through that, it offers an opportunity to close the gap between the material and social world and thereby tackle the uncertainties inherent in the complex challenges of climate change their divide created in the first place.

Keywords: Uncertainty; Values; Values-based Education; Systemic thinking; Professionalization and citizenship

0.

We (humans) are facing the immense challenge of anthropogenic climate change; this is a complex challenge, surrounded by uncertainty.

1.

Uncertainty can be both aleatory, when uncertainty is caused by randomness, or epistemic when it points to a lack of knowledge and thus indeterminacy or ignorance (Hora, 1996). Uncertainty comes as a direct consequence of information abundance and the ambiguity of conflicting information (Cormier, 2024). It emerges from the open-endedness of the systems at hand, the multiplicity of actors involved (human and non-human) in those systems, and their non-linear behaviors. In the words of the Romanian professor Basarab Nicolescu (2010), “no level of reality can constitute a privileged place from which one is able to understand all other levels of reality whereas even a finite topological distance can contain an infinite number of levels of reality”. The more we know the less certain we are of our possibilities to act upon our goals.

2.

Uncertainty can be seen as a predicament. It is pervasive. It hinders our ability to act, it disempowers us. It paralyses our promptness to engage. It makes us fearful, undecisive: what if there is a better way? What if what we ultimately decide to do ends up hurting us in unexpected ways? As the Polish sociologist and philosopher Zygmunt Bauman argues citing Leo Strauss (2000, p.23), “(…) we are just toothless, (our) unprecedented freedom (is) followed by unprecedented impotence”.

3.

Modernity fought uncertainty with objectivism. Knowledge was scientized, it became a synonym of science. And with time, science became the synonym of truth. Other means of understanding the world were marginalized, looked down upon or overruled as subjective (Morin, 2007). This is evident in the polar-opposite terms still being used like hard and soft science (Shapin, 2022), or otherwise the battles between the quantitative (aleatory) and purely scientific versus the applied, qualitative (epistemic), critical theory of the social sciences (Harasim, 2012). To combat uncertainty, decision-making originally turned to statistics and nowadays, AI, increasing our reliance on predictions and quick fixes. Reality was thus freed from the need of mediation, translation

or negotiation. Instead, it found solace in the security of the 'average', represented by the 'bell curve' that guaranteed normality and gradually colonized indeterminacy (Hughes, 2022).

4.

The more complex the challenges at hand, the bigger the need for more scientific disciplines required to address then (Mazzocchi, 2019). Modernity siloed knowledge in scientific disciplines thereby limiting the frame of reference within each discipline (Buchanan, 2018). **Overgrowing specialization led to knowledge fragmentation further contributing to us feeling that our view of the world is partial and incomplete.**

5.

One of the most significant ramifications of ubiquitous scientization and siloed knowledge has been the divide between the material and social worlds (also expressed in the divide between hard and soft science mentioned earlier). **Expert systems disembedded social systems from their context** (Giddens, 1990). Our way of thinking about the world prevents us (humans) from grasping the mechanisms of its development as it fails to acknowledge the socio-political dimensions inherent in the material aspects of global society (Hornborg, 2009). **Up to date there is little understanding (and therefore much uncertainty) how materiality has shaped the patterns of actors, power and knowledge and their interdependencies** (Van Assche et al., 2021). New materialists argue, there are various forces and presences of the material in the social and hence the political (ibid.); political ecologists further argue that it is because of these relations that the environmental impacts are unevenly distributed (Hornborg, 2009). Coloniality has been central to the making of modern societies worldwide (Anora & Stirling, 2023): suffice to study how the decarbonization goals of colonizing powers lead to further colonizing entire African or South American regions for mining necessary resources or waste landfilling.

6.

The current challenge of anthropogenic climate change and with that, the dislocation of people (climate migrants), plants and animals are product of capitalism, coloniality and the political divide between the material and the social world (Whyte, 2017). These dynamics are further exacerbated and nurtured by the established power relations in the globalized world that caused (and benefited from) the divide of the material and social world in the first place. These powers exalt monetary value over all others. It is indicative that the notion of growth persists despite all evidence against it. **Our modernist thinking of the world has not only caused**

unforeseen damages (rather ironic considering it relied so much on prediction) but also compromised our ability to act upon said damages. The question then becomes: if the values of modernism are inadequate, then other values could be driving our decisions?

Part II | Values

7.

Schwartz (1992) defines values as 'the criteria people use to select and justify actions and to evaluate people (including the self) and events'. Values are everywhere; they manifest in people's behaviors and have a cognitive component (underlying beliefs) and an affective one (feelings and attitudes) whose entanglement may not always be discernable (Dressel, 1971). Values can be extrinsic because their properties are external or intrinsic, because their necessary properties are independent of their relations (Steinert, 2023).

8.

Regardless of their type, values call for explanation, contextualization, continuous evaluation and they are susceptible to change, a process called valuation (ibid.). Values are not a predetermined set of social rules or principles, nor a dogma or ideology; they define our response-ability in different contexts and in time, they represent how we choose to situate ourselves and relate to the otherness we are confronted with. They condition how we prioritize the world and how we choose to perceive it. They are pervasive; our reading of the world is product of our values (Dressel, 1971). How we act upon the world is product of our values. Any choice we make reveals what we believe (cognitively) and feel (affectively) to be worthwhile.

9.

This is a critical moment of choice for deciding how we (humans) wish to navigate the uncertainty of our current challenges. We can stick to modernist values, and thus retreat to the safety of predictions, succumb to the convictions of science, and let uncertainty become the new control apparatus as we leave others the responsibility to decide for us, be the 'dancer' who is afraid to take one step out of the line. Or we can reverse the predicament and claim uncertainty to fuel a complete rethink: we can use uncertainty as the driving force for a new understanding of the world, of ourselves, of our agency and responsibility in it.

10.

Whereas values are internalized cognitive or affective structures that influence people's choices, collective values relate to peoples' cultural identity (Schwartz, 1992). Considering that climate change is a global phenomenon -and thus not related to one culture only- developing collective values, or values that prioritize the collective for sustainability might be an impossible task (Mazzucato, 2022). **There is only one place where collective values around decarbonization and decolonization can be safely formulated, negotiated, and publicly performed.**

This is a task for the university.

Part III | Towards a value-based education in architecture and built environment studies

11.

Thinking in systems and values is not currently inherent to built environment studies. Systems complexity is fraught in a semester-long and classroom-limited assignments where emphasis -with few exceptions- is put on outputs rather on how these are produced (Till, 2005). Up until recently design studios still largely relied on predetermined design briefs where efforts invested in form-giving dexterity rather than the any values related to users, materials or fabrication. Sustainability was deemed to be a quest irrelevant to architecture (Hosey, 2012). Similarly, engineering studies are characterized by technological solutionism, hence the increased reliance on AI, and the proliferation of 'digital tools' being developed to be used as design aids at times even insinuating it can replace design completely.

Architectural and engineering pedagogies are still prone to promoting action more than reflection.

12.

Interdisciplinary and at times also transdisciplinary (although less often) learning formats have become ubiquitous; however, such attempts can be misleading as they can rely to science only, hard or soft. Efforts might be channeled to engineering a solution, most likely a technical one; or they might be channeled to engineering consent.

Architectural and engineering pedagogies are still prone to promoting solutions, even if they are forging reality.

13.

Coupled with the incessant urge for growth comes innovation; yet, as a recent study indicates, scholars no longer engage with a broader range of extant knowledge and therefore, innovative activity is slowing down compared to how much research is being published the reason for it being that (Park et al., 2023).

Architectural and engineering pedagogies are still prone to promoting newness within disciplines and not in relation with their impact on the world.

14.

As the university becomes more and more dominated by capitalism, its compromise with colonialism and patriarchy becomes increasingly more visible as well (de Souza-Santos, 2019). Nevertheless, the university is still needed as a source of open debate and experimentation to support the ecological perspective (Barnett, 2018). It needs to help learners to 'unlearn and relearn' and reformulate the reference frameworks around climate justice and the equitable use of resources (Sultana, 2024). It needs to help create 'the safe spaces to do dangerous things' (Hughes & Lokko, 2021).

15.

This is a critical moment of choice for the education of the built environment with regards to finding the pedagogies capable of supporting meaning-making and decision-making in conditions of uncertainty. We can continue to encourage the problem-solution binary, the obsession with innovation, and the normativity of the modernist tradition. Or we can choose to position learners back in the world they are observing, describing and measuring, and learning as the process of continuous valuation of the self and the world. We can opt for a values-based education (VbE).

16.

No education is without values; but a values-based education:

…originates in the acknowledgement that it is values (extrinsic and intrinsic) that inform individuals' decisions on how prioritize the world, how to read it and how to act within it.

…builds on concepts regardless of whether they have been fully articulated already or are novel. A VbE picks up from Freire and Illich and the pedagogies of mattering (Gravett et al., 2021) of post-human, feminist and critical theories which have long emphasized the importance of response-ability and the situatedness of knowledge. At the same time,

VbE also considers the more recent theories of learning like connectivism (Downes, 2012) which address learning in conditions of uncertainty and emphasize the creation of knowledge through connections within open, accessible, and diverse networks. VbE focuses not on reinventing

…does not prescribe its own values nor imposes values on learners; rather, it encourages students to discover and develop their own.

…feeds on multiple perspectives and the values they carry ensuring that these will be listened to and considered. The learners' prior lives and experiences are accounted for, included, respected, and protected. VbE thus is "making kin" in unexpected collaborations and combinations (Haraway, 2016).

…recognizes the interconnectedness of everything and everyone within this world viewing the material and social worlds as a continuum. It is inherently systemic.

…accepts that values are in flux and feeds on uncertainty to valuate, ensuring that the values applied to current challenges are revisited, exposed, translated, discussed, and renegotiated.

…opens up a multiplicity of learning spaces where experiences can be shared, and knowledge can be gained from others. VbE is not confined to the classroom, or the web- it is immersive and ubiquitous.

…advocates for the existence of multiple knowledges and different ways of knowing of the world. It encompasses not just science, but also science.

…acknowledges the importance of the values of ecology and technology while equally considering the psycho-cultural dimensions of altruism, relationality, empathy, active listening, care, justice. The affective component of values is given equal consideration to the cognitive one.

…brings to the foreground the fundamentals of any profession and recontextualizes the professional's contribution to the world. This is no longer about managing the complexity of any profession (although this aspect should not be underestimated); it is about asking professionals to position themselves and to use the values inherent to their positioning to make meaning and decisions.

…reconnects education and professionalization with citizenship by framing learning not just as a pathway to self-actualization and self-awareness, but also as a means of contributing to the broader social and civic good. This is exactly why uncertainty, and the doubt it carries, can ultimately be seen in a positive light. Uncertainty requires a certain tuning in with the world; it calls for unity and tolerance. And this is, ultimately, what the value component in a values-based education is all about.

References

Anora, S., & Stirling, A. (2023). Colonial modernity and sustainability transitions: A conceptualisation in six dimensions. *Environmental Innovation and Societal Transitions, 48*. https://doi.org/10.1016/j.eist.2023.100733

Barnett, R. (2018). *The ecological university.* Routledge.

Bauman, Z. (2000). *Liquid modernity.* Polity.

Buchanan, P. (2018, October). Reweaving webs of relationships. *e-flux Architecture.* https://www.e-flux.com/architecture/overgrowth/221630/reweaving-webs-of-relationships/

Cormier, D. (2024). *Learning in a time of abundance: The community is the curriculum.* Johns Hopkins University Press.

de Sousa Santos, B. (2019). Decolonizing the university. In B. de Sousa Santos & M. Meneses (Eds.), *Knowledges born in the struggle: Constructing the epistemologies of the Global South* (pp. 219–239). https://doi.org/10.4324/9780429344596

Downes, S. (2012). *Connectivism and connectivist knowledge: Essays on meaning and learning networks.*

Dressel, P. L. (1971). Values cognitive and affective. *The Journal of Higher Education, 42*(5), 400–405. https://doi.org/10.1080/00221546.1971.11778644

Giddens, A. (1990). *The consequences of modernity.* Polity Press & Blackwell Publishers.

Gravett, K., Taylor, C. A., & Fairchild, N. (2021, October 21). Pedagogies of mattering: Re-conceptualising relational pedagogies in higher education. *Teaching in Higher Education, 29*(2), 388–403. https://doi.org/10.1080/13562517.2021.1989580

Harasim, L. (2012). *Learning theory and online technologies.* Routledge.

Haraway, D. (2016). *Staying with the trouble: Making kin in the Chthulucene.* Duke University Press.

Hora, S. C. (1996). Aleatory and epistemic uncertainty in probability elicitation with an example from hazardous waste management. *Reliability Engineering & System Safety, 54*(2–3), 217–223. https://doi.org/10.1016/S0951-8320(96)00077-4

Hornborg, A. (2009). Zero-sum world: Challenges in conceptualizing environmental load displacement and ecologically unequal exchange in the world system. *International Journal of Comparative Sociology, 50*(3–4), 237–262. https://doi.org/10.1177/0020715209105141

Hosey, L. (2012). *The shape of green: Aesthetics, ecology and design.* Island Press.

Hughes, F. (2022, May 12). 'Filthy logics': The architecture of mediocrity [Berlage Keynote Lecture]. https://www.youtube.com/live/tfNfnrcPutU

Hughes, F., & Lokko, L. (as told to M. Mollard). (2021, November). A school willing to take risks. *The Architectural Review.*

Mazzocchi, F. (2019). Scientific research across and beyond disciplines. *EMBO Reports.* https://doi.org/10.15252/embr.201947682

Mazzucato, M. (2022). Collective value creation: A new approach to stakeholder value. *International Review of Applied Economics, 38*(1–2), 43–57. https://doi.org/10.1080/02692171.2022.2144149

Morin, E. (2007). Restricted complexity, general complexity. In *Worldviews, Science and Us* (pp. 5–29). https://doi.org/10.1142/9789812707420_0002

Nicolescu, B. (2010). Methodology of transdisciplinarity: Levels of reality, logic of the included middle and complexity. *Transdisciplinary Journal of Engineering & Science, 1*(1), 19–38.

Park, M., Leahey, E., & Funk, R. J. (2023). Papers and patents are becoming less disruptive over time. *Nature, 613*, 138–144. https://doi.org/10.1038/s41586-022-05543-x

Schwarts, S.H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 25, pp. 1-65). Academic Press.

Shapin, S. (2022). Hard science, soft science: A political history of a disciplinary array. *History of Science, 60*(3), 1–42. https://doi.org/10.1177/00732753221094739

Steinert, S. (2023). Philosophy and value. In *Interdisciplinary value theory* (pp. 67–82). Palgrave Macmillan. https://doi.org/10.1007/978-3-031-10733-7_5

Sultana, F. (2021). Critical climate justice. *The Geographical Journal, 188*(1), 118–124. https://doi.org/10.1111/geoj.12417

Till, J. (2005). Lost judgment: From skirting boards to suicide. In *EAAE Prize 2003–2005: Writings in Architectural Education* (pp. 164–181).

Van Assche, K., Duineveld, M., & Beunen, R. (2021). Material dependencies: Hidden underpinnings of sustainability transitions. *Journal of Environmental Policy & Planning, 24*(3), 281–296. https://doi.org/10.1080/1523908X.2022.2049715

Whyte, K. (2017). Indigenous climate change studies: Indigenizing futures, decolonizing the Anthropocene. *English Language Notes, 55*(1–2), 153–162. https://doi.org/10.1215/00138282-55.1-2.153

Author's Biography

Olga Ioannou is assistant professor at the Faculty of Architecture and the Built Environment of TU Delft and co-leader of the faculty's CBE Hub. Her current research focuses on circular products and processes with an emphasis on the design of bio-based circular building products and the creation of bio-based value networks. She is particularly interested in the systemic character of circularity and how it challenges the established processes for the production of the built environment, stakeholder relations and societal values towards a circular society. With a strong research background on architectural engineering education, Olga has developed and is currently coordinating several educational initiatives with the aim of integrating circularity in BK curricula.

Comments by author

on the process of writing this manifesto:

It felt nice to write something beyond the usual paper norms/ formats. I am quite fond of position papers, and I was happy to contribute such a text. As is always with writing, it helps me sharpen my thoughts. We are very much involved in education and day-to-day teaching and learning, but we don't spend enough time reflecting on this activity as much. This manifesto gave me an opportunity to take a step back and contemplate what I think/feel is important.

on the received comments:

It was really helpful and kind. They helped me make the text more coherent.

“Why is this manifesto inspiring to me?
This manifesto inspires me because it reimagines higher education as a deeply human endeavour that values small, connected communities and active learning. It challenges the conventional, impersonal structures of modern academia and urges us to reclaim education as a process of collective growth, empathy, and shared responsibility.

Why is this manifesto meaningful to me and to our broader community?
This manifesto is meaningful because it directly addresses the disconnect between traditional educational practices and the needs of today’s diverse learners. It resonates with students and educators by advocating for decentralised, values-based education that fosters critical thinking, inclusivity, and genuine human interaction, ultimately enhancing our collective learning experience.

What impact can this manifesto have on higher education practice?
This manifesto can impact higher education by promoting innovative, community-centred practices that decentralise power and prioritise real-life learning, connecting learning and citizenship, a crucial connection in our times.”

Comments by

Roberto Rocco

Exploring the Purpose of What it Means to Be Human to Understand the Purpose of Education

Written by:

Angela Rout,
Saba Hinrichs-Krapels

Abstract

When we envision the nature and purpose of higher education, we find ourselves reflecting, examining and discussing what it means to be human, and the relationship between being the individual person and the broader community. In this article, we present three foundational assumptions about the nature of human existence within society. We assert that delving into these underlying principles can empower educators to foster intrinsic motivations for learning among individual students, while inspiring communities and institutions to provide meaningful support for their educational journey. These principles are:

1. Humans are born with innate curiosity
2. Humans need to both receive and give kindness and care
3. Learning is a continual process of challenge and success

Our article further explores these principles by considering how they can inform the mission and vision of higher education in the 21st century. We propose pedagogical approaches that align with these ideas and explore their implications for access and inclusivity within educational environments.

These principles resonate with our experiences as post-secondary educators in design and engineering. They are influenced by our experiences living and working in educational systems around the globe, and reflection on our personal belief systems. We propose that implementing these principles will influence how educators perceive and facilitate the learning process for adult learners, foster a sense of community within the classroom, and shape how higher education institutions endorse lifelong learning. We present these reflections as a catalyst for discussion and welcome thoughtful debate regarding their validity, relevance and applicability to the evolving landscape of higher education.

Keywords: societal progress; service; social cohesion; intrinsic motivation

The shifting role(s) of higher education

Higher education has always been a mirror of society's aspirations. Historically, it was a means of cultivating skilled workers, specialists, and leaders—those equipped to build civilizations and advance humanity. Universities (or their equivalent) were not just centres of training but also of innovation, culture, and moral development. In many traditions, higher learning was closely tied to religious rationales: Catholic social teaching, for instance, placed human dignity at the centre, holding that human beings possess inherent worth and that education was a path to nurturing this dignity. Likewise, in Islamic and Buddhist traditions, higher education developed within religious institutions such as madrasas and monasteries, which supported scholarship alongside moral and spiritual development. Long before the rise of medieval European universities, centres of higher learning had already flourished elsewhere. Nalanda University in India (5th century CE) attracted scholars from across Asia to study philosophy, medicine, mathematics, and astronomy. In the Islamic Golden Age, institutions such as Al-Qarawiyyin in Morocco (859 CE) and Al-Azhar in Cairo (970 CE) advanced theology, philosophy, medicine, and the sciences, while also preserving classical knowledge that later influenced Europe. By the 11th and 12th centuries, European universities such as Bologna (1088), Paris (c.1150), and Oxford (with teaching traceable to 1096) developed out of cathedral schools, monastic traditions, and associations of students and masters, laying the foundation for the model of autonomous universities that still shapes higher education today.

In recent decades, however, the narrative has shifted. For many young people, higher education is increasingly seen as a pathway to personal financial security, or ambitious financial goals. But even this promise is beginning to fade. Degrees, once viewed as golden tickets to upward mobility, no longer guarantee financial success. There are entrepreneurs, creators, and professionals who achieve remarkable careers without formal degrees, or who obtain general education and gain specialised skills on the job. Examples such as tech innovators thriving on self-taught skills or tradespeople finding lucrative opportunities challenge the idea that a traditional degree is essential. As argued by Jonathan Grant in his book "The New Power University", universities "are no longer the sole gatekeepers to opportunity. Today, we see people from diverse backgrounds—self-taught technologists, skilled tradespeople, and independent entrepreneurs—creating value and driving innovation."

This prompts us to ask: in a world where financial success does not depend on higher education, what is its purpose? Why do we need universities, and how can they reshape themselves to meet the needs of

the present and the future, especially given the complexities in society? Climate change, inequality, technological disruption, and geopolitical tensions demand graduates who are not just skilled but also thoughtful, adaptable, and purpose-driven. What if universities of the future focus on fostering transdisciplinary collaboration, lifelong learning, and a commitment to the public good, thereby renewing their role as pillars of civilization?

In this article we challenged ourselves to reimagine higher education not merely as a system for preparing students for jobs, but as one that equips them to navigate and address the complexities of the 21st century. These complexities include rapid technological change, the proliferation of information and misinformation through social media, globalization and cultural interdependence, growing social and economic inequalities, environmental crises, and geopolitical uncertainty. While workforce preparation remains important, universities also have the potential to serve as transformative institutions that foster scholarship, drive innovation, and engage with societal challenges through research, civic partnerships, and ethical leadership. True learning, therefore, extends beyond the acquisition of knowledge for financial gain to cultivating critical thinking, adaptability, responsibility, and a commitment to the well-being of society—a vision echoed by UNESCO's Futures of Education initiative, which emphasized that "education must be a key driver of transformation, not just a tool for economic growth."

This highlights the essential role of education systems in preparing individuals to address global challenges, focusing on human dignity and collective well-being rather than just economic advancement. In his same book Grant also emphasises this shift, arguing that universities must now engage more deeply with society and address global challenges. The role of higher education is moving away from simply granting degrees to fostering social mobility, innovation, and impactful contributions to the public good.

Education as re-examining what it means to be human

But how can educators cultivate a generation prepared to tackle global societal and environmental challenges if we operate under the belief that economic incentives are students' primary motivator? Our previously stated assumptions propose that while financial stability is undeniably important, human motivation is complex and shaped by deeper intrinsic factors that influence learning and engagement. By recognizing and understanding these fundamental drivers, educators can create learning environments that not only equip students with the skills to address pressing global issues but also inspire them to do so with a sense of purpose and fulfilment. We therefore advocate for a return to foundational

principles in adult education, re-envisioning education as the medium through which we critically engage with the profound question: What does it mean to be human?

This reframing demands a thorough examination of the interplay between the individual as a human being and the broader community to which they belong. The essence of education, therefore, lies in this dual exploration of the self and of the collective. To chart this transformative course, we propose three foundational assumptions about the nature of human existence and learning:

1. Humans are born with innate curiosity
2. Humans need to both receive and give kindness and care
3. Learning is a continual process of challenge and success

By delving into these assumptions, we argue that educators can unlock a deeper understanding of intrinsic motivation, empowering individual learners to embark on personal growth while simultaneously cultivating a sense of shared purpose and vitality within communities.

What might those principles look like in practice?

The assumptions above draw on Rogers and Maslow's humanist educational theories (Kumari, 2024), which posit that humans are intrinsically motivated to make sense of the world and are naturally social beings, ideas often found in some spiritual or religious belief systems. Additionally, we argue that people are inherently curious, kind, seek caring, non-transactional friendships, and require both failure and success to learn. It is natural for students to want to help one another and contribute to the world. To illustrate how these ideas manifest in practice, Roger's Theory of Unconditional Positive Regard means that teachers and mentors accept students for who they are, they empathise with their feelings and retain authenticity and transparency in their interactions. Maslow's Hierarchy of Needs is a framework for teachers to ensure student's core needs are being met through education, including their physiological needs, safety needs, belongingness and love needs, esteem needs and self-actualisation.

While these concepts have affinity for early educational stages, they also play a role in higher education. For example, consider how acknowledging the intrinsic curiosity of learners can transform the learning environment. When educators design learning objectives around inquiry and discovery, rather than rote memorization, they tap into this natural curiosity. Activities like project-based learning, case studies, research question formulation, storytelling, debates, and discussions ignite students' desire to explore and investigate. Assessments that include peer reviews, portfolios, open-ended papers, and creative performances further

support this by connecting learning to meaningful, real-world contexts. Such approaches foster autonomy, creativity, and metacognitive reflection, enabling students to engage deeply with their subjects. This natural curiosity also extends to understanding and addressing complex societal issues. When students are encouraged to question the world around them, they naturally engage with ethical dilemmas, social justice, and global challenges. Integrating discussions on values, ethics, and the responsibilities we carry in our personal and professional lives deepens their learning experience. Through exploring current societal problems, students develop critical thinking skills and a sense of moral responsibility, preparing them to contribute thoughtfully to the workforce and society at large.

Coupled with activities that foster curiosity, belongingness is also a core need for humanistic education. Curiosity thrives in environments where kindness and care are embedded in the learning process. Recognizing that people are inherently social and compassionate, educators can create collaborative spaces where students feel safe to express ideas, support one another, and grow together. Learning activities that encourage teamwork, peer feedback, and shared responsibilities nurture these qualities. Classrooms become communities where students are motivated not just by personal achievement but by the collective success and well-being of their peers.

Finally, at the heart of meaningful education is the understanding that learning is a process shaped by both challenge and success. When students have their needs met, they feel safe to fail. Students must be given opportunities to fail, reflect, and try again within supportive environments. Encouraging experimentation without the fear of failure allows students to embrace setbacks as integral to growth. Activities that promote iterative learning, such as design thinking exercises, collaborative problem-solving, and reflective journaling, help students develop resilience and adaptability. Assessments should recognize the value of the learning journey itself, rewarding not just final outcomes but also the process of grappling with complex ideas, revising work, and learning from mistakes.

Through these practices, grounded in the principles of innate curiosity, natural kindness, and the dynamic process of challenge and success, higher education can become a transformative experience. While humanistic educational perspectives may be well aligned with schools in the humanities and arts, the realisation that all humans have fundamental learning needs, means such values and attitudes also plays a critical role in engineering and STEM higher education. As such, we advocate for a shift beyond the transactional pursuit of knowledge to foster environments where learning is deeply connected to what it means to be

human, and where students are empowered to engage thoughtfully with the ethical and societal responsibilities they will encounter in their lives and careers.

Concluding remarks

In reimagining the future of higher education, we return to a fundamental question: What does it mean to be human? We propose that this is the foundation upon which we must build the purpose of education. Higher education should not be confined to the pursuit of credentials or economic utility. Instead, it must embrace three core principles: innate curiosity, intrinsic motivation for care and kindness, and continual process of challenge and success. By anchoring education in these principles, we move beyond transactional models toward transformative experiences in higher education. Universities become spaces where knowledge is not just accumulated but explored together, where diverse perspectives foster empathy and understanding, and where learning is inextricably linked to the moral and social fabric of our world. The purpose of education, then, is not simply to prepare students for the workforce but to prepare them for life: to inspire curiosity, to challenge assumptions, and to empower individuals to shape a future rooted in equity, sustainability, and human dignity.

We propose that implementing these principles will influence how educators perceive and facilitate the learning process for adult learners, foster a sense of community within the classroom, and shape how higher education institutions endorse lifelong learning driven by the desire to learn and serve society. We also propose that the process of finding common values can help bridge barriers between learners of different belief systems and/or cultures. We present these reflections as a catalyst for discussion and welcome thoughtful debate regarding their validity, relevance and applicability to the evolving landscape of higher education.

Disclosures and acknowledgements

As this is a manifesto, and not an academic publication, we wish to make clear our assumptions and motivations that have influenced this piece. Both of us teach in higher education systems in The Netherlands but have previously been exposed to higher education as students and teachers in other countries, including Canada, Germany and the United Kingdom. Both as children ourselves and now as parents, we have experienced primary and secondary education in Paraguay, Zimbabwe, Canada, The Netherlands and the UK. Much of what we observe in this manifesto has been due to our experiences, both positive and negative, in these different education systems. Furthermore, these concepts are inspired by our personal belief systems, where we are encouraged to re-examine our identity as human beings that use our talents and capacities to serve humanity, in whichever way is commensurate with our current context and reality. All ideas originated from notes taken from in-person discussions. The text was partly refined and edited using chat GPT, yet the final version was verified and endorsed by the authors.

References

Abdúl-Bahá, Gail, M., & Khan, A. K. (Trans.). (1990). *The secret of divine civilization*. Bahá'í Publishing Trust.

Bevis, T. B. (2019). The notion of universities. In *A world history of higher education exchange* (pp. 35–53).

Britannica, The Editors of Encyclopaedia. (2025, January 30). *University*. Encyclopedia Britannica. https://www.britannica.com/topic/university

Grant, J. (2021). *The new power university: The social purpose of higher education in the 21st century*. Pearson UK.

Kumari, S. (2024). Humanism in education: Fostering student-centered learning through Maslow's and Rogers' theories. *International Journal of Research Publication and Reviews*, 2582–7421. http://www.ijrpr.com

Moore, J. C. (2019). The Middle Ages: 500–1500. In *A brief history of universities*. Springer.

Oza, P., & Japee, G. (2020, January 20). *History of higher education – From ancient to the modern*. https://doi.org/10.13140/RG.2.2.14254.46406

Perkin, H. (2007). History of universities. In J. J. F. Forest & P. G. Altbach (Eds.), *International handbook of higher education* (pp. 159–205). Springer.

UNESCO. (n.d.). *Futures of education*. https://www.unesco.org/en/futures-education

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Saba Hinrichs-Krapels is an Associate Professor (TPM) using systems and design approaches in complex decision-making environments, focussing on Health Systems and Policy especially in global health efforts.

Comments by authors

on the process of writing this manifesto:

Before this call for manifestos arose, we had already spent a few coffee chats talking about parenthood, school, higher education, and how to align our own values with what we do. Mainly: how to avoid what we believe to be false dichotomies between science and spiritual values. This call was a nice opportunity to put those thoughts together and focus it on one of the key current parts of our jobs: teaching science!

on the received comments:

We are very grateful for the TIP/TOP comments. Firstly, we realize that we needed to emphasize that much of what we argue is based on our own values, and we had to make this explicit in the text. We also more explicitly show the sources that have inspired our writing, even if not as academic references. We are also grateful the the commentator welcomed our ideas and engaged us in further reading.

Comments by

Marcell Várkonyi

Angela and Saba in their manifesto make an important connection between two questions: what it is to be a human being; and what is the purpose of higher education. Their line of reasoning follows that in order to make sense of why we educate and receive education, we need to understand what role it plays in our lives; and in turn to understand that, we need to make sense of our lives more broadly. I find it important to make this link, and I do believe that those of us studying and working in (higher) education should consider this more throughout our engagement with education. This line of reasoning also suggests that ultimately the answer to the purpose of higher comes down to our set of values, since there is no one right answer to what it means to be a human being.

Curiosity and care, values that the authors place high importance on, are values I cherish myself – I see them as crucial for our existence, and for being connected and part of the environment, the world around us. The observations of Angela and Saba on the disconnect between higher education and the community is therefore important: when curiosity and care are lacking, we arrive at a system which instead of being for and by humans, is for the system's sake, and thus, is instrumentalized in its raison d'etre. Bringing these values back into the discourse, as they argue, can therefore be crucial.

Yet, I also find myself grappling with something in this manifesto: there seems to be a jump made from asserting the values (i.e. assumptions) of the authors, to making broader claims about the purposes of higher education. The individual values, on which the formulated purposes of higher education rest, due to their very nature are rooted in subjectivity. While I understand that working in ways that embrace these values could bring benefit to education, due to the personal nature of values and philosophies of life, I do not think that one can, on a broader level, "implement" specific values. My take-away from their manifesto is that rather than aiming to realize certain specific values in higher education, we ought to connect more closely with the values of our own – and discover more intimately what these are in the process of doing so.

Between a Rock and a Hard Place: Reflecting on and Reimagining PhD Processes

Written by:

Caiseal Beardow,
Laura Barendregt

Abstract

This work takes the position that if higher education is to create better worlds, then we need to consider the policies and discourses that organise and fund it, not just what happens inside the classroom. Reflecting on our experiences as PhD candidates at TU Delft, we discuss tensions and conflicts we have observed, connect them to the institutional structure and language of the PhD trajectory, and try to take a step forward by imagining how they could be otherwise.

Keywords: PhD, postgraduate education, reflection, collaboration, critique

A Doctor of Philosophy (PhD) is considered the pinnacle of higher education. In principle, it aims to shape those who pursue it into accomplished researchers, who contribute to society through academia, industry, and education. However, PhD candidates are expected to do more than conduct research; they teach in courses and undertake education themselves. On a daily basis, they shift between the roles of researcher, student, educator, and (within the Dutch system) employee. As semesters pass and pressure to 'finish on time' mounts, candidates can feel torn between these multiple identities, and the varying expectations and notions of success that they engender. It is our experience that when such identities come into conflict, learning tends to lose out in favour of roles whose outputs are more tangibly defined.

In this piece, we consider how the institutional structures that govern PhD programmes may be limiting our potential as learners, researchers, and teachers. We draw on our experiences as late stage PhD candidates at TU Delft, and contemporary educational practices, to deconstruct tensions we have observed and imagine how things could be otherwise.

Reflecting

At its core, a PhD is a "degree programme consisting solely of working on a research project" (Phillips & Johnson, 2022, p.2). In the Netherlands, the concept of "working on a research project" is translated quite literally into programme structure: most candidates enter the university as employees, signing a temporary employment contract that defines research as their primary obligation. Contracts generally last 4 to 5 years, during which a candidate is expected to plan, execute, and manage their research project, publish in academic outlets, submit their thesis, and emerge from their defence ceremony as a fully-fledged researcher.

At TU Delft, such a researcher is defined as "independent", "organised" and "communicative" (TU Delft University Graduate School, 2024, p.2). These three qualities are used to help determine a candidate's readiness to defend their thesis. An independent candidate shows "ownership" of their research, acts on supervisors' advice, and defends "methodological choices and results". An organised candidate is "flexible to changes in circumstances" and can "identify potential problems in the research plan" in a "timely" manner. Conversely, depending on others to "set deadlines and milestones" or failing "to establish a clear work plan" are signs of disorganisation. A communicative candidate engages "stakeholders and other society actors to further [their] research and its impact", and "communicate[s] research work to peers", as opposed to working "mostly in isolation". The image of a successful PhD candidate at TU Delft is defined in contradictions: avoiding both reliance on others and the appearance of isolation, and carrying out a multi-year research plan

whilst adapting to changeable, potentially unfamiliar circumstances. These conflicting expectations are compounded when the additional roles of teacher and learner are overlaid.

Candidates' obligations as teachers are typically defined in our employment contracts, expressed as a percentage of working hours we should commit to teaching in our faculty. In practice, we have found that adherence to this differs greatly amongst faculties, departments and supervisors. Some candidates are expected to meet the teaching hours specified, others will take on surplus teaching from their supervisors, whilst others still will be encouraged to align teaching activities with their research to avoid 'distraction'. As learners, candidates must follow courses to obtain credits, with a minimum requirement to be eligible for defence. At TU Delft this minimum is 45 credits, or 540 hours (TU Delft Graduate School, 2024b, p.3)—a figure that can feel both unattainable and hardly enough. Again, a candidate's faculty and supervisory team determine which learning activities and courses they may put towards this sum (TU Delft Graduate School, 2024b, p.2).

These expectations illustrate the inter-role conflicts that, in our experience, are emblematic of the PhD experience at TU Delft. We have heard candidates referred to by senior professors—with whom we share a collective labour agreement— as 'students', and by students themselves as 'Professor' and 'Doctor'. Neither fully students, teachers or researchers, we shift contextually between these identities. One aspect is constant throughout: the tendency to separate and prioritise research over other crucial aspects of the PhD trajectory.

This habitual favouring of research is not constrained to candidates' own experiences, but is in fact ingrained in the formalising language of PhD programmes and funding. All candidates in the Netherlands are legally required to discuss the "progress of [their] research" (at least) annually with their supervisors (Universities of the Netherlands, 2024, p.60). At TU Delft, these annual reviews are organised around forms that ask candidates, "Is the project on track or delayed? If delayed, why? What measures have been taken to address the delay?" (TU Delft Graduate School, 2023a, p.2; see also 2023b, 2023c) Discussions of learning are constrained to a summary of "obtained GS credits" (TU Delft University Graduate School, 2024a, p.6). Additionally, candidates hired through nationally-funded grants are typically expected to contribute to "progress reports" that detail the "project results" achieved to date (Dutch Research Council, 2024a, p.10). European grants follow a similar structure, further identifying the number of completed PhDs within a project period as a success criterion (European Research Council, 2012, p.74). Consciously or not, a PhD candidate's success is judged by their productivity: the tangible outputs and labour they offer to institutional stakeholders.

If we consider candidates purely as university employees, focusing on productivity may seem plausible. However, doing so implies that candidates' own training is secondary to their productive obligations and primarily their own responsibility. Self-management of learning is a common trait of PhD programmes (Phillips & Johnson, 2022, p.3), but universities and supervisors also have a "vital responsibility" to support candidates' "personal and professional development" (Lindén et al., 2013). In the Netherlands, supervisors are in fact legally required to "set up" a "training and guidance plan" on behalf of candidates, specifying "what knowledge and skills must be acquired and how this should be done" (Universities of the Netherlands, 2024, p.60). Despite this, we find that candidates are largely left to self-design their education—a situation that is both alarmingly common and harmful to candidates' progress (Promovendi Netwerk Nederlands, 2025).

The contradictions discussed above reflect a systemic dichotomy in Dutch academia between knowledge production and acquisition. Within TU Delft, there is growing recognition of what progressive educationists have long argued: both research and learning should be understood as continued, collective, contextual endeavours (Cope & Kalantzis, 2015; Freire, 1970/2005). The university's *Vision on Teaching & Learning* stresses the importance of collaboration between students and teachers, and supporting staff in developing their teaching skills (TU Delft, 2023, p.8). What does this mean for PhD candidates, who must learn how to both conduct research and teach? Where could we fit in this proposed community of knowledge, and how might we thus reimagine the PhD process at TU Delft?

Reimagining

We believe revisiting the Guidelines for the *PhD Thesis and Competencies of the PhD Candidate* could be an effective starting point. The document seeks to "lay out a language to discuss" the development of a candidate's dissertation and their readiness to defend it (TU Delft University Graduate School, 2024a, p.1). Language is intertwined with cultural values (Lakoff & Johnson, 2008), and TU Delft's academic culture values knowledge production above all—especially if done in a linear and individual way.

In reality, many PhD candidates are embedded within labs and consortia, or work with external partners. This requires more than just communication: active collaboration is needed to form effective research goals and procedures. Additionally, many candidates are performing cutting-edge, exploratory research. Doing innovative work naturally involves uncertainty, which makes it challenging to identify problems ahead of time, and especially if navigating unfamiliar or emerging contexts. Despite the complexity these factors bring to a research

project, they can be powerful opportunities for learning if space is held for reflection.

We think the current PhD competences—independence, communication and organisation—should be redefined to better reflect the nature and contributions of our work. We believe that a competent PhD candidate demonstrates **interdependence, collaboration,** and **reflection**. They approach knowledge as a collective resource, work equitably and effectively with others, and critically examine their actions. Redefining PhD competences leads us to imagine alternative ways of assessing them. What if instead of asking candidates to recoup the losses of unexpected events, progress meetings encouraged them to reflect on what they learnt from the experience? What if candidates were given space to share insights that they cannot include in research outputs? What if these outputs and dissertations were accompanied by critical reflections on the process of creating them?

Reflection is also needed on the supervisor-candidate relationship. It is widely acknowledged that this relationship can make or break a PhD experience. PhD programmes tend to model supervisors as either "apprentice-masters" or "role models", which respectively can lead to candidates being exploited or neglected (Phillips & Johnson, 2022, p.4). Again, these issues stem from over-prioritising research. Supervisors are under immense pressure to publish, which can lead them to view candidates as a means of either alleviating or aggravating this pressure. If candidates are to become interdependent, collaborative and reflective, we require more balanced relational models.

One such model is 'near-peer' mentorship (NPM). NPM is a dyadic, collaborative, reciprocal relationship between a mentor and mentee, typically a few years apart in their career trajectories (Akinla et al., 2018; Trujillo et al., 2016). In research contexts, mentees receive guidance in developing their research identity and skills, whilst mentors strengthen their research management strategies (Edgcomb et al., 2010). By diversifying the sources of guidance available to candidates, NPM can also alleviate pressure on more senior researchers (Edgcomb et al., 2010) and support a healthier supervisor-candidate relationship. Mentors exist within the TU Delft system, but in their current form candidates largely experience them as administrative rather than supportive. We feel that taking a near-peer approach—including mentors being recent graduates or post-docs, and greater focus on sustained collaboration—would better serve candidates, supervisors and mentors alike.

Such mentorship can be formalised, but may also emerge if a greater sense of community exists between candidates and other colleagues. Because most PhD candidates in the Netherlands enter the university as employees, they do so asynchronously and thus lack a defined peer

group or cohort. It is therefore important to create an infrastructure that can help candidates to build support networks beyond the supervisory team. A potential approach could be hiring candidates into labs, research or project groups that include PhDs, post-docs and professors. Care needs to be taken here, as there are many accounts of candidates in such constructions becoming workhorses for lab leaders, or accruing additional reporting duties from consortia. Another idea could involve creating PhD cohorts through induction programmes that bring together candidates starting within the same semester. After creating such a cohort, candidates could continue to meet for ongoing peer intervision. Whilst taking some time to come to fruition, this is an aim of the revised research course being offered at our own faculty.

In addition to infrastructure, we need time and agency to be able to create and engage in such activities. We have witnessed senior staff claim that PhDs should do more for themselves, or that policy cannot create a community for them. While we agree that candidate-led initiatives should be encouraged, such sentiments fail to acknowledge how institutional policy shapes the expectations and priorities that candidates internalise and thus act upon. If your environment does not place value in spending time with peers, why would you sacrifice time to attend PhD day in which you could further your research? Furthermore, if a candidate's employment is linked to their residency status or is their sole source of income, then completing their research 'on time' becomes practically essential. While writing this piece, we have both felt anxiety over the time that it has 'taken away' from our research, and questioned if we should continue.

This sense of precarity is now palpable across the entirety of TU Delft. With the Dutch academic sector under increasing financial and political threat (Royal Netherlands Academy of Arts and Sciences, 2025), and an ongoing reckoning with social (un)safety (Netherlands Labour Authority, 2024; TU Delft, 2025), the university finds itself at an inflection point: it must decide who and what it prioritises, and act accordingly. In the past, the needs of vulnerable groups such as PhDs have been overlooked (Inspectorate of Education, 2024)—an oversight that the Executive Board is taking initial steps to address in consultation with community representatives (TU Delft, 2025). However, decision-making power remains largely in the hands of senior management, and sentiments of distrust and disempowerment amongst some employees remain (FNV, AOb & CNV trade unions, 2025). The same relational imbalances we see between PhD candidates and supervisors, inadvertently or otherwise, are playing out at an institutional scale.

We thus invite TU Delft to join us in our reimagining of roles. Could management conduct policymaking democratically, so that community

becomes not just an aspiration, but a practice? Could such policies promote the value of teaching and learning alongside research output, and in doing so, untie the hands of those trying to do good things? In a political climate of competition and scarcity, can our institution choose interdependence, collaboration, and reflection instead? We believe such change is not just possible, but vital—and that now is the opportune time to begin.

Acknowledgements

We would like to thank the TU Delft University PhD Council, Faculty PhD Councils, and Young Researchers Impact for their continued advocacy and support for our PhD community. We would also like to thank Promovendi Netwerk Nederland, whose information resources have been invaluable in preparing this piece.

References

Akinla, O., Hagan, P., & Atiomo, W. (2018). A systematic review of the literature describing the outcomes of near-peer mentoring programs for first-year medical students. *BMC Medical Education, 18*, 1–10.

Cope, B., & Kalantzis, M. (2015). The things you do to know: An introduction to the pedagogy of multiliteracies. In B. Cope & M. Kalantzis (Eds.), *A pedagogy of multiliteracies: Learning by design* (pp. 1–36). Palgrave Macmillan UK.

Dutch Research Council. (2024a). *NWO grant rules*. https://www.nwo.nl/sites/nwo/files/media-files/NWO%20Grant%20Rules%20%282024%29_0.pdf

Dutch Research Council. (2024b). *NWO: Budget cuts hit the Netherlands as a country of knowledge*. https://www.nwo.nl/en/news/nwo-budget-cuts-hit-the-netherlands-as-a-country-of-knowledge

Edgcomb, M. R., Crowe, H. A., Rice, J. D., Morris, S. J., Wolffe, R. J., & McConnaughay, K. D. (2010). Peer and near-peer mentoring: Enhancing learning in summer research programs. *Council on Undergraduate Research Quarterly, 31*(2).

European Research Council. (2012). *Guide for ERC grant holders*. https://erc.europa.eu/sites/default/files/document/file/ERC_Guide_ERC_Grant_Holders.pdf

FNV, AOb, & CNV Trade Unions. (2025). *Onderzoek sociale veiligheid en leiderschap TU Delft*. https://www.fnv.nl/getmedia/1eb9374b-fdbd-48aa-8925-a16daab4c410/20250512-Onderzoek-sociale-veiligheid-en-leiderschap-TU-Delft.pdf

Freire, P. (2005). *Pedagogy of the oppressed* (M. B. Ramos, Trans.). Continuum International. (Original work published 1970)

Government of the Netherlands. (2024). *Aiming for a balanced internationalisation of universities and universities of applied sciences*. https://www.government.nl/latest/news/2024/05/13/aiming-for-a-balanced-internationalisation-of-universities-and-universities-of-applied-sciences

Inspectorate of Education. (2024). *Onderzoek naar naleving van wet- en regelgeving*. https://filelist.tudelft.nl/TUDelft/Actueel/20240216%20Definitief%20rapport%20Onderwijsinspectie%20-%20TU%20Delft.pdf

Lakoff, G., & Johnson, M. (2008). *Metaphors we live by*. University of Chicago Press.

Lindén, J., Ohlin, M., & Brodin, E. M. (2013). Mentorship, supervision and learning experience in PhD education. *Studies in Higher Education, 38*(5), 639–662.

Netherlands Labour Authority. (2024). *Occupational health and safety special: Research report on psychosocial workload at Dutch universities*. https://www.nllabourauthority.nl/publications/reports/2024/05/14/psychosocial-workload-at-dutch-universities

Phillips, E., & Johnson, C. (2022). *How to get a PhD: A handbook for students and their supervisors* (7th ed.). McGraw-Hill Education.

Promovendi Netwerk Nederland. (2025). *Four years of contract, five+ years of work: Factors hindering and supporting a timely PhD completion*. https://doi.org/10.5281/zenodo.14946489

Royal Netherlands Academy of Arts and Sciences. (2025). *KNAW: Academische vrijheid in*

Nederland onder druk. https://www.knaw.nl/nieuws/knaw-academische-vrijheid-nederland-onder-druk

Trujillo, G., Aguinaldo, P. G., Anderson, C., Bustamante, J., Gelsinger, D. R., Pastor, M. J., Wright, J., Márquez-Magaña, L., & Riggs, B. (2015). Near-peer STEM mentoring offers unexpected benefits for mentors from traditionally underrepresented backgrounds. *Perspectives on Undergraduate Research and Mentoring, 4*(1).

TU Delft. (2023). *Vision on teaching and learning 2030*. https://filelist.tudelft.nl/Studentenportal/Centraal/Study%20Climate/Project/VoTL/Vision%20on%20teaching%20and%20learning_Draft5_2023%2011%2010.pdf

TU Delft. (2025). *Quarterly report on social safety and integrity*. https://filelist.tudelft.nl/News/2025/01_Januari/Q4%202024%20report%20v1.0%20EN.pdf

TU Delft University Graduate School. (2022). *Doctoral education competences model*. https://filelist.tudelft.nl/TUDelft/Onderwijs/Opleidingen/PhD/20220301%20DE%20Competences%20model%202022%20V1.pdf

TU Delft University Graduate School. (2023a). *Yearly progress meeting (24 months): Halfway point: Time to look back and define the next steps*. https://filelist.tudelft.nl/LR/Onderzoek/Graduate_School_AE/Documents_and_Links/YPM%20Form%2024%20Months.pdf

TU Delft University Graduate School. (2023b). *Yearly progress meeting (36 months): Finalizing the dissertation: Making sure the thesis is complete within the next 12 months*. https://intranet.tudelft.nl/documents/20147/0/YPM+Form+36+months.pdf/5f0706b4-9174-b5f4-f080-8dddbeceb324

TU Delft University Graduate School. (2023c). *Yearly progress meeting (48 months): Action needed! Obtaining your doctoral degree is taking longer than expected*. https://filelist.tudelft.nl/LR/Onderzoek/Graduate_School_AE/Documents_and_Links/YPM%20Form%2048%20Months.pdf

TU Delft University Graduate School. (2024a). *Guidelines for the PhD thesis and competencies of the PhD candidate*. https://intranet.tudelft.nl/documents/20147/9319511/Guidelines+for+the+PhD+Thesis+and+Competencies+of+the+PhD+Candidate.pdf

TU Delft University Graduate School. (2024b). *Doctoral education guidelines*. https://intranet.tudelft.nl/documents/20147/9319511/Doctoral+Education+Guidelines.pdf

Universities of the Netherlands. (2024). *Collective labour agreement for Dutch universities*. https://www.universiteitenvannederland.nl/files/publications/CAO%20NU%202023-2024%20ENG.pdf

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Laura Barendregt is a PhD candidate at the Faculty of Industrial Design Engineering at TU Delft. Her research and teaching interests include critical approaches to and the intersections of art, design, pedagogy and futures, science and technology studies and ethnographic methodologies.

Comments by authors

on the process of writing this manifesto:

Throughout our PhD trajectories, we have shared many conversations and frustrations about the system we work in. We found ourselves repeatedly arriving at the same conclusion: doing a PhD is often difficult for the wrong reasons. Writing this manifesto together gave us space to articulate our critique, to treat it as legitimate, and to allow ourselves to imagine a better future.

on the received comments:

It was encouraging to see that our commentator saw the message and value in our manifesto. We especially appreciated the tips regarding connections to trans-disciplinary research and broader definitions of knowledge creation within different societal framings.

I deeply thank the authors (Caiseal and Laura) for touching upon four important aspects of PhD research and education at the university level, particularly in the Netherlands. I further appreciate the effort to point out such constructive pathways to address this tension! The above tensions apply not only to PhDs but to all actors in academic and research institutions, including students, supervisors, administrative staff, and support staff as much as we all are required to co-produce knowledge within society to address societal challenges. We all struggle to take these roles in an efficient, effective, and satisfactory way that ultimately contributes to personal development, impactful projects, and a sustainable society. Uncertainties and tensions are also windows of opportunity to open up the rock and hard place feeling. They are an opportunity to discuss and agree on the change we want to see and the trade-offs we are willing to make. Therefore, thank you for bringing this reflection into the discussion.

Comments by

Juliette Cortes Arevalo

All Hail the Imagination!

Expanding Notions of Engineering Expertise in Technical Jigher Education

Written by:

Roy Bendor,
Carissa Champlin,
Peter Pelzer

Abstract

The future orientation of technological innovation requires epistemological diversity in the imagining of a range of possibilities, not the least in light of an increasingly turbulent and uncertain future. However, technical higher education often discounts the imagination in favour of more recognizable forms of expertise. In response we call for pedagogical practices in which the imagination is nourished yet grounded, where criticality and generativity are combined, and where scientific rigour is in service of possibility. We outline such directions by suggesting seven principles based on our teaching experiences.

Keywords: futures, critical imagination, engineering, super-wicked problems

Introduction

Technical education has traditionally focused on the knowledge and skills required to solve complex problems. Engineers, industrial designers, architects and planners are taught to analyze, chart and plan in service of creating better, often more efficient, artefacts, infrastructures and spaces. These skills, however, may no longer be sufficient. In a report submitted to the 4TU Federation of Dutch Universities of Technology (Klaassen et al.,2019), "the engineer of the future" is described as occupying 8 complementary roles: origineering, swarmineering, engagineering, ingraineering, tinkeneering, perfectioneering, imagineering, and fundamentaneering. While all 8 competencies appear odd at first, taken together they articulate the need for future professionals working in technical fields to not only hone their planning and making skills, but also to be able to collaborate with a diverse set of actors and do so from a holistic and entrepreneurial position. The seventh role (imagineering) has particularly caught our eye in that it points directly to the need for future engineers to engage with futures that deviate from 'business as usual'. However, to what extent can engineers be understood as creative actors? Does an engineer really need to act "like a sci-fi movie director" as the report states? And what would this entail? So while expertise – derived from both scientific approaches and practical knowledge – remains central to technical education, it appears that it needs to be expanded to include the ability to imagine future contexts, problems and challenges. Otherwise we risk educating engineers that only focus on what is, while losing sight of what can be.

Our call for more imagination in technical higher education recognizes that many of our current challenges stem from what can be described as "super-wicked" problems that require "applied forward reasoning" (Levin et al., 2012). It also asserts that if education is a form of "confrontation" with the world (Biesta, 2021), higher education must stimulate learners to confront not only the world of today but also that of tomorrow. Accordingly, we believe that the central challenge of contemporary higher technical education is to develop ways to nourish critical imagination: a type of creative thinking that is capable of generating the conditions for alternative realities to emerge, while committed to identifying the conditions that lead to some possible realities to be more or less desirable. How to do this is an ongoing challenge, but one that must be met if we are to truly educate, and not merely train, future-oriented engineers.

In what follows we draw on our experience teaching in higher education programmes at two Dutch technical universities and one interdisciplinary faculty to formulate seven principles for cultivating the imagination:

#1. Imagining is useful for problem solving, but also for problem (re)framing

It is often the case that learners in technical disciplines are trained to solve problems handed to them by others. While the contexts may be complex and the problems 'super-wicked', they believe in their capacity for creative problem solving. But what if the problem to be solved is not the 'real' problem, or is only a subset of a different, larger or deeper issue? And what if it can't be solved at all? In such cases problems need to be reframed instead of solved.

In our experience applying 'what if?' questions not only to possible solutions but also to the framing of the problem itself can lead students to differentiate between material symptoms and societal causes, to identify, for instance, that some engineering problems emerge from historical injustices and the stifling of alternatives.

#2. Imagining is implicated in social power

Imagining a preferable solution is no guarantee for its realization. Often what engineers desire and what can actually be done are at odds, require alignment or must be adjusted. This is because all imagining, and the conditions that may (or may not) allow imaginative possibilities to materialize, are suffused with politics. This is why we advocate for critical futures literacies – fostering an ability to understand who shapes the future, what parties have an interest in perpetuating existing imaginaries, and what levers could be used to promote change (Barendregt et al., 2024).

While applying futuring tools and methods already expands the imagination in technical disciplines, we recommend paying attention to how the tools themselves reflect specific institutional arrangements, types of expertise and power structures. No imagining of the future is innocent, nor are the tools used to facilitate it. Expanding notions of the future also calls for expanding the futuring community by including as many perspectives as possible and carefully weighing which perspectives should become more prominent than others.

#3. Imagining requires exercise

While all humans have the capacity to imagine, we are not equally adept at evoking and using it. Perhaps the capacity to imagine is 'educated out of us' as we are asked to conform to specific learning styles and evaluation. Either way, like a muscle, the imagination requires regular exercise in order to truly open up innovative thinking and doing.

We have observed that playfully exercising the imagination helps to reduce some anxieties around creativity. Games like The Thing From The Future (Candy, 2015) help students warm up to the possibilities of the imagination by providing them with just enough scaffolding – clear goals and prompts – to imagine novel sociotechnical possibilities, and to do so in a fun-filled way.

#4. Imagining needs to be grounded

For the imagination to avoid becoming a tool of fantasy, it must be grounded in what is real and not what is fanciful. In this way it may provide engineers an important bridge between present conditions and possible futures. This is a delicate balance: navigating the momentum of the present and the velocity of the future requires both attitude and evidence.

The imagination can be grounded in many ways, most commonly through desk and field research. Ethnographic research and horizon scanning are particularly useful for contextualizing and situating future scenarios. This has the added advantage of providing educators with criteria to evaluate the degree to which student proposals respond to what they discovered in the world without simply projecting current conditions into the future.

#5. Imagining should be fostered, not limited by quantification

Engineers are trained to rely on numerical evidence, tending to ground the imagination quantitatively. In and of itself this is not necessarily a problem, since quantitative tools and techniques are useful ways to add concreteness and thus plausibility to abstract futures. But we should not lose sight of the way numerical data tend to dominate and sometimes narrow our thinking, nor to the fact that data and models themselves are products of the imagination and never fully mirror the reality they portend to represent.

We recommend balancing quantitative and qualitative evidence when considering possible futures. When marshalling quantitative evidence to substantiate possible futures, educators should make sure that the processes by which this type of evidence was developed are critically evaluated. It is also important to remember that humans predominantly orient themselves toward future possibilities through narratives and stories. The numbers rarely speak for themselves.

#6. Imagining is served by epistemic diversity

Just like there is no single future, there is no single way to imagine the future. Each futuring method carries with it a host of epistemological assumptions and expectations. Diversity is essential for opening up the imagination and increasing the chance that it will yield new possibilities. But this is not trivial given the modernist tradition in which technical education is steeped. This is where interdisciplinary practice, art and Indigenous ways of knowing offer exciting means to pluralize the imagination.

In our experience, involving learners with 'arts meets science' and design festivals offers opportunities to nourish epistemic diversity. Encountering technical tools, methods and practices that were produced according to other epistemological perspectives invites learners to question and contest their own positionalities and then reframe, reconceptualize or repurpose their work.

#7. Imagining should consider multiple temporalities

A commitment to increase possibility by means of imagining difference should not stop at a single moment in some distant future. Just as engineers should become comfortable imagining near and far futures, they would benefit from considering alternative pasts and presents as ways to gain a better understanding of temporal plurality. In the same vein, engaging with non-Western ways to consider and represent time itself can open up the imagination to adjacent possibilities otherwise concealed by dominant, linear ways to address time.

Our experiences with engaging with past futures and futures past – in the form of 'a museum of future pasts' (Hoffman et al., 2021), for instance – testify to the power of imagining in all temporal directions. When students consider alternative pasts, presents and futures they gain a nuanced grasp of historicity and contingency, and recognize the dominance of the 'now' in ways that potentially help undermine it.

Concluding thoughts

The need to address complexity in technical education has long been acknowledged, but with emergent complexity comes a measure of uncertainty. How can we prepare engineering students to engage with, instead of hedge against, future uncertainty? How can we prepare engineering students to design in a future that threatens to be very different from anything we have experienced before? How

does engineering proceed into terrains where facts are less available or obvious? And how can engineers acquire the skills needed to steer change in ways that benefit people and the planet? Our answer points to the role of the imagination in navigating complexity, uncertainty and possibility. As others are increasingly discovering (see for instance (Zevenbergen et al., 2024)), securing a future for humanity requires more than analytic faculties. We will not survive the anthropocene without a significant measure of creativity, and that includes those who are trained to build the infrastructures of tomorrow.

To some extent, integrating the "transdisciplinary imagination" (Harris et al., 2010) as part of the engineering skill set requires unlearning old habits just as it does learning new ones. The distance between what C.P. Snow termed the "two cultures" (Snow, 1959) is no longer tenable, as engineering has much to benefit from engaging with the arts and the humanities, as with the social sciences and policymaking. The principles offered here chart a path toward such transdisciplinarity, but this is by no means the only, nor necessarily the best path forward. To be open to the plurality of possibilities manifested by the imagination is also to recognize that no single possibility is the only one. This is perhaps the most important lesson provided by the imagination: there are always more possibilities, and until we surface, materialize, and 'try them out for size' we will never be sure, collectively, that any possibility is preferable. It is here that we may find the true meaning of imagineering: the capacity to provide society with exciting yet fair, sustainable and just alternatives.

References

Barendregt, L., Bendor, R., & van Eekelen, B. (2024). Teaching for transformation: Lessons from critical pedagogy for design futures education. *Journal of Futures Studies, 28*(4), 123–128.

Biesta, G. (2021). *World-centred education: A view for the present*. Routledge.

Candy, S. (2015). The thing from the future. In A. Curry (Ed.), *The APF methods anthology* (pp. 18–21). Association of Professional Futurists.

Harris, J., Brown, V. A., & Russell, J. (Eds.). (2010). *Tackling wicked problems: Through the transdisciplinary imagination*. Earthscan.

Hoffman, J., Pelzer, P., Albert, L., Béneker, T., Hajer, M., & Mangnus, A. (2021). A futuring approach to teaching wicked problems. *Journal of Geography in Higher Education, 45*(4), 576–593.

Klaassen, R., van Dijk, M., Hoope, R., & Kamp, A. (2019). *Engineer of the future: Envisioning higher engineering education in 2035*. TU Delft OPEN Publishing.

Levin, K., Cashore, B., Bernstein, S., & Auld, G. (2012). Overcoming the tragedy of super wicked problems: Constraining our future selves to ameliorate global climate change. *Policy Sciences, 45*, 123–152.

Snow, C. P. (1959). Two cultures. *Science, 130*(3373), 419.

Zevenbergen, C., Harteveld, M. G., Bloemen, P., van Ham, M., van den Doel, W., Hertogh, M. H., … Tromp, E. (2024). Uniting imagination and evidence by design to navigate climate survival in urbanizing deltas. *npj Ocean Sustainability, 3*, Article 53.

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Comments by authors

on the process of writing this manifesto:

We found the writing process was quite smooth. Since we all pretty much agreed about the importance of the imagination in education, and had experiences bringing this conviction into our respective teaching practices, discussions focused on the ‘how’ and not the ‘why’. We worked in a shared document, and the main task was to find the right balance between the argument and examples of practices that may help bring it to life.

on the received comments:

The reviewer provided thoughtful comments that were useful for reflecting on the main argument and considering the overall scope of the manifesto. This led to some light editing and helped make the manifesto sharper.

This manifesto made me think about the value of the futures literacy skills of our students and alumni. It gives a set of very clear and convincing principles for what imagination could mean in higher (engineering) education, and as such, it both inspires and supports educators to evaluate and/or intervene in their curriculums.

Comments by

Remon Rooij

Manifesto: Engineering Education As a Forest

Written by:

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Oliver Broadbent,
Prof. Sarah Hitt,
Dr. Jonathan Truslove

With thanks to TU Delft and Chris Wise

Abstract

This manifesto argues for transforming engineering education from factory-like efficiency into forest-like resilience that grows strength, adaptability, and care. Too often, today's educational systems take different people and make them into the same kind of engineer - efficient but under-prepared for the complexity of navigating responsible engineering careers. Instead, education must support different pathways: from deep technical specialists to community practitioners, systems integrators, innovators, and contextual engineers. Guided by the Systems Bookcase framework, we call for change across paradigm, goals, mindsets, operations, and design. Engineers of the future must combine rigorous technical foundations with ethical practice, ecological literacy, and the ability to work across disciplines. Reimagined as a living system, engineering education can help society adapt, regenerate, and thrive.

Keywords: systems change, engineering education, regenerative education, global responsibility, interdisciplinarity, lifelong learning, resilience, engineers, future

Introduction

Imagine education as a forest, not a factory. Every tree is a citizen, not a product, rooted in place, shaped by experience, connected with others and part of a living system. Each tree learns in relationship with its environment: drawing energy from the sun, exchanging nutrients through the soil, and adding its canopy to the shared knowledge and wisdom of humanity.

Within this forest stand the engineer-trees. Their roots are complex. Some reach into military power, others into civic purpose, others into innovation and infrastructure. Roots of ethics and stewardship exist too, but too often they lack the nutrients of lived experience, social context, and public need.

In recent decades, clusters of engineer-trees have tipped into sameness: plantations grown to a single pattern. Plantations are efficient but fragile with rows of identical trees that are easy to harvest, productive in the short term, yet shallow and brittle compared to ancient woodland. This is education as a factory: standardised, uniform, efficient. But a healthy forest depends on diversity, adaptability, and the interplay of many forms of life.

The wider forest is under strain - ecological limits, social inequities, climate disruption, technological upheaval. To respond, we need a diverse, interconnected forest, where engineers act, learn and collaborate alongside artists, carers, scientists, organisers, and educators—offering shade, shelter, and renewal together.

Education can also be viewed as a living system, and must act as a steward of the forest. Not by making engineering less rigorous, but more relevant, rooted, connected, and alive. Technical excellence is essential, but not sufficient. Education must prepare professionals not only to critically think, challenge ways of thinking so they can help the forest adapt, regenerate, and renew for people, planet, peace, and power.

This manifesto is a guide to that transformation. It draws on the metaphor of the forest—but also on the **Systems Bookcase**, developed by Oliver Broadbent and James Norman (2021). This framework structures change into five interconnected “shelves”:

- **Paradigm** – the deepest beliefs about what engineering is for
- **Goals** – what education is trying to achieve
- **Mindsets** – the cultural assumptions and values embedded in teaching
- **Operations** – the underlying systems and logistics of delivery
- **Design** – the content, pedagogy, and lived experience of teaching and learning

Like the layers of a forest, these shelves interact: paradigms shape goals, mindsets shape operations, and design expresses the whole system in practice. To shift engineering education, we must work across every shelf - not just the visible design of courses, but also the deeper roots of purpose, culture, and structure.

Let us create education systems as forests, not factories - but as living systems that grow resilience, diversity, and care.

Shelf 1: Paradigm — What is engineering for?

In the Systems Bookcase, the paradigm sits on the top shelf—the highest layer that frames everything beneath it. In the forest, it is like the prevailing climate, soil and geology: the conditions that shape what can take root and thrive.

Now – Current paradigm

Engineering is framed as technical problem-solving for efficiency, productivity, and growth - often treated as ethically neutral, but never truly so. It has delivered infrastructure and innovation, but also reinforced extractive systems, narrowed definitions of success, and created new risks—through over-consumption, inequality, and unchecked technologies such as AI.

Next – Transition paradigm

Engineering shifts towards stewardship - ethical, collaborative work that sustains people, place, and the living world. Engineers act as stewards rather than just problem-solvers, shaping conditions for a safe and just future. This requires humility, cross-disciplinary work, and guiding technological change, including AI, with social responsibility and long-term care. *Practical examples: embedding the four principles of globally responsible engineering* (Engineers Without Borders UK, n.d.)*; integrating intergenerational design practices such as "design for disassembly"* (Pozzoni Architecture, 2023; UK Green Building Council, n.d.)*; running foresight exercises that ask students to imagine engineering in 2050* (The Institution of Structural Engineers, 2022).

Future – Co-evolution paradigm

Engineering becomes a practice of co-evolving with living systems. Engineers help society navigate climate disruption and technological upheaval by adapting and regenerating the conditions for human and

ecological flourishing. The role evolves again: from steward to co-creator and adaptive problem-shaper, working with others to keep life thriving amid turbulence. *Practical examples: regenerative infrastructure projects that restore ecosystems while serving communities* (Huls, 2025; University of Washington, 2023)*; universities partnering with civic groups to experiment with "permeable campuses" where education and community knowledge are shared* (Engineers Without Borders UK, 2025; Stuart & Shutt, 2019)*; multidisciplinary labs exploring bio-inspired materials and more-than-human design* (BIOHM, n.d.; the Design Museum, 2025).

Paradigms do not shift through declaration alone. They change as new practices, mindsets, and goals take root.

Shelf 2: Goals – What kind of engineers are we growing?

If the paradigm is the climate of the forest, then the goals are the kinds of trees we aim to grow. Right now, the system rewards engineers who grow tall and straight: efficient, narrow, competitive. But in resilient ecosystems, growth takes many forms. Forests thrive on diversity. So should our engineering goals.

The 4TU Centre for Engineering Education argues that future engineers must not only master technical knowledge, but also develop as integrators, changemakers, and reflective practitioners (4TU. Centre for Engineering Education, n.d.). Goals must broaden in parallel to grow a diversity of engineers.

Not every engineer must play every role, just as each tree in a biodiverse forest fills a different role. These are not rigid jobs, but developmental pathways—different "species" that engineers might grow into. People may move between them as contexts and needs change. What matters is that complex challenges are met with diverse capabilities. These roles include:

1. **Front-End Innovators**
   Entrepreneurial engineers who thrive at the beginning of challenges. These engineers spot opportunities, frame new directions, and bring ideas into being before they are locked down. They might start a venture applying AI ethically in health care or prototype regenerative materials. Their strength is imagination coupled with action—ensuring engineering addresses meaningful problems.

2. **Community Practitioners**
   Engineers whose work begins with people and place. These practitioners co-create water systems with rural villages, design housing retrofits alongside tenants, or partner on flood resilience. Technical knowledge is inseparable from listening and trust. They are not parachuting in, but becoming part of a web of accountability and care.
3. **Systems Integrators**
   Engineers of connection. These professionals design transport systems balancing logistics, equity, and sustainability, or integrate renewable energy into resilient grids. They see how parts interact and ensure they work together. Like trees at the forest edge, they thrive in transition zones—technical, social, and organisational.
4. **Contextual Engineers**
   Adaptive engineers with strong core skills—conceptual design, systems thinking, ethical judgement—that can be applied across sectors. These engineers move responsibly between domains, applying expertise where most needed. What defines them is not reinvention, but deep responsiveness to context.
5. **Deep Technical Specialist**
   Engineers who master a specific domain—structural design, fluid mechanics, robotics, or software. Others rely on their precision when lives depend on it. Like canopy trees, they anchor the forest with reliability and continuity, but must leave space for renewal and avoid monoculture dominance.

The Mixed Forest

No single engineer embodies all these roles, and every engineer needs to respect and be able to engage with the others. What matters is the ecosystem as a whole: innovators, community practitioners, integrators, contextual engineers, and specialists working in balance. And all must be grounded in a **shared code of ethics**: honesty in uncertainty, long-term responsibility, and deep care for people, place, and planet.

Shelf 3: Mindsets – What beliefs and values shape learning?

In the Systems Bookcase, the mindset shelf is the philosophy of tending the forest: how do we decide what to value, what to prune, what to let grow wild, what disturbances to welcome?

Mindsets are taught through what we model, reward, and include. They show up in who holds authority, whose knowledge is trusted, and how we respond to uncertainty.

We need a cultural shift: from institutional authority to shared authorship. Educators should be appointed not just for technical expertise, but for their belief in the potential of others.

Now mindsets

- Separation: engineering is done to society and nature. Assuming work is beneficial and has a positive impact if there are good intentions.
- Scarcity: there is one right answer.
- Control: systems are stable and fixable.

Next mindsets

- From separation to interdependence: engineering is part of living systems. Deeper appreciation of the breadth of impact of engineering and aim to improve complex living systems not “fix problems” in isolation or superficially “do good”.
- From scarcity to abundance: knowledge exists in many forms.
- From control to emergence: change is iterative and relational.

Ideas for normalising this shift:

- Co-teach with non-engineers.
- Make project-based learning standard, not exceptional.
- Create year-in-context placements.
- Let engineers be shaped by people and place.

Future mindsets

- From interdependence to reciprocity: education actively gives back—sharing knowledge with communities, restoring ecosystems, opening universities.
- From abundance to wisdom: discernment about which knowledge to use, when, and how—valuing ecological literacy, indigenous knowledge, and moral imagination.
- From emergence to stewardship: change is cared for—requiring patience, listening, and responsibility. This future mindset rests on practices such as ecological literacy, more-than-human perspectives, awareness of deep time, and decolonising inherited knowledge.

Shelf 4: Operations – How do we structure education?

Operations are the shelf of systems and logistics—the timetables, assessments, staffing, and governance that quietly but powerfully shape what is possible. In the forest, they are the root networks and seasonal rhythms: unseen structures that channel energy and define how the ecosystem sustains itself.

Now – Dominant operations

Current systems prioritise stability, efficiency, and throughput. Students are timetabled to the hour; modules are standardised; assessment drives learning. Governance is held in small committees, with industry advisory groups that are often conservative, sometimes self-absorbed, and potentially disconnected from public purpose. These structures mirror factory logic more than forest dynamics.

Next – Emerging operations

We need operations that are adaptive and relational. That means:

Teaching teams as ecosystems

Closed-problem areas (e.g. thermodynamics, fluid mechanics). Objective, stable, taught at scale with digital tools and structured assessments. Educators ensure foundational competence.

Open-problem areas (e.g. inclusive infrastructure, systems design, ethics). Complex, contextual, value-laden. Taught in smaller groups through facilitation and lived challenges. Educators focus on uncertainty, judgement, and perspective. This work is demanding, so staff and students need psychological and pedagogical support.

Co-equal, cross-disciplinary teaching teams

At least half of teaching should be co-delivered with non-engineering expertise—psychologists, ecologists, civic leaders, ethicists, social scientists, grassroots engineers, artists. Not as guests, but as competent embedded co-educators.

Coordination and rhythm

Teaching teams need coordination. Curricula should follow seasonal rhythms—intensive blocks and reflective phases. Summer terms could become demonstrators where educators act as students themselves, refining pedagogy and strengthening empathy.

Governance as stewardship

Replace narrow boards and passive advisory groups with Stewardship Assemblies including civic voices, students, community partners, regulators, and industry.

Future – Living operations

Operations must be designed as living systems—globally connected yet locally embedded. This means:

- Centres of Excellence for specialist modules, alongside locally grounded learning.
- Modular, lifelong learning ecosystems where engineers re-enter education at key transitions–personal, societal, technological.
- Teaching recognised as a respected career track equal to or better than research.
- Accountability to place and planet, not just accreditation.
- A national map of engineering education, with institutions specialising in different roles: contextual engineers, deep experts, innovators. Together they form a coordinated ecosystem rather than replicas of the same curriculum.

Shelf 5: Design – What and how we teach

Design is where strategy becomes pedagogy. In the forest, design is the detail of growth: the shape of leaves, the branching of the canopy, the patterns of shade and light. Every lesson, module, and brief is a seed: either reinforcing the current system or helping new forms take root.

Now – Dominant design

Today's curriculum leans heavily on narrow technical mastery. Students mostly learn closed problems. Open-ended challenges - justice, ecology, ethics - are treated as optional. The result is efficient, but fragile. It is worth acknowledging that many educators innovate to address this, but often without systemic support, leaving their work fragile and undervalued.

Next – Emerging design

We need curricula that balance closed and open problems:

- *Closed-problem foundations*: rigorous, demanding technical basics.
- *Open-problem foundations*: early exposure to complexity of systems, ethics, and contextual design.
- *Advanced open-problem learning*: lived challenges such as co-created briefs with practitioners, community partners or live projects

Curricula should help students see and grow into different engineering roles. A future community practitioner might need participatory design and civic engagement; a deep expert might pursue advanced analysis; innovators need opportunities to shape briefs; integrators need cross-disciplinary projects; contextual engineers need repeated opportunities to adapt. Education must make these pathways visible and support students to test and choose.

Design should also weave in moral ambition—helping engineers ask not just "Can this be built?" but "Should it be built, and for whom?"

Future – Living design

Design becomes regenerative, shaping not just competent engineers but citizens. This involves:

- Ecological literacy as core. Engineers must understand living systems alongside the built.
- Permeable universities: curricula co-delivered by outside voices as equal professionals.
- Lifelong pathways: recognising education cannot be front-loaded into three to five years. Engineers and educators should return at career transitions to refresh and re-root their practice.

Conclusion: Choosing the Forest

This is not a manifesto for marginal change. It is a call to reshape engineering education.

We do not need a diverse group of people to become the same kind of engineer. We need a diverse group of people to grow into diverse roles (specialists, integrators, community practitioners, innovators, contextual engineers) so that together they can embrace the complexity of our world.

The risks are real. Ever-larger cohorts processed through standardised curricula reduce education to throughput. When students see their degree as a transaction - a certificate, not a formative experience - we undermine education's civic role: shaping citizens who act with responsibility, imagination, and care and potentially the public's trust in engineers.

The choice is clear. We can cling to efficiency and uniformity. The promise of efficiency hides the cost: graduates whose education under-prepared them for the complexity of real-world practice. Or we can build ecosystems of learning that support both educators and future engineers to thrive. That means:

- Growing **strong ethical practice to support technical roots**, alongside open-ended, purpose-driven learning, as engineering does not take place in an ethically neutral space; technical work always has human and ecological consequences.
- Building **layered, respected cross-disciplinary teaching teams**, recognised and supported for their work.
- Designing curricula that vary between closed and open problems, while allowing **students to shape their pathway** depending on what "species" of engineer they are exploring.

- Embedding **lifelong learning pathways** that engineers can return to throughout their careers.
- Creating governance accountable not just to industry, but to **place, people, and planet**.

The Systems Bookcase has helped us order these ideas, but the forest is what makes them alive. The bookcase may be made of wood, but the forest is where the wood regenerates. Education, too, must regenerate - creating conditions where many species of engineers and other professionals and citizens can flourish together.

And just as you can walk through a forest without being overwhelmed by its complexity, so too can we design education that is rich, diverse, and alive without being unmanageable. Once tended into being, this ecosystem will be what allows engineers, and the societies they serve to thrive.

The forest is ours to tend. The choice is clear. The time to act is now.

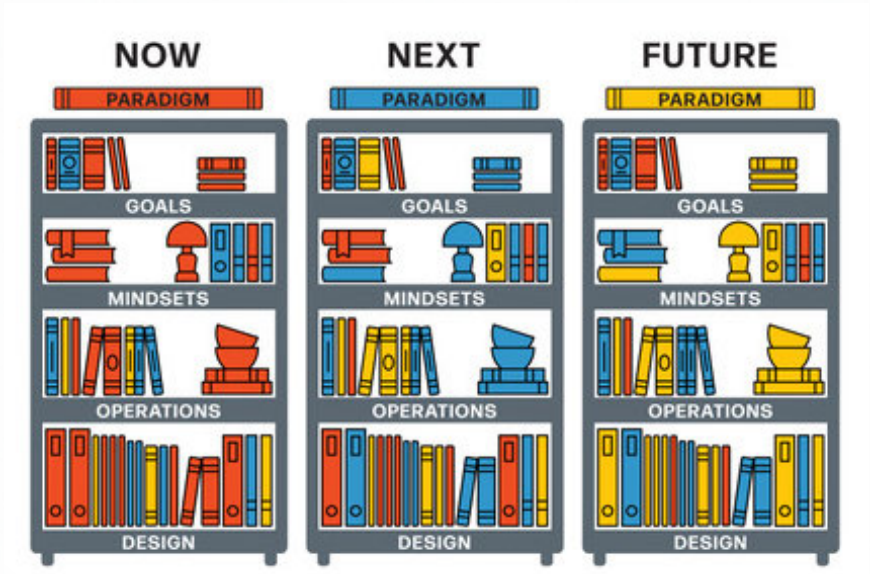


Figure 1: Library of Systems Change diagram by Constructivist is licensed under CC-BY-SA 4.0, based on a drawing that first appeared in the Regenerative Structural Engineer. Image used with permission, no further use allowed.

References

4TU Centre for Engineering Education. (n.d.). *Innovating engineering education for tomorrow's engineer*. 4TU Centre for Engineering Education. https://www.4tu.nl/cee

BIOHM. (n.d.). *BIOHM: Regenerative biotechnologies*. https://www.biohm.co.uk/

Engineers Without Borders UK. (n.d.). *What is global responsibility? Explore the four principles of global responsibility and why we urgently need to reimagine engineering's role in society*. https://www.ewb-uk.org/what-is-global-responsibility

Engineers Without Borders UK. (2025, September 10). *Engineering for People lands in Birmingham*. https://www.ewb-uk.org/design-challenge-lands-in-birmingham

Huls, A. (2025, June 20). *Innovative engineering project supports Indigenous forest stewardship*. York University. https://www.yorku.ca/yfile/2025/06/20/innovative-engineering-project-supports-indigenous-forest-stewardship/?utm_source=chatgpt.com

Pozzoni Architecture. (2023, April 28). *Intergenerational design: Bringing communities together*. https://www.pozzoni.co.uk/stories/intergenerational-design-bringing-communities-together

Stuart, M., & Shutt, L. (2019, January 25). *From fixed to porous: The permeability of our institutions*. Wonkhe. https://wonkhe.com/blogs/from-fixed-to-porous-the-permeability-of-our-institutions

the Design Museum. (2025). *More than human*. The Design Museum. https://designmuseum.org/exhibitions/more-than-human

The Institution of Structural Engineers. (2022, November 24). *Annual academics' conference 2022*. https://www.istructe.org/resources/training/annual-academics-conference-2022

UK Green Building Council. (n.d.). *Design for deconstruction: Practical guide*. https://ukgbc.org/wp-content/uploads/2024/07/Design-for-Deconstruction.pdf

University of Washington. (2023, July 12). *History & restoration project: North Creek Wetland*. https://www.uwb.edu/wetland/restoration

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Emma Crichton is a Chartered Civil Engineer working at the intersection of engineering, education, and systems change. After six years designing treatment works in the Scottish water industry, she joined Engineers Without Borders UK, where she developed international programmes, co-founded the Systems Change Lab, and co-authored the *Reimagined Degree Map and Global Responsibility Compass*. She is now Chair of the Useful Simple Trust and a board member of Azuko and the Engineering Council. Alongside these roles, she works independently with organisations exploring how education, governance, and design can adapt and evolve.

Oliver Broadbent is an 1851 Fellow in Regenerative Design, director of Constructivist, and Chair of Hazel Hill Trust. He is a writer, international speaker, and award-winning educator working at the intersection of design, systems thinking, and regenerative practice. Oliver is the founder and co-facilitator of the Regenerative Design Lab, and author of the Pattern Book for Regenerative Design. Through Constructivist, he develops tools, courses, and experiments that help engineers (and other humans) reimagine their role in creating a thriving future. His work is known for blending rigour with playfulness, and for supporting professionals to take meaningful action in complex systems.

Professor Sarah Jayne Hitt (PhD SFHEA FRSA) has been teaching in universities for almost 20 years. A passionate and dedicated educational leader with a talent for creating interdisciplinary programmes and curricula that centres engineering within social, environmental, ethical, political, and cultural contexts, she moved to Hereford, UK in 2019 to become Founding Professor of Liberal Studies at its start-up higher education provider, the New Model Institute for Technology and Engineering (NMITE). She also works with organisations like the Engineering Professors Council, Engineers Without Borders – UK, and Engineering for One Planet on projects to support globally responsible engineering education and practice.

Dr Jonathan Truslove is an interdisciplinary researcher, facilitator and collaborator developing opportunities to learn about how to embed global responsibility at the heart of how engineering is taught and practiced. As the Education and Skills Lead, Jonathan works across learning journeys in higher education and industry, policy and standards, and impact evaluation. He has over five years of experience in sustainable water and sanitation infrastructure and its relationship with rural communities in challenging environments, across Scotland, Rwanda, Malawi and Cambodia.

Comments by authors

on the process of writing this manifesto:

The experience of writing the manifesto felt like a rare opportunity for creative thinking and expression. It gave us freedom to write without tailoring it to a narrow audience or set of expectations. That freedom allowed us to articulate what we truly felt and believed about engineering education in an authentic way.

Emma was our lead author. At times the writing process felt overwhelming because of the breadth of themes to be covered, but collaboration was invaluable in clarifying ideas, reviewing direction, and sharpening the voice of the piece. It became a process of co-reflection as much as co-writing.

The piece was meaningful to us all because it brought together our decades of experience in engineering, education, and systems change. The manifesto became a way to weave those threads into a coherent vision that could be shared with others.

on the received comments:

The comments were brilliant—thoughtful, detailed, and extremely useful. They offered constructive critique that helped improve both the clarity and the overall flow of the piece.

A key insight was the importance of holding on to clarity and simplicity while describing a very complex situation. The feedback reminded us that the manifesto needed to be accessible as well as visionary, and that metaphors only work when balanced with practical, concrete ideas.

One of the aspects I appreciated most about the manifesto is its clear articulation of the critical changes needed in engineering education. It emphasizes with urgency the necessity of reshaping educational structures to foreground sustainability, social responsibility, and a genuine care for the world. I particularly value the attention given to equity and justice: principles that are urgently needed in our institutions, especially considering the challenges of today's social and environmental climate. I also appreciate the use of simple yet evocative metaphors, such as the bookcase, which make complex ideas not only clearer but also more approachable. By making these pathways intelligible and relatable, the manifesto holds the potential to inspire a broader community to embrace transformation and actively participate in building an education system that is both inclusive and future-oriented.

Comments by

Paula Hueso Espinosa

Transforming Higher Education Today to Shape Education for the Future

Written by:

Juri Mets,
Erna Engelbrecht

Abstract

This manifesto advocates for a reimagining of educational design that prioritizes the needs of the present while fostering the adaptability required for tomorrow. It critiques traditional approaches like constructive alignment, which often prioritize rigid, narrowly defined learning outcomes, and proposes integrating innovative frameworks such as Chaos Theory, Complex Systems Thinking, and Futures Thinking to embrace uncertainty and complexity. To bridge the gap between academic preparation and real-world demands, the manifesto highlights the importance of fostering advanced decision-making skills through heuristic strategies, normative models, and bias awareness. Additionally, it underscores the need for curricula that emphasize complex, ill-structured problem-solving experiences, adaptive reasoning, and collaboration across disciplines. By incorporating scaffolding methods and real-world relevance, we can transform learning into an intellectually engaging experience. Finally, the integration of hybrid intelligence is presented as a pathway to prepare graduates for evolving workplace demands by augmenting human cognitive abilities. By embracing a pedagogy of the present, we prioritize educational design that addresses the immediate needs of learners and society, paving the way for a pedagogy of the future to emerge through the collective impact of our ongoing educational innovations.

Keywords: adaptive curriculum design; cognitive effort; ill-structured problem-solving; decision-making competencies

Introduction

With socio- and geopolitical challenges looming, various organizations are exploring how education can prepare students for a volatile and uncertain future (e.g. Kamp, 2016). These efforts often include skill-focused teaching methods, courses aimed at preparing students for anticipated work environments, and the drive for technology-enhanced education. However, instead of designing education for this uncertain future, Facer (2016) proposes a pedagogy of the present, emphasizing the richness of current opportunities over speculative future scenarios. This approach aligns with Poli's (2011) view of the future as a source of abundant possibilities to shape the present. By continually innovating education for what is needed in Industry and Society now, educational design for the future develops organically. In the light of this view, this manifesto presents a number of ideas on what is needed now for 'education of the future' to emerge.

Reconsider constructive alignment to embrace uncertainty

When course design is strongly grounded in the theory of constructive alignment (Biggs, n.d.; Biggs & Tang, 2011), curriculum design tends to be overly rigid with narrowly defined learning goals aimed at preparing students for predictable, well-defined jobs. On the one hand, constructive alignment offers a solid foundation for educational design by emphasizing the identification of clear learning goals and the development of content and assessments that are aligned with those goals.

On the other hand, while effective in stable contexts, such approaches fall short in equipping graduates with the skills to navigate today's challenges posed by technological disruption, climate change, and socio-political instability. Already, our graduates seem unprepared for the realities of Industry (OECD 2022). To ease the rigidness of traditional curriculum design approaches, we suggest a number of alternatives that can be explored further. Our suggestions are not new, but mostly absent from present practices.

> Approaches using Chaos Theory in Education (Davis et al., 2008; Akmansoy & Kartal, 2014; Hunter & Benson, 1997) to reflect the non-linear and dynamic nature of learning. Complex Systems Thinking for making sense of the interconnected world around us (Hyyppä et al., 2024) and Futures Thinking (Damhof et al., 2020; Kazemier et al., 2021) as methodologies for using collective intelligence to uncover assumptions and

discover new possibilities for innovation (Kazemier et al., 2020; UNESCO, 2020). Fuzzy Logic (e.g. Balkir et al., 2011; Popescu & PiStol, 2021), especially in disciplines that involve interpretation, ambiguity, and multiple perspectives, can provide a framework to handle uncertainty and gradations of truth. The Learning Sciences Framework (Tokuhama-Espinosa, 2019) integrates theory and empirical evidence and encourages iterative testing and refinement. Connectivism (Goldie, 2016; Bell, 2011; Downes, 2022) to describe educational design that integrates technology to facilitate networks, collaboration and interconnection. The Emergent Curriculum and Adaptive Learning design allows for flexible learning paths that adapt according to learners' needs (e.g. Hofman et al., 2020). Finally, Heutagogy (D'Souza, 2024) and Life-Long Learning (Davies & Longworth, 2014; Jakobi & Rusconi, 2009) influence learning design by emphasizing learner autonomy through self-directed learning.

By broadening the range of frameworks used for educational design, we can create curricula that are more dynamic, flexible and responsive to demands of an ever-changing world. Of course, including new paradigms for educational design would require a gradual change process supported by research and best practices.

Create motivating environments that provide deep intellectual engagement

The current approach to curriculum and instructional design in Higher Education (HE) often assumes that students either enjoy intellectually demanding activities or, at the very least, respond to them with emotional neutrality. On this basis, intellectual ability is frequently viewed as both a necessary and sufficient condition for successful learning. However, research summarized by David, Vassena, and Bijleveld (2024) indicates that "mental effort is inherently aversive" (David et al., 2024, p. 1). For this reason, educators need to be careful in how they select and design educational materials such as tasks, instructions and learning spaces.

Individuals are more likely to engage in "mentally effortful activities" when they "receive and enjoy the rewards associated with these activities" (David et al., 2024, p. 13). Consequently, developing research-based strategies is crucial. These strategies should prioritize rewards that align with the motivation to undertake and sustain effortful cognitive tasks.

Insights from research on the need for cognition, a trait reflecting an individual's tendency to engage in and enjoy thinking-intensive activities (Cacioppo & Petty, 1982), offers valuable insights into identifying such motivating rewards (e.g., Cacioppo et al., 1996; Gheza et al., 2023).

Effortful mental activities can also be supported through competition, social challenges, and tasks related to real world issues relevant to students. Additionally, scaffolding measures (interventions that provide structured support during learning) have been shown to enhance reasoning (e.g., Croskerry, 2003; Perkins et al., 2012). These approaches acknowledge the aversive nature of mental effort, and, instead of viewing it as a hurdle,use it as a catalyst for transforming education in an engaging experience.

Design curricula that provides complex, ill-structured problem-solving experience

Educational practices often emphasize solving well-structured, predictable problems, which differ significantly from the ill-structured, ambiguous challenges encountered in real-world contexts (Chin & Chia 2006; Daniels et al. 2007; Jonassen 2000; Palmer et al. 2000; Shin et al., 2003). Using well-structured problems with predefined solutions simplifies the development and management of learning activities and the assessment of students' performance. However, such practices fail to develop the problem-solving skills required to address dynamic, open-ended issues (Daniels et al. 2007). Consequently, this gap leaves graduates underprepared for the complex reality of their everyday and professional lives.

Research has shown that engineering students and graduates excel at solving predefined textbook problems but often struggle to apply their knowledge in uncertain and evolving contexts (Palmer et al. 2000, Johanssen et al. 2013). This disconnect underscores the need for curricula to incorporate "complex, ill-structured problem-solving experiences" (Jonassen 2000, p. 63) into which reflect the realities of real-world environments. Examples of such problems include tasks like identifying vulnerabilities in a simulated network to defend against cyberattacks or designing a game that balances technical constraints, player engagement, and storytelling.

To address this issue we need to reconsider the skills prioritized in problem-solving training. This can include adaptive reasoning, mathematical thinking, computational thinking, simulations and collaboration with students from other educational domains and organizations outside the university.

Bridge the competency gaps: enhancing decision-making and resourceful states for workplace readiness

The mismatch between the skills graduates possess and the demands of the labor market has become a pressing concern. Employers and economic organizations increasingly question whether graduates are equipped with the competencies required for the 21st-century workplace, particularly in problem-solving, and critical thinking (OECD 2022). This concern is often linked to employees' struggles with avoiding flawed decision-making and ineffective problem-solving (e.g. Dumitru et al. 2018; Penkauskienė et al., 2019).

Viewing problem-solving as a series of decisions highlights the critical role of decision-making in achieving effective solutions. Decision-making is often defined as the process of selecting the best course of action from available options. To systematically enhance decision-making, we propose three key pillars for consideration.

A widely accepted perspective associates advanced decision-making ability with the use of normative models, such as rules of logic or probability. However, most real life situations are highly complex and uncertain, and individuals, often constrained by limited time, knowledge, and cognitive resources, tend to rely on heuristics rather than normative tools (Cokely et al., 2018). Moreover, in certain conditions, heuristics can result in more accurate decisions than the application of normative models (Gigerenzer & Gaissmaier, 2011). Recognizing heuristics as a decision-making strategy, and understanding when and how it should be applied, forms the first pillar for improving decision-making.

The second pillar for improving decision-making is adopting a systematic approach to applying normative models (Baron, 2012). Developing strong skills in using normative criteria enables graduates to evaluate the quality of judgments and decisions more effectively. Mastering key normative models, such as mathematics, logic, and statistics, can be further enhanced by studying frameworks like game theory (Fudenberg & Tirole, 1991) and signal detection theory (Lynn et al., 2015), among others.

A third pillar of improving decision-making involves identifying and addressing potential biases and other influences, such as language-, social-, thought-, and belief-related factors. Understanding these influences can help develop systematic approaches to improve decision-making.

In addition to the three pillars directly supporting improved decision-making, cultivating a resourceful state in individuals can further enhance

their capacity to tackle complex tasks. Tasks involving non-repetitive processes, which Autor and Price (2013) highlight as increasingly important, require advanced interpersonal skills compared to repetitive tasks. For instance, the ability to quickly adapt to unfamiliar teams or social situations illustrates the growing demand for such skills. Furthermore, advanced training in communication, collaboration, and self-regulation can help students prepare for the dynamic challenges of the modern workplace. Finally, learning to use AI assistance in decision-making, also called 'hybrid intelligence' (Akata et al., 2020), offers a promising way to extend students' capabilities beyond human limitations.

Conclusion

Educational innovation must move beyond traditional, linear models of learning and assessment to prioritize deep intellectual engagement and complex problem-solving. A curriculum designed around ill-structured challenges and adaptive reasoning will better equip graduates to thrive in dynamic professional environments. At the same time, understanding the cognitive effort required for learning—and designing environments that make such effort rewarding—can transform education into a more meaningful and engaging experience.

The challenges of our time demand an education system that is both responsive to the present and facilitates continual innovation. Instead of fixating on prescriptive measures for how to design education for the future, we advocate for an educational paradigm that embraces complexity, uncertainty, and the richness of present opportunities.

References

Akata, Z., Balliet, D., De Rijke, M., Dignum, F., Dignum, V., Eiben, G., Fokkens, A., Grossi, D., Hindriks, K., Hoos, H., Hung, H., Jonker, C., Monz, C., Neerincx, M., Oliehoek, F., Prakken, H., Schlobach, S., Van Der Gaag, L., Van Harmelen, F., … Welling, M. (2020). A Research Agenda for Hybrid Intelligence: Augmenting Human Intellect With Collaborative, Adaptive, Responsible, and Explainable Artificial Intelligence. *Computer, 53*(8), 18–28. https://doi.org/10.1109/MC.2020.2996587

Akmansoy, V., & Kartal, S. (2014). Chaos Theory and its Application to Education: Mehmet Akif Ersoy University Case. *Educational Sciences: Theory & Practice.* https://doi.org/10.12738/estp.2014.2.1928

Autor, D., & Price, B. (2003). *The Changing Task Composition of the US Labor Market: An Update of Autor, Levy, and Murnane.* https://economics.mit.edu/sites/default/files/publications/the%20changing%20task%20comp%202013.pdf

Balkir, Z., Alniacika, U., & Apaydın, E. (2011). Fuzzy logic in legal education. *Turkish Online Journal of Distance Education, 12*, 60–69.

Baron, J. (2012). The point of normative models in judgment and decision making. *Frontiers in Psychology, 3.*https://doi.org/10.3389/fpsyg.2012.00577

Bell, F. (2011). Connectivism: Its Place in Theory-Informed Research and Innovation in Technolo-

gy-Enabled Learning. *International Review of Research in Open and Distributed Learning, 12*(3), 98–118. https://doi.org/10.19173/irrodl.v12i3.902

Biggs, J. (n.d.). Constructive alignment in university teaching. *HERDSA Review of Higher Education, 1.* Retrieved January 28, 2025, from https://www.tru.ca/__shared/assets/Constructive_Alignment36087.pdf

Biggs, J., & Tang, C. S. (with Society for Research into Higher Education). (2011). *Teaching for quality learning at university: What the student does* (4th edition). McGraw-Hill/Society for Research into Higher Education/Open University Press.

Cacioppo, J. T., & Petty, R. E. (1982). The Need for Cognition. *Journal of Personality and Social Psychology, 42*(1), 116–131. https://doi.org/10.1037/0022-3514.42.1.116

Cacioppo, J. T., Petty, R. E., Feinstein, J. A., & Jarvis, W. B. G. (1996). Dispositional Differences in Cognitive Motivation: The Life and Times of Individuals Varying in Need for Cognition. *Psychological Bulletin, 119*(2), 197.

Chin, C., & Chia, L.-G. (2006). Problem-Based Learning: Using Ill-Structured Problems in Biology Project Work. *Science Education, 90*(1), 44–67. https://doi.org/10.1002/sce.20097

Cokely, E. T., Feltz, A., Ghazal, S., Allan, J. N., Petrova, D., & Garcia-Retamero, R. (2018). Skilled Decision Theory: From Intelligence to Numeracy and Expertise. In K. A. Ericsson, R. R. Hoffman, A. Kozbelt, & A. M. Williams (Eds.), *The Cambridge Handbook of Expertise and Expert Performance* (2nd ed., pp. 476–505). Cambridge University Press. https://doi.org/10.1017/9781316480748.026

Croskerry, P. (2003). The Importance of Cognitive Errors in Diagnosis and Strategies to Minimize Them: *Academic Medicine, 78*(8), 775–780. https://doi.org/10.1097/00001888-200308000-00003

Damhof, L., Kazemier, E., Gulmans, J., Cremers, P., & Beenen, P. (2020). Anticipation for emergence: Defining, designing and refining futures literacy in higher education. In *Humanistic futures of learning: Perspectives from UNESCO Chairs and UNITWIN Networks* (pp. 168–171). UNESCO.

Daniels, M., Carbone, A., Hauer, A., & Moore, D. (2007). Panel-Ill-structured Problem Solving in Engineering Education. *2007 37th Annual Frontiers In Education Conference—Global Engineering: Knowledge Without Borders, Opportunities Without Passports*, F3F-1.

David, L., Vassena, E., & Bijleveld, E. (2024). The Unpleasantness of Thinking: A Meta-Analytic Review of the Association between Mental Effort and Negative Affect. *Psychological Bulletin.* https://doi.org/10.1037/bul0000443

Davies, W. K., & Longworth, N. (2014). *Lifelong Learning.* Taylor and Francis.

Davis, E. J., Smith, T. J., & Leflore, D. (2008). *Chaos in the classroom: A new theory of teaching and learning.* Carolina Academic Press.

Downes, S. (2022). Connectivism. *Asian Journal of Distance Education, 17*(1). https://files.eric.ed.gov/fulltext/EJ1350294.pdf

D'Souza, R. (2024). Understanding Heutagogy: A New "Gogy." *Journal of Research Initiatives, 8*(4).

Dumitru, D., Bigu, D., Elen, J., Jiang, L., Railienė, A., Penkauskiene, D., Papathanasiou, I., Tsaras, K., Fradelos, E., Ahern, A., McNally, C., O'Sullivan, J., Verburgh, A., Jarosova, E., Lorencová, H., Poce, A., Agrusti, F., Re, M., Puig, B., & Palaigeorgiou, G. (2018). *A European Collection of the Critical Thinking Skills and Dispositions Needed in Different Professional Fields for the 21st Century.* [Technical Report].

Facer, K. (2016). Using the Future in Education: Creating Space for Openness, Hope and Novelty. In H. E. Lees & N. Noddings (Eds.), *The Palgrave International Handbook of Alternative Education* (pp. 63–78). Palgrave Macmillan UK. https://doi.org/10.1057/978-1-137-41291-1_5

Fudenberg, D., & Tirole, J. (1991). *Game theory.* MIT Press.

Gheza, D., Kool, W., & Pourtois, G. (2023). Need for Cognition Moderates the Relief of Avoiding Cognitive Effort. *PLOS ONE, 18*(11), e0287954. https://doi.org/10.1371/journal.pone.0287954

Gigerenzer, G., & Gaissmaier, W. (2011). Heuristic Decision Making. *Annual Review of Psychology, 62*(1), 451–482. https://doi.org/10.1146/annurev-psych-120709-145346

Goldie, J. G. S. (2016). Connectivism: A knowledge learning theory for the digital age? *Medical Teacher, 38*(10), 1064–1069. https://doi.org/10.3109/0142159X.2016.1173661

Hofman, A., Brinkhuis, M., Bolsinova, M., Klaiber, J., Maris, G., & Van Der Maas, H. (2020). Tracking with (Un)Certainty. *Journal of Intelligence, 8*(1), 10. https://doi.org/10.3390/jintelligence8010010

Hunter, W. J., & Benson, G. D. (1997). Arrows in time: The misapplication of chaos theory education. *Journal of Curriculum Studies, 29*(1), 87–100. https://doi.org/10.1080/002202797184215

Hyyppä, I., Rasa, T., & Laherto, A. (2024). Fostering students' systems thinking through futures education. *Frontline Learning Research, 12*(2), 27–50. https://doi.org/10.14786/flr.v12i2.1301

Jakobi, A. P., & Rusconi, A. (2009). Lifelong Learning in the Bologna Process: European Developments in Higher Education. *Compare: A Journal of Comparative and International Education, 39*(1), 51–65.

Jonassen, D. H. (2000). Toward a Design Theory of Problem Solving. *Educational Technology Research and Development, 48*(4), 63–85. https://doi.org/10.1007/BF02300500

Jonassen, D., Strobel, J., & Lee, C. B. (2006). Everyday Problem Solving in Engineering: Lessons for Engineering Educators. *Journal of Engineering Education, 95*(2), 139–151. https://doi.org/10.1002/j.2168-9830.2006.tb00885.x

Kamp, A. (2016). *Engineering education in the rapidly changing world: Rethinking the vision for higher engineering education.* TU Delft, Faculty of Aerospace Engineering.

Kazemier, E. M., Damhof, L., Gulmans, J., & Cremers, P. H. M. (2021). Mastering futures literacy in higher education: An evaluation of learning outcomes and instructional design of a faculty development program. *Futures, 132*, 102814. https://doi.org/10.1016/j.futures.2021.102814

Lynn, S. K., Wormwood, J. B., Barrett, L. F., & Quigley, K. S. (2015). Decision making from economic and signal detection perspectives: Development of an integrated framework. *Frontiers in Psychology, 6*.https://doi.org/10.3389/fpsyg.2015.00952

OECD. (2022). *Does Higher Education Teach Students to Think Critically?* (D. Van Damme & D. Zahner, Eds.). OECD. https://doi.org/10.1787/cc9fa6aa-en

Palmer, B., Marra, R. M., Wise, J. C., & Litzinger, T. A. (2000). A Longitudinal Study of Intellectual Development of Engineering Students: What Really Counts in Our Curriculum? *30th Annual Frontiers in Education Conference...* 2, S3A-2.

Penkauskienė, D., Railienė, A., & Cruz, G. (2019). How Is Critical Thinking Valued by the Labour Market? Employer Perspectives from Different European Countries. *Studies in Higher Education, 44*(5), 804–815. https://doi.org/10.1080/03075079.2019.1586323

Perkins, D. N., Farady, M., & Bushey, B. (2012). Everyday Reasoning and the Roots of Intelligence. In J. F. Voss, D. N. Perkins & J. W. Segal (Eds.), *Informal Reasoning and Education* (pp. 83–106). Routledge.

Poli, R. (2010). Steps Toward an Explicit Ontology of the Future. *Journal of Futures Studies, 16.*

Popescu, V. F., & PiStol, M. S. (2021). Fuzzy logic expert system for evaluating the activity of university teachers. *International Journal of Assessment Tools in Education, 8*(4), 991–1008. https://doi.org/10.21449/ijate.1025690

Shin, N., Jonassen, D. H., & McGee, S. (2003). Predictors of Well-structured and Ill-structured Problem Solving in an Astronomy Simulation. *Journal of Research in Science Teaching, 40*(1), 6–33. https://doi.org/10.1002/tea.10058

Tokuhama-Espinosa, T. (2019). The Learning Sciences Framework in Educational Leadership. *Frontiers in Education, 4*, 136. https://doi.org/10.3389/feduc.2019.00136

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Juri Mets is a Junior Research Fellow at Tallinn University, specializing in methods to develop and enhance reasoning skills. With degrees in Law and Economics and over 23 years of private sector experience as a lawyer, consultant, and corporate legal counsel, Juri leverages extensive professional expertise in academic pursuits. Juri's research interests include methods for measuring and improving reasoning abilities, designing educational games for reasoning training, and studying the impact of digital persuasion technologies on people's beliefs.

Erna Engelbrecht is a 4TU.CEE PhD candidate and Learning Developer at TU Delft. With a background in Language Studies and Computer-Integrated Education, she has worked as a Learning Developer in both the private sector and higher education. She is currently part of the Educational Innovation team at Teaching and Learning Services at TU Delft, and her PhD research focuses on developing a framework for evaluating educational innovations.

Acknowledgements

We would like to acknowledge Aitana Bilinski from the Delft University of Technology for her conceptual contribution to this paper.

Comments by authors

on the process of writing this manifesto:

We have been talking about the points we made in our manifesto for a while now, and were looking for a way to implement or share our ideas. The timing of the call for this manifesto was perfect! The process went fairly smoothly for the most part, especially because we were motivated due to our high interest in the topics of discussion. Of course, with this being a personal interest project, it did become difficult to manage with our regular responsibilities at work. Moreover, we are still in need of the time and space to fully investigate and develop the ideas presented in the manifesto. However, we are glad to have been part of this, because it provides a starting point for possible initiatives in the future.

on the received comments:

We received some very good comments and interesting insights. One key aspect where our points of view differed considerably from that of the commentators is that we work in completely different fields, and the education systems which we are (and have been) exposed to differ from theirs like night and day. Because of the differences in our contexts, perspectives and experiences, we decided not to adjust the content of the manifesto, but would instead like to continue the discussion if the opportunity presents itself. One thing we agreed on is that we need more guidelines for implementing educational change, for example, using AI and transitioning to transdisciplinary education. All in all, reflecting on the comments sparked further discussions between ourselves, which shows that this was a valuable learning experience.

This manifesto inspires me to reflect on both my past education and my current experience managing the complexity of writing a scientific master's thesis. It holds particular meaning to me because my educational journey was unconventional—both of my parents are non-academics, and I began with an apprenticeship. Over the past 15 years, I've gained diverse experiences that have made me more aware of the practice-theory gap, even though my field of training was different at the start. I believe it is important to challenge outdated teaching approaches, and I see many of these methods already being applied in the Urbanism Master Track at TU Delft. Additionally, there might be a great potential in translating this manifesto into multiple languages to reach teaching staff in countries where education is even more linear than in prestigious Universities like TU Delft. In my view, budget constraints (which impact the time capacity of teachers) also play a significant role in how teaching is organised at less privileged institutions. The impact could be that, even with small methods and tools, the learning environment can be enhanced without the need to completely overhaul an entire curriculum. It might be interesting to suggest improvements for pilot courses that are taught in a similar way across Europe (or the world) to show that change doesn't necessarily require a full structural redesign. This is my personal and simplified view, and I understand that in practice, implementing such changes may be more complex.

Comments by

Jakob Pesendorfer

Change to Care

Transforming our Dducation and Focus on Students' Identity Development

Written by:

Steven Flipse,
Iklim Akay,
Marian Bosch-Rekveldt,
Paul Chan,
Wenyi Chu,
Thomas Geydan,
Éva Kalmár,
Hanno van Keulen,
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Martijn Leijten,
Jorge Martinez Castaneda,
Lisanne Roseboom

Abstract

At TU Delft, we are not just educating engineers; we are shaping the future of engineering and engineering education. We are empowering our students to become the kind of leaders who can navigate complexity, embrace change, and build a better world, also under VUCA conditions. In this manifesto, we develop a line of reasoning to rethink our education, moving away from 'professional problem solvers' to 'individuals who care for our collective future from an engineering background.' We believe that TU Delft has a unique opportunity to lead the way in reimagining engineering education for the VUCA world. By embracing the principles outlined in this manifesto, we can empower our students to become the future-proof engineers that our society needs. We invite all members of the TU Delft community – faculty, students, and staff – to join us on this exciting journey.

Keywords: Care, engineering education

Introduction

Imagine a world where artificial intelligence outpaces human decision-making, where rising sea levels threaten coastal cities, and where energy demands push our planet to the brink. The challenges we face are unprecedented: technological revolutions, global interconnectedness, social upheavals, and the urgent need to address climate change and biodiversity loss. We live in a VUCA world – volatile, uncertain, complex, and ambiguous – and it demands a new breed of engineer. As Barabási (2011) noted, "an increasing number of the big questions of contemporary science are rooted in the same problem: we hit the limits of reductionism." A technical solution focusing on a single aspect of the problem will not lead to sustainable change. To thrive in our future environment, engineers need more than just technical chops: they must be proactive, adaptable, resilient, responsible, entrepreneurial, and aware of the impact their work has on society and the planet.

At TU Delft, we are not just educating engineers; we are shaping the future of engineering and engineering education. We are empowering our students to become the kind of leaders who can navigate complexity, embrace change, and build a better world, also under VUCA conditions. In this manifesto, we develop a line of reasoning to rethink our education, moving away from 'professional problem solvers' to 'individuals who care for our collective future from an engineering background.'

Changing perspectives from 'concern' to 'care'

TU Delft has a proud legacy of engineering excellence. Our graduates are known for their problem-solving skills and technical expertise. But the problems they are facing are becoming increasingly complex, not just from an engineering perspective, but particularly also from a socio-political perspective. The origins of problems are socially debated, and the solution spaces are highly politicized. In a VUCA world, engineers need to be able to:

- Make critical decisions in the face of uncertainty and constant change
- Be sensitive to both new technologies and other ways of thinking
- Embracing lifelong learning as a necessity to adapt to constant societal change
- Collaborate effectively with people from diverse backgrounds

- Understand the impact of their work on society and the environment
- Develop solutions that benefit humanity and the planet

In an earlier essay in 2004, Bruno Latour (a French philosopher, sociologist, and anthropologist of the 'scientific process') discusses that 'matters of fact' contrast with what he calls 'matters of concern,' offering a nuanced perspective on scientific inquiry and knowledge production.

Matters of fact are understood as discrete, objective, and self-evident truths that can be observed and verified independently of social or cultural context. Matters of concern, by contrast, focus on the broader web of relationships, controversies, and contexts that give rise to facts. They emphasize the dynamic, contested, and situated nature of knowledge. We have acknowledged this also within the TU Delft and, of course, observe problem-based learning, challenge-based learning, design education, and inter- and transdisciplinary pedagogies being used in our educational approaches to familiarize students with these dynamics and social complexity.

But we would advocate to go one step deeper and change the way in which we teach our students to embrace this VUCA world. Not as matters of concern but as 'matters of care.' We follow Maria Puig de la Bellacasa (2017), a philosopher who built on Bruno Latour's concept of matters of concern by introducing a more explicitly ethical and affective dimension. Her work highlights the importance of care (NB, not healthcare, but care in the broadest possible sense) as a way to rethink how we relate to the world and the issues that matter to us.

This shift emphasizes not only recognizing connections and relationships but also taking responsibility for and nurturing those relationships. Furthermore, by calling into question the networks of relationships that condition or constrain our human understanding, we shift away from 'how engineering can contribute to social problem solving,' towards 'how we can respond to and engage with the world in ways that involve care, maintenance, and repair' in the reordering of things (cf. Foucault, 2003) especially in contexts of ecological and social crises. So, not 'care about,' but 'care with' our collective future. And this paradigm shift requires us to also transform the way in which we teach our future engineers, and the starting points from which we do that.

Empowering Students as Agents of Change through Identity Development

From this perspective, we believe that education is not just about acquiring knowledge and skills; it is also about developing a strong sense of self. If we truly move from concern to care, students must find reasons for themselves to want to care for their future rather than just knowing what they could do to care for their future. From this perspective, we cannot just focus on knowledge and skills as part of academic competencies coming from whatever disciplinary, interdisciplinary, or transdisciplinary background. We suggest following Gert Biesta, who identified three key purposes of education: qualification, socialization, and subjectification. Next to qualification, which involves equipping learners with knowledge, competencies and practical skills for societal roles, such as employment, we should also focus on socialization, which focuses on integrating learners into social structures by discussing cultural norms, values and traditions of the university and the larger social environment, and subjectification, which should gain priority in our education systems, emphasizing personal autonomy and critical thinking, helping learners to develop their identity and engage with the world meaningfully.

We believe that subjectification has been largely neglected in our engineering education. An overemphasis on qualification has overshadowed the development of individuality, or at least our potential contribution to or responsibility for students' identity development during their time at our institution. Critical pedagogue Paulo Freire (2005:73) theorizes that 'the more students work at storing the deposits entrusted to them, the less they develop the critical consciousness which would result from their intervention in the world as transformers of that world.' Following his ideas, we are advocating for fostering critical consciousness in our students, help them discover their personal values and aspirations with their engineering pursuits, and inspire them to actively 'care' for and positively impact their environment.

Anticipating and Integrating Future Engineering Competencies

For students to care and to develop their identity, we, teachers, need to stay ahead by co-producing future-oriented engineering competencies into our curricula. And such competency requirements may also develop over time and are not carved in stone. For us, this means that we need to put emphasis on designing agile degree programs that can:

- Identify and integrate future engineering competencies, e.g. by collaborating with societal partners to determine the competencies that will be in demand such as systems thinking, effective communication, digital literacy, computational thinking, negotiation, and persuasion.
- Be modular and flexible, allowing for swift integration of new competencies. Electives and minors in emerging fields like ethics and governance in technology, sustainable energy, AI, and innovation and entrepreneurship to enable students to tailor their education.
- Foster transdisciplinarity and interdisciplinarity, to promote a systems engineering approach to challenges by integrating insights from various fields, including social sciences, business, and humanities. This approach prepares students to address complex, real-world problems.
- Stimulate critical awareness in students, by taking on a dialogue approach in teaching. By fostering dialogue between students and teachers, these interactions encourage the sharing of insights, the challenging of assumptions, and the development of a deeper understanding of the subject matter. The teacher and students become jointly responsible for a process in which they all grow, mediated by constructs or real-world events (Freire, 2005:80). To support this process, students could maintain a portfolio of their work to document their learning journey and reflect on their progress.

By embracing these principles, TU Delft aims to prepare engineers who are technically proficient, responsible, and capable of navigating the VUCA world, respecting and advocating societal stakeholders' viewpoints and interests and able to tackle problems from the systems' perspective. In that world, they learn to make informed decisions, and contribute positively to the care of our society and the environment from their own, individual, moral frameworks, whichever form that may take.

From problem solvers to individuals who care for our future

We believe in the transformative power of learner agency, envisioning a world where students actively shape their own educational journeys. University education, for us, is not merely about the ability to absorb knowledge but about cultivating the "knowing will" – the capacity to apply knowledge meaningfully to make a real difference in the world.

Achieving this vision requires a fundamental shift from a teacher-centric model to a student-centric approach. In this framework, students are empowered to take ownership of their education and develop a strong sense of self, becoming active participants rather than passive recipients in their learning process. This is also in line with our steps towards more inclusive education. Students are important agents to map their levels of competencies and in figuring out what knowledge and competencies they need to become a professional with certain values, knowledge, and skillset, and create their own learning trajectories. To bring this vision to life, we will take several steps.

First, we aim to give students greater choice and control over what they learn and how they learn it, fostering an environment of autonomy and personal responsibility and supporting diversity.

Second, we will create a learning environment that actively encourages exploration, experimentation, and a willingness to take risks, recognizing that innovation often arises from trying, failing, and trying again. Third, we will emphasize self-directed learning, enabling students to pursue their unique interests and passions while staying engaged and motivated.

In addition to this, we will transition our focus from traditional, close-ended problems to open- ended projects that challenge students to think creatively, critically, and collaboratively. This approach equips learners with the tools to tackle real-world complexities while fostering teamwork and adaptability. This also means, moving away from just the 'problem solving' approach that we have so intensely adopted within our institution, and move more towards a more realistic perspective where problems are not merely societal 'speedbumps' for which engineers design and develop coping tactics.

Through open-ended challenge-based learning, students are encouraged to reflect deeply on the societal impact of their engineering solutions, understanding also better the ethical and communal dimensions of their work. By embracing these strategies, we aim to nurture empowered learners who are not only equipped with knowledge but also motivated to apply it for meaningful and lasting change in the world.

Evolving Educators for a Caring Future

The transformative vision we have outlined, shifting from 'problem solvers' to 'individuals who care for our collective future,' demands a parallel evolution in our educators. They are no longer solely knowledge disseminators, they must become architects of transformative learning experiences. This necessitates a pedagogical shift, embracing active learning facilitation, innovative digital and hybrid methods, and

assessment designs that truly gauge complex competencies. Crucially, educators must cultivate strong mentoring and coaching abilities, fostering student identity development through reflective practices and culturally intelligent, inclusive pedagogies. To model lifelong learning and navigate the complexities of a VUCA world, continuous professional growth is paramount, including AI and digital literacy, and the capacity for interdisciplinary collaboration. Moreover, educators must embody leadership, facilitating team dynamics, managing change, and engaging stakeholders to cultivate a learning environment where the principles of care and responsibility are not merely taught, but lived.

Conclusion

We believe that TU Delft has a unique opportunity to lead the way in reimagining engineering education for the VUCA world. By embracing the principles outlined in this manifesto, we can empower our students to become the future-proof engineers that our society needs. We invite all members of the TU Delft community – faculty, students, and staff – to join us on this exciting journey.

Acknowledgements

Large Language Models were utilized in certain sections of the text for editing or drafting narrative or argumentative sections that were then carefully checked, reviewed, and/or modified by authors for accuracy and alignment.

References

Barabási, A.-L. (2011). The network takeover. *Nature Physics, 8*(1), 14–16. https://doi.org/10.1038/nphys2188

Brakels, J., van der Meulen, S., Andernach, T., Thomas, N., & Penny, G. (2024). *Vision on education*. TU Delft.

Foucault, M. (2003). *The order of things: An archaeology of the human sciences*. Routledge.

Freire, P. (2005). *Pedagogy of the oppressed* (M. B. Ramos, Trans.; 30th anniversary ed.). The Continuum International Publishing Group. (Original work published 1970)

Latour, B. (2004). Why has critique run out of steam? From matters of fact to matters of concern. *Critical Inquiry, 30*, 225–248.

Puig de la Bellacasa, M. (2027). *Matters of care: Speculative ethics in more than human worlds*. University of Minnesota Press.

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Thomas Geydan
Drawing on a science background and international education, Thomas Geydan is an educational developer and coach at Delft University of Technology. He specializes in coaching, curriculum design, and bridging academic learning with essential professional skills. Thomas creates innovative educational solutions that empower students and educators, preparing future STEM professionals to thrive in a dynamic world by fostering technical excellence and personal growth to meet evolving economic, social, and environmental challenges.

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Wenyi Chu is a PhD candidate at Delft University of Technology, researching future engineering skills, with particular attention to transdisciplinary collaboration and emotional competencies. With a background in GIS engineering and educational sciences, Wenyi draws on both industry and academic experience. Prior to starting the PhD, she worked in the Dutch semiconductor sector. Her research is shaped by an interest in how technical education can better prepare students for complex social and professional environments. Wenyi is also engaged in conversations around inclusion and is interested in how different ways of thinking and being can contribute to more process-oriented and intuitive engineering practices.

Hanno van Keulen is an Associate Professor of Science & Engineering Education at the faculty of Applied Sciences, and Director of Studies of the MSc Science Education & Communication, which is also the certificate program for teaching STEM subjects in secondary schools. Hanno's research and educational development projects are on the boundaries of STEM education with literacy, art, and diversity-equity-inclusion, ranging from pre-Kindergarten to the PhD. He received his PhD from Utrecht University on 'Making sense – Simulating research in organic chemistry education'. He is editor-in-chief of the European Journal of STEM Education.

Martijn Leijten is an assistant professor of Organisation and Governance at the faculty of Technology, Policy and Management of Delft University of Technology. He manages and teaches courses on project management, process management and leadership and strategic management and is a member of the Board of Studies of the interfaculty Master's programme Construction Management and Engineering. His research focuses on the management of major complex transitions in infrastructures. He is also involved in educational programmes for practitioners.

Iklim Akay is a systems engineering educator at Space Systems Engineering and coordinator of the Collaborative Design Lab at the Faculty of Aerospace Engineering. While her work in space physics may seem far from systems engineering, it is all about managing uncertainty, whether in space, design, or navigating stakeholder needs in satellite instrumentation. As a core contributor to the NxTGEN project, she helps shape the Dutch Approach to Systems Engineering for the high-tech industry. Deeply engaged in educational innovation through the IDEE community, she envisions engineering education as a living system, thus with systems thinking, through collaboration, and for the (space systems) engineers of tomorrow.

Lisanne Roseboom
As Project Manager of the TU Delft Teaching Academy's Initiative on Innovation in Delft Engineering Education (IDEE), Lisanne Roseboom facilitates a space for educational innovation by organising transdisciplinary collaboration and supporting the project teams working on five institution-wide educational challenges. She has a background in critical pedagogy and youth care, and therefore focuses in her work on process management, systemic work in organisations, shared decision making and co-creation of knowledge and solutions with different stakeholders. Alongside IDEE, Lisanne co-initiated SPiCE, a group of students that integrate student perspectives into educational innovation at TU Delft.

Dr. Eva Kalmar is Assistant Professor at TU Delft, at the Industrial Design Engineering Faculty. She is investigating the dynamics of transdisciplinary collaborations in the context of mission-driven innovation and technology development.
By combining sociology and communication theories with the fields

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Dr. Jorge Martinez is an Assistant Professor with focus on Education at the Multimedia Computing Group of the Intelligent Systems department of EEMCS faculty in TU Delft. He conducts research on acoustic, audio, speech signal and language processing. He conducts evidence-based, and evidence informed innovation in education, pursuing an education vision that could be described as “emphatic and inclusive scientific education”. A vision that incorporates ways to getting to know and understand better our societal context and ourselves, our students and each other, to give students the long-lasting skills and values they need to cope with the challenges of modern society.

Paul Chan is Professor of Design and Construction Management at Delft University of Technology. He has developed a track record of studying how people cope with organisational, social and technological change in addressing societal and sustainability transitions. He is currently leading research projects on transdisciplinary collaboration in sustainable urban environments. He was Editor-in-Chief of Construction Management and Economics, and Past Chair of the Association of Researchers in Construction Management. He has also written on masculinities and sexualities in the construction industry, and is co-author of Constructing Futures (2010), a Wiley-Blackwell book on leadership and futures thinking in the construction industry.

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Comments by authors

on the process of writing this manifesto:

It was a collective effort of the TU Delft Innovation in Delft Engineering Education team on Future Engineering Skills. We enjoyed the process very much.

on the received comments:

We are very grateful for the feedback we received. The input is very much appreciated.

The topic is relevant in relation to current scenarios. Having this thought of transforming the education focus towards more societal and communal dimension would produce sensible engineers/humans for the future.

Comments by

Ganesh Umkansar

Facilitating safe and reflective environments to approach, analyse, and act upon diversity in (engineering) education

Written by:

Juliette Cortes-Arevalo,
Camilo Benitez-Avila

Abstract

The global shift against diversity underscores universities' vital role in embracing diversity beyond mere representation. A key challenge is recognizing diversity beyond cross-cultural boundaries of, for example, gender, ethnicity or nationality. We suggest universities to foster an intercultural approach that recognizes the co-existence of multiple forms of difference and the agency of continuously shaping one's identity. By fostering the development of a diversity competence throughout and beyond the curriculum, we envision universities not only as places for learning how to make projects or innovations on time, on budget, and with functional quality. Universities are also places for reflecting on which type of society these projects contribute to and what role one plays. Do we want a society and engineers that build bridges between people or set walls between them? Overlooking diversity in the engineering practice can lead to growing pressures overtime within and between diverse groups. We write this manifesto from our teaching experience about intercultural relations. First, we outline the impact of ignoring diversity on sustainable development. Then, we discuss diversity in theory and how our technical university embraces it. Finally, we reflect on the students' perspectives on our attempts to shift from managing diversity to developing competencies. We call for each course and project where teamwork occurs to facilitate a safe and reflective environment to approach, analyse, and act upon diversity at three levels: at the professional level, by recognizing how (technical) work involves both making and caring; at the project level, by navigating biases and teamwork challenges; and at the societal level, by recognizing the project's (unintended) impact and role.

Keywords: Inter-cultural, teamwork, project-based education, life-long learning

A relevance that was taken for granted

Despite shifts in engineering education toward cultural diversity, global events reveal resistance from leaders and society. In 2024, worldwide politics saw a clear shift to the right, with voters expressing “some feeling that migratory flows contribute to keeping wages too low.” (Euronews, 2024). President Trump was elected, vowing to build a U.S.-Mexico border wall and rollback diversity initiatives in the world’s largest economy (BBC, 2025). Tech leaders like Elon Musk and Mark Zuckerberg advocate similar policies in engineering workplaces (Breck Dumas, 2025). Meanwhile, the ruling coalition in the Netherlands imposed budgetary restrictions on higher education and purposively reduced the share of international students in universities (Persbureau, 2024). Current events and facts show a global shift against diversity and contrast with the relevance given so far from the social justice and sustainable development’s perspective.

A common call to deal with societal challenges like climate change, inequality, and environmental degradation is about integrating sustainable development principles into all education (Žalėnienė & Pereira, 2021). The call to educate (future) professionals capable of transforming society and looking for social justice is an ambition that flourished with the worldwide commitment to sustainable development goals. Such a call gained force in the era of internationalization of higher education, supporting the mobility of students (Horn et al., 2022). As societal challenges are more complex and universities become more international, it is clear that (future) professionals should develop competencies in their field, meet global needs, and work with others from diverse backgrounds (Brundiers et al., 2021). However, building a sustainable, equitable future requires changing practices, shifting power, and fostering cross- boundary collaboration between cultures, disciplines, societal stakeholders, and policy sectors (Gordon et al., 2019). In addressing the call, educational institutions have faced several contradictions, such as tradition vs. innovation, single vs. together, inside vs. outside, and comprehensive vs. pragmatic (Daneshpour & Kwegyir-Afful, 2022). The remaining challenges for improving sustainability education are high. For example, fostering global citizenship and shared responsibility is essential to inspire voluntary and collective action (Guillén-Yparrea & Ramírez- Montoya, 2023). On top of that, universities should now justify the relevance of diversity competencies in their education.

What does the theory say about diversity?

Despite the recent attention to working and collaborating in diverse cultural settings in education, business, and government, among others, efforts to train diversity date to the 1930s (Sabet & Chapman, 2023). Initially, there was no distinction between cross, multi, and inter- cultural terms. However, the emphasis was mainly on a cross-cultural view by comparing cultural groups. As such, by reducing identity to a single social group, one takes an ethnocentric or mono-cultural perspective. Yet, we all begin by viewing other cultures as "us" versus "them" while (unconsciously) denying, defending, or minimizing differences. A multi-cultural or ethnorelative perspective emerges when one starts to accept, adapt to, and integrate aspects of one's and others' cultures (Bennett, 1986). Multi-cultural competence is about interacting effectively and appropriately with those different from us. However, "effective and appropriate" reflects the outsider's perspective rather than mutual understanding.

Emphasis then moved on to understanding differences and the appropriateness and effectiveness of interactions between people. Intercultural competencies are about "improving human interactions across difference, whether within a society (difference due to age, gender, religion, socio-economic status, political affiliation, ethnicity, and so on) or across borders." (Deardorff, 2006, p. 70). After all, communication misunderstandings "often stem not from culture but from limited awareness of each other's share in the communication, social context, or individual traits, biological or psychological" (Hoffman & Verdooren, 2018, p. 26). Yet, the desired outcomes of social interactions (cultural or not) should distinguish the personal or "inner" outcomes for adequacy and effectiveness from the inter/intra personal or "outer" ones (Deardorff, 2009, p. 33).

Finally, for reflecting on any interpersonal interaction cultural or not, Griffith et al. (2016) further suggested to critically reflect about diversity differences in three stages: approach, analyse, and act. Veine (2020), added the test it out stage. Hence, approaching is about reflecting with a positive attitude toward differences. Analysing involves the unbiased acceptance, assessment, and integration of these differences. Acting translates thought into action while maintaining control in challenging situations. Testing it out is about using and applying the learning in other situations to start a new learning cycle. Then, diversity competence is about transforming an experience with an unfamiliar difference into a familiar one to which one knows how to react, enabling shared interaction goals with an adequate, effective yet ethical attitude (Hoffman & Verdooren, 2018). A reflective approach to diversity also requires sharing the desired individual and shared outcomes in a relationship, checking and revisiting regularly to align each other's expectations (Lantz-Deaton & Golubeva, 2020).

As such, working towards sustainability development goals are not only about the ability to collaborate in diverse teams. Inner development recognises the need to reflect, be responsible, empathetic, care, and respect for oneself and others (Wickson et al., 2025). Diversity recognizes the co-existence of multiple forms of difference, the agency of continuously shaping one's identity, and the intentional journey of embracing diversity. Overall, culture is a dynamic and rich concept. It (Hoffman & Verdooren, 2018, p. 24):

- Reflects the complex habits of our various social groups, not a one-time phenomenon.
- Encompasses group characteristics, not limited to the individual.
- Is learned through personal experiences and historical developments, not biological.

Hoffman & Verdooren (2018) further point out that people—not cultures—interact. While cultural habits or group memberships may not always be a choice, cultural habits can be adapted, ignored, or expanded. Culture shapes how we interpret others (model of reality) and act (model for reality). In alignment with the UNESCO conceptual and operational framework (Leeds- Hurwitz, 2013), a diversity competence is rooted on the individual practice of valuing diverse worldviews and identities (Figure 1). Even small actions can help build a more just world. As such, diversity

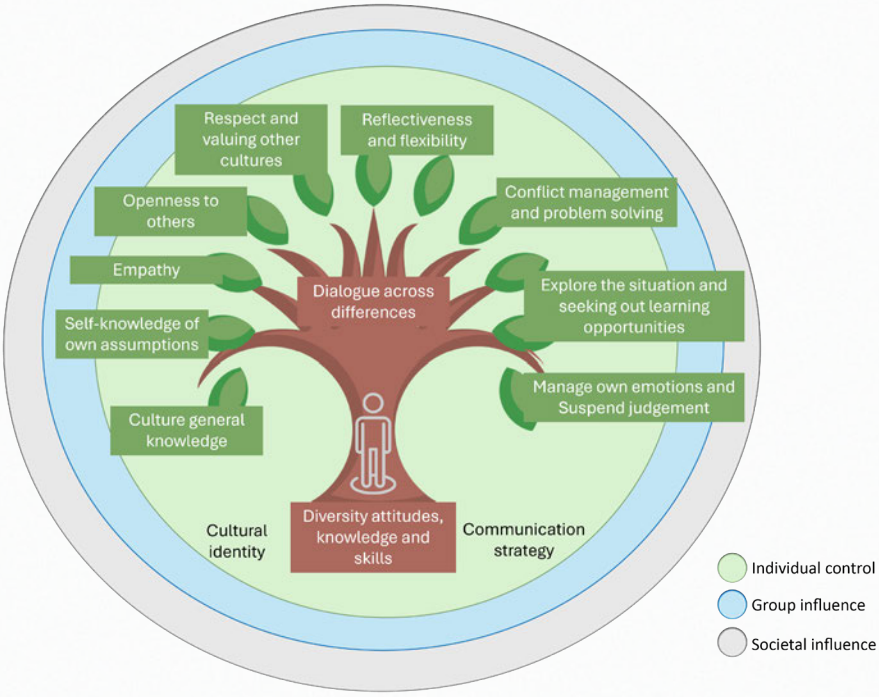


Figure 1: Key attitudes, knowledge, and skills to build a diversity competence starting from the individual circle of influence. Image created by the authors based on the concepts presented by Deardorff (2020) and the circles of influence by Medhora (2020). The use of a tree was inspired by Leeds-Hurwitz (2013). Tree icon from Freepik.

celebrates uniqueness while recognizing common needs like dignity, safety, and autonomy. It further encourages reflection on power dynamics and ethical questions about justice, collective action, and mutual respect. Diversity fosters solidarity through shared experiences and respect and helps to explore and adjust behaviours, meanings, judgments, and core values individually and collectively (Escobar, 2017; Hoffman & Verdooren, 2018).

So far, organizational policies have prioritized equity, diversity, and inclusion, promoting inclusive leadership and social cohesion. However, diversity ambitions are often oversimplified into the increasing representation or are promoted with functional objectives such as a business case, an organizational or revindication strategy for improving productivity and reputation and supporting otherwise marginalized groups (Holck et al., 2016). Fostering diversity goes beyond the business case. Diversity safe environments are a safe physical, social, and psychological space for interaction. However, spaces in university and industry, among other organizational contexts, often become toxic (Clegg et al., 2023) or unsafe without intervention (TUDelft, 2025). As referred on some LinkedIn discussions, the TUDelft university has arguably improved diversity indicators (Chorus, 2025). Despite the university budget cuts which may imply otherwise, the discussion further pointed out that diversity is about prioritizing people over profit, collaboration over competition, nurturing over self-praise, and a thriving environment over mere survival (Fakhredin, 2025). Goh et al, (2022) define thriving environments as spaces where the members feel energised, learning and moving on a development direction.

Meanwhile, the TU Delft introduced diversity and social safety guidelines, with the Teaching Academy offering reflective guidance across six dimensions (Hermsen et al., 2022). The guidelines emphasize action and growth, focusing on society, product, process, interactions, learning, and self. Collecting insights from using these guidelines and embedding reflection and diversity competencies at the curriculum level and in all project-based courses is still necessary (Gregersen-Hermans, 2017). After all, challenges in intercultural teams mirror those in project- based education, including language barriers, exclusion, teamwork skills, and stakeholder relations (Jiang et al., 2023).

What have we tried and learned from teaching?

We wrote this manifesto building on the experience of teaching a course on intercultural relations and diversity competence in a first-year master's course at this university. We started coordinating the course two years ago when we joined as lecturers. We partner to bring our different but complementary expertise working on integrated and participatory management. Key characteristics of the course included:

- **An already intercultural view, now closer to professional practice.** Following the guiding book (Hoffman & Verdooren, 2018), students were asked to analyse a communication challenge in a personal cross-cultural relation of their choice. To do so, they reflected on each other's language, way of thinking, intention, organizational context, and view of each other. We turned a solo essay into a group reflection essay with two cases. Students reflect on a communication challenge on a reference engineering case. Then, they select among teamwork communication challenges in their student's life one to analyse.
- **Serious games as safe environments.** The course used a game to help students experience cultural differences by simulating interactions between two archetypes cultures. We introduced a game designed to illustrate that interpersonal communications are not limited to cross-cultural differences in our professional practice but lead to differences from the communication or the context.
- **Bringing theory into reflections about practice with effort in providing feedback.** The course had a guiding book that explained the theory of diversity with cross-cultural examples, and we added references illustrating construction and engineering cases.

We invested in providing feedback to the students on their essay introductions and theory discussions so that they can use this feedback in their joint reflections for the final essay.

While the course has been received positively by some: "The learnings about intercultural relations were very good and useful for the future, including the use of games as a safe learning environment". Simultaneously, others did not enjoy the course as much and required "a more practical approach, which is about the actual scenario in the world". Overall, students found difficult to explore the different viewpoints from theory or distant examples from practice. We should also finetune the message that come across every lecture and discussion. Students suggested not reinforcing stereotypes through the game experiences and starting discussions based on the student's experience or surrounding environment with actual examples from the professional practice. We used this manifesto as means to reflect on how to take this feedback into the course. As we write, we work on the course improvements.

How can we practically embrace diversity?

We call for each course and project where teamwork occurs to facilitate a safe and reflective environment to approach, analyse, and act upon diversity at three levels in a bottom-up fashion (Figure 2):

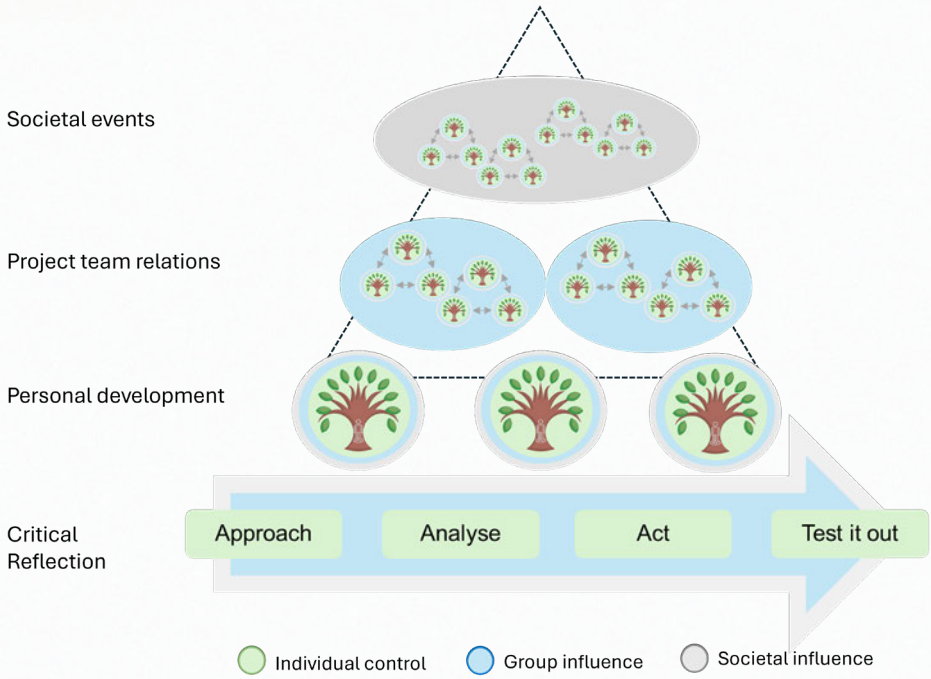


Figure 2: Call for action to practically embrace diversity. Image created by the authors based on the concepts presented by Deardorff (2020) and the circles of influence by Medhora (2020), adapting the Teamwork reflection pyramid by Veine et al. (2020) by exercising the Right to Quote.

- At the project level, one navigates biases and teamwork challenges. Then, it comes to the point that engineers play a social role in delivering projects on time, on budget, and quality. Understanding the other, addressing communicating challenges, and going beyond stereotypes are critical in any collective task, regardless of whether such a task entails diverse knowledge, customs, or values.
- At the professional level, one considers how technical work can involve making and caring. Suppose one has ambitions for being relevant to the world and beyond the boundaries of daily life. In that case, such diversity entails cultural differences that we need to prepare our students for. There is a dividend of diversity in the pure instrumental way of increasing representation. However, practically

fostering diversity should not be reduced to its instrumental dividends. Diversity competences also foster spaces for caring about how the word shaped by engineering impacts one's and others' lives.

- At the societal level, one recognizes its role and its project's (unintended) impact. Engineers have been trained to take such impact as evident and non-problematic for so long. A technical domain unfolds, serving values, viewpoints, interests, and ideas on the desirable society and world. At the societal level, we invite students to reflect on the social and political projects their engineering practice aligns with. We invite them to consider the (unintended) consequences or "walls" between diverse groups and invite them to build "bridges" instead. After all, we may recognise from each other's experiences that overlooking diversity in the engineering practice can lead to growing pressures overtime within and between diverse groups.

Acknowledgements

We thank the students who participated in the course and provided valuable feedback for improvement, also to the formal and informal reviewers at different stages of this manuscript. We acknowledge using ChatGPT to shorten long sentences while writing draft versions that we critically review and rewrote.

References

BBC (2025). *Email demands US government workers report DEI programmes.* By Kayla Epstein and Brajesh Upadhyay. https://www.bbc.com/news/articles/c78wn5qg3nyo

Bennett, M. J. (1986). A developmental approach to training for intercultural sensitivity. *International Journal of Intercultural Relations, 10*(2), 179–196. https://doi.org/10.1016/0147-1767(86)90005-2

Breck Dumas, B. S. (2025, January 7). *Elon Musk applauds Zuckerberg's move ending fact-checking on Facebook, Instagram* [Text article]. FOXBusiness. https://www.foxbusiness.com/politics/elon-musk-applauds-zuckerbergs-move-ending-fact-checking-facebook-instagram

Brundiers, K., Barth, M., Cebrián, G., Cohen, M., Diaz, L., Doucette-Remington, S., Dripps, W., Habron, G., Harré, N., Jarchow, M., Losch, K., Michel, J., Mochizuki, Y., Rieckmann, M., Parnell, R., Walker, P., & Zint, M. (2021). Key competencies in sustainability in higher education—Toward an agreed-upon reference framework. *Sustainability Science, 16*(1), 13–29. https://doi.org/10.1007/s11625-020-00838-2

Chorus, C. (2025). *Boy, there is work to be done* [Online post]. https://www.linkedin.com/posts/caspar-chorus-492b64194_boy-there-is-work-to-be-done-i-just-read-activity-7283129401087590401-8pRL

Clegg, S., Loosemore, M., Walker, D., van Marrewijk, A., & Sankaran, S. (2023). Construction-cultures: Sources, signs, and solutions of toxicity. In S. Addyman & H. Smyth (Eds.), *Construction project organising* (pp. 3–17). Wiley-Blackwell. http://www.scopus.com/inward/record.url?scp=85147917310&partnerID=8YFLogxK

Daneshpour, H., & Kwegyir-Afful, E. (2022). Analysing transdisciplinary education: A scoping review. *Science & Education, 31*(4), 1047–1074. https://doi.org/10.1007/s11191-021-00277-0

Deardorff, D. K. (2006). Identification and assessment of intercultural competence as a student outcome of internationalization. *Journal of Studies in International Education, 10*(3), 241–266. https://doi.org/10.1177/1028315306287002

Deardorff, D. K. (Ed.). (2009). *The Sage handbook of intercultural competence*. Sage.

Deardorff, D. K. (2020). *Manual for developing intercultural competencies: Story circles*. Taylor & Francis. https://doi.org/10.4324/9780429244612

Escobar, A. (2017). *Designs for the pluriverse: Radical interdependence, autonomy, and the making of worlds*. Duke University Press.

Euronews. (2024, December 24). *European political landscape shifts right in 2024*. By Gregoire Lory & Amandine Hess. https://www.euronews.com/my-europe/2024/12/24/european-political-landscape-shifts-right-in-2024-as-far-right-gains-ground

Fakhredin, F. (2025). *Boy, there is work to be done* [Reply comment; Online post]. https://www.linkedin.com/feed/update/urn:li:activity:7283129401087590401?commentUrn=urn%3Ali%3Acomment%3A%28activity%3A7283129401087590401%2C7283134554855342080%29&dashCommentUrn=urn%3Ali%3Afsd_comment%3A%287283134554855342080%2Curn%3Ali%3Aactivity%3A7283129401087590401%29

Goh, Z., Eva, N., Kiazad, K., Jack, G. A., De Cieri, H., & Spreitzer, G. M. (2022). An integrative multilevel review of thriving at work: Assessing progress and promise. *Journal of Organizational Behavior, 43*(2), 197–213. https://doi.org/10.1002/job.2571

Gordon, I. J., Bawa, K., Bammer, G., Boone, C., Dunne, J., Hart, D., Hellmann, J., Miller, A., New, M., Ometto, J., Pickett, S., Wendorf, G., Agrawal, A., Bertsch, P., Campbell, C. D., Dodd, P., Jan-

etos, A., Mallee, H., & Taylor, K. (2019). Forging future organizational leaders for sustainability science. *Nature Sustainability, 2*(8), 647–649. https://doi.org/10.1038/s41893-019-0357-4

Gregersen-Hermans, J. (2017). Intercultural competence development in higher education. In D. Deardorff & L. Arasaratnam-Smith (Eds.), *Intercultural competence in higher education* (pp. 67-82). Routledge.

Griffith, R. L., Wolfeld, L., Armon, B. K., Rios, J., & Liu, O. L. (2016). Assessing intercultural competence in higher education: Existing research and future directions. *ETS Research Report Series, 2016*(2), 1–44. https://doi.org/10.1002/ets2.12112

Guillén-Yparrea, N., & Ramírez-Montoya, M. S. (2023). Intercultural competencies in higher education: A systematic review from 2016 to 2021. *Cogent Education, 10*(1), 2167360. https://doi.org/10.1080/2331186X.2023.2167360

Hermsen, P., Rooij, R., Rijnbeek, G., & Adrichem, T. (2022). *Reflection in engineering education: White paper '100 DAYS OF… REFLECTION'*. Delft University of Technology.

Hoffman, E., & Verdooren, A. (2018). *Diversity competence* [Edwin Hoffman & Arjan Verdooren]. Managementboek.nl. https://www.managementboek.nl/boek/9789046905982/diversity-competence-edwin-hoffman

Holck, L., Muhr, S. L., & Villesèche, F. (2016). Identity, diversity and diversity management. *Equality, Diversity and Inclusion: An International Journal, 35*(1), 48–64. https://doi.org/10.1108/EDI-08-2014-0061

Horn, A., Scheffelaar, A., Urias, E., & Zweekhorst, M. B. M. (2022). Training students for complex sustainability issues: A literature review on the design of inter- and transdisciplinary higher education. *International Journal of Sustainability in Higher Education, 24*(1), 1–27. https://doi.org/10.1108/IJSHE-03-2021-0111

jagatkreasi. (2025). *Tree generic color fill icon*. Freepik. https://www.freepik.com/icon/tree_14290552

Jiang, D., Dahl, B., & Du, X. (2023). A systematic review of engineering students in intercultural teamwork: Characteristics, challenges, and coping strategies. *Education Sciences, 13*(6), Article 6. https://doi.org/10.3390/educsci13060540

Kolb, A., & Kolb, D. (2024). *Experiential learning cycle: Things to know about the 8 ALICE & David Kolb experience-based learning systems*.

Lantz-Deaton, C., & Golubeva, I. (2020). How do we define intercultural competence? In C. Lantz-Deaton & I. Golubeva (Eds.), *Intercultural competence for college and university students: A global guide for employability and social change*(pp. 111–155). Springer International Publishing. https://doi.org/10.1007/978-3-030-57446-8_4

Leeds-Hurwitz, W. (2013). *Intercultural competences: Conceptual and operational framework*. UNESCO Digital Library. https://unesdoc.unesco.org/ark:/48223/pf0000219768

Neville Medhora [@nevmed]. (2020, June 15). The "Circle of Influence" concept. [Tweet]. Twitter. https://x.com/nevmed/status/1272348361933369344

Persbureau, H. O. (2024, May 16). *This is what the Dutch coalition agreement says about higher education—Delta*. https://delta.tudelft.nl/en/article/this-is-what-the-dutch-coalition-agreement-says-about-higher-education

Sabet, P. G. P., & Chapman, E. (2023). A window to the future of intercultural competence in tertiary education: A narrative literature review. *International Journal of Intercultural Relations, 96*, 101868. https://doi.org/10.1016/j.ijintrel.2023.101868

TUDelft. (2025). *Social safety*. TU Delft. https://www.tudelft.nl/en/community/social-safety

Veine, S., Anderson, M. K., Andersen, N. H., Espenes, T. C., Søyland, T. B., Wallin, P., & Reams, J. (2020). Reflection as a core student learning activity in higher education—Insights from nearly two decades of academic development. *International Journal for Academic Development, 25*(2), 147–161. https://doi.org/10.1080/1360144X.2019.1659797

Wickson, F., Lambert, L., & Bernstein, M. (2025). Growing through transformation pains: Integrating emotional holding and processing into competence frameworks for sustainability transformations. *Current Opinion in Environmental Sustainability, 74*, 101525. https://doi.org/10.1016/j.cosust.2025.101525

Žalėnienė, I., & Pereira, P. (2021). Higher education for sustainability: A global perspective. *Geography and Sustainability, 2*(2), 99–106. https://doi.org/10.1016/j.geosus.2021.05.001

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Camilo Benitez-Avila is a political scientist by training, with an MSc in System Dynamics and a doctoral on the governance of Public-Private Partnerships. His research explores the ethics of urban social resilience, addressing the tensions between culture, power, and organisation. Camilo collaborates with like-minded colleagues, highlighting the coloniality of engineering and exploring possibilities for rethinking it so that engineering enforces human rights.

Comments by authors

on the process of writing this manifesto:

It was a journey of looking back and forward on the purpose of teaching a competence that is some much needed but equally overlooked nowadays.

While as a first author I took the lead, the second author balance, questioned and helped to put our thoughts into perspective on the reality of today's events at the university and beyond.

on the received comments:

Following the commentator remarks, we shared the manifesto with colleagues. Their feedback highlighted the importance of ethical and effective interactions—Effectiveness, though shaped by project limits, stays ethical when guided by the principle of treating others as one wishes to be treated—fostering a just society through shared effort.

I think the manifesto is very wel written! The language used and overal story line of the the manifesto is really nice.

Comments by

Feline Kaaij

Reflective Collaboration

Written by:

Annie Aggarwal,
Katie Barry

Abstract

The Reflective Collaboration manifesto reimagines the educational landscape such that the distinct roles of student and teacher are transformed into those of collaborative learners. Collaboration is identified as an essential social, professional, academic, and personal skill. Many forms of collaborative learning pedagogies, ranging from teamwork to community-engaged learning, have emerged in HEE. Though various challenges, ranging from a poor sense of belonging in groups or feeling excluded, to educator ability or curricular constraints, all hinder collaborative motivations and experiences. To scaffold collaborative learning in HEE, promote inclusion, ownership, and skills development, Reflective Collaboration (RC) is proposed. The RC model outlines three forms of reflection: on self to promote authenticity; on and in relation to others, to develop reflexivity; and collective dialogue to promote connectivity. The manifesto further describes three key areas that the RC model can guide, and that the RC landscape requires to thrive. These include appropriate orientation moments to learn about each other to support diversity and enhance inclusion; regular moments of reflection for goal setting and feedback that allow opportunities for improvement; and the adaptation of the educator role to that of a facilitator to guide reflection and dialogue amongst learners. With its focus on skills development for inclusion and collaboration, the RC landscape offers lifelong learning opportunities for both educators and students.

Keywords: Collaboration, Reflection, Skills Development, Learning-centric

Reflective Collaboration (RC) is proposed as a landscape for education, wherein learning happens together and from each other, supported by reflection. Students and teachers are both collaborative learners, where each comes with their own expertise and experiences to generate knowledge; each simultaneously teaching and learning. Higher education not only prepares students for the future but also enables sense-making and innovation that informs the futures of communities and people.

There is a call for tertiary education to offer diverse approaches to prepare students to deal with the complexity and uncertainty of sustainability issues (Lambrechts et al., 2018). Engineers need to consider environmental, ethical, and societal impacts in developing sustainable solutions (UNESCO, 2021). The growing complexity and scale of global challenges require professionals to work in multi-disciplinary and multi-cultural teams. In alignment, some of the most important employability skills often include communication, self-motivation, critical thinking, and being able to work in a team. Though, as per the Labour market map, 60% of respondents (Dutch employers) felt that university graduates were insufficiently prepared in areas such as communication, teamwork, and adaptability (Sociaal en Cultureel Planbureau, 2022).

Various collaborative learning pedagogies in HEE range from teamwork, or project-based courses, to challenge-based or community-engaged learning, interdisciplinary programmes, or joint degrees. Many forms of collaborative learning have emerged in HEE, both as a learning objective and a way of learning (Evans & Center for Assessment, 2020). As a way of learning, collaborative learning also has many personal and academic advantages. It is known to promote self-efficacy, boost learning motivation, and lead to better learning outcomes (Wu & Huang, 2010). A collaboratively rich environment has been recommended to improve students' cognitive performance, social relationships, and metacognition (Kumar, 2017). Social interaction not only motivates students to learn but also encourages them to be focused, participative, and dedicated to interchange ideas with one another (Hrastinski, 2008). Specifics of cooperating with others can form learning objectives, such as setting up effective meetings, identifying team roles, or handling conflicts. It offers opportunities to develop an inclusive mindset and skills for collaboration, such as maintaining an open disposition, communicating with a broad range of people, or being flexible in terms of adapting goals and approaches for the greater good.

Though within a landscape that is becoming increasingly diverse, with people from different backgrounds, disciplines, and cultures working together, learning together is not without challenges. Diverse groups often face conflicts due to differences in communication styles, ways of working, or thinking. Amongst students, differences in pre-existing

knowledge and speed of comprehension can be vulnerable aspects within groups. In extreme cases, exclusionary attitudes, or feelings of being left behind or left out, can lead to a poor sense of belonging. Students are often demotivated, finding themselves forced to work in groups, failing to see its relevance. They often tend to divide up the project into parts to briefly integrate these before submission, hardly engaging in discussion throughout the project. This limits the opportunities for critical discussion and reasoning, which can hinder the quality of the project. In such cases, students also tend to stick to roles they are most comfortable with or consider their strengths, further limiting the scope of improving upon their weaknesses. Another common conflict is unequal contribution, also described as freeriding behaviour in student teams (Hall & Buzwell, 2012), wherein team members fail to contribute their share and ride along on their teammates' efforts. Misaligned expectations, whether in terms of grades or project outcomes, often result in additional conflicts and frustrations.

Educators might face difficulties in addressing conflicts over differences, assessing individual contributions, or managing expectations. Shaping appropriate learning activities and assessment for collaboration is also time-consuming and requires expertise. Unresolved conflicts, friction, or differences within workplace collaborations cause additional stress. The predominant focus on disciplinary knowledge leaves little to no space for coaching or reflection, often seen as 'soft' skills. Though most challenges within groups, both students and educators, result from a lack of or absence of communication skills. Furthermore, collaborative learning activities often form a minor component of a predominantly individual learning journey, incorporated in an ad hoc manner or insufficiently developed to fit the constraints of a rigid curriculum. Constructive alignment (Spelt et al., 2014) can be a useful approach in designing consistent interdisciplinary learning environments and to help students understand what is expected from them in those learning environments. Misalignment in collaborative learning objectives, activities, and assessment subsequently leads to poor student motivation and engagement. For instance, when Learning Objectives (LOs) are outlined, without activities or assessment, students receive an implicit message that while these skills are deemed important on paper, they are not important enough to spend time on. In case activities are conducted without any LOs or assessment, students fail to see their value and intention. Without the appropriate space and time dedicated to reflection or dialogue, skills development and collaborative learning are often hampered, due to unresolved issues, frustrations, or demotivation. Subsequently, it hinders the learning process for students and teachers alike.

To promote reflection and dialogue, and enable authentic partnerships amongst learners, the Reflective Collaboration (RC) landscape refers to the model developed by the authors (Figure 1). Drawing upon the socio-constructivist theory (Vygotsky, 1980), the various facets of awareness for authentic engagement (Cranton, 2006; Cranton & Carusetta, 2004) and the value of reflection for skills development (Hermsen et al., 2022; Mello & Wattret, 2021), the model describes three essential components to guide RC in practice. These include self-reflection to promote authenticity; reflection on and in relation to others to develop reflexivity; and collective dialogue to develop connectivity.

The RC model (Aggarwal & Barry, 2023) supports the development of reflective prompts which can guide bottom-up initiatives for diversity & inclusion, regular moments of reflection, and the educator's role as a facilitator. These are further described as three essential aspects to appropriately sustain and nurture a Reflective Collaboration landscape.

Orientation for Diversity & Inclusion

Diversity serves as rich grounds for reflection on self and others. Collaboration across disciplines, cultures, or expertise can support criticality by exposing learners to 'foreign' concepts and perspectives. Learners themselves benefit from critical reflection, as they adapt and redefine their own identity based on collaborative experiences. An intersectional view (Brünig et al., 2024; Crenshaw, 1991; Crenshaw, 2018) towards diversity proposes that intersecting identity aspects, such as race, social class, gender, or abilities, lead to unique forms of discrimination and privilege in each context with existing power structures. This view enables an understanding of diversity in terms of the interconnectedness of various identity aspects. Within a learning context, diverse identities also result in a unique combination of strengths and perspectives. The RC approach enables reflection on and the exchange of unique individual experiences for learners to develop awareness and understanding of themselves and their peers. Learning about and making space for each other's values, personalities, or identities can foster connectivity within groups. And enhance both collaborative outcomes and learners' sense of belonging and well-being.

> The model guided an inter-stakeholder session at a Dutch STEM university as a DEI (Diversity, Equity, Inclusion) initiative. The workshop promoted authenticity by prompting participants to self-reflect on their various personal and social identity aspects and how these increase or decrease challenges in their daily lives. For instance, not knowing the language at a Dutch STEM university can severely impact social exchange or connection with Dutch peers or colleagues. Reflection and discussion on its connection to exclusion or privilege in a specific social context encouraged social reflexivity.

By promoting the exchange and discovery of different identity perspectives. Dialogue on how intersectionality takes shape in HEE and preventing exclusion as a collective and individuals supported connectivity and actionable reflection amongst participants.

At the start of any group work, or when a new member joins, it is essential to get to know each other and build trust to start on the right note. Learners might reflect on and share personality styles and attitudes, or other aspects such as skills, team roles, or communication styles. These can enable them to develop awareness and understanding of each other and serve as a useful foundation for upcoming collaborative interactions. In this sense, RC enables a bottom-up initiative for diversity & inclusion, one that can be embedded in different collaborative learning pedagogies.

During an in-class activity centered around getting to know your team members, Second-year Electrical Engineering BSc. students created a team logo using LEDs. The LED colours corresponded to specific DiSC personality profiles (DiSCProfile, n.d.), which students picked based on who they are likely to be in different hypothetical collaborative situations, such as the night before a presentation, or in the position of a leader. After a moment of reflection and discussion with teammates, ChatGPT-generated DiSC personas were revealed for groups to pick the appropriate DiSC colours and corresponding LEDs. The activity enabled student groups to learn a bit more about their teammates' attitudes in collaborative scenarios, before starting a project together.

Regular reflection to promote ownership and improvement of Collaborative Learning:

Encouraging learners to define and interpret their own personal learning objectives and assessment criteria (Espinosa et al., 2022) can promote motivation, intrinsic curiosity, and creativity. Reflecting on and sharing personal learning goals can encourage members to draw upon each other's strengths, build competencies, and address personal weaknesses. Formulating collective knowledge-based goals can be promoted through team goal-setting activities that enable reflection and dialogue with peers. Current practices very much contradict the social nature of learning (Boud & Bearman, 2022). In response, RC challenges the highly individualistic focus on performance, competitions/ publications, and winning by diverting focus on personal learning and

Development of authenticity refers to shaping one's sense of self, as they question values and assumptions they had previously uncritically assimilated. Five dimensions of authenticity include self-awareness, awareness of others, relationships & context and critical reflection.

Authenticity

For engagement

Critical reflection can foster authentic relationships when directed towards the nature, quality and feelings towards the relationships and interactions within the group.

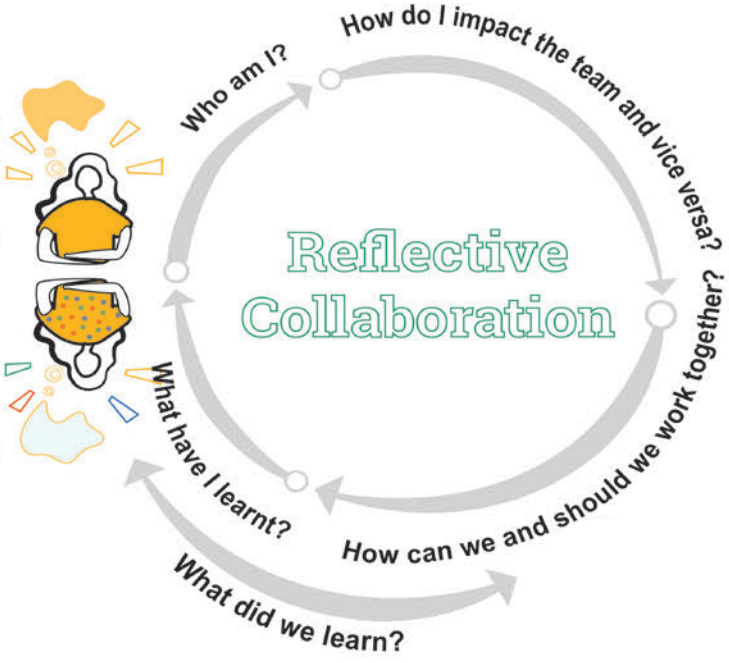


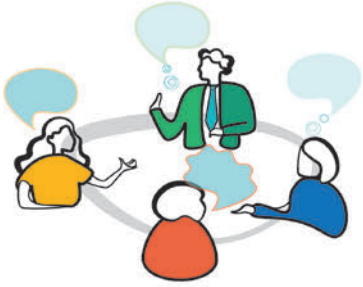
Figure 1: The Reflective Collaboration (RC) landscape. Made by the authors.



Reflexivity

As a team member

Reflexivity refers to the ability to recognise, examine and make explicit their impact on the project, process and team. And alternatively, the project, process and team's impact on oneself.



Connectivity

As a team

Connectivity stands for team members being in sync, having the appropriate communication channels, being open-minded and open to feedback and having the capacity to communicate openly and honestly.

group goals, which promotes both group and individual aspirations and growth.

With its focus on reflection, self, and learning, RC enables learners to fail forward, wherein mistakes serve as opportunities to evaluate and improve one's work or skills. Reflection on self and peers' contribution towards teamwork or team climate can be implemented using peer review tools such as BuddyCheck and must be supported with in-class dialogue sessions. Formative moments of assessment using appropriate reflective prompts can allow students to practice and incorporate regular dialogue towards collaborative outcomes and learning.

> In an in-class dialogue session for first-year Electrical Engineering BSc. students, student groups shared a compliment or, constructive feedback and a compliment for another member in the team. This created a positive mood within groups, as students felt acknowledged and appreciated by their peers. The students also rated out of five how their team was doing on post-its, discussed with a facilitator what was working well and what might be improved within the team.

Peer reviews and formative assessment supported by reflective dialogue, rather than summative assessments, can enable members to take responsibility for their group behaviour, outcomes, and learning. This also alleviates the educator from having to objectively assess collaborative skills development.

Educator as facilitator over assessor

An RC landscape proposes that the current educator adapts from an assessor to a facilitator. The existing power dynamics and hierarchy, such as the distinction in the perceived power of supervisor or assessor versus the student, limit space for authentic, open, and honest dialogue or genuine feedback. For instance, graduation supervisors have indicated that "students do not provide any feedback to supervisors, even when asked." There is also a need for learners to step outside of their comfort zone and into a 'Brave Space'. While 'safe spaces' aim to provide refuge from discrimination and harm, 'Brave Spaces' encourage individuals to engage in courageous conversations, confront biases, and challenge perspectives constructively. To stimulate inclusive learning communities, learners must explore the different realms of brave and safe spaces. Trowell (Trowell, 2024) describes the value of safe, brave, and facilitated spaces in student-staff partnerships to help build resilience, enhance

wellbeing, and offer personal development opportunities. This highlights the essential role of the facilitator to enable navigating these realms of safe and brave spaces for students to share, exchange, and engage in dialogue. For instance, by setting up norms of interaction, encouraging everyone to share, or keeping those who tend to dominate the dialogue in check. Furthermore, in modelling openness, the facilitator might also create space for making mistakes themselves and engage in collaborative learning for skills development and knowledge generation.

In conclusion, Reflective Collaboration (RC) is proposed as an approach to foster an inclusive learning landscape that promotes collaborative ownership and skills development. Essentials to foster such a landscape include starting on the right note and learning about each other to nurture diversity & inclusion within groups. Reflection and dialogue to formulate personal and collective goals promote motivation and connectivity, and moments of regular reflection allow space for mistakes and opportunities for improving upon them. Lastly, a facilitator plays an essential role in creating opportunities and providing prompts for reflection and dialogue. The central focus on skills development and reflective dialogue encourages connection, lifelong learning for inclusion, and collaboration skills development amongst educators and students alike.

Acknowledgements

I would like to mention Mireille-Howard Snels, Johanna Colgrove, and Nayantara Thomas for many rich conversations that helped me develop an understanding of collaborative learning, both in experience and concept.

References

Aggarwal, A., & Barry, K. (2023). *Reflective collaboration model to foster inclusive dialogue*. TU Delft. https://www.tudelft.nl/studyclimate/projects/collaborative-learning-1/reflective-collaboration-model-to-foster-inclusive-dialogue

Boud, D., & Bearman, M. (2022). The assessment challenge of social and collaborative learning in higher education. *Educational Philosophy and Theory, 56*(5), 459–468. https://doi.org/10.1080/00131857.2022.2114346

Brünig, L., Kahrass, H., & Salloch, S. (2024). The concept of intersectionality in bioethics: A systematic review. *BMC Medical Ethics, 25*(1). https://doi.org/10.1186/s12910-024-01057-5

Cranton, P. (2006). Fostering authentic relationships in the transformative classroom. *New Directions for Adult and Continuing Education, 2006*(109), 5–13. https://doi.org/10.1002/ace.203

Cranton, P., & Carusetta, E. (2004). Developing authenticity as a transformative process. *Journal of Transformative Education, 2*(4), 276–293. https://doi.org/10.1177/1541344604267898

Crenshaw, K. (1991). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stanford Law Review, 43*(6), 1241. https://doi.org/10.2307/1229039

Crenshaw, K. (2018). Demarginalizing the intersection of race and sex: A black feminist critique of antidiscrimination doctrine, feminist theory, and antiracist politics [1989]. In K. Bartlett (Ed.), *Feminist legal theory: Readings in law and gender* (pp. 57-80). https://doi.org/10.4324/9780429500480-5

DiSCProfile. (n.d.). *DiSC styles.* https://www.discprofile.com/disc-styles

Espinosa, P. H., Persaud, S., & Giaccardi, E. (2022). MYRUBRIC, a co-creative journey to activate resilient learning communities. *DS 117: Proceedings of the 24th International Conference on Engineering and Product Design Education (E&PDE 2022), London South Bank University* (8th–9th September 2022). https://doi.org/10.35199/epde.2022.124

Evans, C., & Center for Assessment. (2020). *Measuring student success skills: A review of the literature on collaboration*. Center for Assessment. https://files.eric.ed.gov/fulltext/ED607774.pdf

Hall, D., & Buzwell, S. (2012). The problem of free-riding in group projects: Looking beyond social loafing as reason for non-contribution. *Active Learning in Higher Education, 14*(1), 37–49. https://doi.org/10.1177/1469787412467123

Hermsen, P., Rooij, R., Rijnbeek, G., Adrichem, T., & TU Delft Teaching Academy. (2022). *Reflection in engineering education: White paper '100 DAYS OF… REFLECTION'* [Slide show]. https://filelist.tudelft.nl/TUDelft/Thema-sites%20TU%20Delft/Teaching%20Academy/Themes/Reflective%20Engineer/Whitepaper/100Days%20of%20Reflection%20in%20Engineering%20Education.pdf

Hrastinski, S. (2008). What is online learner participation? A literature review. *Computers & Education, 51*(4), 1755–1765. https://doi.org/10.1016/j.compedu.2008.05.005

Kumar, R. R. (2017). *The effect of collaborative learning on enhancing student achievement: A meta-analysis*. https://spectrum.library.concordia.ca/982327/

Lambrechts, W., Ghijsen, P. W., Jacques, A., Walravens, H., Van Liedekerke, L., & Van Petegem, P. (2018). Sustainability segmentation of business students: Toward self-regulated development of critical and interpretational competences in a post-truth era. *Journal of Cleaner Production, 202*, 561–570. https://doi.org/10.1016/j.jclepro.2018.07.303

Mello, L. V., & Wattret, G. (2021). Developing transferable skills through embedding reflection in the science curriculum. *Biophysical Reviews, 13*(6), 897–903. https://doi.org/10.1007/s12551-021-00852-3

Sociaal en Cultureel Planbureau. (2022). *Arbeidsmarkt in kaart Werkgevers - editie 3.* https://digitaal.scp.nl/arbeidsmarkt-in-kaart-werkgevers-editie-3/

Spelt, E., Luning, P., Van Boekel, M., & Mulder, M. (2014). Constructively aligned teaching and learning in higher education in engineering: What do students perceive as contributing to the learning of interdisciplinary thinking? *European Journal of Engineering Education, 40*(5), 459–475. https://doi.org/10.1080/03043797.2014.987647

Trowell, M. (2024). The importance of safe, brave and facilitated spaces in student-staff partnerships: Finding a space for compassion. *Pastoral Care in Education*, 1–22. https://doi.org/10.1080/02643944.2024.2322534

UNESCO. (2021, March 24). *Engineering for sustainable development: Delivering on the Sustainable Development Goals.* https://www.unesco.org/en/articles/engineering-sustainable-development-delivering-sustainable-development-goals

Vygotsky, L. S. (1980). *Mind in society.* https://doi.org/10.2307/j.ctvjf9vz4

Wu, T., & Huang, Y. (2010). A systematical approach for learner group composition by utilizing U-learning portfolio. *Educational Technology & Society*, 210–214. https://doi.org/10.1049/cp.2010.0563

Authors' Biographies

Annie Aggarwal has a background in community-based architecture, Interaction design, and participatory design. As part of Education and Student Affairs at the Delft University of Technology, she is leading a design research project focused on collaborative learning within the HEE curriculum. Various collaborative learning interventions informed by the Reflective Collaboration principles have been developed and successfully tested centrally and at different engineering faculties. Currently, efforts are being made to share best practices and scale these to different programmes.

Katie Barry is an Educational Psychologist and a University Teaching Qualification trainer at the Teaching and Learning Services at the Delft University of Technology. In her current work, she is implementing various interventions to promote inclusive education and teaching, including a VR empathy training for educators. Plus, exploring the educators' role in the university's Duty of Care.

Comments by authors

on the process of writing this manifesto:

It was somewhat challenging to work on two publications simultaneously around similar themes of collaborative learning and reflection. To ensure both were distinct and yet provided relevant insights. At the same time, I was motivated and inspired by the success of ongoing pilots developed based on the concepts within the manifesto.

on the received comments:

It was a bit overwhelming at first glance to see the number of comments on the PDF and the tips I received. I soon discovered a lot had to do with my writing style, where too much was compressed into too few words. Leading to unclarity, and ideas getting lost in the way. The reviewer's comments inspired a deeper look into the focus of the manifesto and a restructuring of ideas to avoid repetition, improve clarity, and flow.

This manifesto is thought-provoking because it presents a Collaborative Learning (CL) model that challenges the traditional approach to education. One area where this vision could have a profound impact is in PhD education. Traditionally, doctoral research has been an individual endeavor, but under a CL model, we could see a shift toward collaborative PhDs, where students work alongside a wider academic community, including peers, faculty, and industry partners. This approach could lead to richer, more interdisciplinary research and foster a shared responsibility in knowledge creation. Collaborative PhDs would also make doctoral studies more accessible and appealing. Many potential candidates may be deterred by the solitary nature of traditional research, but a collaborative model could encourage more individuals to pursue a PhD.

Comments by

Rhys Evans

Rethinking Architectural Education:

Towards a Transformative and Emancipatory Pedagogy

Written by:

Mehmet Ali Gasseloglu,
S. Zeynep Yılmaz Kılıç

Abstract

Architectural education today stands at a strategic crossroads—its current form shaped by historical hierarchies and neoliberal agendas, yet holding the transformative potential to become a vehicle for social and ecological justice. This manifesto critically examines the structural and epistemological obstacles constraining the discipline, including hierarchical teaching practices, rigid formalism, and a growing disconnection from pressing social and ecological realities. Central to this critique is the commodification of education, which has reshaped architectural pedagogy into a market-oriented enterprise, distancing it from its core social responsibilities.

We argue for a fundamental shift in architectural education, urging a departure from top-down, authoritative teaching methods toward collaborative and participatory approaches to learning processes. Embracing an interdisciplinary and reflexive stance, we challenge the dominance of universalist design paradigms, advocating instead for localized, context-sensitive, and community-driven architectural practices. This manifesto explicitly calls for the repoliticization of architectural education, reclaiming it as a critically engaged discipline committed to addressing the complex social and ecological crises of our times. We emphasize that architectural education must transcend its historical and institutional constraints, prioritizing ethical awareness, social equity, and ecological stewardship over market-driven values and profit-oriented models.

Furthermore, reclaiming universities as sites of radical intellectual exploration and production is foundational in resisting the widespread influence of neoliberal policies within higher education. We call on educators, students, and institutions alike to confront institutional conservatism, challenge hegemonic structures, and actively dismantle those frameworks that perpetuate social injustice and ecological degradation. In doing so, architectural education can become a transformative force, embracing the uncertainty within its structures as a catalyst for change, fostering localized, and socially meaningful architectural practices.

Keywords: Collaboration, Reflection, Skills Development, Learning-centric

The Need for Transformation

Architecture today faces critical challenges, including climate crises, mass migrations, rapid technological transformations, natural disasters, extensive urban development, spatial inadequacies, poor design quality, and economic pressures. However, beneath these immediate crises lies a deeper, more systemic issue: the alignment of architectural education and professional training with neoliberal economic policies. This alignment has resulted in the commodification of education, a neglect of social and environmental responsibilities, and an increasing detachment from critical engagement with the urgent issues of our time. To meaningfully address these challenges, we must first acknowledge the complicity of universities and educational institutions in perpetuating these crises. Only through this recognition can we begin to foster genuine transformation.

Historically, architectural education has undergone significant shifts, each responding to contemporary needs and crises. Traditional historical narratives, such as those rooted in the European tradition, from guild-based apprenticeships and the structured treatises of Vitruvius (15 BCE), Alberti (1485), and Serlio (1545)—often present a limited, Eurocentric view. They aimed to systematize architectural knowledge by defining clear principles, guidelines, and standardized methodologies, thus creating structured frameworks intended to achieve order, consistency, and replicability within architectural practice. These narratives universalize European cultural frameworks by consistently presenting them as the definitive standard for architectural knowledge and practice. The founding of institutions like the Académie Royale d'Architecture in 1671 further embedded rationalism, hierarchy, and dogmatism into pedagogical structures. Although figures such as Claude Perrault (1683) and Jacques-François Blondel (1737) critiqued these traditions, their critiques largely remained internal to the European academic model, perpetuating hierarchical and competitive systems such as those institutionalized at the École des Beaux-Arts. Today, in many countries worldwide, courses such as architectural history still predominantly reproduce this Eurocentric perspective, often entirely neglecting substantial contributions and pedagogical practices from Asia, Africa, the Middle East and other regions. This persistent exclusion of diverse and complex knowledge traditions—including indigenous, vernacular, and community-based building practices in the Global South, as well as Asian and Islamic pedagogies, highlights the urgency of actively decolonizing architectural education, reimagining it as a pluralistic, context-sensitive, and inclusive practice genuinely representative of global diversity.

The persistence of Eurocentric frameworks laid the foundations for

architectural education in the Modernist era, shaping its principles, methods, and values. Among the institutions most emblematic of this continued influence is the Bauhaus, whose legacy significantly shaped, and continues to shape, modern architectural pedagogy. Initially revolutionary in its interdisciplinary and experimental approach, the Bauhaus legacy has paradoxically contributed to the standardization and homogenization of design thinking (Jones, 1969). The aesthetic principles laid out by figures such as Moholy-Nagy and Kandinsky and the standardized design decisions of Ernst Neufert as an output of the Bauhaus, continue to dominate contemporary pedagogy, often at the expense of contextual sensitivity and diverse approaches. Critically examining the Bauhaus, Lefebvre (2009) highlights its historical role in promoting political change through architecture while simultaneously defining it as an institution that ultimately serves the architectural requirements of state capitalism. Lefebvre's critique can be seen as an extension of Tafuri's (1976) analysis, which positions architectural education institutions as integral to capitalist development, shaped by the deep entanglement of the state, market, architecture, and urban planning. Despite various reform attempts, architectural education remains constrained by the institutional frameworks established during the Modernist era, inhibiting meaningful change. Beyond critical positions, groups such as TEAM X and the Smithsons have also published manifestos and reports that radically challenged modernist architecture, laying the groundwork for the emergence of postmodernism. However, the rise of postmodern 'star architects' has only deepened these issues, as architectural education increasingly prioritizes the replication of dominant design signatures over nurturing students' own critical and original approaches. This shift has further entrenched homogeneity within design studios, suppressed unique creativity, and reinforced a culture of replication. Today, this uniformity stands as a stark testament to architecture's troubling complicity with neoliberal commodification.

Furthermore, contemporary architectural education has increasingly conformed to neoliberal economic imperatives, transforming pedagogy into a market-driven enterprise. According to Troiani (2017), the underlying cause for architecture and higher education's growing alignment with neoliberal principles is the transformation of universities from institutions dedicated to knowledge and learning into entrepreneurial entities that commodify education. As a result, both students and educators have been redefined as economic actors, and knowledge is primarily assessed for its market potential rather than its intrinsic value or societal contribution. In their pursuit of global competitiveness, architecture schools prioritize branding strategies and marketable aesthetics, reinforcing a profit-driven educational culture that commodifies creativity and knowledge. This market-oriented approach

undermines collaboration and further distances architectural education from its essential social, cultural, and ecological responsibilities.

To overcome these deep-rooted structural issues, architectural education must undergo radical transformation. This requires dismantling institutionalized pedagogical frameworks, resisting the commodification of knowledge, and redefining education as a public good. A critical, context-sensitive, and emancipatory pedagogy must replace the current model, fostering intellectual curiosity, ethical responsibility, and meaningful engagement with pressing societal and ecological challenges. By reclaiming architectural education from its restrictive traditions and neoliberal constraints, we can unlock its true transformative potential and shape an architecture that responds to the complexities of the contemporary world.

Rethinking Architectural Values

Architectural education has long emphasized formal aesthetics and rigid disciplinary boundaries, often neglecting social, political, and ecological responsibilities. To remain relevant, the discipline must redefine its values;placing care, collectivity, and justice at its core, not at its periphery. Conventional pedagogies reinforce hierarchies, prioritizing technical proficiency over critical inquiry. Yet, as global crises—climate change, housing inequality, urban commodification; intensify, architecture must evolve. By rethinking its pedagogical values, the discipline can become collaborative rather than authoritative, politically engaged rather than neutral, and rooted in care rather than commodification.

Dismantle Top-Down Teaching

Conventional pedagogy assumes knowledge is fixed and unidirectional, delivered from educator to student. This top-down model is not a recent development but is deeply embedded in the historical evolution of architectural pedagogy. As discussed in the introduction, the institutionalization of architectural knowledge, from the treatises of Vitruvius and Alberti to the codified design norms of the Bauhaus and Neufert's standardizations, has contributed to the illusion of a universal architectural language. This legacy has normalized authoritative teaching practices, reinforcing hierarchical structures and standardizing knowledge production across diverse contexts.

However, such universalism often masks Eurocentric assumptions and ignores local specificities, contributing to the marginalization of alternative ways of building, knowing, and designing. Dismantling top-

down teaching is therefore not merely a pedagogical shift but a critical intervention into this history of standardization and epistemological domination. Education should instead be structured as a dynamic, reciprocal process of inquiry and engagement, one that empowers students as co-producers of knowledge and challenges the historical legacy of architectural education as a one-directional, universalizing enterprise. A practice-oriented and inquiry-driven approach allows students to become active participants in knowledge production rather than passive recipients of predefined content. This underscores the urgent need for a pedagogical shift, one that integrates lived experiences, interdisciplinary engagement, and direct interaction with the environments and communities that architecture ultimately serves.

Such a transformation also necessitates an unlearning process, particularly for educators. While relying on established methods may provide a sense of security, it often reinforces conventional thinking rather than fostering innovation. To cultivate new ways of addressing problems, educators must critically examine the values embedded in past approaches and question the assumptions that have shaped their disciplinary perspectives. This reflexive process not only redefines architectural education but also helps uncover the root causes of the crises we face today, revealing how disciplines themselves contribute to shaping, sustaining, or challenging systemic inequalities and environmental degradation.

To fully embrace this pedagogical shift, architectural education must also develop the capacity to engage with uncertainty, not as a threat, but as a generative condition that invites critical inquiry, experimentation, and transdisciplinary thinking.

Embrace Uncertainty, Engage Across Disciplines

Education, like the environments we design for, is unpredictable. Instead of resisting this uncertainty, architectural pedagogy must learn to navigate and learn from it. Instead of seeking comfort in established knowledge, educators must foreground what remains uncertain, acknowledging the inherent vulnerabilities within the education system. By embracing this openness, higher education can evolve into a dynamic and reflexive practice that actively engages with the complexities of the contemporary world.

Uncertainty may relate to the future, resolution, or positionality, requiring a closer or alternative perspective on a given phenomenon. Therefore, embracing uncertainties and developing an adaptive, responsive educational model first necessitates an awareness of a discipline's own vulnerabilities. It also calls for taking an ethically and politically

conscious stance on transformation. In this process, not only facts but also speculation can serve as a valuable tool, an experimental approach to making sense of the future and offering novel perspectives that challenge existing understandings.

Repoliticize Architectural Education

Architecture is inherently political, yet contemporary architectural education often treats design as an apolitical, aesthetic exercise, overlooking its social and environmental implications. While politics may surface in design studios, these discussions remain superficial, rarely challenging regulatory frameworks or advancing radical alternatives centered on spatial and environmental justice. Studios fail to cultivate critical perspectives on the socio-political forces shaping architecture, limiting their potential for transformative change.

Lefebvre (1991) reminds us that "*space is not a scientific object removed from ideology or politics. It has always been political and strategic,*" while Till (2009) asserts that "*architecture is not autonomous; it is messy, contingent, and deeply political.*" Repoliticizing architectural education requires embedding ethical positioning, social equity and environmental justice into design pedagogy. Architecture must be assessed not only on form and function, values often emphasized under commodified models of education, but also on its socio-political and ecological impact. Contemporary crises —climate change, social inequality, and housing shortages— should not be treated as theoretical concerns but as catalysts for structural change. As Harvey (2014) argues these crises are deeply entangled with capitalist structures, demanding a radical rethinking of architecture's role. By reclaiming architecture as a contested space shaped by negotiations and systemic forces, education can equip students with the tools to challenge dominant paradigms and envision alternative futures.

Localize Learning, Decolonize Education

The emphasis on localization serves a dual purpose. On one hand, it challenges the dominance of Western-centric frameworks that often align educational content with neoliberal economic policies, reinforcing global hierarchies. On the other, it fosters a more critical engagement with crises that are directly observed and experienced, grounding abstract architectural education in tangible, lived realities. By repositioning local perspectives at the center of architectural pedagogy, education can become more attuned to the socio-political and environmental

complexities of specific contexts.

To counter the erasure of local expertise and indigenous knowledge systems, architectural education must facilitate direct collaboration with communities, positioning them as active participants in design processes rather than passive subjects of intervention. However, the term "participation" itself requires critical scrutiny. While participatory tools are often framed through democratic ideals and presented as inherently empowering, their implementation can sometimes reproduce existing hierarchies or serve tokenistic purposes. In such cases, participation risks becoming a manipulative tool rather than a genuinely democratizing process, silencing rather than amplifying local voices and knowledge systems. This critique is not a rejection of participatory methods, but a call to remain attentive to how they are framed, practiced, and whose interests they ultimately serve.

A truly decolonial approach to participation would move beyond formalized consultation processes and instead foster long-term, reciprocal relationships grounded in trust, mutual learning, and shared authorship. Such collaborations must be shaped by the community's own terms, values, and temporalities, allowing architectural education to act not as an expert-driven intervention but as a facilitative practice that amplifies local agency. In this way, pedagogy can become a vehicle for non-extractive engagement, supporting communities in addressing their spatial realities without co-opting or instrumentalizing them. Without a reorientation of architectural education toward the realities of those most affected by spatial injustice, architecture risks remaining complicit in perpetuating the very inequalities it seeks to address. This includes revaluing local knowledge systems and centering community-defined priorities in the design process, crucial steps toward decolonizing both pedagogy and practice. By localizing pedagogy, architecture can serve as a tool not only for design but for social transformation.

Reject Commodification, Foster a Culture of Care

Architectural practice today unfolds within a political economy shaped by real estate speculation, branding logics, and commodified urban space. Within this context, design increasingly serves market demands, often at the expense of ecological and social responsibility. Peggy Deamer (2018) critiques this paradigm, arguing that architectural labor has been co-opted by capitalism, reducing design to a service industry that reinforces market logics instead of challenging them.

To counter this, architecture must shift toward a care-centered approach, prioritizing justice, well-being, and ecological stewardship. This requires redefining ethical responsibility in education and practice, training

architects as agents of change who critically engage with systemic inequalities. A transition from commodification to care demands new design priorities. Success should be measured not by market value but by social and ecological impact, fostering inclusivity, resilience, and community empowerment. Addressing the climate crisis requires shifting from carbon-heavy methods to regenerative, circular design, emphasizing repair, reuse, and ecological resilience.

Ultimately, redefining architecture through care means transforming its training, practice, and evaluation. By moving beyond serving capital to advocating for spatial justice and ecological balance, architecture can become a tool for healing, inclusion, and systemic change, embedding care at its core.

Transform and Liberate Education

Rather than challenging dominant systems, architectural education too often prepares students to operate comfortably within them. Studios prioritize efficiency, aesthetics, and market-driven solutions over ethical and political engagement, limiting opportunities for radical experimentation and social critique. In this context, transformation must begin within education itself, not only by revising what is taught, but by reshaping how learning is structured, who holds authority within it, and what forms of agency it enables.

By *transformative*, we refer to an education that equips students not merely as technical experts, but as agents of change, capable of questioning dominant norms, confronting systemic injustices, and imagining alternative futures. This vision calls for the transformation of institutions, educators, pedagogical practices, and students' roles, ultimately serving broader societal shifts toward more just, caring, and ecologically responsive environments.

Transformative pedagogies dismantle traditional hierarchies, positioning students as co-creators of knowledge. Paulo Freire's *Pedagogy of the Oppressed* (1970) advocates for mutual learning rather than rigid authority. In architecture, this translates into radical studios, critical spatial practices, and collaborative research centered on spatial justice, feminist urbanism, and decolonial design. This transformation, however, is not dependent on institutional endorsement. Even in rigid or conservative contexts, transformative practice can emerge through informal alliances, subversive pedagogical experiments, and localized acts of resistance, initiated by educators, students, or collectives. It is about creating cracks within existing structures through which new ways of learning and relating can begin to grow. Transformative education is therefore not a prescriptive model but a long-term, situated process, one that

acknowledges the real constraints of the socio-political climate while remaining committed to radical possibility.

Reclaim Universities as Radical Spaces for Change

Universities today are increasingly shaped by logics of competition, quantification, and performance, values borrowed from the marketplace. Within this climate, architectural education often finds itself repurposed: geared toward producing efficient professionals rather than critical thinkers and prioritizing measurable outputs over meaningful engagement. As a result, design studios become sites of reproduction, not resistance, spaces where technical mastery is emphasized while political imagination is sidelined. This has led to the commodification of knowledge, where universities function as corporate entities, producing graduates who adapt to rather than challenge existing systems.

Resisting the commodification of education demands a reorientation of knowledge production, as a catalyst for societal transformation, not corporate expansion. Soja (2010) argues that combining the terms spatial and justice opens up a range of new possibilities for social and political action. So, to reclaim universities as spaces of radical transformation, spatial justice must be prioritized.

Unlearn, Reimagine, Reshape!

As architectural education continues to evolve within a landscape shaped by neoliberal pressures and institutional inertia, its ethical and political responsibilities often risk being sidelined, calling for a conscious effort to unlearn, reimagine, and reshape what education can be. This manifesto advocates for a transformative pedagogy that resists commodification, reclaims architecture as a socially embedded practice, and fosters justice-oriented, participatory learning.

To achieve this transformation, we must rethink the epistemological and institutional foundations of architectural education. This involves moving beyond top-down teaching models and embracing collaborative knowledge production, where students actively engage with the social, political, and ecological realities shaping the built environment. A localized and decolonized pedagogy must challenge the hegemonic, universalist frameworks that have long defined architectural discourse, prioritizing community-driven approaches, critical inquiry, and interdisciplinary engagement.

The future of architectural education demands institutional transformation, but this is rarely a straightforward process. While

universities must reject market-driven priorities and strive to become spaces of resistance and renewal, such change often faces inertia, competing agendas, or outright resistance. In this light, transformation may begin through partial, incremental shifts, initiated by committed educators, students, or collectives working within or around institutional constraints. By embedding activist pedagogies, ethical design, and community engagement into curricula wherever possible, architectural education can lay the groundwork for broader structural change, even in the absence of full institutional support.

Reclaiming architectural education is a political act. Educators, students, and institutions must take shared responsibility for fostering a system that not only reflects the world but actively works toward a more just and sustainable future. This manifesto is a call for action, embrace uncertainty, resist systemic inequalities, and commit to radical transformation.

Acknowledgements

The authors acknowledge the use of AI-assisted tools for proofreading and language refinement in the preparation of this manuscript.

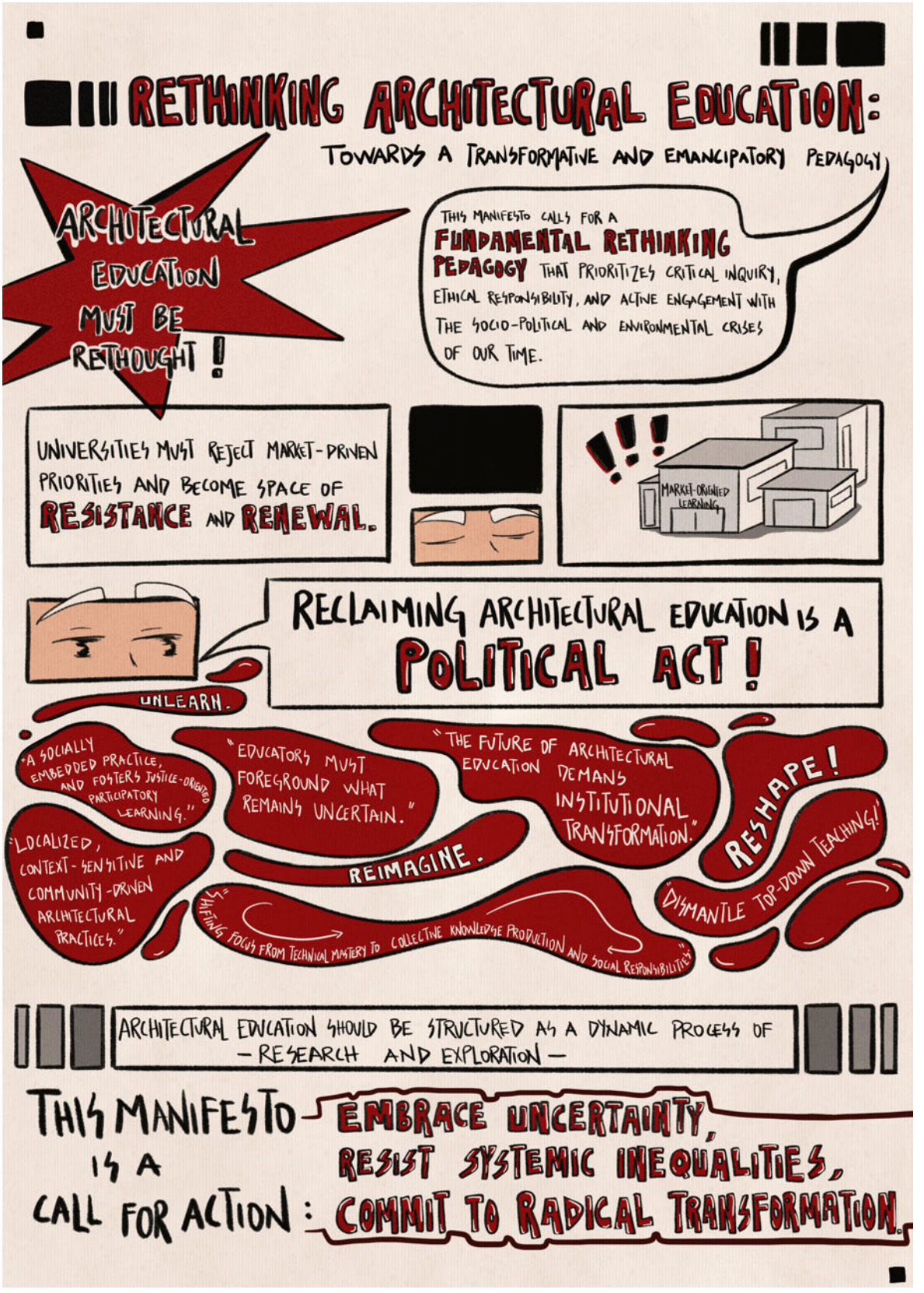


Figure 1: Image created by Melike Nur Taser, used with permission, no further use allowed.

References

Alberti, L. B. (1988). *On the art of building in ten books* (J. Rykwert, Trans.). MIT Press. (Original work published 1485)

Blondel, J.-F. (1771–1777). *Cours d'architecture ou traité de la décoration, distribution & construction des bâtiments*(Vols. 1–6). Paris.

Deamer, P. (2018). Architecture and labor: The architectural lobby and the fight for fair practice. *Architectural Design, 88*(5), 78–85.

Freire, P. (1970). *Pedagogy of the oppressed.* Bloomsbury Academic.

Harvey, D. (2014). *Seventeen contradictions and the end of capitalism.* Oxford University Press.

Jones, P. L. (1969). The failure of basic design. *Leonardo, 2*(2), 155–160. https://doi.org/10.2307/1572021

Lefebvre, H. (1991). *The production of space* (D. Nicholson-Smith, Trans.). Blackwell. (Original work published 1974)

Lefebvre, H. (2009). Space and state (A. Kowalski et al., Trans.). In N. Brenner & S. Elden (Eds.), *Henri Lefebvre: State, space, world* (pp. 223–253). University of Minnesota Press.

Middleton, R. (1959). Jacques François Blondel and the Cours d'Architecture. *Journal of the Society of Architectural Historians, 18*(4), 140–148. https://doi.org/10.2307/987849

Neufert, E. (2019). *Architects' data* (5th ed., J. Kister, Trans.). Wiley-Blackwell. (Original work published 1936)

Perrault, C. (1993). *Ordonnance for the five kinds of columns after the method of the ancients* (I. K. McEwen, Trans.). Getty Center. (Original work published 1683)

Serlio, S. (1996). *Sebastiano Serlio on architecture* (V. Hart & P. Hicks, Trans.). Yale University Press. (Original work published 1545)

Soja, E. (2010). The city and spatial justice. In B. Bret, P. Gervais-Lambony, C. Hancock, & F. Landy (Eds.), *Justices et injustices spatiales* (pp. xx-xx). Presses universitaires de Paris Nanterre.

Tafuri, M. (1976). *Architecture and utopia: Design and capitalist development* (B. L. La Penta, Trans.). MIT Press.

Till, J. (2009). *Architecture depends.* MIT Press.

Troiani, I. (2017). Academic capitalism in architecture schools: A feminist critique of employability, 24/7 work, and entrepreneurship. In H. Frichot, C. Gabrielsson & H Runting (Eds.), *Architecture and feminisms: Ecologies, economies, technologies* (pp.170-180). Routledge. https://doi.org/10.4324/9780203729717

Vitruvius, M. P. (1960). *The ten books on architecture* (M. H. Morgan, Trans.). Dover Publications. (Original work published ca. 15 BCE)

Authors' Biographies

Mehmet Ali Gasseloğlu
Istanbul Technical University - Gebze Technical University, Istanbul, Türkiye
Driven by a commitment to spatial justice and collective agency, my work challenges the disciplinary boundaries of architecture. As a co-founder of Lokal: Research and Design Initiative, I engage in collaborative practices that center lived experience and informal spatial strategies, reimagining public space as a site of resistance and transformation. My research critically engages with the socio-political production of space, exploring how spatial practices are entangled with power, resistance, and transformation in contested urban environments. Currently, I am pursuing a PhD in Architectural Design at Istanbul Technical University and serve as a research and teaching assistant at Gebze Technical University. Through both research and pedagogy, I aim to cultivate transformative design approaches that subvert dominant systems and support the emergence of just urban futures.

S. Zeynep Yılmaz Kılıç
Middle East Technical University, Ankara, Türkiye
I see housing not merely as a building type, but as a socio-political construct shaped by capitalism, commodification, and ideology. Through my research, I investigate how the semantic and spatial dimensions of housing reflect and reproduce broader systems of inequality—and how architecture might intervene. I am a PhD candidate in Architecture at Middle East Technical University, where my work focuses on deconstructing the narratives that normalize housing as a commodity and on exploring alternative frameworks rooted in care, equity, and resistance. My academic path has intersected with multiple institutions, enabling me to engage with diverse approaches to architectural pedagogy. Across these experiences, I remain committed to critically rethinking the built environment—not as a neutral backdrop, but as a terrain of power, possibility, and transformation.

Comments by authors

on the process of writing this manifesto:

Writing this manifesto was both a reflective and generative process for us. We approached it collectively, which allowed us to bring in our disciplinary backgrounds and lived experiences. Working together helped us articulate shared struggles in architectural education, but also envision hopeful, alternative futures.

on the received comments:

The TIP/TOP comments were incredibly generative and helped us revisit our manifesto with fresh eyes. The TOP feedback affirmed our attempt to connect historical analysis with contemporary urgencies and appreciated the clarity and structure of our six principles; this was reassuring and motivating. At the same time, the TIP comments drew our attention to deeper tensions we had not fully addressed. These reflections encouraged us to think more critically about the limits of working within existing institutional structures and disciplinary vocabularies. We see these comments not just as editorial suggestions, but as invitations to continue the conversation, one that we hope to keep expanding beyond the manifesto format.

The manifesto effectively traces how architectural education evolved from guild systems through neoliberal commodification, showing how current crises are rooted in institutional history. This point is also very relevant for a lot of other disciplines!

Comments by

Aditi Natarajan

Bridging the Gap:

Transformative Higher Education through Technology-Enhanced Learning

Written by:
Akruti Murhekar,
Sarayu Madhiyazhagan,
Apoorv Agrawal

A transformative teaching approach enabling graduates to adapt to continuously changing demands of the employment market

Keywords: technology-enhanced learning, adaptability, inclusivity, lifelong learning, higher education transformation, skill development, industry partnerships, sustainable development goals (SDGs), global–local integration, agile curricula, interdisciplinary collaboration

The evolving landscape of higher education necessitates a transformative approach to address the critical skill mismatch between graduates and the continuously changing demands of the employment market. This manifesto proposes a reimagined framework for higher education that connects pedagogy and andragogy; the art and science of helping adults learn—focusing on skill development, access, and inclusivity. As technological advancements reshape the future, the urgency for upskilling has never been greater. The integration of technology-enhanced learning tools and models, which combine traditional on-campus learning with innovative digital tools, is essential for equipping learners with relevant skills that align with future job market needs.

A significant share of future employment opportunities does not yet exist and remains largely unpredictable due to the unprecedented pace of technological advancements. Consequently, higher education must prioritise equipping graduates with adaptive skills and competencies that enable them to respond effectively to evolving labour market demands.

In recent years, particularly in the Global South and India, educational policies and initiatives have been reformed by the challenges of the COVID-19 pandemic and rapid technological growth. In the Asia-Pacific region, the Learning Management Systems (LMS) market is projected to grow at a CAGR of 19.5% from 2021 to 2028, highlighting the increasing reliance on technology in education.

The United Nations' Sustainable Development Goal 4 (SDG 4) underscores the importance of inclusive and equitable quality education, advocating for lifelong learning opportunities to enhance employability, and the Sustainable Development Goal 8 (SDG 8) focuses on promoting sustained, inclusive and sustainable economic growth with productive employment and decent work for all. But seldom is there a sense of integration between the two.

Higher education should be informed by global expertise while being tailored to local contexts to ensure its effective application and relevance. Despite increased enrollment in educational institutions, an 'upskilling' challenge persists, where many students fail to acquire basic competencies necessary for adapting quickly to the constantly changing workforce. For example, disparities in educational outcomes are stark; children from less affluent backgrounds often lag significantly behind their more affluent peers in foundational skills. This inequity calls for a reevaluation of curricula to prioritise practical skills alongside academic knowledge.

The National Education Policy (NEP) 2020 in India exemplifies this shift by promoting a flexible and multidisciplinary approach that integrates technology into learning environments. It recognises the need for

educational systems to adapt rapidly to changing global demands while ensuring that all students have access to high- quality education regardless of their geographical or socio-economic status, fostering access and inclusion to higher education.

To effectively bridge the skill gap, educational institutions must foster partnerships with industry partners, employers and communities, ensuring that curricula remain relevant and responsive to labour market needs. By adopting a technology-enhanced approach that combines digital resources with hands-on experiences, higher education can create an inclusive environment that prepares diverse learners for success in an increasingly complex world. This manifesto advocates for an educational transformation that is not only responsive but also proactive in addressing the evolving challenges of today's workforce.

MANIFESTO FOR TRANSFORMATIVE HIGHER EDUCATION

BRIDGING THE GAP : A CALL TO ACTION

01 EMBRACE TECHNOLOGY ENHANCED LEARNING

Integrate traditional and digital methods for flexible educational experiences

02 FOCUS ON ADAPTABILITY AS A SKILL

Prioritise flexibility and practical skills to ensure workforce readiness

03 PROMOTE INCLUSIVITY

Ensure equitable access for all students, fostering diversity

04 ADAPT TO TECHNOLOGICAL ADVANCEMENTS

Shift to agile curricula that can adapt to new societal and industrial needs

05 RE-EVALUATE CURRICULA

Shift towards real-world applications and critical thinking

06 FOSTER INDUSTRY PARTNERSHIPS

Collaborate with employers to align education with labour market needs

07 ENCOURAGE LIFELONG LEARNING

Instill a culture of continuous education for career adaptability

08 TAILOR EDUCATION TO LOCAL CONTEXTS

Adapt strategies to reflect local cultural and economic realities

09 INTEGRATE SDG GOALS

Align initiatives with UN Sustainable Development Goals for quality education

10 UTILISE LEARNING MANAGEMENT SYSTEMS (LMS)

Facilitate personalized learning paths through effective tracking

11 CHAMPION MULTIDISCIPLINARY APPROACHES

Prepare students for complex global challenges through cross-disciplinary studies

12 PROACTIVE EDUCATIONAL TRANSFORMATION

Transform into agile and student-centred pedagogies to equip learners to future workforce needs

Join Us in Reimagining Higher Education!

This manifesto will serve as a rallying point for educators, policymakers, and institutions to rethink higher education, making it transformative, inclusive, and responsive to today's learners and tomorrow's workforce.

5 ACTION POINTS FOR 'BRIDGING THE GAP' IN HIGHER EDUCATION

Adaptability

01 Implement Adaptive Learning Technologies



Online illustrations by Storyset

Community Involvement

02 Strengthen Community Engagement



People illustrations by Storyset

Collaboration

03 Cultivate Interdisciplinary Collaboration



People illustrations by Storyset

Faculty Development

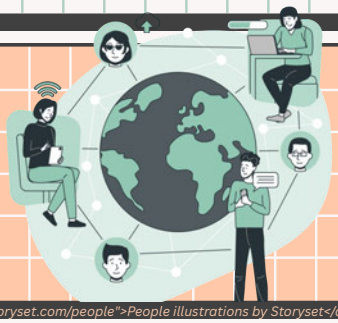
04 Enhance Faculty Training in Technology Integration



Presentation illustrations by Storyset

Global Engagement

05 Establish Global Learning Networks



People illustrations by Storyset

Figure 1: Visualisation of the manifesto. Made by the authors.

Authors

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Sarayu Madhiyazhagan | University of Texas at Austin, USA

Apoorv Agrawal | University of Dublin, Ireland

Comments by authors

on the process of writing this manifesto:

Writing the manifesto was both a reflective and collaborative process for us. working together across different institutions with exposure to different school of thought made the brainstorming process rich, this brought together each of our perspective and experiences on education systems and their challenges. The common denominator was that we all saw higher education as a bridge between academic knowledge and the evolving realities of the labour market. Writing and refining the manifesto gave us the space to merge our background in planning and design with the growing focus on user-centered technology-driven solutions in urban (education) systems.

on the received comments:

The TOP comments were valuable, helped us in refining our terminologies to better align with the manifesto's intent. The suggestions and reflections on emphasis on adaptability gave us a sharper focus on agility and lifelong learning.

This manifesto made me rethink the role of technology in learning and how we can prepare our alumni for a rapidly changing society and labour market.

Comments by

Remon Rooij

Frugal Innovation Research Event (FIRE) Program:

Igniting Human Ingenuity via Co-Creation

Written by:

Christopher Adlung,
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Meggy Kantert,
Eleonora Cammarano

Abstract

This chapter addresses the evolving role of education in solving complex problems, characterized by environmental, social, and economic disparities. We hereby contemplate on the recent development of modern academic approaches, often missing the opportunity to equip students with the skills required to seek and address real-world challenges effectively. In specific, we critique the role and development of education systems for its emphasis on extrinsic rewards, the limited integration of critical thinking, and the neglect of holistic character development of students. To contrast this development, we propose a co-creation-based educational approach via the Frugal Innovation Research Event (FIRE) program, using frugal engineering and design thinking to foster students' skills, creativity, and personal growth within the scientific community. The program integrates intercultural and interdisciplinary perspectives to foster co-creative innovation, enabling the discovery of new problems and tasks by challenging existing paradigms and addressing real-world complexities beyond the scope of established scientific approaches. By embracing local resource constraints, the program highlights human creativity and unlocks innovative potential, turning complex problems into practical, real-world solutions. This program is designed for students, but actually everyone, who is committed to becoming their most authentic and truest self, who courageously explore life, and who joyfully celebrate the power of innovation, diversity, and the full breadth of the human experience. We hope to inspire and enthusiast a large community, that is willing to embrace complex problems as a fertile ground for growth.

Keywords: Frugal Innovation, Co-creation, Complex Problems, Experimental Learning, Open Science

Glossary

Term	Meaning
Complex problem	Ambiguous, ill defined, stakeholder-dependent, interconnected problem without predefined solution, that typically occurs in dynamic, social contexts.
Frugal Engineering	An applied science and design philosophy focused on developing and creating solutions that maximize value and robust functionality, while minimizing costs and resource consumption.
Co-creation	A methodology that addresses complex problems through its emphasis on joint and collaborative efforts, creating value, both materially and symbolically.

Introduction

On a global scale, our current Anthropocene era presents societies with increasingly complex problems such as environmental degradation, economic inequities, and social disparities. The underlying problem structure presents systemic, interdependent, interdisciplinary, and multi-stakeholder characteristics, marked by inherent uncertainties, that potentially reach tipping points across scientific, economic, governmental, creative, and spiritual dimensions (O'Riordan et al., 2013). We contend, that contemporary education systems, which were often established during periods of lesser complexity, have not evolved sufficiently to provide students with the required skills to address the outlined problem structures. Furthermore, they provide limited growth opportunities to navigate problems effectively.

Historically, education was designed to equip individuals with the skills

and knowledge necessary for specific professions or tasks. However, in recent times, the pursuit of extrinsic rewards (e.g. certifications, grades) have become a dominant theme, leading to a detachment from fundamental questions. The lack of cultivating introspection (inner growth) and the missing exploration of practical tools (skills) contribute to the inability to seek respective answers. Critical thinking is often subordinated to theoretical knowledge, while limited exposure to diverse cultures repeats and fosters narrow perspectives. In light of Artificial Intelligence (AI), this becomes even more serious. The widespread use of AI poses a threat by letting humans move away from be-coming architects of their own existence, to passive prompt engineers, all while surrendering the very essence of what makes us human - being creative problem solvers. Disciplinary silos, struggling to connect with each other, hinder the integration of knowledge. The resulting academic echo chambers often remain detached from social, governmental, and economic needs. Furthermore, students are forced to uniquely choose among single disciplines to pursue career and academic paths. Moral fundamentals, especially virtues like wisdom (ability to make sound decisions), courage (upholding beliefs despite the challenge of fear), and moderation (harmony between emotions and rationality), are not ingrained into student's curriculum, leading to a lack of holistic character development and preparation for real-world challenges. Diagnosing large parts of the education systems in high-resource settings with the described characteristics, education in low-resource settings face a variety of different challenges. Extensive reforms beyond the education sector are required and should encompass curriculum alignment with societal needs, continuous teacher trainings, and better access to infrastructure, energy systems, and technology. While it is proven that education reduces poverty, drives economic growth, and improves household income, only minor changes have been achieved (Hoogeveen et al., 2019).

In summary, this presents a dual challenge for stakeholders in the education system. First, how do we create meaningful education? And second, how can novel education approaches contribute to solving the complex problems of our time? With this in mind, there is a need for an increasing focus on educational tools, allowing students to develop skills, while being engaged in self-discovery. We challenge the status quo by embracing complex problems with a co-creative program, promoting personal growth and skill development in which the individual and diverse backgrounds of students are considered as strengths. Therefore, we will employ exercises that are designed around the principles of co-creation and frugal engineering, aiming to solve complex problems in alignment with local communities. We call this program Frugal Innovation Research Event (FIRE).

Literature review

The challenges addressed in our program can be characterized as complex problems. Complexity encompasses the notion of ambiguous, ill defined, stakeholder-dependent, interconnected problems without predefined solutions, that typically occur in dynamic social contexts (Ritchey, 2011). Frugal engineering is an applied science and design philosophy focused on developing and manufacturing products that maximize value and robust functionality, while minimizing costs and resource consumption (Rao, 2022). The concept is embedded within the larger framework of frugal innovation (Moleka, 2024). Frugal engineering was chosen for its fit with low-resource settings, and its focus on simple, yet practical solutions that are rooted in creativity rather than excessive use of resources. The theoretical foundations for co-creation consists of five dimensions identified by Messiha et al. (2025), encompassing (i) multi-stakeholder collaborative action, (ii) process of co-learning towards innovation, (iii) contextual knowledge production, (iv) generating meaning, and (v) an open, trustful and inclusive dialogue.

The literature provides a strong conceptual foundation for tackling complex problems via frugal engineering within collaborative environments. However, it lacks empirical insights that systematically document problem spaces, cognitive decision-making in innovation processes, and the influence of interdisciplinarity and interculturality on co-creation.

Existing programs showcase a variety of educational approaches. For instance, the GROW program at TU Delft, supports PhD students from African settings conducting research in Europe (TU Delft, 2024). While the program is restricted to doctoral research by African students in Europe, it lacks both bi-directional exchange and an interdisciplinary component. The STEP training developed by Frese et al. emphasizes entrepreneurship via bottom-up business creation, but lacks introspective components (Frese et al., 2016).

Implementation steps

Creative output requires the integration of new insights with existing knowledge structures (Rossi, 2000). Therefore, co-creation will be operationalized by enabling students to explore the connection between external collective challenges and their individual growth journey. We match students with complementary skills, encourage collaborative learning, and facilitate an open dialogue. By engaging in experimental learning and collaborative reflection, students will synthesize the data they collect on-site into higher orders of understanding. The

program will operationalize frugal engineering in the context of skill development during the analysis and prototyping phase. The evaluation of this operationalization will be based on feedback throughout the program, assessing relevance, effectiveness, and real-world impact of the students' co-creative and frugal engineering efforts. The program aims to generate prototypes that can be further developed in business ventures (Gielnik et al., 2016). The program's evaluation will include criteria on technological readiness, documented decision-making, and student feedback. The event will integrate storytelling and social media strategies, supported by local agencies. The Godfrey Okoye University proposes the implementation of the FIRE program as an action-oriented research event, which can be integrated into the local curriculum, including academic credits.

The design-thinking process is rooted in imagination

Our program approach follows a design-thinking process (Chung, 2019), allowing students to examine the problem space of an interdisciplinary setting first, before they start developing prototype-based solutions. We hereby follow the notion of open science principles, as outlined by the Open Science Manifesto (OCSD net, 2025).

In the beginning, students will collect data that helps to understand the scope, stakeholder, and root cause of problems within single domains, e.g. healthcare, energy, water, before they examine the interdisciplinary characteristic. Next, students will engage in self-directed learning and introspection to conduct primary and secondary research to gather valuable insights, ultimately identifying and deducing opportunity clusters. Precise questions will be formulated, guiding further exploration and problem-solving. Larger problem areas will be assessed via expert panels and local community engagement prior to students entering the solution phase. Within the solution space, brainstorming sessions spark creative ideas, which are then carefully evaluated for feasibility and impact. Students will develop and present a clear vision, before building physical and virtual prototypes, that will test the effectiveness of their ideas. Via continuous learning, iteration, reason, and faith (Vladimirovna et al., 2020) improvements will be made, ultimately guiding students from a state of "don't know" to "should be". For a solution to be deemed creative, ideas must withstand evaluation as being valuable, affordable, and accessible. In the attempt to find the best possible solutions in reference to the examined problems, students will learn to compete and to collaborate. We refer to this notion as "Coopetition" (Corbo et al., 2023).

This structured process embodies the concept of imagination, which for our program holds the characteristics of a realistic, harmonious, evolving,

and collective vision. We build upon David Hume's findings, pointing out that the imaginative faculty is integral to the cognitive processes of the individual mind and to the formation of social structures (Hume, 2000). To form social structures in our program, we will incorporate interdisciplinary and intercultural dimensions which, according to Trang & Burnard et al., have an influence on creativity (Trang, 2019; Burnard et al., 2017). In our program design, we will further develop this for co-creative outcomes.

Co-creation can be enabled by interdisciplinarity and interculturality

Co-creation emerges to address complex problems through its emphasis on joint and collaborative efforts, creating value, both materially and symbolically (Galvagno et al., 2014). We claim that interdisciplinarity and interculturality, when configured and guided by scientific methods, can shape co-creative outcomes while offering an immersive education experience.

The interdisciplinarity dimension aims to move beyond traditional, domain-specific problem-solving techniques. Here, the processes involved profoundly influence each other in a network of institutions, organisations, phenomena, and stakeholders (DeTombe, 2015). To better address societal challenges, experts from diverse fields have revisited the application of scientific methods to navigate complexity (Murthy, 2000; Espinosa et al., 2008). Our interdisciplinary approach integrates data-driven insights from multiple fields, promoting systems thinking to tackle complex challenges (Da Costa Junior et al., 2019). Through experiments and field studies, students will investigate areas such as health, energy, water, thereby enhancing their understanding and uncovering interdependencies.

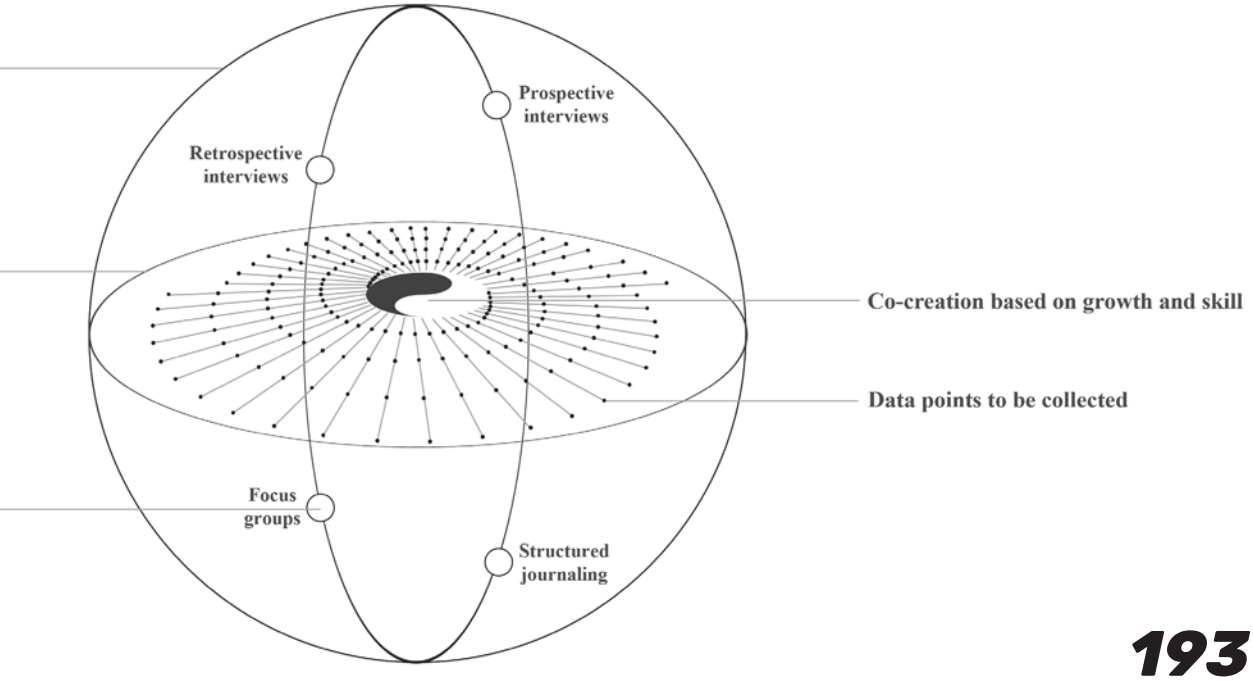
Meanwhile, intercultural collaboration enhances cognitive flexibility and problem-solving capabilities by fostering mutual understanding and empathy among participants from diverse cultural backgrounds. In specific, Stein et al. (2014) outlined that naturalistic learning settings considerably impact second language learning. Other studies demonstrate that different cultural contexts cultivate global citizenship by gaining and appreciating one's own cultural identity as well as the complexity and richness of human diversity (Pashby, 2015). In general, the intercultural dimension emphasizes the holistic development of diverse individuals by harmonizing intellect,



perception, and feeling, allowing students to identify shared human values and foster a sense of community. These components suggest that fostering communal bonds is essential for individuals to establish control over their relationship with nature and society. It is argued that exposure to foreign cultures encourages innovative problem-solving, while strengthening resilience against uncertainty and miscommunication (Deutscher Ethikrat, 2023). Central to this framework is the integration of social and technical elements to facilitate a transformative process, enabling students to channel their creativity into tangible, humanly conceived outcomes. In return, students will be able to bring forth innovations rooted in both technical expertise and humane values. Combined with the interdisciplinary dimension, students engage in co-creative outcomes.

In conclusion, we argue that both dimensions, interdisciplinarity and interculturality are required to unlock the co-creative potential needed to develop meaningful solutions for complex problems. Methods such as prospective and retrospective interviews, post-training questionnaires, journaling, and focus groups will further facilitate this exploration and knowledge integration. Figure 1 outlines the self-developed collaborative framework for co-creation at the intersection between intercultural and interdisciplinary dimensions.

Figure 1: Authors' self-developed collaborative framework for co-creation at the intersection between the intercultural and interdisciplinary dimension. Made by the authors.



Desired Outcomes

Our program highlights the increasing need for educational approaches, that address complex global challenges via creative expressions. The program will draw upon long-standing pedagogical approaches dating back to John Dewey's work on experimental learning (Ord, 2012). By embedding the program within a systematic design approach, it will demonstrate how it builds on past educational frameworks while integrating concrete outcomes, which will materialize during and after the program. The primary goal of this initiative is to explore how to cultivate co-creative outcomes in the form of non-standardized solutions, while systematically documenting (i) the problem space under examination, (ii) the cognitive processes involved in decision-making throughout the innovation process, and (iii) the resulting prototype-based solutions. This threefold outcome will enhance transparency of socio-cultural and technical assumptions, and enable context-sensitive prototype-solutions, tailored to local needs. Evaluation criteria for program success include the completeness of documentation, the degree of integration into existing curricula, and the effectiveness of prototype solutions in addressing local needs. Student outcomes will be evaluated based on affordability, accessibility, functionality, and resource-efficiency of presented solutions, along with the creativity demonstrated to overcome resource constraints. We aim to deepen the understanding of frugal innovation and its underlying principles in context-specific settings through a multidisciplinary perspective (Leliveld et al., 2023). In specific, we aim to investigate how frugal innovation addresses culturally and interdisciplinarily, complex challenges, exploring the boundaries between technical solutions and their social contexts.

Program Limitations, Anticipated Challenges and Mitigation

Our program complements formal education, but faces limitations such as time for deep engagement, measuring growth and skills outcomes, and difficulty in scaling while maintaining quality and local relevance. While our goals are ambitious, we are aware of pragmatic challenges, e.g. complex interdisciplinary work, documentation, infrastructure gaps, and cross-cultural communication. Therefore, mentoring and clear role definitions will ensure effective collaboration. Personal growth will be supported via documentation checkpoints. Local materials and partnerships will be encouraged, addressing potential resource and infrastructure gaps. Intercultural training and conflict resolution will support cross-cultural communication.

References

Bhatti, Y., Khilji, S.E., & Basu, R. (2013). Frugal Innovation. In S. E. Khilji & C. Rowley (Eds.), *Globalization, change and learning in South Asia* (pp.123-145). Chandos Publishing.

Burnard, P., Ross, V., Minors, H. J., Powell, K., Dragovic, T., & Mackinlay, E. (2017). *Building interdisciplinary and intercultural bridges: Where practice meets research and theory.* BIBACC Publishing.

Chung, W. C. (2019). *The praxis of product design in collaboration with engineering.* Springer International Publishing.

Corbo, L., Kraus, S., Vlačić, B., Dabić, M., Caputo, A., & Pellegrini, M. M. (2023). Coopetition and innovation: A review and research agenda. *Technovation, 122*, 102624. https://doi.org/10.1016/j.technovation.2023.102624

Da Costa Junior, J., Diehl, J. C., & Snelders, D. (2019). A framework for a systems design approach to complex societal problems. *Design Science, 5*, e2. https://doi.org/10.1017/dsj.2019.2

DeTombe, D. (2015). *Handling societal complexity: A study of the theory of the methodology of societal complexity and the COMPRAM methodology.* Springer.

Deutscher Ethikrat. (2023). *Interculturality.* Deutscher Ethikrat. https://www.ethikrat.org/en/topics/medicine-and-health/interculturality/

Espinosa, A., Harnden, R., & Walker, J. (2008). A complexity approach to sustainability: Stafford Beer revisited. *European Journal of Operational Research, 187*(2), 636–651. https://doi.org/10.1016/j.ejor.2007.03.025

Frese, M., Gielnik, M. M., & Mensmann, M. (2016). Psychological training for entrepreneurs to take action: Contributing to poverty reduction in developing countries. *Current Directions in Psychological Science, 25*(3), 196–202. https://doi.org/10.1177/0963721416645518

Galvagno, M., & Dalli, D. (2014). Theory of value co-creation: A systematic literature review. *Managing Service Quality, 24*(6), 643–683. https://doi.org/10.1108/MSQ-09-2014-0187

Gielnik, M. M., Uy, M. A., Funken, R., & Bischoff, K. M. (2017). Boosting and sustaining passion: A long-term perspective on the effects of entrepreneurship training. *Journal of Business Venturing, 32*(3), 334–353. https://doi.org/10.1016/j.jbusvent.2016.12.001

Hoogeveen, J., & Rossi, M. (2019). Transforming education outcomes in Africa: Learning from Togo (p. 103). Springer Nature.

Hume, D. (2000). *A treatise of human nature.* Oxford University Press.

Leliveld, A., & Knorringa, P. (2018). Frugal innovation and development research. *The European Journal of Development Research, 30*, 1–16. https://doi.org/10.1057/s41287-017-0123-8

Leliveld, A., Bhaduri, S., Knorringa, P., & van Beers, C. (2023). Capturing frugal innovation: Introduction to the Handbook on Frugal Innovation. In A. Leliveld, S. Bhaduri, P. Knorringa, & C. van Beers (Eds.), *Handbook on Frugal Innovation* (pp. 1-26). Edward Elgar Publishing. https://doi.org/10.4337/9781788118873.00007

Messiha, K., Altenburg, T. M., Giné-Garriga, M., Chastin, S., & Chinapaw, M. J. (2025). Enriching the existing knowledge about co-creation: Identifying dimensions of co-creation using explicit theory in various research fields. *Minerva*, 1–24. https://doi.org/10.1007/s11024-

025-09491-1

Moleka, P. (2024). Frugal innovation for inclusive and sustainable development in Africa. *Advanced Research in Economics and Business Strategy, 5*(1), 107–117. https://doi.org/10.5281/zenodo.1234567

Murthy, P. N. (2000). Complex societal problem solving: A possible set of methodological criteria. *Systems Research and Behavioral Science, 17*(1), 73–101. https://doi.org/10.1002/(SICI)1099-1743(200001/02)17:1<73::AID-SRES200>3.0.CO;2-O

Open and Collaborative Science in Development Network (OCSD net). (2025). *Open science manifesto.* OCSD net. https://ocsdnet.org/manifesto/open-science-manifesto/

Ord, J. (2012). John Dewey and experiential learning: Developing the theory of youth work. *Youth & Policy, 108*(1), 55–72. https://doi.org/10.1080/09537325.2012.10780745

O'Riordan, T., & Lenton, T. (2013). *Addressing tipping points for a precarious future.* Oxford University Press.

Pashby, K. (2015). Conflations, possibilities, and foreclosures: Global citizenship education in a multicultural context. *Curriculum Inquiry, 45*(4), 345–366. https://doi.org/10.1080/03626784.2015.1060141

Rao, B.C. (2022). Frugal engineering. In P. Régnier, D. Frey, S. Pierre, K. Varghese, and P. Wild (Eds.), *Handbook of innovation & appropriate technologies for international development*(pp. 140-153). Edward Elgar Publishing. https://doi.org/10.4337/9781800885001.00013

Ritchey, T. (2011). *Wicked problems–social messes: Decision support modelling with morphological analysis* (Vol. 17). Springer Science & Business Media.

Rossi, E. L. (2000). *Dreams, consciousness, spirit: The quantum experience of self-reflection and co-creation.* Zeig Tucker & Theisen Publishers.

Stein, M., Winkler, C., Kaiser, A., & Dierks, T. (2014). Structural brain changes related to bilingualism: Does immersion make a difference? *Frontiers in Psychology, 5*, 1116. https://doi.org/10.3389/fpsyg.2014.01116

Tang, M. (2019). Fostering creativity in intercultural and interdisciplinary teams: The VICTORY model. *Frontiers in Psychology, 10*, 2020. https://doi.org/10.3389/fpsyg.2019.02020

TU Delft. (2024). *New research programme to address urgent challenges in Africa: GROW Program.*https://www.tudelft.nl/2023/global/nieuw-onderzoeksprogramma-voor-urgente-uitdagingen-in-afrika

Vladimirovna, S. A., Nikolaevna, T. O., Anatolyevna, D. M., Vladimirovna, I. E., & Vasilyevna, K. O. (2020). Scientific creativity: Philosophical aspect. *European Proceedings of Social and Behavioural Sciences*, 1–14. https://doi.org/10.15405/epsbs.2020.07.02.30

Authors' Biographies

Christopher Adlung is an external, self-funded PhD Researcher in the Faculty of Technology, Policy, and Management at the Technical University in Delft. His research focusses on the interplay between digital health technology and frugal innovation in low-resource settings. He is the Founder and CEO of TAIRIS Medical B.V., where he is building public–private–academic partnerships to transform healthcare systems.

Arie Adriaensen is currently an Assistant Professor at the Faculty of Technology, Policy and Management at TU Delft in the Netherlands. His work revolves around socio-technical engineering and Resilience Engineering. He currently chairs the Young Talents program of the Resilience Engineering Association and he co-chairs the TC Resilience Engineering of the International Ergonomics Association.

Maartje Van Den Bogaard is an Associate Professor at the UTEP College of Education in El Paso, Texas. She is a mission-driven education expert committed to innovative, sustainable solutions and equal access in higher education.

Meggy Kantert is an International Liaison Officer and is currently a PhD student at the Faculty of Political Science at Godfrey Okoye University in Nigeria. Her research focuses on entrepreneurship as a key strategy for poverty alleviation in developing countries.

Eleonora Cammarano is a Lectures Assistant at Johns Hopkins School of Advanced International Studies (SAIS). Her main interests are in the intersection of climate change and security, gender perspectives, Global South perspectives, and cybersecurity.

Comments by authors

on the process of writing this manifesto:

We had a collective way to share ideas, thoughts, and concepts among all participants. This not only enriched the outcome, but also grounded the paper in light of different perspectives.

on the received comments:

The reflections and comments from the reviewers helped to sharpen the methods and desired outcomes of the paper. We are very grateful for taking the time to review out findings.

I thank authors coming from universities in the Netherlands, USA and Nigeria to share their ideas on the need to address societal challenges and hopefully also education in a frugal way. The needs and constraints of today's world remind us to come together and be creative and imaginative while considering scientific methods for prospective and retrospective insights into the process. Thanks for sharing your ambitions and ideas to pursue the principles outlined. I believe that we can learn from the efforts made at each university.

Comments by

Juliette Cortes-Arevalo

Learning in the Field for Responsible Design

Written by:

Diwen Tan,
So Yeon Park

Abstract

This manifesto uses education as a medium to bridge research and practice in architecture and urbanism, while stimulating critical thinking and enhancing ecological and social awareness among students in the pursuit of responsible design.
Since the late 20th century, architects, urban designers, and planners have made efforts to address challenges associated with climate change, urbanisation, and environmental degradation. Researchers have proposed concepts, such as 'landscape as urbanism', to invoke a new way of understanding and intervening in urban and rural environments. For these efforts to have a wide impact, they require public resonance. On-the-ground projects must leverage existing networks and values and foster conscious behaviours.
However, numerous projects failed to achieve this by following the conventional practices, thus limiting their societal implications and sometimes proving counterproductive. A huge gap rests between academic research and design practice at different scales, from interior space to urban landscape.
In this regard, we argue that this gap should be addressed by reshaping education in higher education institutions, where researchers and current and future practitioners (students) naturally converge.
Effective design requires a sound basis of field understanding, which extends beyond merely visual spatial information to include the ability to recognise human interactions embedded in the context. In this manifesto, with a specific example, we detail fieldwork methodologies that illustrate key information to examine and how to tailor this information considering its applicability in the process of design. We then propose a transdisciplinary, hands-on curriculum focused on approaching responsible design through fieldwork in architecture and urbanism.

Keywords: fieldwork methods, design practice, responsible design, transdisciplinary education

1. Education, research, and practice

Since the late 20th century, architects, urban designers, and planners have made tremendous efforts to address societal challenges such as climate change, urbanisation, and environmental degradation (Avermaete & Gosseye, 2023). For example, some researchers have proposed the concept of 'landscape as urbanism' to invoke a new way of understanding and intervening in urban and rural environments. While being meaningful, these efforts often fail to have a broader impact or gain widespread public resonance, mainly because of the persistent disconnect between research and practice.

Researchers' ideas often remain within academia and are not aligned with the realities of practice, including cultural norms, community needs, and other aspects involving the human dimension; practitioners may prioritize immediate project goals and aesthetic concerns over incorporating research-driven insights. This gap results in projects that lack contextual sensitivity and thus fail to foster sustainable change.

This manifesto uses education as a critical medium to bridge research and practice in architecture and urbanism (Figure 1). Universities, as intersections of theoretical research and practical application, are uniquely suited to address this gap, bringing together diverse communities of students (future practitioners), researchers, designers, and other professionals. Through education, these groups can collaboratively engage in design and research. By stimulating critical thinking, encouraging immersive fieldwork, and promoting transdisciplinary approaches, education can provide future practitioners with skills and knowledge to translate research into context-sensitive solutions.



Figure 1: Diagram illustrating education as the potential bridge between research and practice in the fields of architecture and urbanism

Our argument aligns with insights gathered from informal talks with students enrolled in master's programmes in architecture and urbanism at TU Delft[1]. These students generally exhibited enthusiasm for sustainability, often holding a strong position on contemporary paradigms, challenges, and design and planning practices. The research and design package at TU Delft includes design studios that run throughout the first academic year (one studio per quarter), complemented by lectures and workshops on theory and methodology.

However, a closer examination of the curriculum has revealed a certain limitation. For example, the mapping analysis primarily draws on the given GIS data and literature of contexts for each design project. Fieldwork, though always required, is conducted by students themselves intensively in 1-2 days, concentrating on a pre-chosen broad topic (often spatial elements such as public space or water). The talks with students imply a lack of full attention to the process of being in the field and potentials of the field, and that insights gained are limited to a small scale (e.g., street level) that is only concerned with space use, building function, and atmosphere. Thus, the analysis focuses more on aesthetic forms and composition than behaviours and spatial practices. This gap affects the design development phase as well. Designs are often developed by an intuitive vision and several strategies within the given method themes, yet they are not necessarily informed by historical contexts or in-depth analyses of the surrounding environment. This approach risks creating homogenous digital mappings and raises questions regarding the accountability and contextual relevance of design proposals.

This lack of comprehensive and careful understanding and investigation of the 'field', both in practice and education, often overlooks important aspects such as human interactions and the 'embeddedness' of place. In this regard, we argue that education in higher institutions must evolve. By restructuring curricula to emphasize immersive fieldwork, critical reflection, and integration of theoretical inquiry with creative application, education can foster greater contextual sensitivity and societal responsibility in future practitioners.

[1] The evidence is gained based on informal talks with students who graduated from MSc Architecture, Urbanism and Building Sciences, especially those in tracks of Architecture, Urbanism, and Landscape Architecture, in addition to the authors' teaching experiences. Though with limited numbers, we were able to extract coherent insights. The questions used include: "How do you come up with design strategies? How do you do the spatial analysis, based on what materials and information? How do teachers guide for and in the field? How do you read the study site? How do you integrate site analysis results into design?"

2.‘The field’: From reading to acting

2.1 Investigating China’s urban villages: between tradition and modernity

Can ‘the field’ tell us the story itself and inform a more inclusive and responsible design? To illustrate how education can bridge the gap between research and practice, we introduce an ongoing doctoral research project at the department of Urbanism, TU Delft, which explores future inclusive urbanism by understanding the coexistence of tradition and modernity (social-spatial and ecological practices in particular) in China’s metropolitan areas and their implicit values in a post-growth city. The fieldwork is an essential part of the research that invites the researcher to ‘experience’ the field (Okely, 2012) to understand the local reality of any space, territory, or landscape, which is a cultural construct consisting of contested layers and embedded in a wider context.

The rapid development and urbanisation in China are often facilitated by the planning perspective of a city without history, in a process of construction, destruction, and reconstruction. While building a ‘generic city’ with names like global city, eco-city, or innovative city, the reality shows more complex, varied, and even contested landscapes with the persistence of villages in a city like Shenzhen. These villages as a whole indeed carry the past and present of the city. Despite being labelled as problematic ‘urban village’, which implies being left behind of progress and modernisation and a negative connotation of crimes and urban poverty, they also generate opportunities endogenously as being outside of the formal regime.

2.2 Fieldwork as a method

With the preliminary topic on examining traditions and heritage values of villages in Shenzhen under the veil of rapid but uneven development, the researcher started her first 3-month intensive fieldwork in 2023. The fieldwork was purposive, but also flexible enough to allow the explorative process to take off, driven by the researcher’s curiosity and plural perspectives of ‘encounters’. Drawing on urban studies (architectural perspective) and anthropology, the fieldwork was carried out with mixed methods of observation, narrative interviews, and architectural ethnographic mapping. This multi-methodological approach is more than a simple combination of different methods; it aims to foster innovation and critical thinking.

Observation began with a general survey for an initial comprehensive understanding of the site, before gradually moving to a ‘dive-in’ status. Spatial configuration, demography, rhythms of activities (what, when, and

where people do), as well as self-experience (e.g., first impression) were elements considered as what constitutes a field. Ethnographic drawings (Kaijima et al., 2018) were used to visually map the observed spatial characteristics and interactions among individuals and their surroundings in an analytical way. Rather than focusing solely on form and composition, the drawing process allowed the researcher to mimic the production process of space and reexamine architectural typology from a spatial practice point of view.

The act of drawing requires keeping looking for a relatively long time, which most people today have forgotten how to do it[2]. Drawing trained the researcher how to observe things with patience to be able to dig under the surface. What the researcher had overlooked became visible, such as Mao's portrait painted on the door lintel of a private house, which was used to replace the previous trace of religious beliefs, though being faded and partially obstructed by exposed electrical wires. This indeed demonstrates how history is layered and tradition seems lost but has left traces. Creating sketches and drawings on site also encouraged 'encounters' naturally with diverse population. Listening was the basic principle for interviews to probe a deeper understanding of spatial practices, everyday lived experiences, and their expectations. These casual talks were repeated to increase the reliability of the oral narratives.

The result of what you 'see' (which includes all sensual information) could transcend time and space. By combining different movements in time within one drawing, the researcher articulated simultaneity, revealing multiple meanings of a location (Figure 2). It was not about how many maps or drawings to create, but about delivering an analytical message and highlighting values of the site, which a photograph cannot achieve.

Data collection is never static. As fieldwork furthered, the researcher moved beyond the threshold of acceptance towards the understanding of what she was seeking, exactly as Rabinow (2007) reflected. It was time to question herself and the topic as to the state of data. The traditions, her initial topic, especially those conventional heritages such as fengshui practice and architectural materiality, have been lost in simplified memory. It turns out that villages themselves also pursued the appearance of modernisation. It was time to rethink what traditions are and what lived experiences mean. The questions were reformulated into: what are values of these villages as non-places, being neither urban nor rural? What are forms of tradition in the present and how do they interact with modernity? Gradually, by refining drawings as a reflection, a hypothesis arose that the past lives in the present with traditions embedded in forms of names, artefacts, buildings, and, more notably, daily practices. Villages are places where traditional and modern layers intersect and create a potential hybridity.

[2] The average time for looking at a graphic on small screen probably similar to the average shot length of 2.5 seconds.

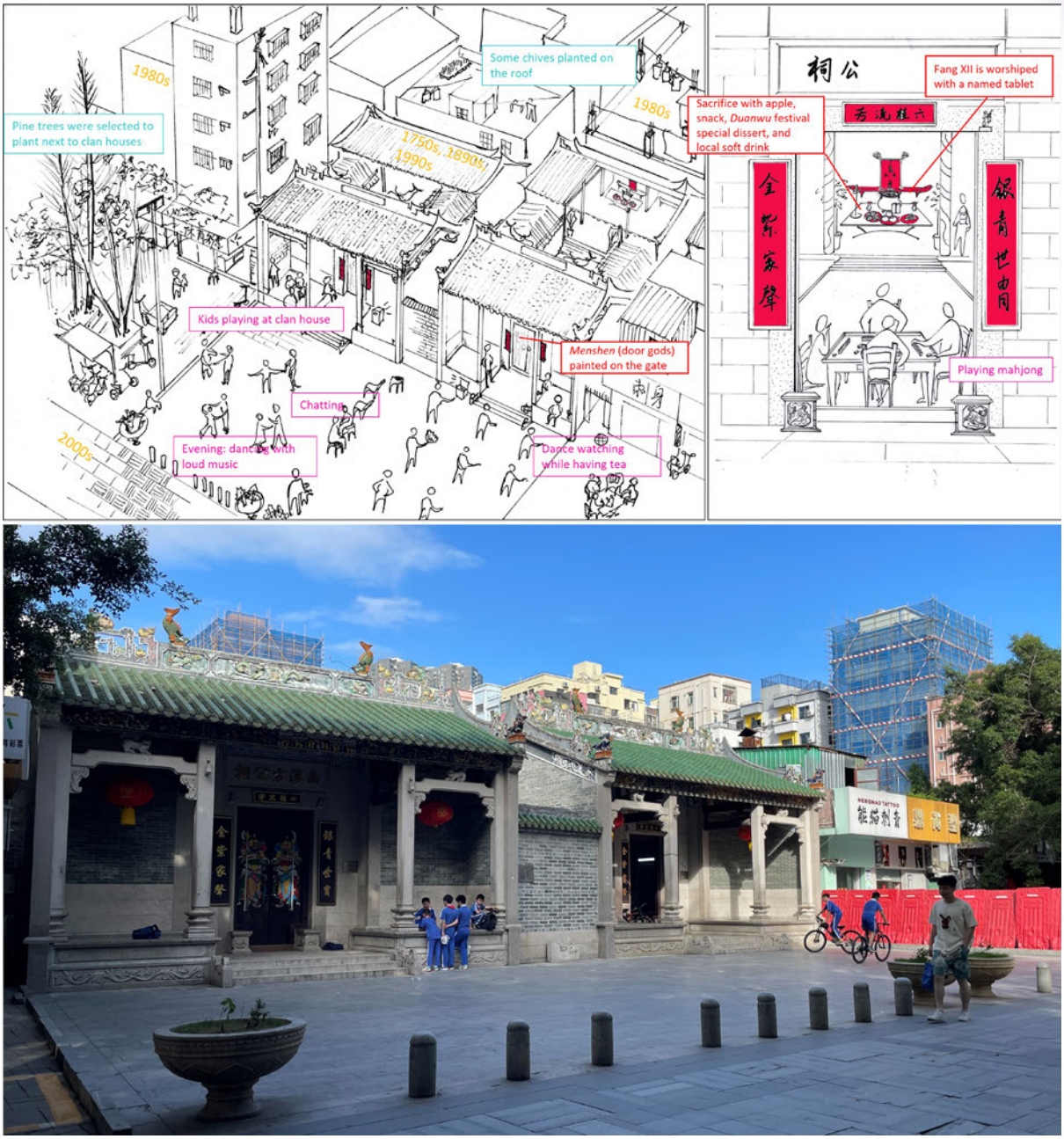


Figure 2: Using architectural ethnographic drawings to interpret and analyse data collected during the fieldwork. This research draws only qualitative data. Quantitative data can also be included, according to research objectives. Made by the authors.

2.3 Lessons from the field

Following a nuanced understanding and reflecting on the ongoing redevelopment project, alternative principles were proposed to guide future design and planning for a more inclusive approach. They are: step 1 reading a place as a network rather than from a zoning perspective; step 2 recognising the existing values; and step 3 (strategically) embedding or designing the state's vision of programmes and functions with consideration for the networks and layers of a place (Tan & Nguyen, 2024). Different from making a compromise among different or even paradox voices, this aims to mediate between state and local actors, and between formal regulative plans and informal practices.

Fieldwork is rather an explorative process. The preliminary topic and research questions help to focus, but 'being in the field' with an open mind, careful looking and listening allows you to be discursive in order to find a place's values. Fieldwork is not about justifying problems by collecting additional information from the field and adding it to the initial mappings and preproposed topic and theme(s). It is an important approach for reformulating problems, reframing themes, drawing upon what you 'see' and what you experience with encounters in the time and space, within the interconnected social, economic, and environmental contexts. It is these more nuanced and comprehensive readings of the existing in the field that bear the potentials for future actions towards socially and environmentally responsible design.

3. Fieldwork as transdisciplinary education agenda

We advocate that a transdisciplinary, hands-on curriculum focusing on approaching responsible design be developed through reintroducing fieldwork as a form of 'critical realism' (Ewing, 2011) and integrating it into design studios (Figure 3). The current curriculum is structured with a focus on knowledge and contextual literature (step 1) as well as design with visions and development of a toolkit for transformations (steps 6-7). Students are directed by the predefined themes (e.g., water, agriculture, and circularity) to dig problems, frame questions, and envision the future, rather than drawing from the field. Fieldwork is merely used for justification.

Thus, we emphasise the necessity of incorporating and strengthening four essential principles (steps 2-5). Reading and Encounters are what are missing from the current education and need to be added to train students how to 'see' and analyse what they 'see' in the field, using interdisciplinary methods. Practical knowledge thus engages with critical thinking over time. Themes and (Re)framing steps can be carried out

differently with a deeper understanding of the networked contexts and possible site values, which then lead to responsible actions.

We propose an optional hands-on session as part of the studio(s) during the first semester of the master's programme. This session may span three weeks for a quarter-long studio, focusing on methods for reading and being in the field while giving insights into site analysis. It can also be extended into a semester-long session that spans two studios, giving more emphasis on the reframing step. In both cases, intensive fieldwork will be applied. We anticipate that the educational approach, proposed through this manifesto, will not only bridge the gap between research and practice but also foster deeper contextual awareness and social responsibility among future practitioners.

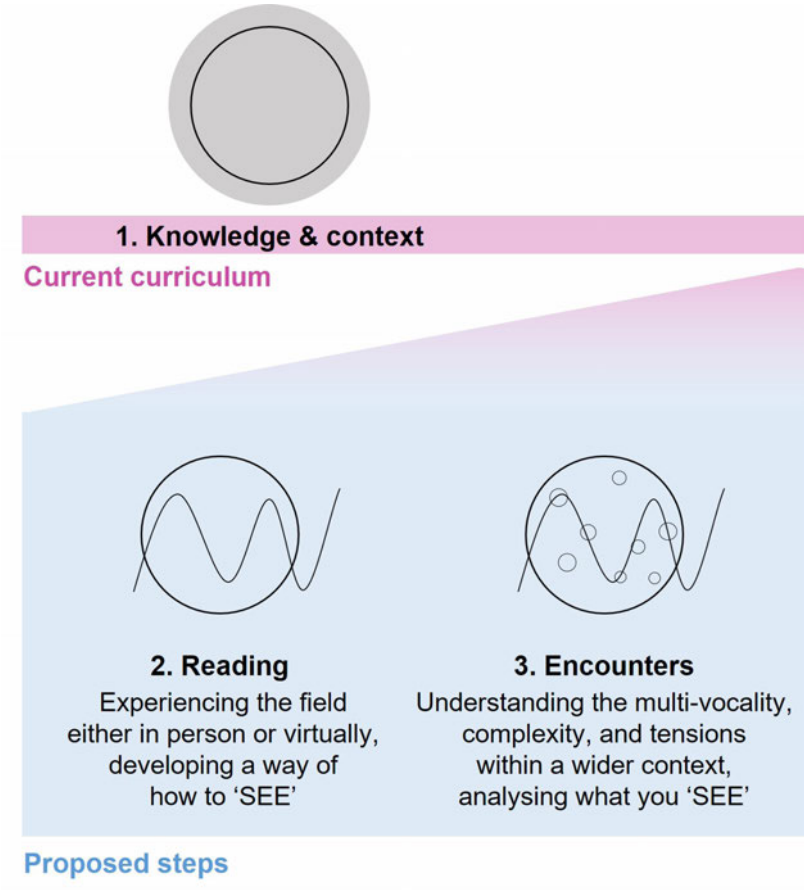
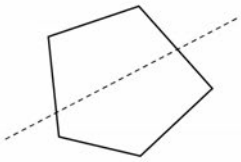
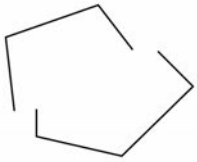


Figure 3: Hands-on course curriculum redeveloped by reintroducing and incorporating fieldwork. Image created by the authors based on Dorst et al. (2016).



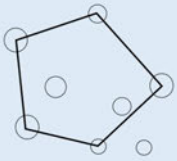


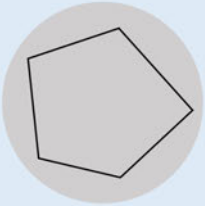
6. Futures

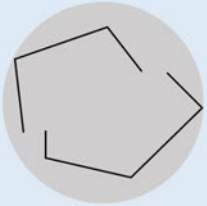
Exploring possibilities:
what qualities to intensify?
what could be the outcomes
?

7. Transforming

Investigating design strategies
for community's collective ima
gination







4. Themes

Recognising values
of a place, based on the criti
cal appraisal of contexts

5. (Re)framing

Reframing questions and fo
rmulating hypothesis based
on the existing knowledge p
ool

8. Learnings

Drawing lessons
in a long-term perspective

Acknowledgements

We thank our respondents, alumni and current students from MSc Architecture, Urbanism and Building Sciences, for giving unstintingly of their time.

References

Avermaete, T., & Gosseye, J. (2023). *Urban design in the 20th century: A history.* gta Verlag.

Dorst, K., Kaldor, L., Klippan, L., & Watson, R. (2016). *Designing for the common good.* BIS Publishers.

Ewing, S. (2011). Introduction. In S. Ewing, J. M. McGowan, C. Speed, & V. C. Bernie (Eds.), *Architecture and field/work* (pp. 1–3). Routledge.

Kaijima, M., Stadler, L., & Iseki, Y. (2018). *Architectural ethnography.* TOTO Publishing.

Okely, J. (2012). *Anthropological practice: Fieldwork and the ethnographic method* (1st ed.). Routledge.

Rabinow, P. (2007). *Reflections on fieldwork in Morocco* (2nd ed.). University of California Press.

Tan, D., & Nguyen, M. Q. (2024). Beyond the palimpsest: Traditions and modernity in urban villages of Shenzhen, China. *Cities, 151*, 105093. https://doi.org/10.1016/j.cities.2024.105093

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So Yeon Park is an assistant professor at the School of Architecture, Seoul National University of Science and Technology, South Korea. She earned her PhD in Architecture from Korea University and worked as a postdoctoral researcher at Delft University of Technology. Her expertise lies in analysing human behaviour in built environments using various methods, including VR experiments, surveys, interviews, systematic observations, and simulations. Her research provides evidence-based design strategies to enhance individuals' physical, emotional, and psychological well-being.

Comments by authors

on the process of writing this manifesto:

We both are satisfied with our cooperation process and output. Discussions we had really shaped a better thought. From an initial idea to a more concrete manifesto, it is also process of reflection backwards and forwards. We both enjoyed a lot.

on the received comments:

We appreciate the commentator's feedback. It pushed us to think further about a possible actionable step. We now wish our proposal could be realised and tested in the near future.

This manifesto motivates me to encourage my students to engage in critical field work. I will use some of the practical exercises mentioned in this manifesto in my teaching and suggest them to students who are planning to.

Comments by

Geertje Slingerland

Realizing the Promises of Transdisciplinarity

Written by:

Dr. Wander M. van Baalen,
Thijs Heijmeskamp,
Dr. Steven Flipse

This contribution is written as collective

Abstract

We live in numerous crises, ranging from environmental crises, food crises, a cost-of-living- crisis, a housing crisis, and so on. The climate crisis, as our planetary plundering is euphemistically referred to, is not something we can entirely prevent anymore but is already here, devastating current and future possibilities for human and more-than-human livelihoods. The prevailing academic response to the plethora of crises appears to be the relentless production of scientific articles, surveys, and reports, thereby only offering ever more detailed analyses of the scale and rate of our web of life's demise. As educators and scholars, we must reimagine how we teach and learn in order to better formulate and address the challenges we face.

Transdisciplinary education has regained traction as a transformative approach that promises reshape how we teach, learn, and research, enabling us to better understand and respond to the complex, interconnected challenges that define our current predicament. However, engaging in transdisciplinary education and delivering its promises is no easy task. We propose five challenges that we believe to be essential for, and constitutive of, doing transdisciplinarity well. These challenges are: a) the challenge of multiplicity, b) the challenge of friction, c) the challenge of normativity, d) the challenge of judgment, and, e) the challenge of imagination. Taken together, we propose that embracing the challenges constitute an *ethos of staying with the trouble* that should inform transdisciplinary education. An ethos of staying with the trouble is about a recognition of the interdependencies of various issues in the world, but also the recognition that we are part of, and our practices may be constitutive of the issues we seek to address.

Keywords: Multiplicity, friction, normativity, judgment, imagination

Introduction

Numerous crises surround us, ranging from environmental crises, food crises, a cost-of-living- crisis, a housing crisis, and so on. The climate crisis, as our planetary plundering (Schinkel and Van Reekum, 2019, p. 11) is euphemistically referred to, is not something we can prevent, but is already here, devastating current and future possibilities for human and more-than-human livelihoods. With 2024 recorded as the warmest year on record (WMO, 2025) and predicted to set another record for global carbon emissions (WMO, 2024), the UN Climate Change Conference held in oil-rich Azerbaijan felt like a farcical performance. The proposed $250 billion a year to help vulnerable nations weather the effects of climate catastrophe was received as a "slap in the face" by people in developing nations and small islands.

The prevailing academic response to the plethora of crises - both shaped by and exacerbating existing inequalities - appears to be the relentless production of scientific articles, surveys, and reports, thereby only offering ever more detailed analyses of the scale and rate of our web of life's demise. With increasing methodological and theoretical sophistication, we have been able "to keep a tally of the expanding death around us" (Racimo et al., 2022, p. 2). Alongside many others, we recognize that this must change. As educators and scholars, we must reimagine how we teach and learn in order to better formulate and address the challenges we face.

Amidst multiple crises and a widespread inability to address them effectively, transdisciplinarity has regained traction as a transformative approach to knowledge production. It promises to reshape how we teach, learn, and research, enabling us to better understand and respond to the complex, interconnected challenges that define our current predicament. Within transdisciplinary education, teaching and learning is a collective and collaborative endeavor across disciplines and with actors outside academic institutions. It is this collaboration with academic outsiders as knowledge producers that sets a transdisciplinary approach apart from multi- and interdisciplinary approaches. Transdisciplinarity challenges the supposed sufficiency of mere disciplinary approaches to education and research in formulating and responding to the complex issues before us. In this sense, transdisciplinarity flies in the face of well-known academic cries for 'more autonomy' or 'more independence' (Van Baalen 2023), therefore we propose to understand transdisciplinarity as a search for better dependence.

However, engaging in transdisciplinary education and delivering on its promises is no easy task. In the following sections, we propose five challenges that we believe to be essential for, and constitutive

of, doing transdisciplinarity well. These challenges emerge from our teaching experiences, theoretical engagements, and many invaluable conversations with teachers, students, and scholars within the Convergence consortium. As productive challenges tend to do, they overlap and collapse into each other. They do not follow the accounting logic of a checklist but rather are to be taken as a framework for critical reflection and action. They invite ongoing dynamic engagement with the complexities and contradictions inherent in transdisciplinary work. Taken together, we propose that embracing the challenges constitute an *ethos of staying with the trouble* that should inform transdisciplinary education (cf., Haraway, 2016). An ethos understood as a purposeful practical attitude of responding. In our educational work and in this manifesto, we are committed to maintaining and further cultivating the transformative potential that we discern in transdisciplinarity.

The Challenge of Multiplicity

The first thing to recognize is that transdisciplinarity is always irreducibly multiple. It is a productively contested concept, and it houses a wide variety of practices under its banner. We argue that this contestation is a good thing, and there is no additional merit in striving for a definite account of transdisciplinarity. First, because the continued relevance of the concept precisely stems from its capacity to invite a wide variety of actors into discussions about what constitutes 'good education' or 'good knowledge production.' It thereby invites us to see anew our taken for granted modes of education and it opens a space where we can begin to talk about the purpose of education again, breaking away from merely legitimizing our work in "the language of the company report" (Collini 2018, p. 17). The dialogue is not an obstruction to 'doing effective transdisciplinarity' but is precisely the point.

In addition to its continuously contested conceptual status, transdisciplinarity is characterized by a rich diversity of practices unfolding under its name. We argue that this diversity is, again, a strength. Transdisciplinary practices emphasize the situated nature of knowledge production, which resists the imposition of epistemological formalism or a forceful ambition to "scale up" any single version of transdisciplinarity in the form of a fixed method and fixed curriculum. Instead, how transdisciplinarity is exercised depends on the particulars of the situation and the concerns of those that are involved, which cannot be established outside of the transdisciplinary process itself.

The challenge of multiplicity, therefore, calls for a critical appreciation and cultivation of both the conceptual and practical diversity of transdisciplinarity. Far from being a weakness to resolve, this multiplicity

is a vital strength, one that ensures the enduring relevance and adaptability of transdisciplinary approaches.

The Challenge of Friction

The Challenge of Friction begins with the idea of transdisciplinarity in education as *an encounter across difference*. This encounter inherently brings with it frictions, conflicts, and paradoxes that arise from the coming-together of people with diverse disciplinary backgrounds, worldviews, and practices. Instead of avoiding or minimizing these tensions, transdisciplinary education should embrace them as opportunities for productive pedagogical moments. Friction provides a space to uncover what is at stake and to critically examine how different disciplinary approaches to concepts like "data" or "research" can clash or align.

This approach urges transdisciplinary advocates to move beyond the initial Charter of Transdisciplinarity, which calls for *tolerance* of ideas and truths that differ from our own. While tolerance may be a starting point, it is insufficient within the context of transdisciplinary education. Friction should not merely lead to passive recognition of differences but rather to active, critical engagement with one another's ways of working and understanding the world. Such engagements push beyond coexistence toward meaningful interdependence and collaboration.

The Challenge of Normativity

The imperative to *do better*, whether in education or knowledge production, is a recurring theme in nearly all writings on transdisciplinarity. As our introductory anecdote suggested, however, the climate solutions proposed by the mouthpieces of the fossil fuel industry might be a catastrophe for large swaths of human and more-than-human lives on this planet. That is to say, what this *better* entails is by no means a straightforward matter. For those engaged in transdisciplinary teaching and learning, the challenge lies in making explicit and putting up for debate the inherent normativity embedded in matters of knowledge production.

Although we work from a tradition that recognizes the noninnocence of both education and research, many of our peers might feel wary of damaging their credibility by getting involved in addressing societal issues. We wish to counter this negative dread, while empirically unfounded (Kotcher et al. 2017), with a positive proposal. Rather than worrying about losing credibility, the questions to entertain are 'to whom do you wish to be credible through your transdisciplinary work?' and, 'who

deserves to be the arbiter of what counts as credibility?' These questions demand careful collective reflection in transdisciplinary education. They resist universal answers and instead gain potency through their situated, context-specific considerations. Wrestling with these issues is not a hindrance but an essential component of doing transdisciplinary education well.

The Challenge of Judgment

The situated nature of the issues that transdisciplinarity aims to engage with, the friction that arises from different perspectives, backgrounds, methods, and the inherent normativity of knowledge production call for moments of judgment. The challenge of judgment lies in the impossibility for experts to fully determine beforehand what the problem is, who is affected and in what way, what method should be used, what are possible solutions, etc. This is because the very nature of wicked problems and grand societal challenges is that they escape disciplinary understanding. We must make judgments about these issues within the transdisciplinary process itself.

This starts with describing the problem that the particular educational setting is organized around. There is an epistemological difference between recognizing something is amiss and knowing what the problem is. To problematize is not simple observation, it involves judgments about who and what is included, whose concerns are prioritized or dismissed, and what kind of worlds we aim to (re)create. Because of the contextual sensitivity of the problems that transdisciplinary education aims at, diverse perspectives and knowledges are necessary. The challenge therefore lies in the need for judgments that follow from a collective transdisciplinary process and establish new collective normative ideas.

This judgment is not a one-off moment, as a problem is usually not established but refined throughout the process, requiring new judgments. The same holds for possible solutions and validation of the educational process, each involving judgments that follow from a collective process. This process will inevitably involve its fair share of tensions and frictions, which should be embraced rather than feared. The challenge lies in that we cannot solely rely on expert judgment and knowledge as such, but that judgment is organized in such a manner that no disciplinary perspective is a priori leading.

The Challenge of Imagination

Transdisciplinary education, by its very nature, always carries a speculative dimension. It not only engages with "what is" questions but also embraces the challenge of asking "what if" questions. From its earliest conception, transdisciplinarity has been an explicitly normative project, operating with the awareness that its practices unfold within an already normatively laden and messy world. This means that, sooner or later, transdisciplinary education encounters the question: What kinds of worlds do we hope to (re)create through our transdisciplinary practices?

To engage meaningfully with this question, we must learn to quiet the inner voice that is always quick to narrow the horizon of possibilities. The voice that reins in our imagination and insists, *that's just the way things are*. The pedagogical challenge, then, is to cultivate conditions that nurture our collective imagination. Transdisciplinary education is particularly well suited for this task. Its inherently frictional nature creates opportunities to momentarily estrange ourselves from our disciplinary and personal habits. Our taken-for-granted ways of conducting research and framing problems are disrupted, creating fissures that should be pedagogically seized to reimagine both what is and what ought to be.

A helpful starting point to challenge the authority of our 'realist inner voice' is to collectively entertain the question posed by Liboiron and Lepawsky (2022, p. 143): "Rather than starting with the idea of feasibility based on existing systems and power relations, what specifically makes this problem seem impossible to solve, and how do we change that so the problem is no longer impossible?" This reframing shifts our focus from passively accepting limitations to actively imagining pathways for transdisciplinary transformations.

Conclusion

We have written this text because we were inspired by the transformative promises that always accompany the term transdisciplinarity: its promise to work towards a mode of education and knowledge production better equipped to analyze and intervene in our current predicament. Its promise to work, in diverse ensembles, towards better tomorrows. We are committed to realizing the promises of transdisciplinarity, but we did not fail to see that part of the promise was *work*.

The work lies in embracing the challenges we have proposed: The Challenge of Multiplicity, Friction, Normativity, Judgment, and Imagination. Committing oneself to this constellation of challenges is what constitutes practicing an *ethos of staying with the trouble* that

should always inform transdisciplinary education. This commitment does not remain abstract; it materializes as a worldly encounter, where we may think together, make a fuss together, learn new things, and engage in the risks and joys of composing better worlds (Haraway, 2016, p. 15).

And as transdisciplinary discourse continuously teaches us, this work is not something that should, or even *can* be done in isolation. It is about a recognition of the interdependencies of various issues in the world, but also the recognition that we are part of, and our practices may be constitutive of the issues we seek to address. In changing the world, we invariably change ourselves. In coming together in a transdisciplinary ensemble, the 'we' that started it, will not be the same at the end of the journey. That is what 'we' mean when we say that transdisciplinarity, done well, is never a mere coming-together, but also a becoming- together.

Acknowledgements

We would like to thank Sake Zijlstra for his generous contributions to this manifesto.

References

Collini, S. (2018). *Speaking of universities.* Verso Books.

Haraway, D. J. (2016). *Staying with the trouble.* Duke University Press. https://doi.org/10.1215/9780822373780

Kotcher, J. E., Maibach, E. W., Miller, J., Frumkin, H., & Leiserowitz, A. (2017). Does engagement in advocacy hurt the credibility of scientists? Results from a randomized national survey experiment. *Environmental Communication, 11*(3), 415–429. https://doi.org/10.1080/17524032.2016.1275732

Racimo, F., Valentini, E., Rijo De León, G., Santos, T. L., Norberg, A., Atmore, L. M., Murray, M., Hakala, S., Appel Olsen, F., Gardner, C. J., & Halder, J. B. (2022). The Role of Life Scientists in the Biospheric Emergency: A Case for Acknowledging Failure and Changing Tactics. Zenodo. https://doi.org/10.5281/zenodo.7047049

Schinkel, W., & Van Reekum, R. (2019). *Theorie van de kraal: Kapitaal, ras, fascisme.* Boom.

Van Baalen, W. M. (2023). Art hyphen science: Moving through writings, writing, and practices. *Internationales Jahrbuch für Philosophische Anthropologie, 11*(1), 95–108. https://doi.org/10.1515/ijpa-2023-0007

World Meteorological Organization. (2024, November 11). *2024 is on track to be hottest year on record as warming temporarily hits 1.5°C*. https://wmo.int/media/news/2024-track-be-hottest-year-record-warming-temporarily-hits-15degc

World Meteorological Organization. (2025, January 10). *WMO confirms 2024 as warmest year on record at about 1.55°C above pre-industrial level*. https://wmo.int/media/news/wmo-confirms-2024-warmest-year-record-about-155degc-above-pre-industrial-level

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Wander M. van Baalen is a senior lecturer in the Humanities Department at Erasmus University College and a postdoctoral researcher at Delft University of Technology. Drawing on Science and Technology Studies, the environmental humanities, and speculative and empirical philosophy, his work explores transdisciplinary pedagogies, practices of knowledge (e)valuation, and matters of public issue formation. At the Rotterdam Arts & Sciences Lab, he collaborates with artists, scholars, and community partners to develop educational practices at the intersection of arts and sciences, working to imagine and cultivate more just and equitable futures.

Thijs Heijmeskamp is a postdoctoral researcher in the field of philosophy on transdisciplinary education at TU Delft and a postdoctoral researcher on the normativity of resilience at the Erasmus University Rotterdam. His research interest concerns how a person's agency is shaped by and in turn shapes its embodiment and their ecological relations, that includes material, social and cultural relations. His research aims to bring (lived) experiences into research. He works in the area of education, cognitive sciences and philosophy, (meta)ethics, philosophy of action, ecological psychology, urban studies, and pragmatism.

Dr. Steven Flipse is an Assistant Professor at TU Delft, focusing on transdisciplinary collaboration and responsible innovation. His research examines how scientists, engineers and designers can integrate diverse viewpoints - spanning societal, economic, and environmental considerations - into their innovation processes. He aims to understand decision-making in inter- and transdisciplinary teams, aiming to promote inclusiveness and ethical reflection in research and development. In his education, he also aims to integrate inter- and transdisciplinary perspectives in innovation management.

Comments by authors

on the process of writing this manifesto:

In writing this piece, we set out to weave together theoretical perspectives, insights from our own teaching practice, and ideas generously shared by scholars and educators we encountered during our postdoctoral research in the Convergence consortium. We found the manifesto to be a fitting genre: it allowed us to honor the diversity of these inputs while also presenting them in a form that we hope speaks to a wide range of audiences.

on the received comments:

We considered if incorporating the comment would improve clarity, without it leading to unnecessary tangents or increasing the overall length too much. Thus we aimed to incorporate the comments as much as possible, without radically changing the manifest. Fortunately, the comments were of such nature, that we believed we were able to do so. The comments made us aware that we needed to be a bit more precise in how we communicated our understanding of TD and that we could say a bit more about how our contributions is based on theory and praxis.

As an academic trained in multiple disciplines and fields of study, I've long been grappling with the challenge of fostering a genuinely inter- or transdisciplinary approach to education and research. The manifesto helps me on this journey by providing a language for the challenges that I've practically experienced and embodied but do not always have the words for. It helps me name the challenges I face more clearly, and provides comfort in sitting with the associated discomfort.

Comments by
Ramón Spaaij

Revolving Education:

Promoting Civic Engagement through Transdisciplinary Education

Written by:

Dieudonné Elohym da Costa

Abstract

Higher education must evolve into a revolving cycle of transformation, where students are equipped not only with theoretical knowledge but also with practical skills and civic responsibility. This manifesto calls for embedding transdisciplinary and community-based projects as a core element of university curricula, directly linking academic learning with societal needs. Drawing inspiration from the principles of military service - where character formation, discipline, and social duty are paramount - Revolving Education proposes key steps towards developing contextualised transdisciplinary educational models with civic engagement, empathy, and problem-solving as central aspects of academic development.

Today's youth, though often well-informed, are underprepared to mobilise and advocate for meaningful societal change, as current educational systems fail to foster a deep sense of purpose and responsibility. By focusing on transdisciplinary collaboration across disciplines and breaking down academic silos, this manifesto calls for hands-on, real-world engagement with communities to help students apply their knowledge to various social issues. Universities, as civic institutions, must continually adapt to societal needs, ensuring that their graduates are not just good professionals but also engaged citizens capable of creating a sustainable, positive impact in the world.

Keywords: Transdisciplinarity, Civic Engagement, Community-based, Social Duty, Empathy, Problem-solving

What about our Education?

Higher education holds the potential to be the cornerstone of progress, yet this potential is not fully explored when it comes to using it as a vehicle for social transformation. Universities promote knowledge production, equip learners with various skills, and encourage critical thinking, but still fail to bridge the gap between academia and real social impact. Fresh graduates join the workforce with extensive theoretical knowledge but very little understanding of how to navigate and resolve complex social, environmental, and economic challenges. Nowadays, people have access to all kinds of information, particularly the youth, given the ease of accessing any resources online, but most people are still not educated on the importance of having a base knowledge of other disciplines, collaboration, and the application of various skillsets in addressing pressing social issues.

This manifesto calls for an urgent paradigm shift in educational systems. A shift towards weaving civic engagement, transdisciplinary collaboration, and hands-on problem-solving into the higher education fabric.

To achieve that:

1. Higher education must be **reimagined as a dynamic and revolving system** that constantly adapts to the evolving needs of our society and prepares learners not only for academic excellence but also for meaningful engagement with the world beyond university walls.
2. Higher education must **move from knowledge-sharing towards knowledge co-creation**, and turn learners into active participants in shaping solutions for real-world challenges, instead of passive recipients and observers.

This manifesto then comes as a proposed set of actionable steps and offers a prototypical model for the development of contextual practices, for the inclusion of transdisciplinary, community-oriented projects into the university curricula. Inspired by social duty models from other fields that instil social responsibility, discipline, and civic engagement through acts of service that nurture our communities.

It will also serve as an advocacy tool for an educational framework that positions universities as civic institutions that prepare learners to become agents of change, and not merely good professionals.

What is happening?
Where does Transdisciplinarity come in?

Our university curricula, which were once designed to shape and equip future leaders, have fallen into disgrace and become mass producers of passive knowledge recipients that blindly follow conventional social structures in an egocentric quest for comfort and commodities. No one dares to challenge the status quo, experiment, or innovate in a way that is truly significant to the life of the masses, which the privileged, educated class should contribute to, with their acquired knowledge from reputed institutions and their positions of influence and leadership.

In many cases, even when there's a genuine will to do differently, disciplinary silos and rigid academic structures and protocols inhibit action and prevent learners and academics from addressing real-world challenges such as social inequality, rapid urbanisation, and climate change. **Academic practice remains theoretical and completely disconnected from the communities it is meant to serve.** Curricula prioritise academic excellence and target chasing over know-how and applied learning. As a consequence, **learners graduate without a glimpse of how to enact meaningful social change** with the resources they were given and contribute even more to the steep decline of civic participation in multiple spheres of society.

While interdisciplinary and multidisciplinary approaches integrate disciplines without altering their boundaries, **transdisciplinarity dissolves these barriers and encourages direct collaboration between academia and society** (Nicolescu, 2002). Through problem-driven inquiry and engagement of multiple stakeholders (academia, industry professionals, policymakers, community members, etc.), it inspires knowledge co-production that is socially acceptable and contextually relevant. As emphasised by Rittel & Webber (1973), **"wicked problems" demand solutions drawn not only from academic expertise but equally from lived experiences.**

How can we do it?

An odd example of a social structure that promotes such values and shapes individuals into active participants in society, instilling discipline, social duty, and resilience, is military service. **This reference is not an endorsement of acts of war, but rather of acts of service, courage and determination** that lead individuals to put their differences aside, stand on the frontlines and **place the needs of the group above personal gain.**

Over the past two centuries, military training has revolved around teamwork, problem-solving under real-world pressures, and collective responsibility, fostering character formation through challenges that demand critical thinking, adaptability, and solidarity. It stands as evidence that **structured, purpose-driven experiences can shape individuals into citizens capable of meaningful civic engagement.**

Although the military service prepares patriots for national defence bodies, the **advancement of a social responsibility mindset that transcends the individualistic spirit modern society grapples with could be revisited and adopted in higher education**, as a mechanism to develop the same values and equip learners to be greater contributors to societal change and participate actively in the resolution of social, environmental, and economic challenges at a local and global level.

Learning about climate change, social inequality, or urban development within academic silos does not benefit learners and the public at large in any way. **If education is meant to serve the people, it should be developed with the people it is called to serve.** Learners should participate in community projects and acquire first-hand experience.

However, this is not about including traditional community service or field-specific volunteering programmes as an extracurricular activity, but rather **making civic engagement a pedagogical tool and the core of academic curricula across all disciplines.**

4-Year Revolving Education Model - Transdisciplinary Curriculum for Civic Engagement (Prototypical)



Figure 1: A 4-year model, adaptable to diverse academic programmes to encourage transdisciplinary practices. Diagram made by the author.

This prototypical model can be adapted to multiple learning fields and in various stages of academic programmes.

In order to make it **sustainable and scalable in the long run**, higher education institutions must **collaborate** with civil society organisations, NGOs, and the private and public sectors. **Acknowledging** the many hardships and challenges that will arise, both internally and externally, in the early stages of implementation and curriculum adaptation. **Co-design** curricula that intertwine academic proficiency with social relevance, **establish** strategic partnerships and networks for mentorship, and **encourage** open dialogue between all stakeholders.

What Must be Considered to Contextualise and Implement a Revolving Education Model?

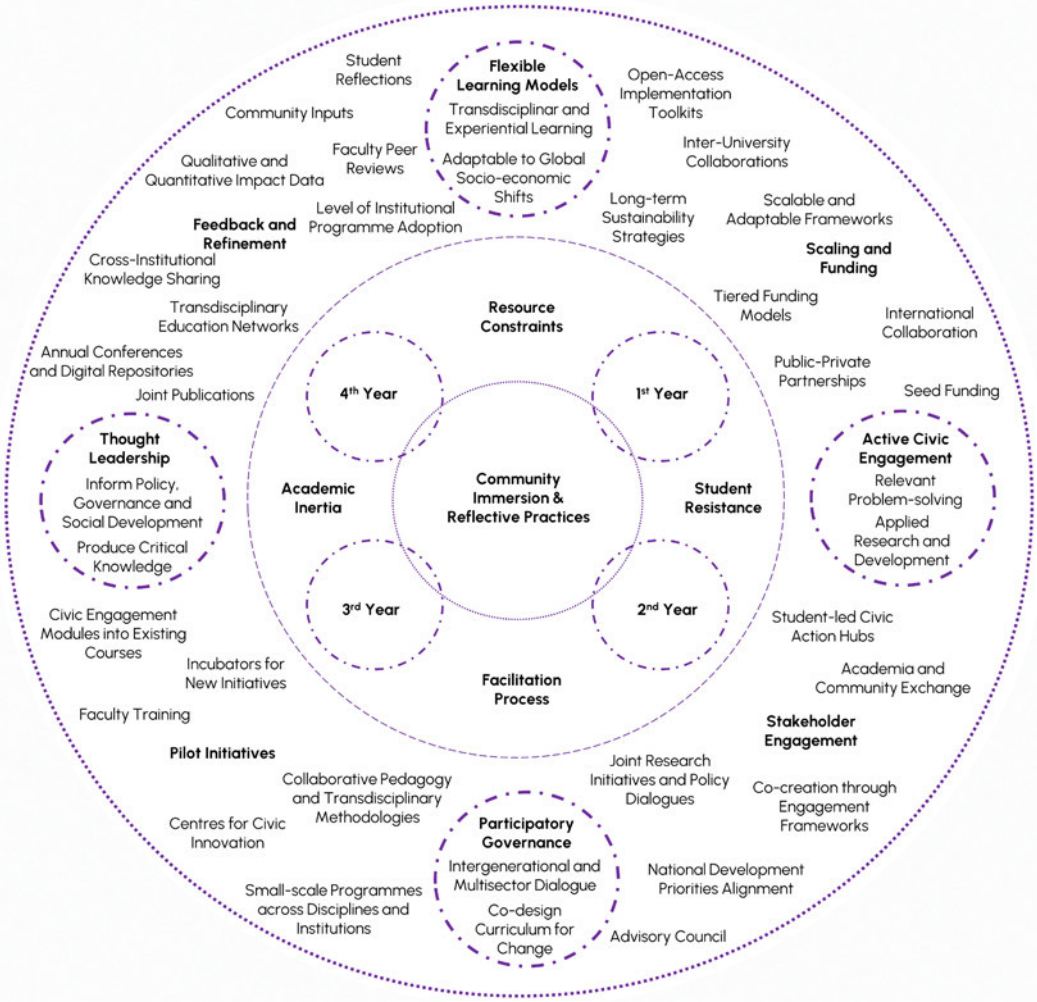


Figure 2: Aspects to consider in the implementation of revolving models. Diagram made by the author.

Transdisciplinary education that promotes civic engagement demands a structure that responds well to constantly evolving scenarios, ensures its relevance in relation to the local context, and maintains its sense of purpose.

Its impact can be measured through various metrics and indicators, such as **excelling graduates, employability rates, assumed leadership positions in civic sectors, an increase in youth participation in advocacy and community-driven projects, and tangible developments** in safety, housing, education, public health, sustainability and more, through student-led initiatives.

Yet its deepest effects lie beyond metrics. In the **growth of empathy, collective responsibility, ethical awareness, a sense of purpose, and a shared commitment to justice.** These intangible shifts, visible in how societies care, deliberate, and sustain hope, cannot and should not be reduced to targets, reminding us that **true education serves meaning and human dignity over mere productivity.**

Revolving Education

What is the future of higher education? If we do not move from education that produces passive recipients of knowledge, to launching active participants in civic matters, all the other spheres of society will continue to derail for lack of meaningful civic engagement. Those who have the resources to contribute to the reparation of our social fabric and address societal issues must do so. Through transdisciplinary practices that bring together academic knowledge and lived experiences, we can maximise social impact and stand a chance to resolve certain wicked problems that most of our societies deal with today. Social responsibility, empathy, discipline, and servant-leadership traits will emerge from these interactions and exchanges, and hopefully shape a new generation of active citizens and ethical professionals. Making them more cooperative, adaptable to evolving global landscapes, and better contributors to a healthy workplace culture.

This approach has the potential to strengthen local and global civic institutions and **foster community cohesion, immersion, and collaboration,** addressing pressing societal challenges such as climate adaptation, rapid urbanisation, housing, and social justice. Turning universities into **civic hubs that catalyse equitable and sustainable development. Hubs of co-production of knowledge, community-driven solutions, and promoters of participatory governance in many fields.** Universities can encourage innovation and systemic transformation while ensuring their relevance and contribution to society in general, and not only academia. Public and private sectors can also contribute to the development and integration of scalable frameworks into education policies and development priorities, and maximise cross-border collaborations, to **ensure learners accompany global advancements.**

To take this **from theory to action**, all stakeholders must commit to immediately contributing **towards a curriculum reform that prioritises critical thinking with empathy and problem-solving for social impact.** Invest in community-university partnerships, and see that as an essential vehicle to bridge lived experiences and academic excellence. Ultimately, challenging the status quo, academic silos, and bureaucratic processes and boosting **learning ecosystems that promote co-creation. To ensure that higher education not only advances careers but also communities, societies, and the world at large.**

Now What?

Academic excellence cannot be achieved in isolation from society.

We should not have to choose whether we want to be great professionals or good citizens! We should not have to beg for civic participation and meaningful contributions to social development from those who have the resources to advance it, and do not do it simply because **they have not been educated on its relevance to the common well-being.** It must come from a place of conscientisation of one's social duty and the importance of the interconnectedness of formal knowledge systems and lived experiences, in the resolution of societal challenges.

We must end academic silos and reinvigorate the power and prowess of transdisciplinary practices! Collaboration and knowledge co-production must be the core of higher education and help us break free from obsolete educational models that fail to address contemporary challenges.

Education must again become a tool for social transformation! It must not be built upon intellectual excellence only, but also agency, civic responsibility, and empathy. Universities must become civic hubs, **evolve in response to societal needs, and revolve around equipping graduates with the technical and interpersonal skills** necessary to build and maintain ecosystems of progressive and transformative change.

We hereby call upon learners, educators, communities, civic institutions, government, industry professionals, policymakers, and international development organisations to develop and commit to delivering educational models that advance academic excellence and meaningful social impact.

The future of our society depends on our education.

Food for thought

Biesta, G. J. J. (2010). *Good education in an age of measurement: Ethics, politics, democracy.* Routledge. https://archive.org/details/goodeducationina0000bies

Nicolescu, B. (2002). *Manifesto of transdisciplinarity.* State University of New York Press. https://archive.org/details/manifestooftrans0000nico

Rittel, H. W. J., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy Sciences, 4*(2), 155–169. https://doi.org/10.1007/BF01405730

7 Collective Action Steps

1. **Conduct participatory research with communities** to identify pressing social, economic, or environmental issues that **students can help address.**
2. **Embed civic engagement projects into the curricula**, not as extracurricular activities but as **core components of all disciplines.**
3. **Form multidisciplinary teams** of students and faculty to **work on community-based projects together.**
4. **Build long-term partnerships** between educational institutions and local or national organisations to **ensure that the projects have continuity and a lasting impact.**
5. **Promote transdisciplinary reflections** through collaborative writing, presentations, discussions, or other media, and continuously **adapt the engagement models based on insights from stakeholders.**
6. **Offer incentives** for students and faculty to participate in community-based projects through **scholarships, awards, and formal recognition.**
7. **Do it now! Act on any project, dream, or idea that surfaced as you read this manifesto. Contact your collaborator and develop accountability.**

Author's Biography

Elohym is a passionate advocate for multisectoral and intergenerational dialogue, who moved from Luanda to Cape Town in 2020 to work and study Architecture at CPUT. He is the Outreach and Partnerships Lead at Young Urbanists, has worked with Bitprop delivering affordable backyard housing in the Cape Flats, co-founded the NowNow Design Competition, and is the South Region Head of the African Union of Architects Student Committee. Elohym has also been working as an events planner and art director in youth and community-based organisations since 2016.

Comments by author

on the process of writing this manifesto:

This timely and thoughtful call to reimagine the future of education rekindled old feelings, ambitions and disappointments towards the position academia has held for a very long time, without yielding fruits worthy of praise in the face of a decaying society. Being invited to revisit that without the typical constraints of academic writing was very refreshing and liberating to some extent. I am grateful.

on the received comments:

As I read through the comments, I could feel that someone indeed took the time to think and feel with me, and ultimately commented from a position of care and relatability. And nothing better than a commentator that gives you a reading recommendation that aligns with what you want to communicate, but did not know or could not articulate clearly!

In my reading, Dieudonné's manifesto takes a pragmatic and ethically driven approach to the long-standing philosophical problem of the theory-practice gap, in the context of higher education. I find this approach very refreshing and relevant; if one goes on to contemplate about this divide in a theoretical fashion (possibly endlessly), the vote is already cast on the side of theory, and, almost with a sleight of hand, practice is overruled. And that would, I think, also entail abiding by the rules of a status quo which demands of its practitioners of theory to renounce their individual and collective powers.

Comments by
Marcell Várkonyi

Towards a Humanitarian Engineering Paradigm

Written by:

Rhys Evans,
Madison Berry,
Yashi Punia,
Floris van der Heijde

Abstract

Engineering education is at a turning point. The world's most pressing challenges demand a fundamental shift in how engineers are trained, moving beyond purely technical problem-solving to a model that prioritises social responsibility, sustainability, and justice. This manifesto critiques the current profit-driven, technocentric paradigm of engineering and proposes a new Humanitarian Engineering Paradigm, where ethical and societal considerations are central to the engineering practice. Key reforms include integrating ethical and historical contexts, fostering critical and systems thinking, engaging students with real-world societal impacts, and amplifying marginalised voices. A Theory of Change outlines how the systemic issues in engineering education can be addressed through curricular restructuring, interdisciplinary collaboration, and community-centred pedagogy. The authors envision a future where all engineering is humanitarian engineering, and engineers are ethically driven agents of systemic change, realigning the profession to serve humanity and advance justice for those most affected by systemic inequities.

Keywords: Humanitarian Engineering, Participatory Decision-Making, Sustainable Development, Ethical Engineering, Interdisciplinary Studies, Humanist Education

Glossary

Term	Meaning
Epistemic Humility	The acknowledgement of the limits of one's own knowledge and understanding. It refers to an openness to revising beliefs and worldviews when confronted with diverse perspectives, particularly when making decisions that impact communities.
Humanitarian Engineering	An approach to engineering that prioritises social equity, sustainability, and ethical considerations in problem-solving and design. It seeks to use engineering to improve human well-being rather than focusing solely on profit or technical efficiency.
Humanitarian Engineering Paradigm	A proposed shift in engineering education and practice that embeds humanist values and humanitarian principles, such as equity, sustainability, and participatory decision-making, into the core of the discipline.
Participatory Decision-Making	A process where stakeholders, especially marginalised and affected communities, are actively involved in making decisions that impact them, ensuring their voices shape engineering solutions.
Systems Thinking	An approach to understanding complex problems by analysing the connections and causal relationships between different components of a system, rather than isolating issues as independent variables.

1. Current Engineering Paradigm

As we face unprecedented socio-ecological challenges such as climate change, resource scarcity, and global conflict, it is clear that the traditional paradigms of engineering education are insufficient for today's world. Engineering has historically focused on technological innovation driven by economic gain, often at the expense of marginalised communities and ecosystems. In fact, much of modern engineering's foundation can be traced back to its role in colonisation and empire-building, where large-scale infrastructure projects served economic and political interests rather than ensuring the welfare of local populations. This legacy still echoes through contemporary practices, with engineering often perpetuating inequalities under the guise of progress.

As Leydens and Lucena argue in Engineering Justice (2017), the commercial demand for utilitarian engineers fed back into engineering education, which prioritised efficiency and hyper-optimisation over ethical, value-driven solutions. Education became designed to meet market needs, creating a cyclical feedback loop of engineering for profit. Adapting the education system would be an effective way of changing the engineering mindset during its formation. Introducing broader and more social values would create more world- and impact-aware engineers who will drive change throughout the industry. All engineering education needs to adapt to humanitarian engineering principles in order to create a fairer and more equitable world.

In our manifesto, we propose a Humanitarian Engineering Paradigm that redefines the role of engineers in society by integrating humanitarian principles such as equity, sustainability, and participatory decision-making into the heart of engineering education. We explore how this paradigm can address systemic issues within the profession, outline the necessary reforms to embed these values in higher education, and identify the key barriers that must be overcome to implement these changes effectively. Our manifesto is intentionally grounded in the question of where we can go from here from within our current techno-solutionist institutions. It is framed for educators, students, and institutional stakeholders and deliberately written in the style of an engineer's manifesto. This approach, we hope, makes it both relatable and persuasive to those who may not yet be fully convinced of the need for far-reaching transformation, but who are open to concrete, actionable change.

2. Humanitarian Engineering Paradigm

We envision the future of engineering as humanitarian engineering. In a Humanitarian Engineering Paradigm, the real-world impacts of the engineering profession are not hidden from practitioners. Instead, engineers are aware of the social impacts their work has and are equipped with the problem-solving skills needed to critically consider a wide range of ethical considerations.

We believe that in order to create a Humanitarian Engineering Paradigm, higher education can work as a catalyst to ignite the change. Humanitarian engineers would emerge from higher education informed, critical, and value-driven, ready to make a positive impact on the increasingly complex and multidisciplinary world.

To make this vision more concrete and to illustrate what this transformation could look like in practice, we present the following examples of how engineers might act in different scenarios in a Humanitarian Engineering Paradigm:

- A materials engineer is educated about the pervasive violations of indigenous people's rights when acquiring critical raw materials. When tasked with selecting materials for a new product, the need to avoid rights violations is considered equally alongside the mathematical and economic design constraints. Instead of opting for the cheapest or easiest supplier, they advocate for alternatives, such as recycled materials, locally available materials, or ethically sourced supplies.
- A mechanical engineering graduate must choose between several job offers, including one from Big Oil. The student has studied the multiple controversies linked to Big Oil's operations, including their role in perpetuating the climate crisis. When it comes time for the student to pick, they choose a smaller company that prioritises environmental justice, despite a lower salary offer, because they do not want to be complicit in Big Oil's actions.
- A civil engineer tasked with designing a new piece of urban infrastructure involves the local community in the design process. When the community rejects the proposed construction, the engineer respects their decision, raises the issue with upper management, and advocates for alternative designs. They persistently argue for respecting the community's decision and eventually succeed in either revising the design to align with the community's needs or cancelling the project altogether.
- A transportation engineer designing a new public transit system ensures that accessibility is a top priority. Rather than treating accessibility features as add-ons, they integrate them into the initial design and consult with community members with disabilities to

ensure the system meets their needs.

- A software engineer is tasked with developing an AI algorithm for a financial institution. They notice that the data used to train the algorithm is biased against historically marginalised communities, leading to a discriminatory loan approval process. Instead of ignoring the issue, they raise concerns with their team and advocate for using a more representative dataset. Additionally, they argue against fully automating loan decisions because they recognise that AI systems may occasionally make inaccurate or unfair rejections.

Many engineers already embody these examples. Engineers may learn about the wider context of their profession through individual learning, the pursuit of relevant electives, and engagement in extracurricular volunteer activities, like Engineers Without Borders, or they may already be aware of social issues through their own lived experiences. However, these engineers are exceptions, not the rule. Our proposal instead envisions that all engineers are empowered to view the world through a humanitarian lens as an integral part of their engineering higher education.

Higher education is a time when people begin to break out of their shells and have the opportunity to reshape their understanding of the world. This is a critical time to impress aspiring and young engineers with a more holistic view of their profession and the society which they will simultaneously impact and be impacted by. A humanitarian higher engineering education system would need to reframe and realign many aspects that are currently based on assumptions about what and how engineering should be taught. Approaching this transformation with epistemic humility and openness to new perspectives, as described by Leydens and Lucena (2017), ensures that these changes are inclusive, reflective, and better aligned with the complexities of our diverse and interconnected world.

To mainstream humanitarian engineering in higher education, several shifts to re-conceptualise curricula must occur:

- **Include Ethical and Historical Contexts**: The current engineering curricula often focus too heavily on textbook technical skills while overlooking broader ethical and historical considerations. Rather than treating these dimensions as supplementary, core courses must be re-envisioned as inherently social and historical in nature. This means embedding ethical inquiry, historical context, and participatory design principles directly into the way core concepts are taught—so that future engineers come to see their work not as isolated technical problem-solving, but as a practice deeply situated within, and accountable to, the societies they serve. For example, sustainability metrics and community impact assessments can be integrated into a

variety of otherwise technical modules.

- **Foster Critical Thinking**: Education must shift away from rigid, black-and-white problem-solving approaches. Instead, students should be trained to approach challenges holistically while considering the interconnectedness of technical, social, and environmental systems. Systems thinking should be introduced as a foundational skill to empower students to analyse and address the complexities of real-world issues.
- **Engage Students with Real-World Impacts**: Engineering education often prioritises arbitrary standards, grades, and deadlines over meaningful engagement. This can lead to a sense of learned helplessness among students. Instead, education should immerse students in the real-world impact of their studies through project-based learning, case studies, and internships to foster agency and critical thinking.
- **Promote Diverse Voices**: Recognise the already existing diversity within student bodies and ensure students from a variety of backgrounds are empowered to share and explore their viewpoints safely. Ensure courses use sources from around the world and feature authors from varying cultures, languages, and lived experiences.

The current conversation around humanitarianism often focuses on providing solutions for those in need, usually by experts who aim to do good for communities facing crises. However, this approach sometimes reinforces hierarchical structures, where communities are seen as passive recipients of aid rather than active agents in their own development. As we move towards a new Humanitarian Engineering Paradigm, it is crucial that we reshape this field to embody humanist values—values that emphasise collaboration, empowerment, and shared decision-making. Drawing on Paulo Freire's *Pedagogy of the Oppressed* (1970), we recognise the need to move away from top-down humanitarian efforts and towards an educational and engineering model that treats communities as co-creators of solutions, empowering them to shape their own futures.

This shift calls for a model where engineers work with communities as equal partners, helping them define their own needs and create sustainable solutions. Rather than just providing charity or interventions, the Humanitarian Engineering Paradigm emphasises co-creation, ensuring that communities play an active role in shaping solutions. By integrating humanist principles into humanitarian engineering, we foster an approach that is both ethical and empowering, prioritising justice and equity at every stage of the process.

3. Theory of Change

Our Theory of Change (ToC)[1] illustrates how humanitarian values can drive systemic reform in engineering higher education to address entrenched issues in the profession. Organised into four columns, it outlines: (1) systemic issues in engineering, (2) how higher education reinforces them, (3) proposed reforms to integrate humanitarian values, and (4) the envisioned outcomes of a Humanitarian Engineering Paradigm built on equity, sustainability, and participatory decision-making.

The first column of the ToC highlights how engineering's current paradigm prioritises profit-driven metrics and technical efficiency, often at the expense of social and environmental sustainability. The second column of the ToC demonstrates how higher education perpetuates these systemic issues by reinforcing rigid, black-and-white problem-solving approaches that overlook broader societal contexts. This creates a cycle where engineers are trained to address narrowly defined problems while ignoring the systems in which those problems exist.

To break this cycle, the third column of the ToC proposes embedding sustainability, ethics, history, and participatory design into engineering curricula to ensure students develop a holistic understanding of their societal impact. Interdisciplinary collaboration must be embraced, and engineers must be trained to engage meaningfully with marginalised communities, integrating their perspectives into decision-making.
The fourth column of the ToC envisions a Humanitarian Engineering Paradigm, where technical and social dimensions are deeply interconnected, marginalised voices are central to design processes, and engineers become agents of systemic change. When all engineering is humanitarian engineering, participatory decision-making will be the norm, interdisciplinary collaboration will be mainstreamed, and graduates will be both technical experts and ethical leaders, equipped to tackle climate change, social inequity, and global sustainability with justice at the core of their work.

[1] See the figure on the next pages

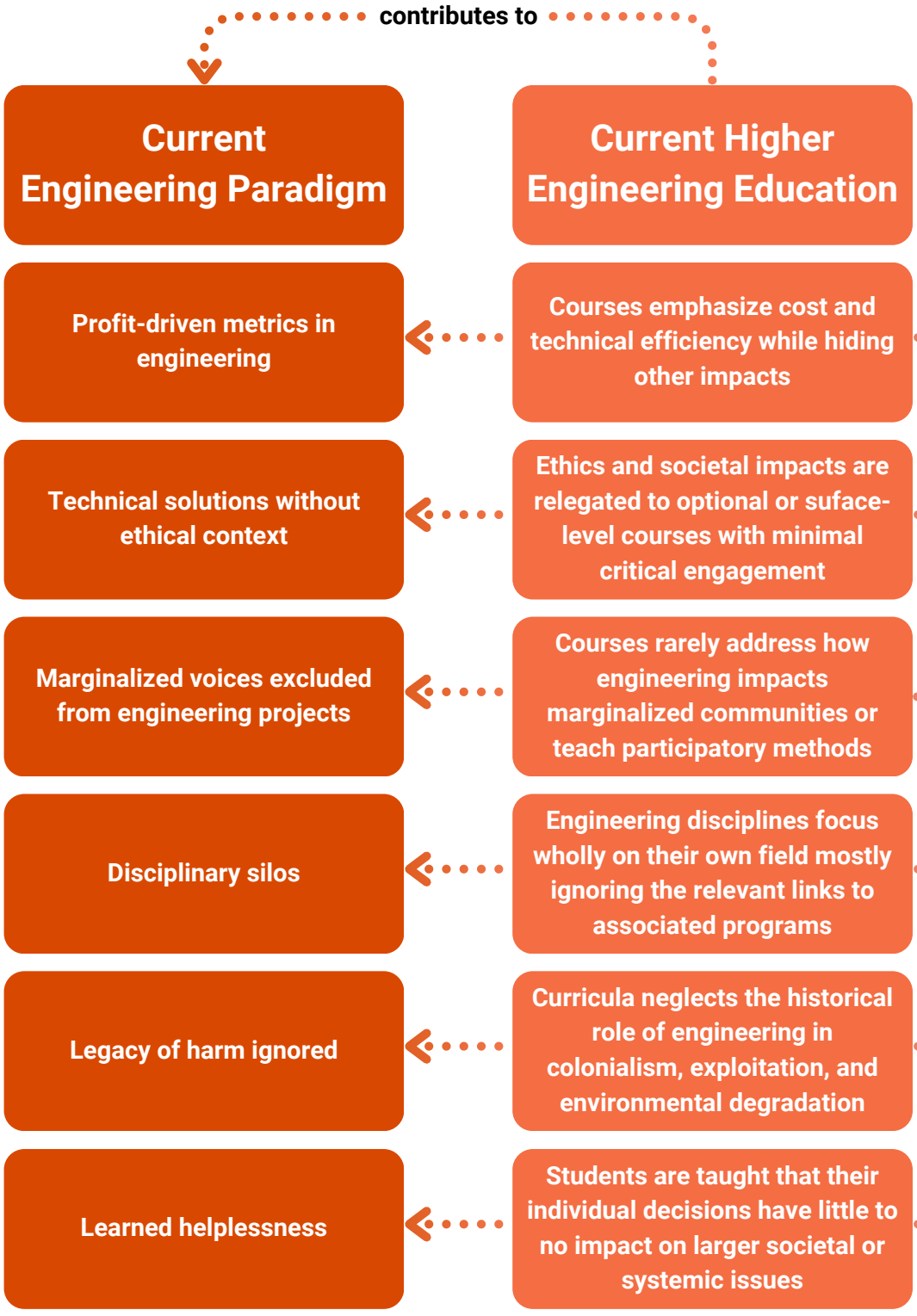


Figure 1: A Theory of Change (ToC) diagram detailing components of the current engineering paradigm (column 1), how higher engineering education (column 2) supports the current paradigm, and how higher engineering education can be transformed (column 3) to create a Humanitarian Engineering Paradigm (column 4). Made by the authors.

creates

Humanitarian Higher Engineering Education	Humanitarian Engineering Paradigm
Metrics such as sustainability, resilience, and equity are given equal educational weight	Engineers use holistic design criteria for success
Introduce mandatory courses on ethics, history, and participatory design and embed these concepts in other courses	Problems and solutions are seen as both technical and social
Teach participatory methods and integrate community feedback into curricula and projects	Marginalized voices are included in decision making
Embed interdisciplinary and intersectional learning into the core curriculum	Multidiciplinary approaches are mainstreamed
Include history of engineering and its complete impacts as indtroductory courses for all engineering students	Past harm is recognized, accounted for, and redressed
Empower students with case studies, systems thinking, and collaborative projects and emphasize collective action	Engineers see themselves as agents of positive change and actively engage in systemic problem-solving

Implementation Barriers

After recognising the importance of integrating humanitarian engineering principles into the broader engineering discipline, it is essential to address the various barriers that might hinder their adoption. These challenges have been classified as institutional, governmental, and external.

Institutional resistance often manifests in the reluctance of academic institutions to redesign curricula, which requires a substantial amount of work, not just in terms of revising educational content, but also in rethinking the best methodologies to impart these principles effectively. Additionally, the current engineering ecosystem is built around established accreditation standards. Modifying these standards will be a slow and bureaucratic process requiring consensus among a wide range of stakeholders. Beyond these, there will also be a need for resources for faculty training, new teaching materials, and possibly the hiring of more staff from social sciences disciplines, all of which will make the integration process slow.

On the governmental level, funding tends to be politically directed, with allocations frequently favouring fields that promise more immediate capitalistic returns, such as cutting-edge technological developments or military procurement, which provides the illusion of making the nation-state more secure. Governmental policies in general are slow to adapt to the integration of new principles, but especially slower if they conflict with current political objectives and ideologies.

Cultural resistance can also pose substantial barriers internally and externally. People may mistrust and refuse to accept this humanitarian rethink of engineering due to a lack of awareness about the benefits and the dire need for humanitarian principles to address global challenges.

4. Conclusion

The historical evolution of engineering shows its capacity for transformation in response to societal needs. Just as other fields have embraced more inclusive and holistic practices, engineering must now expand its scope to integrate humanitarian principles.

The potential for creating a Humanitarian Engineering Paradigm is evident by transformations in other disciplines. Medicine, for instance, is evolving from uniform, generalised treatments to more contextual, personalised care. Psychology is similarly shifting its focus from using extremely boxed and strict frameworks to more holistic and diverse approaches. Urban planning is another example of a discipline which is moving from a top-down implementation strategy to people-centred approaches that

prioritise participatory design.

Humanitarian engineering is not just an isolated discipline—it is an intersectional rebellion against a profession that far too often sacrifices people and planet for profit. By reimagining higher education through a Humanitarian Engineering Paradigm, we empower engineers to dismantle these systems and replace them with equity and justice, where engineering serves humanity, not corporate greed. Realising a Humanitarian Engineering Paradigm may be institutionally hard, but imagining it is easy, and imagining is the first step.

References

Freire, P. (1970). *Pedagogy of the oppressed.* Herder and Herder.

Leydens, J. A., & Lucena, J. C. (2017). *Engineering justice: Transforming engineering education and practice.* Wiley. https://doi.org/10.1002/9781118757369

Authors' Biographies

Rhys Evans is a data scientist specialising in climate resilience and sustainable urban development. He holds an MSc in Engineering and Policy Analysis from TU Delft and a BSc in Data Science and Artificial Intelligence from Maastricht University. His work combines stakeholder engagement, geospatial analysis, AI-driven modelling, and community-based resilience initiatives, which he applied to climate adaptation projects with the United Nations Human Settlements Programme in Lao PDR. He conducted his MSc thesis research as an internship at the Dutch Ministry of Infrastructure and Water Management. He also volunteers with Engineers Without Borders NL, supporting monitoring, evaluation, accountability, and learning.

Madison Berry works at the Global Center on Adaptation as a Monitoring and Data Analyst. Previously, she supported climate adaptation programmes at both the local and national levels while working with the United Nations Human Settlements Programme office in Myanmar. Madison holds a BSc in Mechanical Engineering with a minor in Engineering for Community Development from the Colorado School of Mines, and an MSc in Engineering and Policy Analysis from TU Delft. During her studies, Madison volunteered with several international water projects across the Global South. She is passionate about travelling and is currently learning Mandarin Chinese.

Yashi Punia holds an MSc in Engineering and Policy Analysis from TU Delft, and has a bachelor's background in mechanical engineering and sociology from Shiv Nadar University. Her research focuses on empowering marginalised communities through engineering solutions that address systemic inequalities. In November, she will begin a PhD at the University of Twente, examining the critical implications of nature-based solutions in the Dutch context, with a focus on addressing concerns around mitigation deterrence and the risk of neo-colonial implementation. Outside of academia, Yashi enjoys exploring, food, literature, and watching an abundance of movies—especially in the company of her dog, Messi.

Floris van der Heijde is an MSc Engineering and Policy Analysis graduate from TU Delft. After completing a BSc in Electrical Engineering, he sought to pursue a career with a broader societal impact. During his master's, he developed an interest in model-supported decision-making, which he implemented in his thesis on sediment reuse for the Port of Rotterdam in collaboration with Deltares. He has been involved in various organisations aimed at improving education quality, including Dentatus and the faculty Board of Studies. Outside of academia, Floris enjoys exercise, nature photography, reading, knitting, and is active in Outsite, Delft's LGBT+ youth association.

Comments by authors

on the process of writing this manifesto:

We wrote this manifesto collectively, drawing on our shared background in the interdisciplinary Master's programme in Engineering and Policy Analysis. While coordinating across multiple schedules was at times challenging, the collaborative process proved deeply rewarding. It allowed us to critically reflect on our individual perspectives, refine our arguments through dialogue, and ensure that the manifesto resonated across a range of lived experiences and professional interests.

It was important to all of us that the manifesto go beyond critique. We wanted to imagine something better—and to propose concrete, actionable steps for moving towards it. Writing together enabled us to co-develop a shared vision of what engineering education could become: one that reflects both our frustrations with the current system and our hopes for a more just, sustainable future.

on the received comments:

We appreciated the TIP/TOP comments and found them thought-provoking and constructive. They encouraged us to reflect more carefully on the tone of the manifesto and how we position ourselves as authors. The suggestion to include more of our own perspective was a helpful reminder that personal context can strengthen a clear argument. It prompted us to think more intentionally about balancing analytical clarity with a more grounded and human voice.

We also valued the reflection on the term "humanitarian." The distinction between humanitarian and humanist education helped us better understand some of the underlying tensions in our framing. While we ultimately chose to keep the term, we agree that it's important to consistently center justice, equity, and power-sharing in both our language and examples.

This reads like a real *engineers'* manifesto, both in its structure and its analytical approach. For me, that is its strength: a practical focus and actionable clarity, including concrete proposals that can be implemented both on the level of the curriculum, and within a single course. The Theory of Change diagram, especially, makes what needs to happen clear to the point of obviousness. And it amounts to a to-do list that I have far from checked off in my own courses.

The manifesto's obvious feasibility and sketching out of a roadmap with explicit cause-and-effect relationships would probably appeal to those colleagues who are not yet on board for a far-reaching transformation of engineering education. This is what an institutional vision on education should and realistically *could* actually be like – tomorrow.

Comments by

Bob van Vliet

A Call for Queer Inclusivity in 21st Century Global STEM Curricula

Written by:

Ajayshankar Jagadeesh,
Paul Chan,
Wenyi Chu

Abstract

As the first quarter of the 21st century comes to a close, academic institutions worldwide continue to operate within traditional, exclusionary frameworks, particularly in STEM (Science, Technology, Engineering, and Mathematics) education. Despite growing emphasis on diversity and inclusion, most STEM curricula remain insufficiently responsive to the needs and perspectives of LGBTQ+ individuals. This is further exacerbated in countries like the USA, where diversity, equality/equity and inclusion programmes in education and research are facing serious threats. We call for a global transformation of STEM education, urging institutions to embrace queer inclusivity as an integral part of their systems and curricula.

Queer-inclusive education is not just about increasing representation but about fundamentally rethinking how STEM subjects are taught, framing scientific inquiry and technological development through a lens that values fluidity, diversity, and interdisciplinary approaches. By incorporating queer perspectives, institutions can foster more innovative, ethical, and socially responsible STEM education, better equipped to address the complex challenges of the 21st century. This requires structural and pedagogical reforms that prioritize critical engagement of queer voices, redefining success in STEM, and challenging traditional binaries that limit creativity and innovation. Through these reforms, global academic institutions can create more equitable learning environments, producing a generation of STEM professionals who are not only technically proficient but also deeply committed to social justice and diversity.

Keywords: Queer theory, equity, curriculum reform, education, STEM

Introduction

As we approach the midpoint of the 21st century, global education systems are grappling with the pressing need to address issues of equity, representation, and inclusivity. Within the realm of STEM education, the traditional paradigms remain largely untouched by the social and cultural revolutions that have transformed other fields of knowledge. We argue that queer inclusivity in STEM curricula is not only a moral imperative but also a transformative approach to fostering innovation, diversity, and ethical responsibility. By integrating queer perspectives into STEM education, academic institutions can pave the way for more holistic and socially-attuned scientific and technological advancements.

STEM education today continues to be dominated by a rigid, linear framework that prioritizes objectivity, neutrality, and hard facts. While these characteristics are essential to scientific rigor, they often perpetuate exclusionary practices by failing to acknowledge the social and cultural contexts in which science and technology operate. LGBTQ+ individuals frequently encounter barriers in STEM fields, ranging from hostile learning environments to the erasure of queer contributions in curricula. This marginalization not only deters talent but also limits the breadth and depth of perspectives that can enrich STEM disciplines.

Despite increasing awareness of diversity and inclusion in academia, efforts to integrate queer perspectives into STEM have been sporadic and insufficient. Most initiatives focus on representation—increasing the visibility of LGBTQ+ individuals in STEM—rather than embedding their experiences and insights into the core of scientific inquiry and pedagogy. This limited approach undermines the transformative potential of queer inclusivity, which goes beyond representation to challenge and redefine the foundational assumptions of STEM education. As a collective of scholars and practitioners from diverse disciplines, career stages, and personal backgrounds, we bring our own experiences to this manifesto. Some examples we present emerge directly from our lived realities within STEM, offering concrete illustrations of the stakes and possibilities of queer-informed approaches.

Queer inclusivity in STEM is about more than fairness or representation; it is a paradigm shift that emphasizes the value of diversity in fostering creativity and innovation. Queer perspectives challenge binary thinking, a dominant feature of traditional STEM disciplines, and offer alternative frameworks that embrace complexity, fluidity, and interdisciplinary approaches. For example, queer theory's emphasis on dismantling binaries can inspire new ways of thinking about biological sex, gender, and identity in medical and life sciences, leading to more nuanced and inclusive healthcare solutions.

Furthermore, queer inclusivity promotes ethical responsibility by encouraging scientists and engineers to consider the social implications of their work. By integrating LGBTQ+ experiences and perspectives into STEM education, institutions can produce professionals who are not only technically proficient but also attuned to the societal impact of their innovations. This holistic approach aligns with the growing demand for ethical considerations in fields such as artificial intelligence, biotechnology, and environmental science.

Why Queer?

We draw inspiration from Queer Theory to call for a need to question and challenge existing (social) structures that underpin STEM education. Queer Theory grew in prominence alongside rising activism in the 1990s at the peak of the AIDS crisis. Riding the wave of postmodern and post-structuralist scholarship, Queer scholarship seeks to challenge heteronormative assumptions that govern societal (and patriarchal) structures and marginalise minority voices in the lesbian and gay communities (nowadays expanded to include LGBTIQA+). In Gender Trouble, Judith Butler questioned the binary categories of male and female by arguing that such clear distinctions are deeply entrenched in political representations and language, and that socially-normative practices serve to reproduce such distinctions. Butler rejects essentialist ideas of gender and instead argues that gender is performative, thus introducing the idea that our (bodily) behaviour shapes our gender. Thus, Queer scholars question the clear boundaries in gender categories and instead focus on how gender is enacted and played out. In so doing, Queer scholars seek to broaden engagement and inclusion of diverse voices beyond mere identity politics.

In engineering education, the dominance of positivistic methods and pursuance of an apolitical position in the name of scientific independence and meritocracy has its roots in nationalist and racist ideologies (Kellam and Jennings, 2021). Therefore, Queer scholarship seeks to engage with the diversity of colours, voices and abilities to dismantle the very societal structures that lock us in such ways of thinking and acting. The dominance of the existing world order is also, arguably, resulting in lock-ins that are creating the economic, ecological and social crises of our times. Attempts to scale up transitions into more sustainable ways of living are also threatened, in part because of the stubbornness of existing political, economic and social structures. Queer scholarship thus provides an opportunity to challenge these structures.

In Bodies That Matter, Judith Butler emphasises the materiality of our bodies in our performative acts. By implication, taking the materiality

of our bodies seriously also means that we move beyond talking the talk to walking the walk. Here, the embodiment of knowledge is a critical point. Engineering knowledge is not only about the analytical, but also understanding what this means and how the analytical translates into performative actions in practice.

Globally, there is a shortage of qualified engineers. This is where diversity and inclusion matters. By engaging with the queer movement, we also seek to empower those who do not fit in within the heteronormative discourse of society.

How are we proposing to do that?

- Queer scholarship as a means to question existing structures of professional knowledge and engineering curriculum.
- Queer methodologies as a means to embrace active listening to diverse voices.
- Queer approaches as a means to enable more political action, particularly in the context of societal and sustainability transitions.
- Curricular reform to integrate LGBTQ+ histories, contributions, and perspectives within STEM disciplines.
- Inclusive pedagogy that moves beyond representation to actively challenge heteronormative assumptions.
- Queering as a method to reimagine the future of work and build resilience in the future labor market and personal well-being.

Case Studies and Success Stories

Following are two of our personal contributions in the realm of queering STEM curriculum.

Impact of Rainbow Roads in Road Engineering Courses

One of the more tangible examples of queer inclusivity in STEM education is the integration of LGBTQ+ representation into traditionally rigid engineering disciplines. A case in point is the inclusion of “rainbow roads” in road engineering courses, both as a symbol of visibility and as a way to challenge conventional infrastructure design. Rainbow-colored crosswalks and road markings, increasingly adopted in cities worldwide, serve not only as public affirmations of LGBTQ+ presence but also as opportunities for engineering students to engage in conversations about inclusivity, urban design, and community engagement (Bain & Podmore.

2023, Savela. 2024).

From a technical standpoint, incorporating discussions about rainbow roads into civil engineering curricula allows students to analyze the structural, material, and safety considerations involved in such projects. Questions around visibility, road friction, weather resistance, and accessibility intersect with broader discussions about who public spaces are designed for and how infrastructure can reflect diverse identities. By embedding these conversations within engineering education, institutions can challenge the traditional perception of infrastructure as neutral and instead encourage students to think critically about how engineering choices impact marginalized communities.

Moreover, this approach disrupts the assumption that STEM disciplines must remain asocial. It demonstrates how engineering can be used as a tool for social change and how embracing inclusivity leads to innovative, community-centered design solutions. The case of rainbow roads underscores the importance of embedding queer perspectives into STEM curricula—not as peripheral discussions but as integral components of engineering education that shape the future of inclusive urban development.

Trans and Nonbinary Inclusion in AI Data Training

Artificial intelligence (AI) is transforming industries at an unprecedented pace, yet its development remains deeply entangled with biases that disproportionately affect marginalized communities, including trans and nonbinary individuals. Most AI systems are trained on datasets that reflect existing societal norms and biases, often reinforcing rigid gender binaries and excluding nontraditional gender identities. This results in real-world consequences, such as misgendering in facial recognition software, exclusionary identity verification systems, and healthcare AI models that fail to account for gender-diverse experiences.

Queer-inclusive STEM education must address this issue by ensuring that AI curricula incorporate trans and nonbinary perspectives at every stage of development (Fosch-Villaronga & Malgieri. 2024). This means teaching students to critically assess the datasets they use, recognize and mitigate bias in algorithmic decision-making, and design AI systems that are inclusive of all gender identities. One way to achieve this is by integrating case studies that examine the failures of current AI models—such as misgendering in voice recognition software or the lack of nonbinary gender options in digital identity systems—and challenging students to develop more equitable solutions.

Additionally, the inclusion of queer perspectives in AI training goes

beyond technical fixes; it requires a fundamental rethinking of how gender is encoded in data systems. Queer methodologies encourage an interrogation of binary classification systems — not only around gender and sexuality, but across broader categories such as healthy/sick, able/disabled, natural/artificial, mind/body, human/machine, and social/technical — and push for alternative approaches that embrace fluidity, complexity, and self-identification. By embedding these principles into AI and data science education, institutions can cultivate a new generation of technologists who approach machine learning and AI development with ethical responsibility, ensuring that emerging technologies do not perpetuate existing inequalities.

This case study highlights the broader need for STEM education to actively challenge exclusionary frameworks. By incorporating trans and nonbinary perspectives into AI training, we not only improve the accuracy and fairness of AI models but also advance a more inclusive and just technological future.

Queer thinking doesn't just challenge how we learn—it also helps us think differently about how we work. Today's students are stepping into labor markets that are unpredictably evolving, where clear paths and fixed roles are no longer guaranteed. Queer approaches make space for flexibility, uncertainty, and resilience— emotional and professional competencies that are becoming more crucial. By queering STEM, we're not just adding new voices, we're opening ways of thinking that can help the future engineers accept, appreciate, and actively tackle the complex societal challenges, not just try to solve them.

Conclusion

Queer-inclusive STEM education has far-reaching implications beyond academia. By fostering a culture of inclusivity and diversity, institutions can prepare students to navigate and address the complex challenges of the 21st century. These challenges, including climate change, global health crises, and technological ethics, require interdisciplinary and socially attuned approaches that queer perspectives are uniquely positioned to provide.

Moreover, queer inclusivity in STEM can inspire a new generation of scientists, engineers, and innovators who are committed to social justice and equity. By redefining success in STEM to include ethical responsibility and societal impact, academic institutions can contribute to a more equitable and sustainable future.

Queer inclusivity in STEM is not merely an additive process but a necessary transformation. By embedding queer perspectives into STEM

curricula, we move beyond tokenistic representation toward a radical reimagining of scientific inquiry, education, and practice. We call on global academic institutions to embrace this paradigm shift, ensuring that queer inclusivity, ethics, and social justice are inseparable from STEM excellence.

References

Butler, J. (2002). *Gender trouble.* Routledge.

Bain, A. L., & Podmore, J. A. (2023). Rainbow infrastruggles: The infrapolitics of LGBTQ2S surplus visibility in suburban infrastructure. *Journal of Urban Affairs,* 1–23.

Fosch-Villaronga, E., & Malgieri, G. (2024). Queering the ethics of AI. In *Handbook on the ethics of artificial intelligence* (pp. 301–315). Edward Elgar Publishing. Should be: Fosch-Villaronga, E., & Malgieri, G. (2024). Queering the ethics of AI. In D. J. Gunkel (Ed.), *Handbook on the ethics of artificial intelligence* (pp. 301-315). Edward Elgar Publishing.

Kellam, N., & Jennings, M. (2021). Uncovering epistemologies and values of our qualitative engineering education research community: Listening for voices. *Studies in Engineering Education, 2*(1), 80–99.

Savela, T. (2024). Detecting deviance: Exploring a controversy surrounding a rainbow crossing through a Deleuzo-Guattarian lens. *Geoforum, 152,* 104025.

Authors' Biographies

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Paul Chan is Professor of Design and Construction Management at Delft University of Technology. He has developed a track record of studying how people cope with organisational, social and technological change in addressing societal and sustainability transitions. He is currently leading research projects on transdisciplinary collaboration in sustainable urban environments. He was Editor-in-Chief of Construction Management and Economics, and Past Chair of the Association of Researchers in Construction Management. He has also written on masculinities and sexualities in the construction industry, and is co-author of Constructing Futures (2010), a Wiley-Blackwell book on leadership and futures thinking in the construction industry.

Wenyi Chu is a PhD candidate at Delft University of Technology, researching future engineering skills, with particular attention to transdisciplinary collaboration and emotional competencies. With a background in GIS engineering and educational sciences, Wenyi draws on both industry and academic experience. Prior to starting the PhD, they worked in the semiconductor sector. Their research is shaped by an interest in how technical education can better prepare students for complex social and professional environments. Wenyi is also engaged in conversations around inclusion and is interested in how different ways of thinking and being can contribute to more “heart-engaged” engineering practices.

Comments by authors

on the process of writing this manifesto:

Writing this manifesto was both a challenging and energizing experience. We wrote it collectively, and that was essential, not just logistically, but philosophically. Our collaboration was rooted in the very values the manifesto advocates: plurality, queerness as method, and an attentiveness to embodied knowledge and positionality.

Our group came together across disciplines, identities, and institutional roles, which led to moments of discovery, and resonance. The writing process involved a nonlinear dialogue, as we tried to remain true to the critical and constructive voice we were aiming for. There was no single "authorial" perspective; instead, we aimed to write with a collective voice that could hold contradiction and difference, rather than flatten it. That made the process meaningful, and also deeply social.

on the received comments:

We are deeply appreciative of the comments we received, both in their generosity and in their challenge. They helped us see the manifesto not only as an argument but as a relational act: a way of connecting, provoking, and inviting dialogue.

We were particularly moved by the first commentator's reminder that inclusion should be valued not just for its effects (e.g., creativity, innovation) but for its intrinsic ethical weight. This reflection pushed us to reconsider how we framed certain arguments and prompted a deeper questioning of our own internalized emphasis on impact and productivity, a reminder of the very systems we hope to reimagine.

The second commentator encouraged us to become more visible in the text, to speak not just about experience, but from it. Their suggestion to make the text more declarative and personal resonated strongly with our own ambitions but revealed where we had hesitated. It affirmed the importance of making ourselves present, not only in argument but in voice.

Both sets of comments ultimately reminded us that the manifesto is not just a product but part of an ongoing process of becoming collectively and institutionally.

What this manifesto drove home to me is not just the clear moral imperative of queer inclusivity as a basic matter of inclusivity and human decency, but also the rich analytical frameworks, approaches, and perspectives that Queer Theory has to offer the STEM disciplines – approaches that are sorely needed in the broader struggle to reshape science, technology, engineering, and math into forces for justice and social progress.

Comments by

Bob van Vliet

Land, Music, Stories, and Embodiment Learning as Pedagogies

A Latin American Call to Rethink Education

Written by:

Fátima Delgado Medina

Abstract

This manifesto calls for a reimagining of education through the embodied pedagogies of land, music, stories, and ancestral wisdom. Rooted in Latin American Indigenous and Afro-descendant cosmovisions, it challenges the dominance of Western-centric models that often fragment identities, exclude alternative epistemologies, and normalize colonial hierarchies. By interweaving Spanish, Quechua, and English, the text itself performs a pluriversal stance, foregrounding the tensions and possibilities of translation as pedagogical practice.

The manifesto outlines how land pedagogies nurture relational knowledge and spiritual bonds between people and place; how music, storytelling, and ritual activate ancestral memory; and how embodiment integrates thinking, feeling, and doing into a holistic "bodymind" approach to learning. Drawing from teaching practice at TU Delft, the manifesto illustrates how students collaborate with grassroots communities in Ecuador, Colombia, and Ghana to engage with colonial legacies in entrepreneurship and innovation. Through experiential learning—such as listening to songs or reflecting poetically—students recognize that authentic learning requires unlearning assumptions, confronting historical injustices, and cultivating solidarity across cultures.

At the same time, the manifesto critically examines how calls for "new pedagogies" may inadvertently reproduce extractive logics if they fail to interrogate power and authority. It urges educators to move beyond token inclusion toward genuine transformation, guided by epistemic humility and embodied solidarity.

Ultimately, the manifesto affirms that education must honor land, ancestors, and communities, weaving dignity, resilience, and creativity into futures where diverse ways of knowing and being can flourish together.

Keywords: decolonial pedagogy, embodiment, land pedagogies, storytelling, pluriversality

Introduction:
Rooted in the Land, Raised by the Stories

I grew up in a landscape of languages—Spanish at home, English in textbooks, and Quechua resonating in the stories of my Andean ancestors. From kindergarten to graduate school, I often struggled with curricula and pedagogies shaped by people who neither cared about my well-being nor my homeland's cultural heritage.

In this manifesto, I intentionally weave Spanish, Quechua, and English. Spanish is the language of my everyday life; English is the global bridge I navigate in academia; and Quechua (or Kichwa) carries the wisdom and spirit of my ancestors' land. By doing so, I invoke a rootedness that challenges monolingual, monocultural assumptions in mainstream education. **Languages are not neutral codes;** they carry the histories, struggles, and hopes of those who speak them.

Land, music, and storytelling run through my veins. They are not mere classroom supplements but **living, breathing pedagogies**—ways of knowing and being passed down through Indigenous and Afro-descendant lineages that have shaped Latin America in ways rarely acknowledged by Western-centric educational models. This manifesto is an invitation to embrace these embodied pedagogies, to question the status quo, and to build pathways for inclusive, transformative education in an ever-changing world.

1. Honoring African and Indigenous Cosmovisions in Latin America

Fragmented Identities and the Debt of Recognition

Para construir una identidad, hay que hacerlo desde nuestra diversidad. Yet across Latin America, **Afro-descendant** communities arrived as enslaved and commodified peoples. Although many nations won independence from Spain or Portugal, true decolonization never followed, leaving racist structures and color-based hierarchies intact and leaving Indigenous Peoples, Afro-descendants, and marginalized communities at a structural disadvantage.

¿De dónde vienen? They came from Mali, Angola, Congo, Ghana, Nigeria, and more—some Christian, Muslim, animist, or Vodou practitioners—arriving with a multitude of languages, spiritualities, and survival strategies. Museums like *Muntú Bantú* in Quibdó (Colombia) preserve these stories: the unspeakable journeys in cramped ships, the capacity to reweave traditions, and the profound resilience that anchored entire communities in new lands.

When **Afro-descendants** encountered **Indigenous Peoples** across the Americas, they built **bridges of cosmovision**—shared spiritual and cosmic unities. This gave rise to *raizales* in regions such as San Andrés Providencia (Colombia), Limón (Costa Rica), Bluefields and Corn Island (Nicaragua), Bocas del Toro (Panamá), and *palenques* and *quilombos* across the continent. Through this union, Afro-descendants and Indigenous Peoples forged new forms of identity and belonging on land that had brutally uprooted them or their ancestors.

Still, Latin American national narratives focus on Spanish heritage. Our **Africanidad** is woven into the dances, foods, and spiritualities of the Caribbean, Central America, and large parts of South America. Yet, these influences are rarely recognized in textbooks or mainstream culture. **Nuestra narrativa sigue fragmentada**—what we call “history” often excludes the immeasurable imprint of Afro-descendant and Indigenous knowledge systems.

2. Pedagogies of Land, Music, and Stories

Land Pedagogies and Relational Knowledge

"Land pedagogies" view the land—*aki* as both context and process. Learning is a gentle unfolding led by curiosity, free from the rigid authority common in Western educational models. It seeks **whole-body intelligence**, tying the spiritual, emotional, and intellectual realms together (Archibald, 2008;Simpson, 2014).

If students never learn to see their local ecologies, genealogies, or ancestral knowledge as valid, they risk losing the profound connection to themselves and their communities. In this sense, education is about sustaining moral, cultural, and spiritual bonds that keep us rooted in one another and the land.

Music, Storytelling, and Ritual as Embodied Pedagogy

Music and storytelling activate ancestral wisdom, bridging the emotional and the intellectual. In my classes, I bring and create "ritualized fictional spaces." There is no podium to hide behind or slides to distract us from each other's presence. We light **Palo Santo**, a sacred wood from the Andean region, and breathe together to form a shared space of respect.

Lo agradezco, lo valoro y me sostiene y nos sostiene. Gracias a los estudiantes por permitirse y permitírmelo hacerlo. Cada vez que comienzo, transcurro y vivo la clase, siento que no solamente habla Fátima, sino que traigo las voces de todos los pueblos, de mi pueblo a la clase, me recuerdan a otros tiempos donde Galeano les hace un guiño a los estudiantes, los abraza y ellos sucumben al dolor, la lucha de tantos pueblos de América Latina[1].

Embodiment as a Pathway to Decolonize Learning - To genuinely reclaim our educational spaces, we must engage the **bodymind**—a seamless interplay of thinking, feeling, doing, and being. The following nine principles of embodied learning capture this ethos (Munro, 2018) (Figure 1):

Practices that uphold oneness require us to look in the mirror, see what is not beautiful, and refuse to turn away. They compel us to interrupt our satisfaction with harmful hopes or desires, even if they appear benevolent, and let go of pleasing performances that mask harmful desires and confront brutal truths. We cannot run away from these challenging realizations or the tough conversations we must have with each other to see whether this collective disease—or soul wound—can be healed and scarred together. It will sometimes be messy, uncertain,



Figure 1: Embodiment as a Pathway to Decolonize Learning. Image created by the authors based on Munro (2018).

complicated, uncomfortable, and infuriating. Growing up to do this work can be painful and terrifying, but it is also full of unimaginable possibilities for joy, togetherness, and wisdom (Stein et al., 2020).

[1] I appreciate and value it, and it sustains us and me. Thanks to the students for allowing themselves and allowing me to do it. Every time I begin, continue, and live the class, I feel that not only Fátima speaks, but I bring the voices of all the peoples, of my people, to the class; they remind me of other times when Galeano winks at the students, embraces them, and they succumb to the pain, the struggle of so many Indigenous People and Local Communities of Latin America.

3. Classroom to Community: Decolonial Perspectives in Practice

In my course, *Idea to Start-up: Climate Action*, at the Delft Centre for Entrepreneurship (TU Delft), students collaborate with community-led initiatives in Ecuador, Colombia, and Ghana. By blending **decolonial perspectives** and **experiential learning** (Figure 2), students and I confront the colonial legacies that still shape traditional entrepreneurship and social innovation.

Yet beyond these practical applications, the deeper challenge lies in confronting the colonial legacies that continue to shape traditional entrepreneurship and social innovation. These legacies are not abstract—they are deeply embedded in historical wounds, persistent inequalities, and narratives of exclusion that continue to mark the communities we engage with. Recognizing them requires students to see that learning is not only about acquiring skills, but also about unlearning assumptions and listening to voices that have long been silenced or ignored.

One way I invite this recognition is through music. **Mercedes Sosa**, often called the voice of Latin America, captured the struggles of Indigenous Peoples and Local Communities in her song *"Antiguos Dueños de la Flecha" (Former Owners of the Arrow)*, partially sung in the Toba language. The song denounces the injustices faced by one of Argentina's largest Indigenous groups:

Indian toba

Wandering shadow of the jungle

Poor Toba reduced

Former owner of the arrows

Indian toba

Your caciques are already gone

Your Chirihuan brothers

Abigails mocovies…

Like many Indigenous Peoples, the Toba face intergenerational injustices, including poverty, malnutrition, and discrimination. Their story is a powerful testament to the tenacity and fortitude of marginalized communities, but also a stark reminder of how colonial structures persist in shaping livelihoods, opportunities, and identities. By engaging with these narratives through song, students are encouraged to confront colonial legacies not as distant history but as lived, ongoing realities.

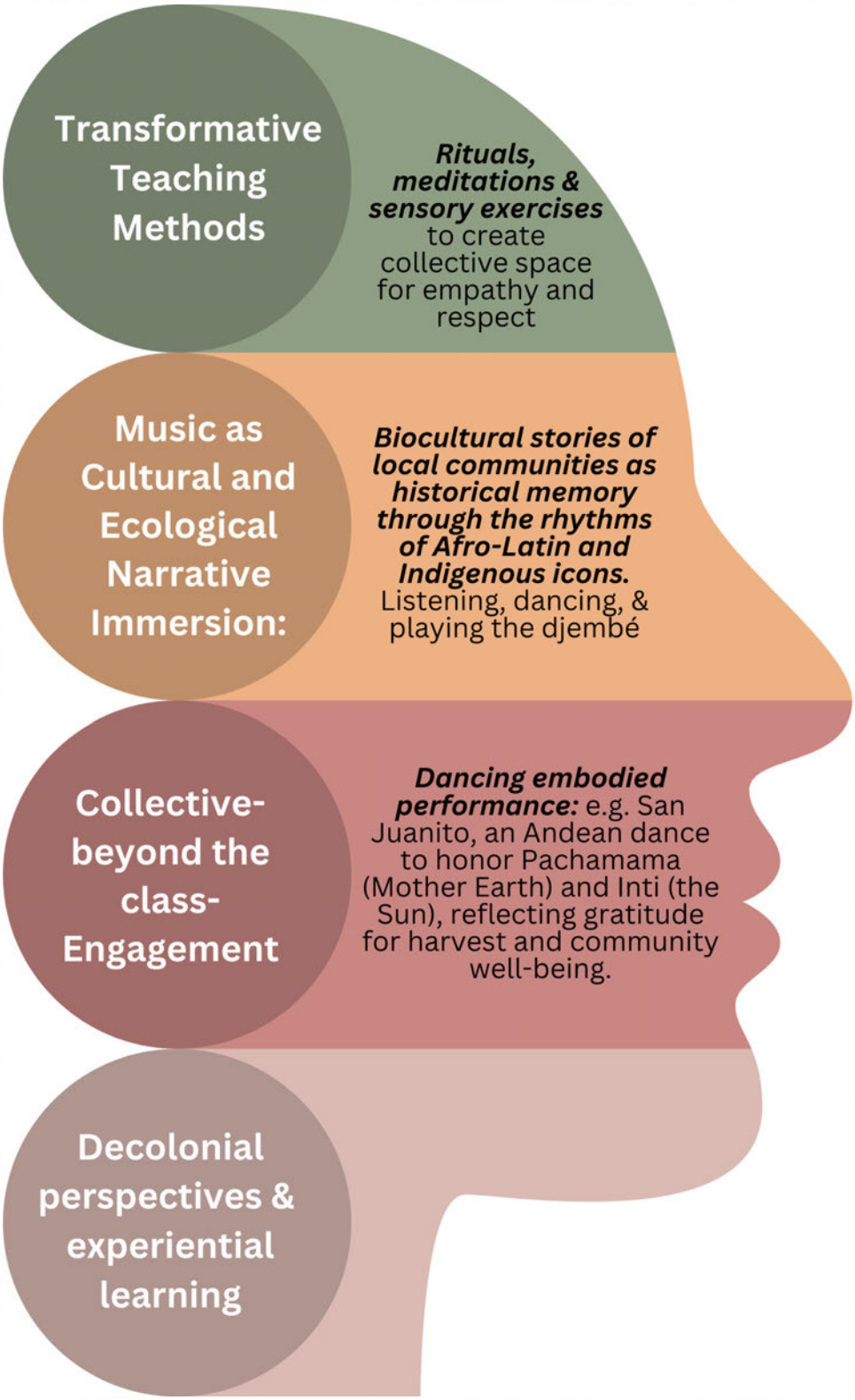


Figure 2: Examples of Decolonial perspectives & experiential learning applied in lectures & workshops. Made by the author.

Student reflections underscore this process of recognition and transformation. One shared: *"All the while I worked in an amazing group with students I wouldn't have otherwise met but are now friends that will stay beyond the course. I loved listening to music in the lectures, listening to the hesitant yet bold voices of my peers as they couldn't hold back the vibes... I am grateful for the experience and cannot wait to hear about future projects and growth in this course."*

Another offered a poem:

"What did I do once I knew?

I took a course called 'Idea to Startup – Climate Action.'

And saw the world in all its harshest fractions…

Regenerative thoughts took root

In hearts and minds, a firm pursuit."

Observing my students sing, reflect, and forge cross-cultural connections reminds me that authentic learning transcends intellectual knowledge. It must engage the **bodymind**, inviting each learner to shift perspectives, behaviors, and ways of relating to the communities they seek to serve. In this sense, the classroom becomes a space of embodied solidarity—where music, stories, and lived encounters guide students toward unlearning colonial legacies and imagining more just and regenerative futures.

4. Tensions and Critiques: Who Decides the Terms of "New Pedagogies"?

Even the most well-intentioned calls for "new pedagogies" can perpetuate existing hierarchies if they fail to question **who sets the agenda** and **whose voices are centered**. When we speak of "inclusion," we risk tokenizing or romanticizing difference rather than engaging in a transformative process that challenges dominant norms and power structures.

This dilemma comes sharply into focus in the poem *Academic Indian Job Description: Have to Know*, by Cash Ahenakew (Jimmy, Andreotti, & Stein, 2019). It vividly captures the **layered burdens** placed on Indigenous (and similarly marginalized) academics to perform authenticity, provide critical perspectives, and simultaneously soothe the discomfort of the very institutions that perpetuate colonial relations:

have to know

Western knowledge and education

plus the critique of

Western knowledge and education

have to know

Indigenous "culture" and education

plus the critique and the critique of the critique of

Indigenous "culture" and education

have to know

how to embody expected authenticity

and how to embody expected critique

of expected authenticity

have to know

how to Indigenize and decolonize

disciplines, protocols, ethics, and methodologies

to make non-indigenous people feel good about their work

have to know

how to live with the guilt of having credentials, a secure job

and the awareness of compliance with a rigged system

built on the broken back and wounded souls of Indigenous People…

The poem highlights the paradox: while institutions increasingly call for "new pedagogies" or "diversity," they often fail to examine their colonial assumptions. Who decides which Indigenous, Afro-descendant, and marginalized voices are recognized, how they are "included," or what frameworks they must fit into? If these questions are ignored, "innovative" pedagogies become another avenue for extractivism—reaping the benefits of diverse perspectives without unsettling the colonial foundations of our educational systems.

In other words, "**new pedagogies**" can quickly become another brand of universalism that re-assimilates differences to validate itself. True transformation requires a profound reckoning with power imbalances, historical violence, and the ongoing effects of colonization on knowledge production and teaching. Rather than using diverse voices to "enrich" already-dominant paradigms, we must ask whether those paradigms need to be re-examined—or dismantled.

5. Land Pedagogies, Epistemic Approaches, and Embodiment

Land pedagogies from Indigenous perspectives—*embodying epistemology in practice—come from the land and with the land*. They emerge in the context of family, community, and relations, free of the overt coercion and authority so normalized in mainstream Western pedagogy that it seldom gets critiqued. The land, *aki*, is both context and process: *coming to know* is learner-led and profoundly spiritual, rooted in freedom (Henderson, 2000) (Simpson, 2014). When realized collectively, these ways of knowing cultivate generations of loving, creative, self-determining, and interdependent individuals who can uphold and advance political traditions and governance systems.

Epistemic pedagogies, in reality, ask us to see the intelligence within *territorial realities*: peasants, social movements, grassroots organizations, campesinos, fishermen, Indigenous Peoples, Afro-descendant communities, and beyond. If we do not acknowledge their forms of knowledge and meaning-making, we miss the more profound metaphors, the references to oral tradition, and the interplay of multiple worldviews. The question becomes: *What if students were never given space to honor their ancestral land-relationality or open-heartedness?* What if the curriculum valued only the standard course outline and assessment rubrics, leaving behind the innate curiosity, joy, and bodily engagement children often have with their environment?

Pedagogies come through the land, music, stories, and embodiment of learning, rising from the roots up—like governance or leadership in reciprocal life. They emerge from being enveloped by the land itself. A person's intimate relationship with the spiritual and physical elements of creation sits at the center of a lifelong learning journey (Deloria, 2001). Ancestors and spiritual beings dwell here alongside living plants, animals, and humans.

The land, *aki*, includes all aspects of creation: landforms, elements, plants, animals, spirits, sounds, thoughts, feelings, energies, and emergent ecologies that connect them (Geniusz, 2009). Critically, **educational pedagogies should be consensual**. If children learn to normalize dominance and non-consent in school, those tools become embedded in how power is wielded later. Within settler colonial contexts, Indigenous Peoples and local communities often lack true consent in their daily engagements. Being colonized frequently means navigating frameworks they never chose.

Embodiment learning offers a transformative pathway by deliberately recognizing and utilizing multimodal bodymind activities that shift perspectives, paradigms, and actions. Conceptualized as integrating the

physical, biological, phenomenological, and experiential, embodiment weaves *thinking, being, doing*, and *interacting* into a monist bodymind (Hocking et al., 2001). In performing arts pedagogy, for example, embodiment is fundamental to the discipline (Kemp, 2012; Hurt, 2014; Lutterbie, 2011; Creely, 2010; Panhofer & Payne, 2011; Carroll, 2011; Zarilli, 2004). These insights resonate across fields, suggesting that mind-body-environment unity fosters deeper, more holistic forms of learning.

6. Conclusion: A Call to Embodied Solidarity

There is a profound urgency to integrate cultural, historical, and social realities into curricula that often privilege narrowly defined concepts of "excellence" or "universal design." This manifesto highlights an alternative path (Figure 3) that honors the many voices usually drowned out by standardization and commodification.

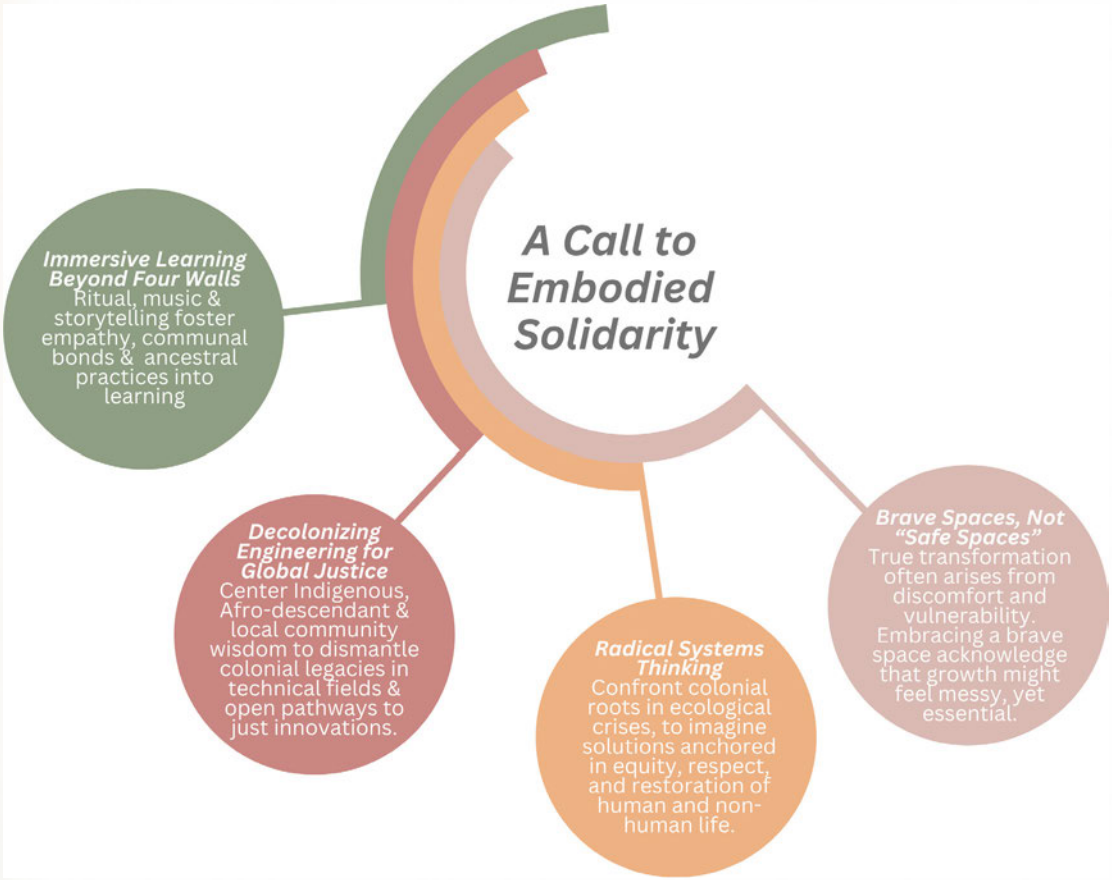


Figure 3: A Call to Embodied Solidarity. Made by the author.

Tupananchiskama—until life makes us meet again. May this manifesto be a **bridge** and an **invitation** for educators, students, and practitioners to create more **just, inclusive, and vibrant learning environments**. By reclaiming the power of land, music, and stories, we honor our ancestors' dignity and nurture future generations' promise to weave a more humane world together.

References

Archibald, J. (2008). *Indigenous storywork: Educating the heart, mind, body, and spirit.* UBC Press.

Carroll, R. (2011). In search of a vocabulary of embodiment. *Body, Movement and Dance in Psychotherapy, 6*(3), 245–257. https://doi.org/10.1080/17432979.2011.617132

Creely, E. (2010). Method(ology), pedagogy and praxis: A phenomenology of the pre-performative training regime of Phillip Zarrilli. *Theatre, Dance and Performance Training, 1*(2), 214–228. https://doi.org/10.1080/19443927.2010.505000

Deloria, V., Jr. (2001). Traditional technology. In V. Deloria, Jr. & D. Wildcat (Eds.), *Power & place: Indian education in America.* Fulcrum Resources. Should be: Deloria, V., Jr. (2001). Traditional technology. In V. Deloria, Jr. & D. Wildcat (Eds.), *Power & place: Indian education in America* (pp. 12-17). Fulcrum Resources.

Geniusz, W. M. (2009). *Our knowledge is not primitive: Decolonizing botanical Anishinaabe teachings.* Syracuse University Press.

Henderson, J. S. Y. (2000). Empowering Aboriginal thought. In M. Battiste (Ed.), *Reclaiming Indigenous voice and vision*(pp. 248–279). UBC Press.

Hurt, M. (2014). *Arthur Lessac's embodied actor training.* Routledge.

Jimmy, E., Andreotti, V., & Stein, S. (2019). *Towards braiding.* Musagetes Foundation.

Kemp, R. (2012). *Embodied acting: What neuroscience tells us about performance.* Routledge.

Lutterbie, J. (2011). *Toward a general theory of acting: Cognitive science and performance.* Palgrave Macmillan.

Munro, M. (2018). Principles for embodied learning approaches. *South African Theatre Journal, 31*(1), 5–14. https://doi.org/10.1080/10137548.2017.1404435

Panhofer, H., & Payne, H. (2011). Languaging the embodied experience. *Body, Movement and Dance in Psychotherapy, 6*(3), 215–232. https://doi.org/10.1080/17432979.2011.572625

Simpson, L. B. (2014). Land as pedagogy: Nishnaabeg intelligence and rebellious transformation. *Decolonization: Indigeneity, Education & Society.*

Stein, S., Andreotti, V., Suša, R., Amsler, S., Hunt, D., Ahenakew, C., Jimmy, E., Cajkova, T., Valley, W., Cardoso, C., Siwek, D., Pitaguary, B., D'Emilia, D., Pataxó, U., Calhoun, B., & Okano, H. (2020). Gesturing towards decolonial futures: Reflections on our learnings thus far. *Nordic Journal of Comparative and International Education (NJCIE), 4*(1), 43–65. https://doi.org/10.7577/njcie.3518

Zarrilli, P. B. (2004). Toward a phenomenological model of the actor's embodied modes of experience. *Theatre Journal, 56*(4), 653–666. https://doi.org/10.1353/tj.2004.0189

Author's Biography

Fátima Delgado is an Ecuadorian lecturer and researcher at the Delft Centre for Entrepreneurship at TU Delft. Her research explores decolonizing sustainability and entrepreneurship, climate action, circular communities, community-based regenerative entrepreneurship, and decolonial participatory design. She has been working with Indigenous peoples, smallholder farmers, and social and grassroots enterprises in Latin America, Africa, and Southeast Asia for over 16 years. Her work challenges the Northern-centered conventional narratives of entrepreneurship and innovation by incorporating diverse epistemologies from historically underrepresented communities.

Comments by authors

on the process of writing this manifesto:

Writing this manifesto was important to me because it allowed me to reclaim pedagogies that shaped me before entering academia—languages, stories, and ancestral wisdom that are often erased in formal education. It is both an act of resistance and healing, weaving together lived experience and scholarly practice to affirm that land, music, and community-based knowledges are central to learning. It also represents a declaration of my positionality and a commitment to embody alternative pathways of education that honor dignity, resilience, and justice.

on the received comments:

The comments affirmed the value of my multilingual and visual choices, reminding me that translation itself can be a pedagogical act of resistance. The suggestion in Section 4 provided me with new insight into how careful transitions help readers follow complex threads, highlighting the need to balance depth with clarity.

To bridge the gap between rational understanding and affective impacts of ones actions, Fátima Delgado Medinas call for embodiment learning and reflections on the use of language ventures beyond teaching ethics and towards pedagogies in, with, and through the real world. For me, educated in an euro-centric technoscientific environment, it is a reminder of my own humanity, reconnecting my body and mind.

Comments by

Juli Osusky

On the Architecturing of Destruction:

Building Space within Academia for Difficult Discussions During an Unfolding Genocide

Written by:

BK Scholars for Palestine

These reflections are time-sensitive; this manifesto was originally written in January, 2025.

Abstract

As genocide unfolds in Gaza, academic institutions—including those branding themselves as leaders in justice—have largely chosen silence. This manifesto, written by BK Scholars of Palestine at TU Delft, emerges to rupture that silence and confront the complicity of academia in systems of colonial violence.

Drawing from bell hooks' vision of education as a practice of freedom, we critically examine how architecture and academia uphold structures of erasure, engineered destruction, and political neutrality that privileges institutional comfort over moral clarity. We write as scholars from colonized and marginalized geographies, navigating a European university where our grief, resistance, and intellectual labor are often dismissed or censored.

The cancellation of our public event Architecturing Destruction in Gaza was not an isolated act but part of a broader institutional pattern—one that treats Palestinian suffering as too political, too uncomfortable, or simply not urgent enough. The continuation of "business as usual" amid mass killing is not apolitical; it is a position that protects power.

This manifesto is a call to reimagine what higher education could be: a space that refuses silence, confronts settler colonialism, and centers the voices of those most impacted. Architecture must reckon with its role in materializing violence, and universities must be held accountable for the knowledge they choose to suppress.

We offer this text as both a critique and an invitation—to reject neutrality, embrace discomfort, and build a pedagogy rooted in justice, solidarity, and refusal.

Keywords: **Palestine, Decolonial Pedagogies, Radical Care**

As bell hooks maintains in her book *Teaching to Transgress*, joining established knowledge institutions does not come without challenges for individuals from marginalized or *othered* realities. In such an institutional environment, it becomes our duty, an embodied call from within, to critically engage with and transgress what is assumed to be normal, to understand and bring to surface "the difference between education as the practice of freedom and education that merely strives to reinforce dominance."(p. 4)

Our experience at Bouwkunde, or the faculty of Architecture—within Delft University of Technology, an institution with a long-standing legacy across various disciplines—has underscored the urgency of this issue, particularly during this devastating year and a half for Gaza and Palestine. This urgency extends beyond our faculty to the broader field of architecture as a discipline.

As scholars and educators, we are in agreement about what kind of scholars and practitioners we do *not* want to become. We are firm in refusing to compromise our values for the sake of fitting into a prestigious institution, one in which several structures have been invisibly operating to maintain hierarchies of domination and control. Constructed out of capitalist motives and colonial legacies, the seeming invisibility of these structures is what gives them more power and allows them to continue operating without interruptions. Now is the time for an intervention and call into question all what we have taken for granted. Over the past year and a half, the complicity of our discipline has become starkly visible, revealing the troubling role architecture plays as a tool of destruction. We will not remain silent about this. Origins, mechanisms and effects of detrimental structures need to be meaningfully addressed so that students of a prestigious and international institution such as TU Delft can learn about the implications of their actions, no matter where they come from.

There is something profoundly unsettling about the way business continues as usual in educational spaces—including within our own faculty—while an ongoing genocide unfolds in Gaza, settler colonial violence escalates in the West Bank, accompanied by subsequent colonial expansion in Lebanon and Syria.

In moments of such profound human suffering and escalating civilian casualties, one expects academic institutions, particularly those that claim to champion critical inquiry and global justice, to pause, reflect, and respond. Yet, the silence was deafening. As scholars from the Global South, including Palestine, it was deeply jarring for us to observe how little attention was paid to the events in Gaza, how seldom they were mentioned - if at all - in classrooms or faculty meetings. Conversations seemed determined to avoid confronting these realities. In the symphony

of ignoring, the rhythms of everyday life in our institution persisted without disruption. Classes continued, deadlines loomed, and the routines of academic life unfolded as though untouched by the unfolding horrors. Students of architecture have been expected to work on their projects concerning housing, educational, religious buildings and cultural complexes while housing, educational, religious buildings and cultural complexes have been systematically and deliberately destroyed.

What rendered itself more clear over time is that this absence of interruption is not merely a failure of empathy or awareness, but a deeply political determination. The seamless continuation of institutional activities serves as a mechanism that reinforces the status quo, insulating the system from accountability and shielding it from any reckoning with its complicity. It hides the structures of power and bias that perpetuate such injustices, ensuring that the narratives of the oppressed remain marginalized, their suffering rendered invisible or irrelevant. In this sense, the very continuity of academic life becomes an act of complicity. It sustains a system designed to privilege certain voices while erasing others, to protect the comfort of those in power at the expense of confronting uncomfortable truths.

Every morning, for over a year and a half, Palestinian, Arab, and Muslim students and staff—as well as anyone with a shred of humanity and empathy, in addition to those who carry genocide memories in other geographies of the world themselves or through ancestral stories—woke up to scenes of unimaginable horror. The images from Gaza are seared into our minds: slaughtered children, women, and men; bodies severed and mutilated; blue, lifeless infants cradled by wailing mothers and fathers; entire families obliterated in an instant. We carry this grief, this anger, and this profound sense of loss into their classrooms and offices. And yet, we are expected to put it aside, to focus on their projects, meet deadlines, and participate in academic life as though nothing has changed. We are asked to continue as normal while carrying a hole in their hearts that is only growing bigger.

During this time, we are often told that we are all equal in the eyes of our institution, that we share the same rights within our classrooms and educational communities. These assurances are repeated through countless institutional inclusivity and diversity initiatives, framed as commitments to fairness and equality. We are presented with events and activities that celebrate these ideals, reinforcing the image of an academic institution that cares deeply for the well-being of all its members. Yet, when we look closer, the veneer of these claims begins to crack. In practice, we see how our institution has failed to live up to its professed values, particularly in addressing the human catastrophe unfolding in Gaza, and its implications on its own students and staff. It has

neglected to acknowledge or support the dozens of students whose lives have been directly and irreparably impacted by an ongoing genocide—one that has claimed what is estimated to be more than 50,000 lives.

To interrupt that silence and create much needed disruption, we worked on creating a collective space for critical scholarly engagement through our group *BK Scholars for Palestine*. Our first initiative was titled "Architecturing Destruction in Gaza, Palestine". At the heart of our discussion was the concept of "architecturing" as a deliberate, ongoing process of violence—a form of engineered destruction that systematically targets Gaza's urban and rural infrastructures with the explicit aim of rendering the region uninhabitable for years, if not decades. This top-down masterplanned destruction extended far beyond individual buildings to encompass Gaza's educational, residential, religious, and cultural spaces, alongside the erasure of agricultural lands, food resources, and vital infrastructure, including water, sewage, roads, and electricity systems. By examining architecture's centrality in these processes, we sought to reframe the discipline not just as a tool for construction, but as a field deeply entangled in systems of oppression and violence—and, conversely, one that holds potential for resistance and reconstruction.

This event was born out of a critical need to address the widespread lack of understanding within our faculty regarding Gaza, Palestine, and the historical continuum of settler colonialism that has shaped the region since Al Nakba in 1948. We aimed to position architecture as a lens through which students and staff could critically engage with these realities, urging architects not only to design and build but to interrogate, resist, and counteract systems of destruction. This stems from our conviction that, as architectural scholars and educators, we hold an ethical responsibility to confront the discipline's complicity in violence and to mobilize its potential for justice-oriented action.

Central to our initiative was the commitment to amplifying Palestinian voices—voices that have long been marginalized in Western academic spaces, by assembling a panel of Palestinian scholars and architects for our event. Drawing on *Edward Said*'s concept of "the permission to narrate," we deliberately foregrounded Palestinian scholars to reclaim the narrative of their experiences, resisting the persistent tendency for others to speak on their behalf. This was not merely an act of academic inclusion but a crucial challenge to the structures of epistemic violence that systematically silence Palestinian perspectives.

Sadly, after months of dedicated work and preparation, during which we maintained regular consultations with the dean and his staff regarding the event's details and schedule, our event was abruptly canceled by our faculty's dean himself, citing concerns about *safety*. The reasoning



Figure 1: The event poster with the title: Architecturing Destruction in Gaza, Palestine. Made by the authors.

was ambiguous, leaving us unsure whether we were perceived as the target or the threat. The explanations offered were vague and remained unsatisfactory in the months that followed. This uncertainty and sense of silencing were compounded by acts of hostility, such as the destruction of our promotional materials. All 200 event posters, which we had carefully distributed across the faculty, were ripped down and thrown into the trash in the days leading up to the event's cancellation. These actions collectively sent a chilling message: Palestinian scholars were being openly censored, and the faculty was declaring, both explicitly and symbolically, that there was no room for Palestinian or pro-Palestinian voices within its walls.

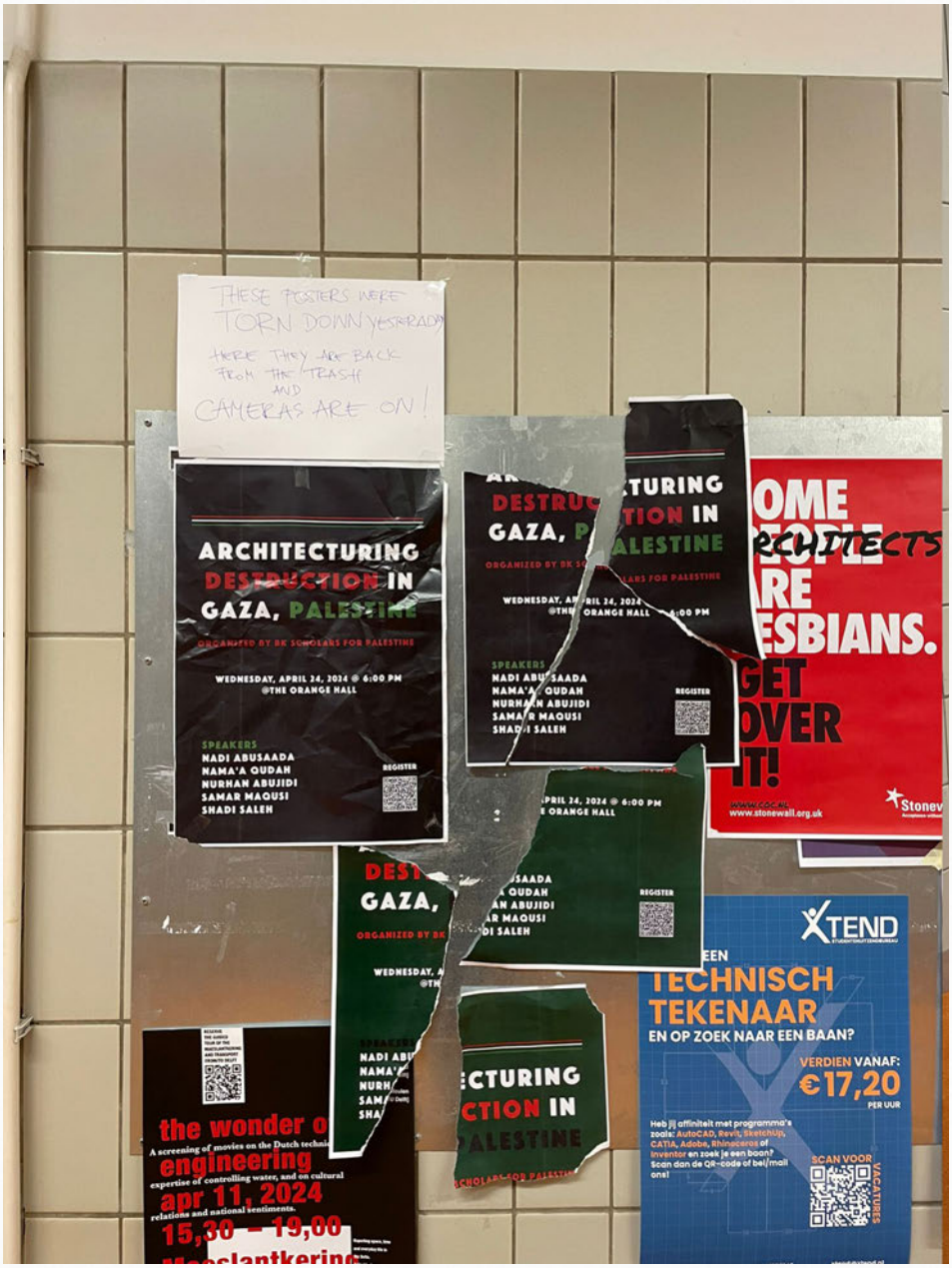


Figure 2: Some of the destroyed event posters that we found in the trash and re-pinned again, in defiance. Made by the authors.

Our university, which prides itself on fostering intellectual growth and critical thinking, has chosen to look away from a tragedy of monumental proportions. Those acts of neglect and also censorship are not due to a lack of awareness but an unwillingness to confront uncomfortable truths. The institution has avoided calling the violence in Gaza by its true name: genocide.

The word *genocide* is said to make some people uncomfortable. But why is the discomfort of a few prioritized over the immense grief and trauma of those losing family members, friends, and entire communities? Why does it outweigh the moral obligation to seek justice, demand accountability, and uphold the principles of international law? Colleagues approached



Figure 2: Some of the destroyed event posters that we found in the trash and re-pinned again, in defiance. Made by the authors.

us in hushed tones, barely audible, to admit they believed a genocide was unfolding in Gaza—but they dared not voice it publicly, fearing backlash or making others uneasy. Conversations were confined to private spaces, whispered behind closed doors, while in public, silence prevailed.

Meaningful actions to address the unprecedented human catastrophe were conspicuously absent, as was any genuine engagement with the crisis unfolding before us. We do not believe that discomfort alone is a valid reason to shut down a conversation. Allowing the conversation to be dictated—or even silenced—by the discomfort of some undermines the very principles of academic inquiry and critical engagement. Instead, we must delve deeper into why such feelings arise and recognize them as an essential part of meaningful dialogue. Addressing these emotions, rather than avoiding them, is vital to fostering a space where complex and urgent issues can be examined with honesty and integrity. By prioritizing the convenience and comfort of some over the urgent needs of others, the institution betrays the very ideals it claims to champion. In its silence and silencing, the institution becomes complicit. Its inaction and hindering of our actions reinforces the systems of power and oppression that enable such atrocities to continue unchecked.

Once again: this is not neutrality; it is a choice—a choice to side with the status quo, to shield itself from accountability, and to prioritize institutional image over human lives. Such choices do not merely undermine the institution's credibility; they erode its moral foundation and alienate those who once saw it as a space of possibility and change. To address this failure requires more than platitudes or performative gestures. It demands a radical rethinking of what it means to be an educational institution in times of crisis. It requires a willingness to listen to the voices of those who are grieving, to create spaces where their pain is acknowledged, to take a stand against injustice, and to listen to its institution's own scholars who dare speak out no matter how uncomfortable it gets.

When we first arrived here, we were told that everything in the Netherlands is flat, from the terrain to the hierarchy, and that we should adapt to this new way of doing things, which might be different from the way things run in "our countries". That flatness in question, which is not always practiced and is selectively utilized in service of some, works on sustaining to the status quo, because it retains the power distribution within the institution and keeps it as it is, mirroring the existing power distribution in the society, shaped by factors such as gender, age and race, among others. As scholars and educators, we need to be honest and genuine in addressing the power imbalance that shapes the everyday experience of students and staff in our institution, and rework the structure of things so that those at the margins can be brought closer to

the center, and those who are at the bottom can move further up.

The system should be redesigned to amplify the voices of those who remained unheard, assist those in need of assistance, and carve out a bigger space for those who have been given almost none.

For Palestinians and pro-Palestine students and staff, the system is inherently designed to work against them. The very flatness that the institution claims to uphold only serves to deepen their censorship and marginalization. Supporting Palestine comes at a cost—a cost that the institution appears unwilling to bear. Taking a stand threatens revenues, disrupts lucrative arms and technology contracts, and challenges partnerships with companies that rely on the perpetuation of war and cycles of violence to maintain their profits. Despite relentless efforts by large groups of students and staff from the university—through demands, letters, petitions, and protests calling for a boycott of complicit arms and technology companies and a severing of all institutional ties with them—the executive board remains unmoved. Even when presented with clear documentation of the complicity of Israeli universities in the killing of Palestinians in Gaza and the West Bank, through the development and deployment of military technologies and academic collaborations, the board continues to claim that there is insufficient reason to act. This refusal to take a stand speaks volumes. It is not a matter of lacking evidence but of prioritizing financial and political interests over justice and accountability. By overlooking the students' and staff's demands and refusing their collective calls for action, the institution aligns itself with the very systems that perpetuate violence and oppression, further alienating those who are already marginalized within its walls. In that sense, the institution's posture of neutrality and apoliticality functions not as a shield, but as a strategy—one that enables it to sidestep a crisis that demands ethical clarity and commitment. Ambiguity is not an innocent position; when used to deflect accountability or obscure violence, it becomes a mechanism of complicity. Institutions that permit or perpetuate such erasure—whether through passive silence or active suppression—do not remain impartial; they expose their alignment. At this juncture, the question is no longer whether one is 'neutral,' but whether one is willing to confront genocide—or be counted among those who rationalize or facilitate it.

The question of Palestine is a universal call for justice—one that resonates with marginalized communities across the globe. It is a moral and political obligation for us as educators, researchers, and justice-oriented communities to heed this call. Palestine speaks to the struggles of women, children, and peoples of the Global South; to all colonized and oppressed populations; and to anyone who has endured systemic discrimination and injustice. This is precisely why we must come together

to create space for critical discussions about Palestine—its history, its people, and its ongoing struggle.

We must confront the settler colonial structures underpinning the current genocide, as well as the massacres and ethnic cleansing that were foundational to the establishment of the State of Israel.

These conversations must be led by Palestinian scholars and students, or at the very least, must center Palestinian narratives and lived experiences. They must expose the material realities of colonialism—what has been taken from Palestinians: their homes, land, communities, and futures—and how. Understanding the mechanisms of displacement, violence, and erasure that have shaped, and continue to shape, Palestinian life is essential not only to grasp the depth of the ongoing injustice, but also to build genuine solidarity with all those struggling for liberation, dignity, and justice worldwide.

It might seem a daunting task, a challenging one. We all carry within us deeply ingrained biases and prejudices, shaped by the environments and narratives we have been exposed to throughout our lives. Recognizing and accepting these biases is the first step toward dismantling them. Anyone engaging with our (Global South-distant) regions from the outside has internalized these biases to some degree, often manifesting in shades of the white savior complex—the belief that one possesses superior knowledge, skills, or moral authority to "help" or "improve" us. In an inevitably relational manner, decades of colonial domination, cultural erasure, and economic dependency have left their marks on many of us. We, insiders, have internalized feelings of inferiority, adopting the very narratives imposed upon us. For those of us who studied or worked in institutions full of Western ideals, the situation becomes even more complicated. We find ourselves inhabiting a liminal space, torn between the role of the savior and that of the victim. On one hand, we adopt the confidence of modern education, feeling equipped to "fix" the challenges our societies face. On the other hand, we remain haunted by the narratives of disempowerment and struggle tied to our identities. This duality breeds a profound sense of confusion and existential dread, as we attempt to reconcile conflicting identities and responsibilities.

In the field of architecture, this tension takes on an added intensity. Architecture is inherently tied to power—it shapes the physical and social spaces where life unfolds. Those of us trained in architectural institutions built on long colonial legacies are often given tools that promise solutions that bring communities to "modernity", to design, build, and to improve their lives. With these tools, we may begin to believe that our education and our mastery of the colonizer's language grant us a unique capacity to "save" our people, often from a comfortable distance, perched in ivory towers. The allure of "making a difference" becomes entangled

with the privileges we have accrued, making it easy to overlook the very communities we aim to serve.

At the same time, architects who come from abroad to engage with our region often exhibit the white savior complex in its most glaring form. Armed with advanced tools, technologies, and theories, they arrive with grand ideas about how to improve cities whose names they struggle to pronounce, dismissing them as backward villages in need of transformation. Their interventions, though often well-intentioned, are rooted in condescension and a lack of genuine understanding, resulting in solutions that are at best irrelevant and at worst harmful. This is why humility must be at the core of our work. We need to descend from our towers—both literal and metaphorical—and reconnect with the realities of the people for and with whom we design, or for and with whom we choose not to design.

Architecture is not merely about building structures; it is about creating spaces where life unfolds, where generations live, dream, and build their futures. It is a deeply social and political act, one that requires openness, sensitivity, and respect for the lived realities of others. Not everyone aspires to a "better" or more "optimized" life as defined by external standards. For some, preserving their way of life is a priority, and that choice must be respected. Others have clear visions of what they need, and our role as architects—or as professionals in any field—is not to impose our ideas but to listen deeply and respond thoughtfully. The communities we aim to serve must always remain the authors of their own stories. Our job is to support, not to speak for them; not to overshadow.

As BK Scholars for Palestine, we believe it is extremely important for our academic institution to foster spaces for deep and difficult discussions. We refuse shallow engagement, whitewashing of history, and the silencing of voices of truth. We believe true change begins when we relinquish our need for control and embrace a position of humility. Only then can architecture—and by extension, our engagement with the world—serve as a tool for equity, dignity, and desired sustainable futures. We refuse to look away, continue with business as usual, or be silenced and institutionalized—unless the institution evolves alongside us, together with the discipline of architecture itself.


FREE
PALESTINE

Through this manifesto, we also encourage and invite you to do so.

Figure 3: Free Palestine! Made by the authors.

Authors' Biographies

BK Scholars for Palestine is a collective of researchers and educators at the Faculty of Architecture (Bouwkunde), TU Delft, committed to critical scholarship, decolonial pedagogy, and justice for Palestine. Formed in response to the institutional silencing of Palestinian narratives, the group creates space for urgent conversations on settler colonialism, spatial violence, and the complicity of architecture in systems of oppression. BK Scholars for Palestine advocates for an academic environment grounded in ethical responsibility, solidarity, and radical refusal.

Nama'a Qudah is an interdisciplinary researcher and architect whose work explores the architecture of displacement, with a focus on Palestinian refugee camps and decolonial knowledge production in Palestine, Jordan, and the region. Her research integrates architecture, anthropology, and creative writing to examine both the material and immaterial dimensions of refugee spaces. For her PhD, she conducted six years of fieldwork in Al-Wehdat refugee camp in Jordan, documenting everyday life through ethnography and storytelling. Beyond academia, she engages in broader conversations on spatial justice, reconstruction, and resistance, participating in networks that challenge colonial frameworks in architecture and knowledge production.

Sabina Tanovic is an architect, scholar, and independent researcher specializing in commemorative architecture. Her book Designing Memory: The Architecture of Commemoration in Europe, 1914 to the Present (Cambridge University Press, 2019) explores European memorial practices through memory politics, grief psychology, and architectural preservation. Sabina leads “Designing Memory,” a specialized practice focused on creating, adapting, and revitalizing memorial spaces that respond to contemporary crises such as climate change, social fragmentation, and global challenges to justice.

Comments by authors

on the process of writing this manifesto:

We came together as a collective to reflect on the events of the past year—on the silences we encountered, the solidarities we built, and the forms of resistance we enacted within and beyond the university. Writing this manifesto became a space for us to regroup, to process the institutional violence and censorship we faced, and to reaffirm the political and ethical commitments that brought us together in the first place. It allowed us to articulate our shared values with greater clarity, to reconnect with our purpose, and to imagine how we might continue resisting complicity while nurturing a community grounded in justice, care, and collective accountability.

on the received comments:

The comments format proved to be particularly useful, as they offered a clearer understanding of both the major and minor recommendations. They helped distinguish between the structural or conceptual revisions that required deeper engagement, and the more specific, technical, or stylistic suggestions that could be addressed more directly. This distinction allowed to approach the feedback with greater clarity and intentionality, ensuring that I could respond meaningfully to the most critical concerns while also attending to the finer details of the work.

While reading this manifesto, I realized I had this lingering idea that my university's complicity and inaction with regards to Gaza (and on other issues, like its collaboration with the fossil fuel industry) were mostly or 'merely' a matter of institutional inertia, a lack of motivation, a failure of priorities. No more. BK Scholars for Palestine describe how TU Delft was not only silent, but combined that silence with active silencing; that it did not merely fail to act, but that its inaction was combined with the active blocking of those who *did* attempt to address the issue. These were not failures, but overt actions of complicity and support for structures and practices of oppression – they *are* structures and practices of active oppression. Instead of refusing to choose, as they claim, our university's and faculties' leadership made a very clear choice – and acted on that choice.

As someone who struggles with the question what I can and cannot ask of my students, or how to draw them into conversations that they have been taught not to have, a smaller remark that I will be chewing on for a while is BK Scholars' call to take feelings of discomfort as input to critical, difficult conversations instead of pointing to them as reasons to avoid those conversations.

Comments by

Bob van Vliet

Breaking the Silence:

A Manifesto for Justice, Inclusivity, and Decolonization in Higher Education

Written by:

POLIS | Platform for Urbanism and Landscape Architecture

Abstract

This manifesto, Breaking the Silence: A Manifesto for Justice, Inclusivity, and Decolonization in Higher Education, critically examines the role of universities in upholding structural injustice through silence and institutional inertia. Using the case of TU Delft's response to the student-led group Scholars for Palestine, it highlights how academic neutrality is often used to suppress politically sensitive discourse. The manifesto argues for the urgent need to decolonize higher education by embracing epistemological, institutional, and personal transformation. It calls for the inclusion of non-Western perspectives in curricula, pedagogical innovation that centers diverse cultural contexts, and institutional policies that support marginalized voices. Through self-reflection, the authors reveal how even student associations internalize institutional pressures, resulting in self-censorship and diluted activism. The document advocates for empowering students as agents of change and emphasizes universities' responsibility to provide platforms for critical engagement and open dialogue. Justice, inclusivity, and decolonization are presented not as optional values, but as essential actions in response to global injustice. The manifesto concludes with a call to action: students must shift from passive recipients to active participants in shaping knowledge, while universities must move from performative inclusivity to structural change. Breaking institutional silence is not only an ethical imperative, it is fundamental to reclaiming the university as a space of critical thought, resistance, and transformation.

Keywords: Decolonization, Justice, Inclusivity, Institutional Silence, Critical Pedagogy, Academic Freedom

Universities, as institutions where new generations of researchers and practitioners are educated, stand at the forefront of global crises and urgencies. The privilege of obtaining a degree and the level of access to decision-makers demonstrate the power of their voices. At the same time, the Western notion of academic impartiality and objectivity often serves as a justification for official university institutions to refrain from taking political positions. At TU Delft, for example, the administration actively attempted to silence the group “Scholars for Palestine,” which protested the university’s inaction in condemning Israel’s war and genocide in Palestine and its refusal to halt cooperation with Israeli institutions and companies, some of which profit from these ongoing atrocities. In April 2024 the group was planning to organize an academic event about architecture and destruction caused by the war in Gaza, which, after minor acts of vandalism, was cancelled by the university. In our opinion, this lack of support for an academic event and the reluctance to take a stance stems, in part, from a worldview that prioritizes impartiality and scientific objectivity. We advocate for greater sensitivity to justice, inclusivity, and decolonial, non-Western perspectives to challenge this mindset. This manifesto explores the processes of self-censorship, the inclusion of alternative voices and ideas in education, and the power of student associations as agents of change. We call on official institutions to establish frameworks that nurture student initiatives and to take action themselves.

This manifesto was written in January 2025. While the situations discussed may have shifted since then, the structural issues we confront, silencing, complicity, and institutional inertia, remain embedded in higher education. Our words reflect a moment in time, but the urgency and principles guiding them persist.

The Problem: Silence and Self-Censorship

As a student-run study association, we have encountered the challenge of self-censorship in academia. When attempting to decide on a theme for the year, we initially wanted to focus on the decolonization of the curriculum through the lens of intersectionality. However, the incident with BK Scholars for Palestine, where scholars were denied space for discussion, exemplifies how institutions suppress politically sensitive topics. We could not afford to lose support from the university, students and agitators. So, to avoid backlash and conflict, we softened our theme to “Togetherness in Diversity,” deliberately avoiding terms like decolonization and intersectionality. Even though we were ethically inclined toward critical change, this got corrupted. Unfamiliar with our own agency as students, we inadvertently mirror the very silencing we aim to resist. This manifesto also acts as an ongoing reflection in the pursuit of justice.

Universities often function as “checklist” institutions, favoring performative inclusion over critical engagement. Western perspectives dominate, while alternative voices are sidelined. In our self-reflection, we must acknowledge that silence is not neutrality,it reinforces power structures. If universities value academic freedom, they must support, rather than suppress, difficult conversations.

Rethinking Curricula

The word *decolonization* is perceived as controversial by many. To avoid misunderstanding and to foster awareness, we will explore their meanings. According to Shahjahan et al. (2022), decolonization can take different forms depending on the context:

- **Epistemological Decolonization**: Challenges the dominance of Western knowledge systems, advocating for the inclusion and validation of diverse, often marginalized, ways of knowing.
- **Institutional Decolonization**: Focuses on transforming educational structures and policies to address and rectify colonial legacies and power imbalances.
- **Personal Decolonization**: Emphasizes individual reflection and the unlearning of internalized colonial biases, encouraging personal growth and a shift in mindset among educators and students.

Addressing all three forms of decolonization in the academic institutional system, different approaches are needed. Derived from Shahjahan et al. (2022) we see four actions universities, lecturers, and students can take:

- **Curriculum Reform**: Revising course content to include diverse perspectives and challenge western-centric narratives. Integrating voices from the Global South, the Middle East, Asia, and other underrepresented regions.
- **Pedagogical Strategies**: Implementing teaching methods that promote critical thinking and recognize students’ cultural backgrounds. Emphasizing the importance of knowledge in non-Western languages and non-textual or visual forms.
- **Institutional Policies**: Developing policies that support diversity, equity, and inclusion within the academic environment.
- **Community Engagement**: Fostering partnerships with local communities to integrate Indigenous knowledge, practices, and cosmologies into the learning experience. Inviting speakers with lived experiences to lecture alongside academic professionals. This includes incorporating real-life stakeholders into the curriculum.

Empowering Students as Changemakers

In an ever-evolving world, universities play a crucial role in shaping students into active participants in society. Beyond acquiring knowledge, students should develop the ability to think critically, engage politically, and contribute meaningfully to global challenges. Institutions must provide the necessary framework to foster agency, equipping students with the skills and confidence to navigate complex issues.

A key component of this framework is the opportunity for students to organize and engage in discussions about pressing real-world crises. Encouraging open dialogue allows them to analyze diverse perspectives and develop informed opinions. Alongside this, experience-based learning should be integrated into academic programs. Standardized internships and exposure to real-life challenges can bridge the gap between theory and practice, ensuring students are prepared to address societal issues effectively.

Equally important is the creation of spaces that encourage debate and disagreement within the curriculum. Universities should promote an environment where students feel comfortable expressing differing viewpoints while upholding intellectual rigor and respectful discourse. By fostering these elements, institutions can cultivate a generation of changemakers equipped to challenge norms, propose solutions, and actively shape the future.

The Role of Universities in Justice and Inclusivity

Academia is inherently political, shaped by historical, social, and ideological forces. The values that guide research, the hierarchies within institutions, and the voices that dominate discussions all reflect broader societal structures. Recognizing this reality is essential in fostering an environment that actively welcomes diverse perspectives. Universities must move beyond performative inclusivity and engage in meaningful dialogue that challenges dominant narratives. Encouraging alternative voices, particularly those historically marginalized, is not just an ethical imperative but a fundamental part of intellectual rigor and progress.

Call to Action

We must take action. In a world where crises shape our daily reality, universities have a fundamental responsibility to foster critical thinking, amplify diverse voices, and serve as catalysts for social change. Higher education, despite its inaccessibility to many, cannot remain isolated from the urgent challenges of our time. Whether or not these issues

directly affect those within academic institutions, universities must confront them head-on. They must take a stand against injustice, elevate marginalized voices, and commit to meaningful change, both for the present and for future generations.

This manifesto calls on students and universities to take an active role in transforming academia into an inclusive, critical, and politically engaged space,one that does not shy away from the world's realities but actively works to challenge and reshape them.

Students: From Recipients of Knowledge to Active Participants

- Organize and participate in open discussions about global crises, fostering spaces where diverse perspectives can be heard without fear of censorship.
- Advocate for inclusivity and justice by challenging institutional silences, questioning Western-centric curricula, and demanding the representation of marginalized voices.
- Engage with real-world struggles by connecting academic knowledge to activism, collaborating with grassroots movements, and centering lived experiences in learning.
- Create alternative platforms when institutions fail to provide space for critical discourse, ensuring that issues of oppression, violence, and inequality are confronted rather than ignored.

Universities: From Learning Spaces to Agents of Structural Change

- Decolonize curricula by integrating diverse epistemologies, languages, and knowledge systems beyond the dominant Western canon.
- Foster environments where students and scholars can engage in critical debates without fear of institutional repression or political backlash.
- Support student initiatives that contribute to justice-oriented discourse, providing institutional backing rather than silencing or sidelining critical voices.
- Acknowledge that everything is political, from research funding to faculty hiring, and taking responsibility for creating an educational system that prioritizes justice, equity, and real-world engagement.

Silence perpetuates injustice. Higher education must break the cycle of complicity and commit to justice, inclusivity, and decolonization, not as abstract ideals, but as tangible actions. The university must be a space where knowledge is not just produced but contested, reimagined, and mobilized for a more just and equitable world.

References

Shahjahan, R. A., Estera, A. L., Surla, K. L., & Edwards, K. T. (2022). "Decolonizing" curriculum and pedagogy: A comparative review across disciplines and global higher education contexts. *Review of Educational Research, 92*(1), 73–113. https://doi.org/10.3102/00346543211042423

Author's Biography

POLIS is the study association for master's students in Urbanism and Landscape Architecture at TU Delft's Faculty of Architecture and the Built Environment (A+BE). Founded in 1989, it provides an open platform that connects students, academics, and professionals working across the urban, rural, and infrastructural landscape. By fostering dialogue between academia and practice, POLIS encourages knowledge exchange and supports students' academic and professional growth. Each year, the association works with a central theme that guides its activities and reflections. For the 2024–2025 board, the theme was "Togetherness in Diversity." This manifesto expresses our collective perspective, shaped by this year's experiences. The main editors of this text were **Juli Osusky, Isabella Jaramillo Diaz, Feline Kaaij, and Jing Spaaij**, graduates of MSc Urbanism.

Comments by authors

on the process of writing this manifesto:

We wrote this manifesto collectively, and the process was both enriching and meaningful. It gave us the chance to debate and share our perspectives, which helped us better understand not only each other's positions but also our own. These discussions encouraged us to think more critically and reflect deeply on where we each stand. Coming together to shape our thoughts into a shared vision for change was a powerful and empowering experience. We're grateful for the opportunity to engage in this process together.

on the received comments:

We are very thankful for the comments we received. They helped us see where our ideas came across clearly and where we needed to be more precise or strengthen our formulation. Since our ideas feel obvious to us, it was especially helpful to get an outside perspective. The feedback gave us valuable insights into how our message is received and where we can improve our writing to better communicate our intentions.

This manifesto is a bold, thoughtful, and timely contribution. It critiques the performative neutrality of higher education and offers a compelling, hopeful alternative rooted in justice, inclusion, and decolonial thinking.
This manifesto could be a powerful tool to mobilise students and educators across the faculty, university and beyond.

Comments by

Johnathan Subendran

Resistance by Research and Design:

Challenging Academic Neutrality and Epistemic Hegemony in Design Education - Six Actions of Resistance in Conflict Zones within Oppressive Regimes

Written by:

Marh Echtai,
Johnathan Subendran

Abstract

This manifesto challenges conventional pedagogies in urbanism by advocating for insurgent research and design methods that resist academic neutrality, epistemic hegemony, and depoliticisation of traditional design education. It proposes alternative approaches to spatial design education, drawing from the lived experiences of students and alumni of the graduation studio at the Urbanism Department of TU Delft, particularly in conflict settings like Syria and Tamil Eelam (North-East Sri Lanka).

Current design education, with its mainstream, Western-centric frameworks, often fails to adequately address the complexities of conflict zones. This manifesto calls for embracing counter-research methods such as counter-mapping, counter-imagination, and spatial political imaginaries to expose and challenge systemic injustices. These methods empower students to resist dominant narratives, develop alternative design strategies, and foster a pluralistic knowledge base rooted in diverse ways of knowing.

Students, such as those involved in research projects on Syria and Tamil Eelam, demonstrate the power of design as a mode of resistance. By spatialising conflict, they challenge the neutrality of academia and offer new ways to imagine the futures and narratives of oppressed peoples. This manifesto invites educators and students to critically engage with oppressive regimes and hegemonic knowledge production by fostering solidarity, activism, and collective action.

Ultimately, this manifesto asserts the urgency of reimagining design education to resist hegemonic practices, advocating for the cultivation of alternative research methodologies that are responsive to the specific needs of communities affected by conflict and oppression.

Keywords: Insurgent research, epistemic justice, alternative design, conflict zones, decolonising research

Introduction

Mainstream spatial design and planning education—particularly at TU Delft's Faculty of Architecture—is deeply rooted in design heroism, solution-driven biases, and Western-centric ideals of democracy. It assumes that everyone has a voice, that academia should remain neutral, and that design can provide objective solutions to complex challenges. This has resulted in an education system that is epistemically and methodologically hegemonic—one that prides itself on being largely apolitical while reflecting only a privileged fraction of the world's complex socio-political and environmental realities.

For years, the Master's program in Urbanism and the broader design curriculum at the Faculty of Architecture have attracted a highly multicultural and international student body. In the first year, students engage with a wide range of design and planning concepts, methods, and perspectives intended to equip them with rigorous, innovative, and socially conscious approaches to research and design. However, the vast majority of these theories and frameworks are derived from Western scholars—predominantly white men whose worldviews were shaped by specific socio-cultural, political, and environmental contexts of the past century. While many of these ideas were once groundbreaking, their continued dominance in education remains largely unquestioned.

Design and research methods are taught under assumptions of data accessibility, political stability, and the notion that design and planning can always provide solutions—regardless of scale or geography. Students are often encouraged to apply these methods universally, shaping broad interpretations of concepts like sustainability, resilience, adaptation, and justice. But what happens when a student seeks to conduct research and engage as a designer in a context of conflict, war, or systemic oppression? Are the methods, epistemologies, and frameworks we are exposed to sufficient? Are we ethically equipped to navigate such realities?

As alumni of this program, we have struggled to apply these Western-centric and liberal ideals to our own research and design work, questioning the relevance of mainstream design and planning education in addressing real-world crises. With the support of our mentors, rather than conforming to the status quo, we pursued insurgent research and design methods that resisted academic neutrality, epistemic hegemony, assumptions of data access, and the ongoing depoliticisation of design and planning education at TU Delft. This led us to embrace counter-research methods such as counter-mapping, counter-imagination, and counter-knowing.

We have taken it upon ourselves to demonstrate what it means to resist

dominant and conventional conditions within the graduation process. In the case of Syria and Tamil Eelam, our research and design projects focus on the liberation and self-determination of oppressed peoples by exposing systemic and spatial oppression under authoritarian and racist regimes—such as the Assad regime in Syria and the Sinhala-Buddhist regime in Sri Lanka. The following sections draw upon examples of resistance through counter-research and design in the context of design education.

We conclude this manifesto with an open reflection on the influential factors that shaped our work. Drawing from personal experience, we feel it is necessary to surface the nuances behind the resistance we engaged in—challenging academic neutrality and epistemic hegemony as both researchers and designers.

Counter-mapping

Marh Echtai (ME):

In my research, I used counter-mapping—a method of creating alternative maps to reveal hidden power structures and challenge dominant narratives—to contest cartographic representations that mask the realities of conflict zones. Recognising that conventional maps are politically charged, I combined archival research and political dynamics observations to uncover hidden power dynamics. Drawing on Koch's "Spatializing Authoritarianism," my work exposes how the Syrian regime manipulates urban space as a tool of control. Before the conflict, policies led to spatial fragmentation and informal settlements; during the conflict, deliberate destruction targeted opposition areas, constituting a clear case of "Spatial Tyranny." Specifically, I documented atrocities committed by the Syrian regime and its allies, including urban sieges, mass bombardments, targeted destruction, chemical weapon attacks, and forced mass displacement. These actions disproportionately targeted informal settlements identified as rebel-held areas, further entrenching spatial inequalities. By contrasting official narratives, which framed these actions as part of a fight against terrorism, with my counter-maps, I highlighted the contradiction between state narratives and the lived experiences of marginalized communities. This approach challenges the myth of academic neutrality and demonstrates the necessity of insurgent, context-specific methods in design education. Counter-mapping, as illustrated by the Damascus case study, thus becomes a powerful instrument for documenting and resisting spatial authoritarianism.

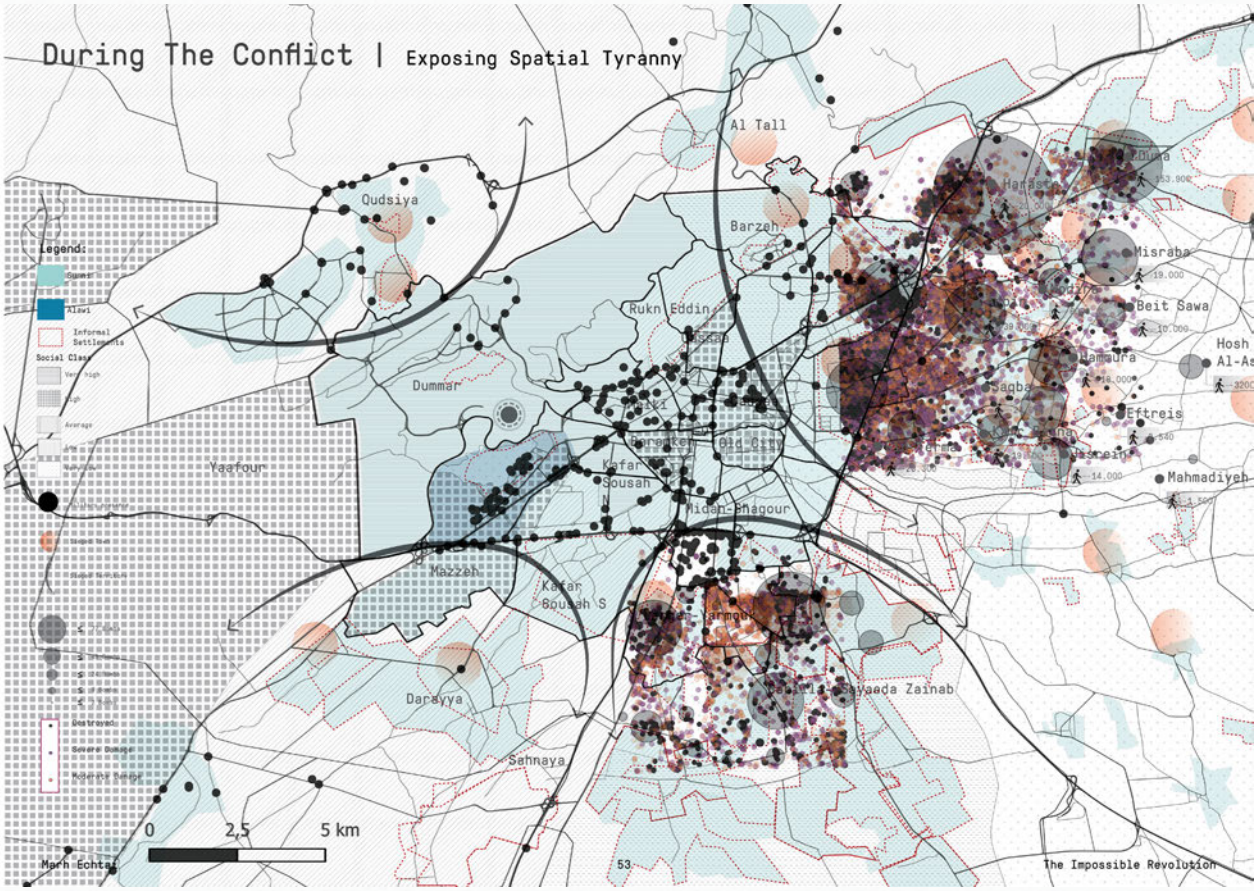


Figure 1: A synthesis map exposing the authoritarian spatial atrocities of the Syrian regime, in relation to the informal settlements. Made by the authors.

Exposing militarisation and Sinhala setter colonisation through counter-mapping

Johnathan Subendran (JS):

Counter-mapping serves as a tool to expose marginalised and suppressed narratives, challenging the oppressive perspectives normalised by the Sri Lankan state. This process involves revealing spatial and systemic structures of domination, such as the disproportionate militarisation of the North-East relative to human settlements and the mapping of state-sponsored settler-colonial projects. These include the construction of religious sites, environmental protection schemes used as instruments of displacement, and military-run tourism initiatives.

More broadly, the boundaries of Tamil Eelam—the independent and ancestral homeland of the Eelam Tamil people—serve as a baseline for exploring, analysing, and imagining alternative futures. Drawing inspiration from the Black Panther Party's counter-mapping of police violence and Indigenous counter-mapping movements in Canada asserting land rights, this research aims to resist and counter dominant, oppressive narratives.

In this context, counter-mapping goes beyond conventional layered mapping techniques commonly practised in graduation projects. Instead, it unveils hidden layers and marginalised perspectives that would otherwise be silenced, offering a powerful means of reclaiming spatial agency against systemic erasure.

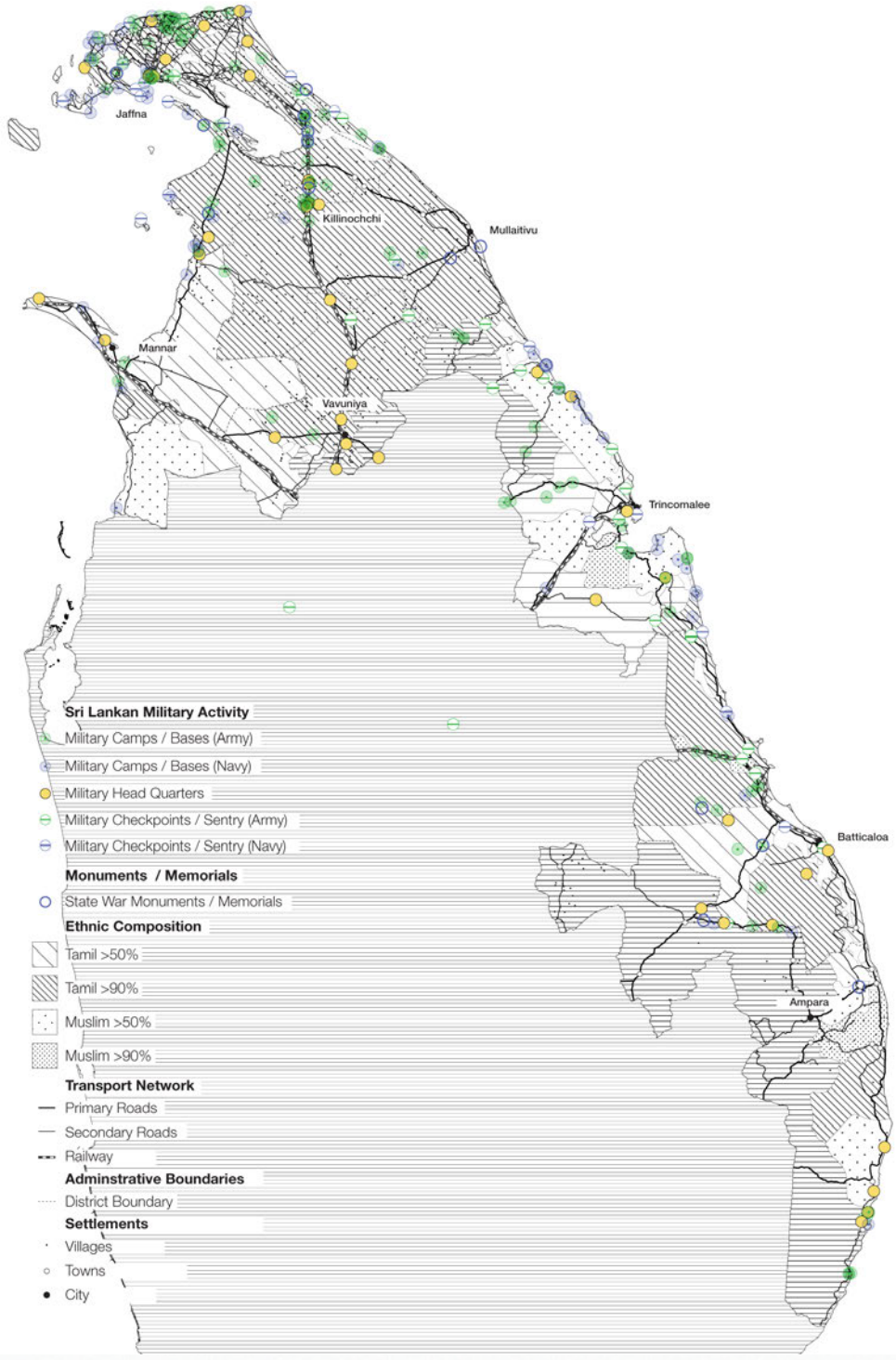


Figure 2: Mapping militarisation in the Tamil Eelam (North-East of Sri Lanka) in relation to to the ethnic composition of the island. Made by the authors.

Counter-narratives | Patterns of resistance

ME:

In my research, counter-narratives—alternative storytelling that challenges dominant or oversimplified representations—served as a powerful tool to reclaim the Syrian narrative from reductionist Western frameworks. Rather than accepting simplified accounts, often attributing the conflict solely to climate change or other singular causes, I delved into the intersectionality of political repression, economic disenfranchisement, social and religious fragmentation, and environmental degradation that collectively ignited the Syrian revolution. By engaging directly with local communities and drawing on diverse data sources, I reconstructed a narrative that resists the commodification and oversimplification of Syrian experiences.

Moreover, I extracted resistance patterns by analyzing grassroots movements that directly counter the regime's spatial tyranny. These emergent strategies not only highlight how communities navigate and subvert systematic oppression but also provide critical insights into alternative, community-driven approaches to narrative reclamation. Together, this counter-imagination approach challenges prevailing academic and media tendencies to prioritize Western-defined agendas. By integrating diverse voices, nuanced accounts, and visible acts of resistance, my work reclaims the stolen Syrian narrative and underscores the multifaceted injustices at the heart of the conflict, offering a more comprehensive and equitable perspective on urban and social dynamics in conflict zones.



Figure 3: A diagram showing the intersectionality of the injustices that led to the Syrian uprising in 2011. Made by the authors.

Spatial political imaginaries

JS:

To resist the chauvinistic and oppressive spatial imaginaries that systematically undermine the self-determination of Eelam Tamils, counter-imagination serves as a crucial driver—one that enables new possibilities for the land to be envisioned. Three spatial political imaginaries are constructed to explore what self-determination and liberation could mean for Tamil Eelam and its people.

The first, *Status Quo*, is characterised by the emergence of insurgent and counter-spatial practices led by community-driven action. The second, *One Nation, Two Systems*, envisions shared systems and economies while maintaining independent conditions for the Tamil people. The third, *Independent State*, involves complete separation, allowing for full political, spatial, procedural, economic, and social self-determination.

Each of these imaginaries demands different scales of change and requires distinct spatial interventions. Within the Status Quo, insurgent and innovative projects—such as hacking and reappropriating existing systems—become necessary acts of resistance. The One Nation, Two Systems model calls for demilitarisation, the introduction of social welfare and access to critical services, and the restitution of ancestral lands. An Independent State, meanwhile, necessitates a complete reconfiguration of governance structures to establish sovereignty.

This imaginative exercise challenges the normative visioning methods in design education—particularly in our graduation year—where projects typically emerge from existing conditions. However, when those conditions are oppressive, racist, and deeply problematic, merely working within them means addressing symptoms rather than root causes. Engaging with alternative imaginaries offers a way to move beyond these constraints and rethink spatial futures beyond domination.

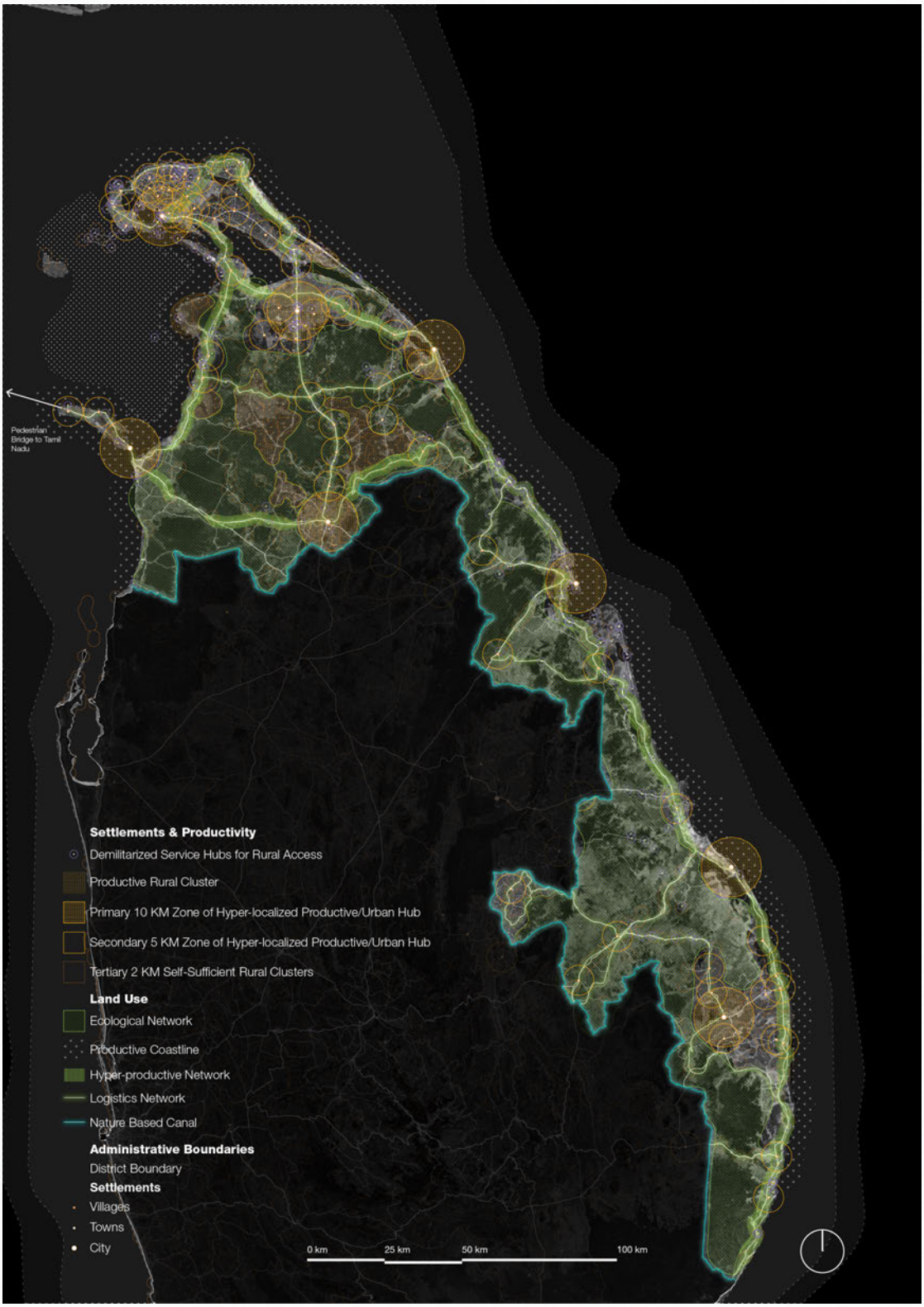


Figure 4: Spatial-political imaginary of Tamil Eelam in Sri Lanka.
Made by the authors.

Reconciliation through storytelling

ME:

In my research, I employed reconciliation through storytelling—a method of using collective narrative-building to foster empathy, healing, and mutual understanding—to challenge conventional spatial planning practices. This approach moves beyond technical fixes and directly addresses the socio-political complexities shaping urban landscapes in post-conflict Syria. In a context marked by deep ethnic, religious, and social divisions and lingering trauma that threatens renewed violence, traditional design heroism often imposes externally defined visions of a "better future." Instead, I created a tool of reconciliation that empowers communities to understand, envision, and design their own desired futures.

Central to this method is storytelling as a transformative practice. By capturing and sharing personal narratives, the research aims to provide a tool that brings war-torn societies back together. This collective narrative-building not only preserves oral histories but also cultivates empathy, understanding, and healing among affected communities.

Importantly, this approach challenges the prevailing design heroism in our discipline. Rather than imposing my own vision, I provided the tools and space for communities to articulate their aspirations, ensuring that the future they design truly reflects their needs and desires. By embracing interdisciplinary perspectives—from anthropology, sociology, and peace-building—and prioritising local voices, spatial political imaginaries offer a nuanced, context-sensitive strategy for rebuilding urban environments and promoting sustainable peace in fragile contexts.



Figure 5: A graph showing the board of the reconciliation tool (Echoes of Resilience). Made by the authors.

Counter-knowing

JS:

Unlike Western-centric spatial justice theories, this research sought alternative ways to conceptualise justice within the Eelam Tamil struggle. Traditional academic frameworks—such as scholarly publications, datasets, and policy reports—often prioritise certain themes while sidelining questions of liberation and self-determination. However, for Eelam Tamils, justice has historically been articulated through other means: manifestos of leading social movements, interviews with key political leaders, perspectives from the diaspora, and fragmented accounts of the struggle found in social media and video footage.

Unlike conventional fieldwork and interviews, which rely on direct engagement with local communities, the heavy surveillance and militarisation of Sri Lanka's North-East posed significant risks for those expressing dissent. To ensure safety, no local inhabitants were included in the research. Instead, counter-knowing emerged as a methodological response—one that embraced a broad spectrum of sources often dismissed as illegitimate under Western scientific paradigms. Social media posts, YouTube footage, manifestos, local newspapers, and policy reports became central to constructing a counter-narrative.

This approach challenges the dominant Western ideals embedded in spatial justice theory, offering a more contextualised perspective that foregrounds recognitional justice, self-determination, and liberation. Counter-knowing, as a critical tool, fosters epistemic diversity by legitimising multiple ways of knowing and breaking free from conventional academic and educational frameworks.

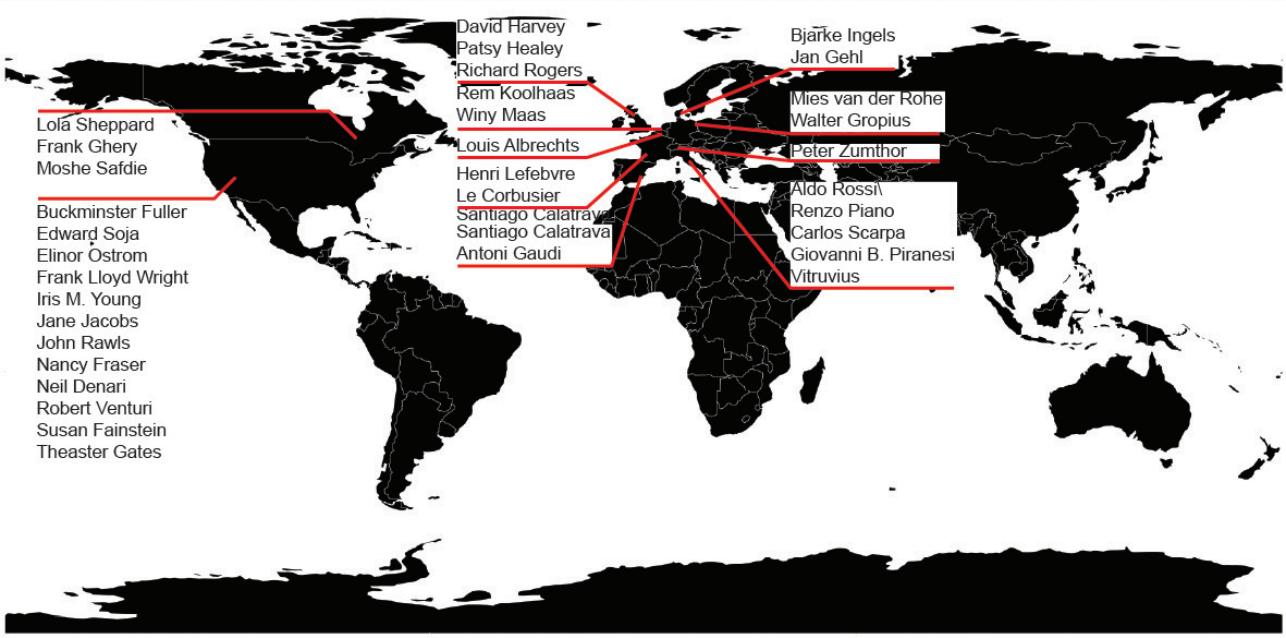


Figure 6: Mapping Western dominance in mainstream architecture, urban design, and spatial justice thinking. Made by the authors.

So what does this mean for you? How do you take this further?

Through these six examples of resistance by research and design, this is a call to recognise and embrace counter-research and design methods—such as counter-mapping, counter-imagination, and counter-knowing—as critical tools for exposing and challenging systemic injustices. These injustices exist both within academia, where hegemonic and Western-centric frameworks dominate, and in conflict zones, where oppressive spatial and political structures shape realities.

By engaging with these methods, students are empowered to resist dominant narratives, develop alternative design perspectives, and cultivate a pluralistic knowledge base that values diverse ways of knowing. This call is ultimately a plea for hope—hope that the next generation of researchers and designers will transcend the limitations of conventional pedagogies and academic practices, forging new pathways toward justice and liberation through design.

The fuel to our fire - an open reflection

We conclude this manifesto with an open reflection—not on limitations, but on the conditions that fueled our resistance.

Throughout the writing of this manifesto, we've come to acknowledge the many factors that shaped its development, and the ongoing need for reflection. At its core, this work emerges from first-hand experiences in research and design, making it a highly subjective and situated account of how these methods were carried out. Yet, we believe that reflecting on our own positionalities is not just valid—it is necessary. These reflections reveal the complex, often invisible barriers one must confront in resisting academic neutrality and epistemic hegemony.

In contexts of conflict, the claim to academic neutrality can easily become complicit in reproducing injustice. As Donna Haraway reminds us, all knowledge is situated—emerging from specific contexts, histories, and positions. Acknowledging our positionalities openly is therefore essential. Neutrality often functions as a mask for complicity, subtly upholding the injustices embedded in the status quo.

You might ask: how transferable are these methods? In the spirit of decoloniality, we refuse to develop methods intended for generalization across distinct contexts. However, we do believe that the conditions in which these methods were forged may resonate with other researchers facing similar struggles. It is in this spirit of shared resistance that we offer our reflections.

These resistive methods did not emerge from abstraction, but out of necessity. As researchers situated in a Western European university, working within urbanism and spatial design, we found that our institution, curriculum, and some educators often failed to move beyond conventional paradigms—particularly when dealing with conflict zones and oppressive regimes. Faced with a lack of relevant data in conventional knowledge repositories, we were compelled to engage with other types of media and evidence—often deemed unreliable by institutional standards—despite their proximity to the lived realities of our research contexts.

Trained as interdisciplinary urbanists, we were not initially equipped to work with such methodological alternatives. Learning by doing, iterating, and validating knowledge collectively became essential to our practice. While some may perceive this as a methodological weakness, we see it as a strength—one that embraces the ethics of adaptability and care.

We share these factors not as limitations, but as forces that propelled our resistance. As readers, we think it's important for you to understand that resistance within large academic institutions is not easy. It requires courage, persistence, and an unwavering commitment to pushing back against narrow-mindedness and hegemonic norms.

This is a plea—to diversify our ways of knowing, to tell students and researchers that they can and should look beyond conventional research methods. These methods, often legitimized within Western contexts, are not universally valid. And they are certainly not sufficient when faced with the urgencies of injustice.

Authors' Biographies

Marh Echtai is an urbanist and PhD researcher at TU Delft, working at the intersection of spatial planning, epistemic justice, and post-conflict recovery. With a background in architecture and urbanism, her work challenges dominant paradigms by centering insurgent knowledge, collective memory, and grassroots agency, especially in contexts marked by conflict, displacement, and fragmentation. Marh's master's research explored how spatial planning can foster healing, recovery, and just futures in war-torn regions, with a focus on Syria. She supports community-driven strategies for place-making, storytelling, and self-determination. Her pedagogical vision resists extractivist approaches to knowledge and instead advocates for decolonial, empathetic, and peace-oriented education in the built environment disciplines.

Johnathan Subendran, a Canadian-born Eelam Tamil spatial designer and Gluon PhD researcher in the Urban Design section at TU Delft. His work explores urban designers integrate knowledge in complex collaborations through a lens of justice, ethics, and critical reflexivity. Grounded in anti-colonial, errant, and critically reflexive values, Johnathan challenges dominant design and academic norms. He is co-founder of Justice by Design, an initiative that fosters justice literacy and critical awareness among spatial designers. As an aspiring educator, Johnathan is committed to rethinking how we teach, practice, and imagine design especially in contexts shaped by oppression, conflict, and structural violence.

Comments by authors

on the process of writing this manifesto:

The collective writing process was very fruitful; it strengthened the conceptualising and writing process. It also makes for a more diverse perspective and increases efficiency.

on the received comments:

It revealed assumptions about definitions and enabled us to include more reflective and insightful content for the reader to take on further.

This manifesto critiques mainstream design and planning education from the perspective of its Western-centric, apolitical and epistemically hegemonic character. It argues that such an approach cannot include the voices of marginalized groups, especially from (post) conflict regions. In that sense, this manifesto is deeply necessary and courageous. It shows the reader that design and planning education can be a tool for justice and equality.

Comments by
Gamze Dane

The manifesto provides an insightful collection of studies conducted to counter the mainstream narratives in design education.

Comments by
Shahryar Ershad Sarabi

Hacking Spatial Design:

An Educational Opportunity

Written by:

Irene Luque Martin

Abstract

This manifesto calls for hacking spatial design education and practice as an urgent response to the disillusionment many graduates face post-graduation. Spatial design students who choose to engage on question of justice during their studies often leave academia with bold, justice-driven visions, only to find themselves in environments – such as design offices- that drain their energy, creativity, and sense of purpose. This disconnect—between the ethics taught in their university and the realities of practice—is not accidental; it is structural. Rather than retreating or resisting outright, this manifesto advocates for hacking as a radical and pragmatic strategy. Hacking here means navigating and subverting the norms of professional practice from within—smuggling in ethics, care, and justice into systems not built to hold them. From proposing inclusive design gestures at the detail level to initiating critical conversations in design offices, small acts can catalyze broader change. Education must shift from abstract idealism to preparing students with tactical, ethical, and political awareness to intervene meaningfully within their own sphere and capacity of action. This is a call to connect students, educators, and practitioners into a network of spatial hackers—a collective determined to transform a profession that too often rewards complicity over courage. Through hacking, we reclaim spatial design not as service to capital, but as a tool for systemic justice.

Keywords: spatial design, hacking, design education, spatial practice, justice by design

How many times have you seen a recent graduate proud, joyful and committed to their practice at the moment they start to work in a design office and after a year or so you can see them completely drained, loss of purpose and disappointed at what design practice means to them. How many times have you seen brilliant students with thesis engaged in question of justice and automatically giving up on design offices as environment where they could practice their values, skills and experience. It is not uncommon to see two type of recent graduate navigating design offices a year or so after their graduation: first the ones who feel partly engaged with the professional pathway, but that somehow also have an immense void after a dedicated thesis where they have explored the boundaries of spatial design fundaments; then you have the second type that either from the beginning or even from their thesis they align and encounter comfort and safety, even joy, in the way current design offices operate following capitalist approaches. It is difficult to add numbers or "validated" data in this regard, as alumni, their health, and the monitoring of the impact on their education in their career becomes an unseen reality. This also engages with a polarized debate within education institutions and whether they are accountable and responsible for the conditions of alumni in their professional pathways.

This must change, since only creating space, research, and monitoring capacity of how and why alumni find meaningful their education in their next steps would make possible to have an accurate, joyful and transformative education in spatial design. This becomes more essential when referring to the large group of the spatial designers coming out of their urbanism or architecture master who end up in design offices, where the culture, the market, and the competitiveness carves any sense of caring and empowerment in a system that is more than ever needed for a systemic change.

This manifesto aims to connect those teachers, lecturers, tutors, mentors, alumni, even current students where they find themselves losing hope, energy and joy into the educational realm. This is a manifesto to claim back and to empower ourselves to reconnect with the meaning of education. To reshape the environment as a safe space to develop transformative journeys and where we can confront and encounter our own colonized self. A spark to generate a network where we can find more people engaged in changing systemic injustices, and a platform to understand that we have the capacity to act in our little realm of impact.

Once in a climate change protest I saw a banner saying: "My individual behavior cannot change the system P.S: said by 2 billion people". This struck me to engage and to start a process to write, reflect and define not only my own designer attitude, but a teaching attitude I have been developing informally for years. It was an invitation to confront and to

engage with my positionality as now full time professor in the educational environment and to assume the responsibility and accountability I have in the future of those recent graduates and their future.

From object to ethics: a generational shift

Spatial Design education (mostly linked to architectural and urban design studies) has undergone a fundamental transformation over the past few decades. In the 1990s and early 2000s, the emphasis was predominantly on what we design. The focus was on aesthetics, objects, and form-making—an era where the dream of becoming a "starchitect" was the pinnacle of success. Design was seen as a discipline of individual genius, where the look and spectacle of the built environment took precedence over its deeper implications. The rise of figures like Zaha Hadid, Rem Koolhaas, and Frank Gehry reinforced this ideal of architectural and urban design excellence being measured through visual and formal innovation. They were and are still today the mainstream of what design is, but they do not relate to a considerable amount of designers perhaps want to contribute to. They were the contemporary ideals replacing modern ideals of Le Corbusier, Frank Lloyd Right, among many others.

However, as the discipline matured, there was a realization that why we design was just as critical as what we design. The mainstream design focus shifted towards collaborative, participatory, and socially responsive approaches. Questions of inclusion, sustainability, and social justice became more prominent (Koning & van Dijk, 2024). Design was no longer just about creating iconic objects but about fostering processes that could empower communities and reshape social structures. Authors such as Jane Jacobs, Patsy Healey, among many others established the principles and basis for design capacities and spatial planning considerations of a more collaborative approach to design. Although these initiatives defined a new pathway where finally social was linked to form, there was also a process of polarization and prosecution of imagination, which was attached to the idea of plans and spatial designers becoming megalomaniacs who did not connected to social needs and demands (Koning, & van Dijk, 2024). This polarization of social and form aspects became the core issue that we still see in many universities in educational programs, but also in professional practice. When social justice considerations are brought up, there is a fear to become the unethical designer who follows form over social considerations.

Simultaneously, the growing awareness of global issues such as climate change, economic disparity, and housing crises pushed design discourse towards ethical considerations. The rise of trendy environmental justice

movements and global policy shifts, such as the UN's Sustainable Development Goals (SDGs), further reinforced the need for design to be socially and environmentally accountable. The role of architecture and urban design expanded from merely crafting spaces to actively engaging with political, cultural, and ecological realities (Szacka et all, 2024).

Now, we find ourselves at a new frontier: the how. This is not about methodology, tools, or softwares—those have been extensively explored in the last decades and this manifesto does not aim to enter in its depth. Instead, it is about how we navigate the ethical dimensions of our practice. How do we reconcile economic pressures from a capitalist market with social responsibility? How do we engage in a spatial design practice that is accountable, transparent, and impactful?

A key part of this shift is recognizing that ethical practice does not operate in isolation. It is deeply intertwined with existing socio-economic structures, power dynamics, and political frameworks. The contemporary moment demands that we go beyond theory and aesthetics, beyond collaboration and participation, and actively integrate ethical considerations into every aspect of practice (Till, 2008). This involves redefining the responsibilities of designers, challenging corporate structures, and pushing the boundaries of traditional education and practice models to align with the pressing needs of our time.

The education-practice gap: between ideals and reality

Current design education often exists in a bubble. Most commonly bubbles are mirroring dynamics of professional practice, where studios follow the master architect/designer who will taught you how to do "good" design. There are some other type of bubbles in universities - If you are lucky as a student (as it mostly depends on distribution and many times not attached to choices per students), you can become part of a studio or be under mentors who do engage in question of social and environmental justice, and do believe in the nexus between social and form. This bubble becomes a space where discourse on ethics, spatial justice, and values flourishes but is often overseen struggles on the working dynamics connected to the realities of professional practice in design offices. In universities and design studios, students are encouraged to engage in critical discussions about equity, accessibility, environmental justice, and decolonization of space. They experiment with radical ideas, propose alternatives, and theorize about just futures. Books such as "Spatial Agency: Other Ways of Doing Architecture" (Awan et all 2011) reinforce the idea that architecture and urban design can operate outside traditional

capitalist structures.

However, once they transition into professional practice, these ideals are often diluted or altogether abandoned. The commercial pressures of architectural and urban design firms, real estate developments, and bureaucratic planning systems rarely leave room for ethical deliberation. Recent graduates find themselves working within a framework that prioritizes profit, efficiency, and risk aversion over justice and accountability. Spatial design becomes a service industry bound to external demands, making it difficult for designers to retain ethical integrity (Till, 2009).

The challenges of transitioning from education to practice are compounded by the structural inequalities embedded in the profession. Entry-level designers often have little agency, making it difficult to advocate for ethical decisions within hierarchical work environments. Additionally, the economic realities of design professions—long hours, unpaid internships, and job precarity—make it challenging for young professionals to prioritize ethical concerns over personal survival.

This disconnect creates a deep frustration among young designers. They enter the workforce armed with the language of designing differently, for social and environmental justice and transformation, only to find that the structures they operate within resist change – ending in the reproduction of the very issues they address in their studies work. The core issue is that education does not adequately prepare designers for navigating these contradictions—for operating within systems that may not align with their values while still trying to make meaningful contributions. As Dana Cuff discusses in “Architecture: The Story of Practice” already in 1992 and which is impressively relevant today; the realities of the profession often lead to a compromise of the very ideals students are encouraged to embrace. Unless educational institutions prepare students for these challenges, the gap between academia and practice will persist, leaving young designers disillusioned and a future where the practice will only constantly perpetuate their current logics.

Hacking the system: bridging knowledge and practice

This situation not only dismantles the joy and the meaning of becoming a spatial designer, but that drains the hope not only in recent graduates, but in everyone who believes systemic change is a necessary step towards a more just future. The way forward is not through complete resistance or outright rejection of existing professional structures but through hacking—a form of strategic intervention that allows designers to work within and around constraints to advance ethical spatial practices.

Hacking, in this context, means recognizing the limitations of a system and finding small but impactful ways to disrupt and improve it from within. It requires designers to bridge their education with their practice, embedding the values they learned in their studies into their professional decisions, no matter how constrained their position might be.

As example, a junior designer in an office might not be able to overhaul the firm's entire ethos, but they can introduce discussions about ethical design during project meetings, planting the seeds for gradual change. Working as designer for a company who responds to a real estate development firm might not have the power to change the entire profit-driven model, but they can advocate for sustainable, locally sourced materials that reduce environmental harm. You can also – as junior designer- push the boundaries on how and why do you draw what you draw. Adding one sqm more to the female bathroom, proposing non-binary bathrooms, proposing morphological compositions that make street more friendly to universal accessibility, composing spaces for safety of woman in the night, pushing for certain lighting formats, proposing spaces for free breastfeeding areas, including benches in areas that foster non capitalist public space domination, among many other ideas.

These actions and dynamics are happening as you read these words every day in those design offices which do not understand or want to hear question of social or environmental justice. And there is where lies the opportunity. What if all these designers, hacking their designs in context of profit driven design, would be able to find each other? They would not feel alone, drained or powerless. They would feel powerful and supported. They would have the network they need to keep pushing their everyday boundaries.

By understanding how to hack spatial design practice, we can bridge the gap between the values we are taught and the realities we work in. The future of design lies not in waiting for a system to change but in learning how to navigate, infiltrate, and reshape it from within. The question now is, how do we engage not only in an individual hacking process, but also how do we leverage a network of hackers that can operate in small changes and leverage transformative change in systemic oppression. And what it is more important, how does education in spatial design engages and focuses on giving the skills and critical thinking for future generations to be aware of the power of hacking and their capacity to collectively change the system.

Acknowledgements

This manifesto relies on 10+ years of experience owning, coordinating, and working in diverse international design offices. From intern, to senior project leader, I had the privilege to meet, connect, and confront many other designers in diverse positions. This experience has led me to have reflections and anecdotes that back up my assumptions and ideas from this text. I will not name them, but the ones who read, know who they are. Thank you for being there, hacking together a system fulfill of systemic injustices. Thank you for doing the world a bit better in every hack you do out there.

References

Awan, N., Schneider, T., & Till, J. (2011). *Spatial agency: Other ways of doing architecture.* Routledge.

Cuff, D. (1992). *Architecture: The story of practice.* MIT Press.

Koning, J., & van Dijk, T. (2024). Rehabilitating utopias: The importance of imagination to confronting our spatial challenges. *Planning Practice & Research, 39*(1), 136–155.

Szacka, L. C., Patteeuw, V., Loorbach, D., & Veenstra, P. (2024). *It's about time: The architecture of climate change*. Nai010 Publishers.

Till, J. (2008). Architecture and contingency. *Field, 1*(1), 120–135.

Till, J. (2009). *Architecture depends* (Vol. 55). MIT Press.

United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development.* United Nations. https://sdgs.un.org/2030agenda

Author's Biography

Irene Luque Martín is an urban designer, educator, and researcher committed to radical spatial imagination and the "otherwise" of spatial design. With over a decade of professional experience in spatial design across rapidly transitioning territories, she now focuses on research and education as catalysts for systemic change. At TU Delft, she is the initiator of a growing body of work on designing by feminist values, using intersectional, collaborative, and justice-driven approaches to reimagine how we teach, learn, and practice spatial design. Her work challenges dominant norms and positions the university as a site of transformative, imaginative action.

Comments by author

on the process of writing this manifesto:

It was extremely refreshing using this manifesto to be more free in my own opinion and writing. to feel more empower to talk about things stricter academia could not. It felt very healthy to have space to be critical on academia and professional practice feeling safe and open in my own writing style.

on the received comments:

Thanks for the care, the space, the reciprocity on the process and the kindness. Again refreshing... the comments were really constructive and motivating to do a full review of the text...very appreciated!

This manifesto reframes what often feels like isolated, behind-the-scenes efforts, advocating for ethics, care, and justice within rigid institutions, as collective, intentional, and deeply political work. The image of a network of spatial hackers suggests that transformation doesn't require heroics, but rather a shared commitment to small, situated interventions. Together, these acts form a counter-practice, one that challenges dominant norms in spatial design education and reclaims agency from within. That shift in perspective is empowering.

Comments by

Mehmet Ali Gasseloglu

The manifesto provides a good overview of the gap between the justice-driven design education and realities of practice

Comments by

Shahryar Ershad Sarabi

Dear University, A Manifesto

Written by:

Ana Vasques, Sanne Koevoets, Tamara de Groot, Ecotonic Collective,
Annette-Carina van der Zaag, Arlon Luijten,
The Action Station,
Joseph Catlett,
The Promiscuous Care Study Group,
Sanne Boersma,
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Abstract

Dear University, A Manifesto **is a multivocal text, written by artists, scholars, educators, and students affiliated with a range of different institutions. The manifesto is written from the spaces within the university where imagining and working towards alternative educational futures remains possible. The authors do not call for the umpteenth incubator or innovative toolkit, rather the manifesto acknowledges and invites into a new assemblage existing initiatives, projects, and practices that are always already here. The multivocal text unfolds as a cascade of questions posed to the university. As such, it holds to account the university as an institution, while it never loses sight that 'we' are implicated in its becoming.**

Keywords: **study, educational futures, imagination, critical pedagogies, difference**

Dear University, why do you build a factory 4 learning and not a home 4 study?

Our manifesto is written from the spaces within the university where imagining and working towards alternative educational futures remains possible. This is not a manifesto, it's an invocation for learning.
There are many of us practicing critical and affirmative pedagogies:

> We hear sounds, words, more words, words that form a sentence, sentences that we cannot understand or decipher, in a language unfamiliar to all of us, inaccessible.
>
> This ethical and political commitment towards a future otherwise, that is not a repetition of the 'same old' masquerading as 'new', emerges from performative gestures that crack open the present,
>
> When we hold hands, where do I end and you begin? Boundaries don't meet, they blend, coalesce, spread themselves so thin until they can simply go no farther.
>
> We mend not because we want to, not because we can, but because we must. We repair our clothes, our devices, our institutions, our curricula, because we are stuck living in the debris of capitalism, colonialism, the heteropatriarchy. Mending, for us, is not a hobby but an existential necessity

You are reading a multivocal text. Where 'we' becomes a stumbling block, a sequence of temporary compositions, a continuous friction, an experiment into what we could be...

This is an encounter across difference: A being-together that does not dissolve difference but lives with it. Shirts may be for ironing, but the unruly entanglements of people, practices, ways of knowing, worldviews, and more-than-human presences are not. We ask you to embrace the inevitable confusions and frictions, as this is precisely where the potential for transformation reveals itself. To put it briefly, brace yourself, reader: this text strays freely from the beaten path.

We don't call for the umpteenth incubator or innovative toolkit, rather our manifesto acknowledges and invites into a new assemblage existing initiatives, projects, and practices that are already present within the university doing the work of reimagining. Starting from an unease, a confusion, a critical vibration, a scream of rage, or a mumble of discontent[1]. It directly challenges the "tie-wearing realist" who narrows the horizon of possibilities by claiming, "that's just the way things are."

[1] This serves as both a homage to and an echo of John Holloway's opening chapter in *Change the World Without Taking Power*, published in 2002 by Pluto Press, London.

academic research, has clung to its boundaries. Its delineated spheres and globes. When we cannot separate ocean from moon, tree from sun, my hand from yours, how can we art from science? Subjective from objective? Political from personal? This story does not ask whether we are intimately connected to all life on earth; the connection is understood as always already present. To lean into it and reach out for each other there.

This work is ongoing, always there, but rarely given the attention and support it deserves. This mode of working immediately disrupts seeing the university as disciplinary units in competition, but emphasises interdisciplinary, undisciplinary and anti-disciplinary relation-making efforts across faculties, departments and knowledge domains.

Ecotonic spaces in the university are everywhere: all the practices where students and staff do not settle for that which is already is, but work with the not-yet, between academia and activism; between research and teaching; between work and personal life.

To be clear, this is not a relationality in an abstract transcendent sense but rather an insistence that "everything is connected to something, which is connected to something else"[2].

Dear University, what does pedagogy even mean? Why should it matter? And for whom?

Talking about pedagogy brings our attention to the practice of teaching and the inseparability of educational practices and the discourses that surround it. Pedagogy is never innocent: it unfolds somewhere, with someone, shaped by choices that are always selective, often exclusive.

we invite you to be attentive to how educational institutions inevitably reflect and reproduce societal inequalities, to recognize how power resides in different places and is used to different ends, [...] and to refuse acting as if we do not hold any power over each other. what power does language hold [...]?

One of the students is speaking in Lithuanian, telling a memory from her childhood in class. Without being able to listen to the exact words of her story, we actively listen to the rhythm of her sentences, the unexpected turns in the middle of it all. We listen to how she looks at her hands she holds in her lap, only a few times looking up, a laugh of relief – it seems – in between a sentence – silence – another short sentence – the story comes to an end.

[2] These words come from Thom van Dooren's *Flight Ways: Life and Loss at the Edge of Extinction*, a work in which we recognize an explicitly situated branch of ecological thinking. The book was published in 2014 by Columbia University Press.

ideas are not abstractions that live only in conceptual languages, impressed upon sheets of paper and written documents. The sharing of such embodied stories, in which students and teacher in class share their own parts, shapes intimate connections on intersections such as race and class in political and historical contexts.

systems of reparation have not delivered what they promised, [...] We ask, what more liveable futures are our bodies able to speculate into being, and how are these already making themselves felt? For a pedagogical possibility of promiscuous care infrastructure

I, as a co-writer now, give a glimpse of our storytelling practice in the classroom, wishing students who composed this group, the witnesses of the confessional narratives to join this effort of writing towards pedagogical possibility.

Dear University, [...] How would we like it to feel in the learning and caring space we share?

"home (eco) in tension (tone)"[3] We need to see our holding hands, our universe, our institutions, as nothing but states of transitions. Everything grows together. Forms of knowledge, like mycelium hugging the roots of trees, or comets swinging from the warps of stars, or little human beings in the rays of their sun, it all grows together. HYBRID, FLUID, UNDULATING, REDUNDANT, PREFIGURATIVE, GENERATIVE

The university is a space where beautiful ideas are thought, metaphors spun, worlds illuminated. And yet. The walls of the university are heavily policed – who is invited in, who is enabled to thrive, who is pushed out? In the snowy landscape of Dutch academia, do your metaphors disrupt the university's material reality, enable other bodies to enter and move through its halls? Did I just make the texture of difference uncomfortable, by speaking of you and I? Has our 'we' now been ruptured? Could a more liveable future emerge from this tear? What will have been enabled by placing our bodies centre stage and calling into question any effort to re-imagine the future as a purely intellectual exercise… The otherwise in future perfect.

It is in the continuous rehearsing and enacting of other modes of learning, teaching, researching that we keep attending to the question of how we like the learning and caring space to feel like. We never make this question obsolete. are we in a way doing this together, are we still ongoing…? This work takes place in-between imagination and actualisation, in critical

[3] Astrida Neimanis deconstructs the word 'ecotone' in *Hydrofeminism*, or *Becoming a Body of Water*, to demonstrate the generative potential of ongoing tensions in interstitial spaces. The essay was published in the edited volume *Undutiful Daughters: Mobilizing Future Concepts, Bodies and Subjectivities* in *Feminist Thought and Practice*, in 2012 by Palgrave Macmillan.

proximity[4] to the institutions we simultaneously operate within and against. This is not a manifesto, it's a manifestation. We engage in a collective worldmaking effort, we feel and not only think our way through alternatives. This is an exercise that makes tensions palpable, and demands we choose how we learn together, where we learn. Do we dare [...] To work at enacting something else?

We are already in space. Earth is space.

Dear University, who do you think you are?

So here we are, (the place where garbage and waste is dumped) polluted bodies on damaged earth, held by gravity and holding one another. A metallic shell of debris. Satellite infrastructure, bouncing poems from surface to sky. Radio conversations jettisoned out into nothing at the speed of light.

How to mend a disrupted ecosystem, a fragmented collective memory, a community stretched until it rips? We don't know either. We don't know how because nobody taught us.

> The demonstration against planned cuts to higher education funding concluded in The Hague on November 25, 2024, with organizers estimating around 25,000 participants. Students, staff, and educators from universities and colleges across the Netherlands gathered at Malieveld to voice their opposition to the government's proposed reduction of over one billion euros in funding for higher education and research.

With each word, pause, hesitation, or stammer, we pick up pieces, mourn, imagine a whole that resists being stitched too tight, and dream, if not plot otherwise. The mends we make are imperfect, haphazard, messy. But they tie us over for another while, just enough to give us some time and space to learn how to make lasting repairs.

Dear University, how satisfied are you with your current 'brand identity' on a scale of 1 to 5?

> As a brand the university is reduced to an image of the university, a marketing image, flat like a 2D-picture. [...] In replacing the university by a branding image,

[4] Davina Cooper, in her work *Everyday Utopias: The Conceptual Life of Promising Spaces* (2013, Duke University Press) uses the term 'critical proximity' to describe a deeply engaged and immersive approach to creating transformative change, in relation to 'everyday utopias' where alternative futures are enacted and practiced.

the university in all its complexity, multiplicity and beautiful messiness is ironed out, whitewashed like so often. [5]

we need an alternative to thinking change as the necessity of moving from the margins to the center - Not translating it to our shared dominant language in the classroom, an alternative to forcing the new, the radical, the affirmatively ill-fitting into existing categories, disciplines, systems that define, limit, and reinforce the harmful and violent structures that fuel environmental destruction and social injustices.

What is necessary is a refusal of mastery in service of emergence. The pause within the gap and the capacity to stay within the discomfort of the overwhelming and the unfathomable. To value, recognize and support ecotonic ways of teaching and learning means creating the conditions for the margins to expand so there no longer is a center.

We must resist the inclination to imbue our pedagogies with the quality of scalability[6], the ideological connotation of the "new" as the most desirable, the best measure of value, the reward for success. That which is scalable does not give in, does not transform, regardless where it travels. The search for quality indicators, for epistemological formalism, understood generously, is the wrong response to a valid concern. How can we cultivate the conditions for 'better' modes of teaching and learning more widely? Our interest goes to a being together across difference. [C]are doesn't seek to innovate but gives attention to and maintains that which is already there, an accumulation of small acts and transfers. If something travels to other communities of practice or 'expands' its reach, then it is by virtue of its capacity to engage in new, always transformative, relationships.[7]

We hold open the opportunity for endless assemblages, radical imagination, protest, repair, solidarity, modes of living not yet here, rebellion, and to many more stories to be told.

Dear University, we are not done with you.

[5] This excerpt is borrowed from Willem Schinkel's commentary on the 2023 OccupyEUR campus protest at Erasmus University Rotterdam, originally published in Erasmus Magazine under the title "In Praise of Flatness: On Campus Protest and Academic Community." In this footnote, we wish to echo Schinkel's message of gratitude to the students who dare to imagine and manifest the university otherwise: "I am thankful to these students for the reminder that the knowledge we produce and the relations we engage in are inseparable from the struggle for our lives. They may be, in the words of the university board, 'a small group', but they are walking tall. And they lead the way in the experimentation with what an 'academic community' can be beyond the brand of an anti-intellectual impact rental shack."

[6] Our thinking about scalability is particularly informed by Anna Tsing's article *On Nonscalability: The Living World Is Not Amenable to Precision-Nested Scales* published in 2012 in Common Knowledge (Volume 18, Issue 3, pp. 505-524).

[7] This sentence, written by Jana Thierfelder and Wander M. van Baalen, appears in the introduction (pp. 16–17) of the edited volume *This is Not a Gardening Book: The Cultivation of Transdisciplinary Practices.* The volume was published in 2023 through a collaboration between Zurich University of the Arts and the Rotterdam Arts & Sciences Lab.

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Annette-Carina van der Zaag (RASL, Sandberg Institute, scholar and artist) and Arlon Luijten (Little Wotan, theatre director and artist) are currently designing the Action Station, a multidimensional initiative oriented towards performance.

Ana Vasques (Erasmus University College, DIT, environmental scientist and educational researcher), **Sanne Koevoets** (Erasmus University College, DIT, feminist scholar) and **Tamara de Groot** (Erasmus University College, RASL, educational researcher) form the Ecotonic Collective, an inter- and transdisciplinary initiative aimed at rethinking the university through the notion of the transformative and interstitial ecotone to counter hierarchical margin-center narratives. The Ecotonic Collective is supported by EUR's Platform for Design, Impact and Transition (DIT) and the Rotterdam Arts & Sciences Lab (RASL).

Sanne Boersma is an academic teacher and scholar with a focus on knowledge creation, storytelling and critical and affirmative pedagogies. Her background is in literary studies, Sociology, STS, ethnography and journalism.

The Promiscuous Care Study Group. Gathering under the aegis of study, the group comprises present and former teachers, students, professors, and researchers within the Willem de Kooning Academy (WdKA) and Research Centre WdKA in Rotterdam. Together the group situates their own collective care practice within a genealogy of artistic and social practice. The sentences in this manifesto are borrowed from the book Promiscuous Infrastructures: Practicing Care (edited by Michelle Teran, Marc Herbst, Vivian Sky Rehberg, and Renée Turner), with the selections convened by Michelle Teran. We thank the authors for their evocative words, which appear here in a new assemblage: Dear University... **Carla Arcos**, "Dear University," inside cover; This is not a manifesto... **Renée Turner**, "Slow, Situated & Reparative Reading: THE GARDEN EDITION," p122; to be attentive... **Vivian Sky Rehberg**, "Against Alienation: Academy/Asylum," p3; to recognize how... **Julia Wilhelm**, "Autoarachnology," p44-45, 62; care envisaged... **Kari Robertson**, "Gravity, Immunity and Soil," p97; Solidarity with... **Carmen José**, "The School Where I Work Has Many Stairs," p46-50; This is not a manifesto... **Turner**, p122; it's an invocation... Michelle Teran, "Learning Grounds," p179; How would we like... Marc Herbst and Michelle Teran, "Learning and Dreaming Together through Social Uncertainty," p155; Do we dare... **Yusser al Obaidi**, "Let Us Meet in the Margins [Barzakh], p115; So here we are... Robertson, p103; With each word... **Turner**, p128; What is necessary... **al Obaidi**, p115; the pause... **Teran**, p179; This story... **Skye Maule-O'Brien**, "Seed/Earth: An Exchange of Relational Knowledge," p142; To lean into it... **al Obaidi,** p119; [C]are doesn't... **Wilhelm**, p62; an accumulation... **Seecum Cheung**, "Carrier, A Deficit, A Surplus," p152.

Sanne Koevoets (Erasmus University College) researches feminised, and therefore often undervalued, marginalised and invisible professions and practices. As a researcher at Erasmus University Rotterdam's Platform for Design, Impact and Transition (DIT), she focuses on repair, restoration and mending as a concept, practice, and ethos for a planet in crisis.

Joseph Catlett is an independent researcher in AI, Creativity, and Transdisciplinary Methodologies. Joseph writes about Cosmic Integrationalism, a research project conducted in collaboration with The Netherlands Space Office and the Association of Space Explorers, with co-researchers, Pragya Jain, Rick Heemskerk, and Kimberly van den Bogaard, where he re-imagines the future of space research and the potential for transdisciplinary transformation.

Wander M. van Baalen is a senior lecturer in the Humanities Department at Erasmus University College and a postdoctoral researcher at Delft University of Technology. He is interested in transdisciplinary pedagogies and research, practices of knowledge (e)valuation, and the ways in which public issues come to be defined and addressed. **Tamara de Groot** is a lecturer at Erasmus University College and PhD candidate at Erasmus School of Philosophy, researching experimental pedagogical approaches from a feminist new materialist framework. **Joseph Catlett** is a student of Creative Intelligence and Technology at Leiden University and an independent researcher working with the Netherlands Space Office on transdisciplinary space research. Under the banner of the Rotterdam Arts & Sciences Lab, the authors came together to create this manifesto. It weaves together the voices of educators, artists, and scholars into a new composition, resulting in a multivocal text that embodies the very principles it advocates.

Comments by authors

on the process of writing this manifesto:

It was important to us that the manifesto's writing process embodied the educational futures we envision. That's why we crafted a multivocal text, weaving together the words, thoughts, and initiatives of educators, artists, and scholars brought together by a shared commitment to reimagining the university. The collaborative process itself was joyful, confusing, and profoundly generative, and for that alone, we're grateful.

on the received comments:

We're thankful for the careful and generous reading of our manuscript by the commentators. Their critique came from a place that cared for the vision underlying our text, and their suggestions helped us refine our ideas while staying true to the manifesto's collaborative spirit.

When a manifesto talks about bringing people and ideas together and acknowledging gaps in academia that disregard how we really feel, it is really nice to see this illustrated even in the way the manifesto is written. The idea of a multi-vocal approach certainly fit the narrative and really engaged the reader, where one could see a story (and possible future) unfold by putting together diverse viewpoints.

The idea of care has been of great interest to me recently, and how care is always so political even when it does not always seem so. Even when or where care is given - and where it is not - is a choice that is made by those in power, and these dynamics also influence academia to a large extent. However, reading about caring for things that already exist and giving them more value, was very enlightening for me. I liked the idea of not always looking for something new and fresh but finding value in perspectives and cultures that exist already.

This manifesto discusses the dynamics of language and power in academia but also care and feeling and it is a great way to discuss the more human parts of academia that we forget or ignore when we are part of large academic institutions. What is our agency as humans, not only in terms of change for the future but also in what has already taken shape? It really questions how we feel in spaces and in our bodies and these questions are not always brought forward when rethinking education. This manifesto is thus a great combination of diverse perspectives that question the various scales of involvement we can have within the higher education practice.

Comments by

Mahaa Ejaz

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