

Educating Future-ready Designers

A FRAMEWORK FOR TEACHING DESIGN FUTURES

Marita Canina and Tatiana Efremenko

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Introduction

The future is no longer a distant horizon waiting to unfold. It is being shaped every day through the decisions we make, the technologies we develop, the policies we adopt, and the values we choose to cultivate. Yet despite living in a time of profound transformation, education often remains focused on understanding the present rather than preparing learners to navigate uncertainty and actively shape what comes next.

Design education is no exception. While design has traditionally been taught as a discipline of human-centred problem-solving, today's designers are increasingly confronted with challenges such as climate change, technological disruption, geopolitical instability, biodiversity loss, and growing social inequalities. These are not isolated problems awaiting solutions but interconnected, evolving conditions that unfold across long time horizons and demand new ways of thinking, imagining, and acting.

Across our years of teaching and research activities at Politecnico di Milano, we observed a recurring pattern among students. While they often demonstrated strong design capabilities, many struggled when asked to imagine alternative futures, reason across longer temporal

horizons, or understand how present decisions might contribute to systemic transformations. At the same time, uncertainty about the future frequently generated feelings of anxiety, powerlessness, and disengagement. These observations raised a simple but ambitious educational question: how can design education help students move from reacting to change toward actively participating in shaping it – learning not only to solve problems, but also to imagine, explore, and design better futures?

This book is both a practical guide and a theoretical contribution to the emerging field of Design Futures Education. It builds on years of experimentation within the Design Futures course at Politecnico di Milano and the research activities of the IDEActivity Center, where successive cycles of teaching, reflection, and research led to the development of an integrated educational framework. Rather than presenting a collection of isolated activities, the book proposes a coherent pedagogical approach that combines creativity, futures thinking, experiential learning, storytelling, and human–AI collaboration to cultivate future-oriented capabilities. Although the framework emerged from years of experimentation within a design programme at Politecnico di Milano, it has been intentionally conceived as a flexible educational architecture. Rather than prescribing a single teaching model, it offers principles, methods, and activities that can be adapted to different disciplines, institutional settings, and educational formats.

The concepts presented throughout this book – including the Future Creativity Loop, the Design Futures process, and the Ministry for the Future educational framework – are grounded in both scholarly inquiry and years of educational experimentation. Together, they offer a pedagogical model for cultivating futures literacy, anticipation, imagination, collaboration, and agency. In this sense, the book is not simply a manual of teaching activities. It is an exploration of how Design Futures can be taught, learned, experienced, and researched.

At the same time, theory alone is not enough. Futures-oriented learning must be enacted, tested, and lived. For this reason, the book combines conceptual foundations with classroom-tested methods and examples developed through real educational experiences, as well as applications in research projects, innovation programmes, and collaborations with companies, artists, and public organisations.

Throughout these pages, you will encounter theoretical foundations, pedagogical frameworks, classroom-tested activities, practical tools, templates and case studies. You will discover how futures thinking can become tangible through immersive experiences, how storytelling can transform learning into participation, how AI can be a creative partner, and how design can become a vehicle for imagining and shaping alternative futures.

At the heart of this book is a simple yet powerful premise: the future is not a predetermined destination waiting to be discovered. Futures are shaped by the assumptions, expectations, values, and imaginaries that influence decisions in the present. Expanding those imaginaries, questioning dominant narratives, and enabling learners to envision alternatives may be among the most important contributions education can make in a time of accelerating change.

This book is therefore an invitation. An invitation to see education not simply as a process of transferring knowledge, but as a space for rehearsing the future. A space where learners can explore uncertainty, experiment with possibilities, challenge assumptions, and develop the confidence to become active participants in creating more desirable, inclusive, and sustainable futures.

Whether you are an educator, researcher, designer, facilitator, or changemaker, we hope these pages will provide both a theoretical lens and a practical framework for bringing futures into your practice and helping a new generation of learners become not only future-ready, but future-making.

For Whom is This Book

This book is designed for anyone interested in bringing futures-oriented thinking into education and creative practice.

It will be particularly valuable for:

- **Design educators** seeking to integrate futures thinking into design studios, project-based learning, and innovation courses across disciplines such as product design, service design, interaction design, communication design, strategic design, spatial design, and design for sustainability.

- **Facilitators, trainers, and workshop leaders** delivering innovation, foresight, and futures-oriented workshops in professional or non-formal learning environments and looking for practical tools to engage participants in imagining and designing alternative futures.
- **Teachers and learning experience designers** who wish to cultivate creativity, systems thinking, anticipation, collaboration, and critical reflection within their classrooms.
- **Researchers** exploring new approaches to Design Futures Education, futures literacy, experiential learning, creativity, and educational innovation.
- **Curriculum developers, programme coordinators, and educational innovators** interested in designing learning experiences that prepare students for complexity, uncertainty, and rapid societal change, seeking frameworks that can be adapted to different educational contexts and learning objectives.
- **Professionals** working in innovation, strategic foresight, public policy, sustainability, organisational transformation, and related fields who wish to adapt Design Futures methods beyond formal educational environments.

No previous expertise in futures studies is required. The book provides both conceptual foundations and practical guidance, making it accessible to newcomers while offering theoretical depth and methodological value for more experienced practitioners.

Although the examples presented throughout the book originate primarily from design education, the underlying principles are intentionally interdisciplinary. The Design Futures approach can be applied across a wide range of domains and scales, from the design of products, services, and experiences to the exploration of future organisations, communities, policies, and socio-technical systems.

Ultimately, this book is for anyone who believes that education should not only help learners understand the world as it is but also empower them to imagine and actively shape the worlds that could be.

How to Use This Book

This book can be read in different ways depending on your goals, interests, and level of experience. You may choose to follow the journey from beginning to end, progressively moving from theory to practice and from understanding futures to designing them. Or you may open these pages in search of a specific activity, a classroom tool, a case study, or inspiration for a new educational experiment. Both approaches are equally valid.

If you are new to Design Futures, we recommend reading the book sequentially. Part I introduces the theoretical foundations that underpin the approach, including the futures literacy and experiential learning, the Future Creativity Loop, the Design Futures process, and the Ministry for the Future educational framework. It lens through which the rest of the book can be understood.

If your primary goal is implementation, Part II offers a detailed walkthrough of the Ministry for the Future educational framework and classroom activities. Here you will find step-by-step descriptions, pedagogical rationales, activities, methods, implementation guidelines, and examples that can be directly adapted to your own courses and workshops enabling students to move from exploring uncertainty to constructing future scenarios and alternative worlds.

If you are interested in applications and case studies, Part III demonstrates how the Design Futures approach has evolved beyond its original educational context and been adapted across diverse research, organisations, and innovation contexts, highlighting its flexibility and scalability. Throughout the book, you will find:

- Educational activities tested in real classroom settings;
- Examples of student projects and future scenarios;
- Practical tools and templates ready to use;
- Reflections on integrating generative AI into creative and futures-oriented learning;
- Connections between theory and practice to support both understanding and implementation.

You may choose to follow the complete learning journey presented in these pages or selectively explore the tools and methods most relevant to your context.

The framework is intentionally modular and adaptable, allowing educators to implement individual activities, entire course structures, or customised combinations that respond to their own educational objectives.

Throughout these pages, you will encounter not only methods and tools, but also stories, experiments, reflections, and examples of futures imagined by students, educators, researchers, artists, and innovators. Together, they illustrate how futures thinking can become tangible through immersive experiences, collaborative imagination, and creative action.

Most importantly, we invite you not only to read this book, but to experiment with it.

The activities presented here are not intended as prescriptions, but as starting points for creating your own futures-oriented learning experiences. The framework presented here is intended to be adapted, challenged, expanded, and reinterpreted. The most effective Design Futures experience is never a replication of an existing model, but a response to the specific people, cultures, questions, and futures that emerge within a particular learning context.

Read selectively or read sequentially. Use a single activity or experiment with the entire framework. Follow the path we propose or create your own. The future, after all, is not something to be followed step by step. It is something to be explored, imagined, and designed.

PART 1

Foundations for Teaching the Future

1. Challenges in the Current Design Educational Landscape

We are educating learners for a world that no longer exists – while the world they will inhabit is still taking shape. Education systems are increasingly called upon to play a central role in enabling the ecological and societal transformations required to address intertwined global and local challenges – from climate change, political instability, technological disruption to widening socioeconomic inequalities. These challenges do not unfold in isolation. Rather, they interact across scales in what has been described as a *polycrisis* – a condition in which multiple crises reinforce and amplify one another, generating uncertainty and systemic fragility. In such a condition, the question is no longer whether education should adapt, but whether its current logic can respond at all. As Elkington (2020) argues, “we must completely rethink how we run our planet” (p. 12). Education is widely recognized as a critical leverage point for such rethinking. Yet paradoxically, it remains one of the most institutionally rigid and slow-moving systems in society.

For decades, educational systems have prioritised stability, standardisation, and disciplinary expertise. While these characteristics supported industrial-era models of learning, they are increasingly

misaligned with a world defined by volatility, uncertainty, complexity, and ambiguity (VUCA). Contemporary challenges require broader capabilities – including systems thinking, anticipation, ethical reasoning, interdisciplinary collaboration, and long-term thinking – rather than knowledge transmission alone.

UNESCO's *Reimagining Our Futures Together* report (2021) calls for a profound shift, from narrowly instrumental and performance-driven models of learning toward educational processes that cultivate collective intelligence, imagination, responsibility, and care for the planet. Education, in this view, is not only about preparing individuals for labour markets but about enabling learners to participate in shaping more just and sustainable futures. However, despite widespread recognition of these needs, institutions often struggle to operationalize these ambitions. Rigid curricula, disciplinary silos, assessment-driven cultures, and resistance to pedagogical experimentation continue to constrain transformative innovation in higher education.

Alongside ecological and societal transformation, education is also being reshaped by rapid advances in artificial intelligence. Beyond acquiring AI-related skills, students increasingly need AI literacy: the capacity to critically understand, evaluate, and collaborate with AI systems (WEF, 2025). Yet many educational institutions still lack coherent pedagogical frameworks for integrating AI responsibly into learning. The challenge is therefore not simply technological adoption, but rethinking how creativity, knowledge production, and human agency evolve within human–AI collaboration.

As a result, AI is often either adopted uncritically as a productivity-enhancing tool or rejected altogether, limiting students' capacity to engage with these technologies in reflective, creative, and socially responsible ways. The question is no longer whether AI will shape the future of education, but how education will shape the terms of human–AI collaboration.

Another paradox emerges from the educational and professional landscapes: institutions are expected to prepare students for professions, technologies, and societal conditions that do not yet exist. The OECD (2018) emphasizes that education systems must therefore focus less on predefined career trajectories and more on cultivating adaptive capacities that enable young people to thrive amid uncertainty.

Similarly, the WEF's *Future of Jobs* report (2025) identifies analytical thinking, creativity, resilience, flexibility, technological literacy, empathy, and self-awareness among the most critical skills for the coming decade. Significantly, these competencies span cognitive, emotional, and relational domains, highlighting the need for holistic educational approaches that integrate knowledge, agency, and values.

Despite this recognition, many educational models remain structured around linear progression, discipline-based fragmentation, and performance metrics that privilege standardization over exploration. The misalignment between educational practice and societal need becomes particularly visible in relation to sustainability. United Nations (2023) surveys indicate that a substantial proportion of young people feel unprepared to address climate change based on their formal education, citing a lack of systemic understanding and future-oriented perspectives. At the same time, the World Economic Forum (2023) reports that nearly half of all workers' core skills are expected to change within a five-year horizon, underscoring the acceleration of change and the limits of education systems focused primarily on static competencies.

Beyond skills and competencies lies an additional, often overlooked dimension: the emotional and existential relationship young people have with the future. Research by Hickman *et al.* (2021) reveals that 75% of individuals aged 16-25 report feeling fearful about the future, with climate change emerging as a central concern. Education, therefore, must do more than equip learners with adaptive skills; it must cultivate agency, expand imaginaries, and restore a sense of participatory possibility.

Preparing students for uncertain futures requires not only knowledge, but the capacity to imagine alternatives and to see themselves as active participants in shaping them. Taken together, these dynamics suggest that education's core deficit is not informational but temporal and imaginative: it remains oriented toward reproducing the present rather than equipping learners to interrogate and transform it.

1.1 The Limits of Contemporary Design Education

Within the broader transformation of education, design education faces a particularly urgent set of challenges. Designers across disciplines, from product and service design to interaction and systemic design, are increasingly expected to engage with complex, long-term, and systemic issues such as sustainability transitions, social justice, digital transformation, ecological regeneration, and technological ethics. If design is inherently future-making, then design education carries a disproportionate responsibility in times of systemic uncertainty.

Historically, design education has been strongly influenced by human-centred design and Design Thinking approaches. These frameworks emphasize empathy, user research, iterative prototyping, and solution-oriented problem solving. They have provided valuable tools and methodologies that have broadened the influence of design across sectors. However, they have also been subject to sustained critique. Meyer and Norman (2020) argue that Design Thinking, as commonly practiced, tends to privilege short-term problem-solving and incremental innovation, offering limited capacity to address long-term, systemic, and future-oriented challenges. The structural limitation is therefore temporal: when design is framed primarily as the optimization of present experiences, deeper questions – *Who defines the problem? Whose futures are prioritized? What long-term consequences are generated?* – remain peripheral.

A second limitation concerns the anthropocentric orientation of mainstream design education. Human-centred design typically positions humans as the primary beneficiaries as decision-makers. While crucial for usability and accessibility, this framing implicitly treats ecological systems, non-human species, technological infrastructures, and future generations as externalities. In an era defined by planetary boundaries, this anthropocentrism becomes not only ethically problematic but pedagogically restrictive.

Norman (2010) observes that design is still predominantly taught as a craft, often with limited engagement with theory, science, or systemic analysis. When design is framed primarily as artifact production, opportunities to interrogate values, power dynamics, and long-term systemic

impacts are frequently overlooked. As a result, graduates may possess strong creative and technical skills, yet remain underprepared to navigate deep uncertainty, conflicting value systems, or contested future scenarios. The skillset required today extends beyond craft and creativity toward futures thinking, ethical reflection, and systemic awareness that includes more-than-human actors in the design process.

Towards future literacy-based design education

In response to these limitations, futures-oriented approaches are gaining increasing attention within education and design research. Futures Literacy, defined by UNESCO as the capacity to imagine, interpret, and use the future to inform present-day decisions, has emerged as a key competence for the 21st century (Miller, 2018). Crucially, Futures Literacy does not concern prediction or forecasting accuracy. Rather, it concerns the ability to recognize that images of the future shape present actions and that by expanding those images, we expand the range of possible interventions. As the Copenhagen Institute for Futures Studies (2025a) argues, Futures Literacy must be cultivated as a life competence, not treated as an optional or decorative addition to educational programs. The future is not a distant destination; it is a lens through which the present is continuously interpreted.

For design education, this implies a fundamental re-framing: designers are not merely problem-solvers but sense-makers who actively construct the horizons within which problems and solutions become thinkable.

Designers increasingly need to navigate ambiguity, work across disciplinary boundaries, and prototype not only products and services but also visions, narratives, imaginaries, and systemic interventions. Futures thinking and imagination are not innate talents reserved for a creative elite; they are learnable capacities that can be cultivated through structured pedagogical approaches (Miller, 2018). Research indicates that futures literacy enhances systems understanding, openness to alternatives, constructive optimism, and reduced fear in the face of complexity (Chen & Hsu, 2020; Kazemier *et al.*, 2021). In

contexts marked by climate anxiety and technological acceleration, cultivating such capacities is not supplementary but essential.

Despite growing recognition of the importance of futures-oriented competencies, many design educators lack structured tools, methodologies, and assessment frameworks to meaningfully integrate Futures Literacy into curricula. Hirst and Spellman (2024) observe that educators often struggle to translate abstract future-oriented concepts into concrete learning activities that fit institutional constraints. Accreditation requirements, limited resources, and entrenched cultural expectations about what design education should produce can create resistance to pedagogical innovation.

Yet the need for futures-oriented education is increasingly evident. As Evans (2004) argues, images of the future are performative: they actively shape behaviour, decision-making, and collective priorities in the present. Without the capacity to critically interrogate future imaginaries, designers risk reproducing dominant narratives – whether techno-solutionist, growth-driven, or extractive – and thereby narrowing the scope of possible change. Futures Literacy, therefore, becomes not only a creative competence but also an ethical one. This marginal positioning reflects a deeper issue: futures thinking challenges the present-oriented logic upon which much design education is built.

Towards post-anthropocentric design education

The escalating climate crisis, biodiversity loss, and transgression of planetary boundaries (Steffen *et al.*, 2015) further intensify the need to rethink design education. As these consequences become ever more visible, design education faces a critical challenge: to expand its epistemological and practical foundations beyond the humans. Post-anthropocentric and more-than-human perspectives (Braidotti, 2013; Haraway, 2016; Escobar, 2018; Forlano, 2017; Szel, 2020) conceptualize humans as embedded within socio-ecological and techno-material assemblages (Figure 1).

From this perspective, design is no longer the act of shaping the world *for* humans, but as an intervention *within* networks of interdependence that span species and temporalities.

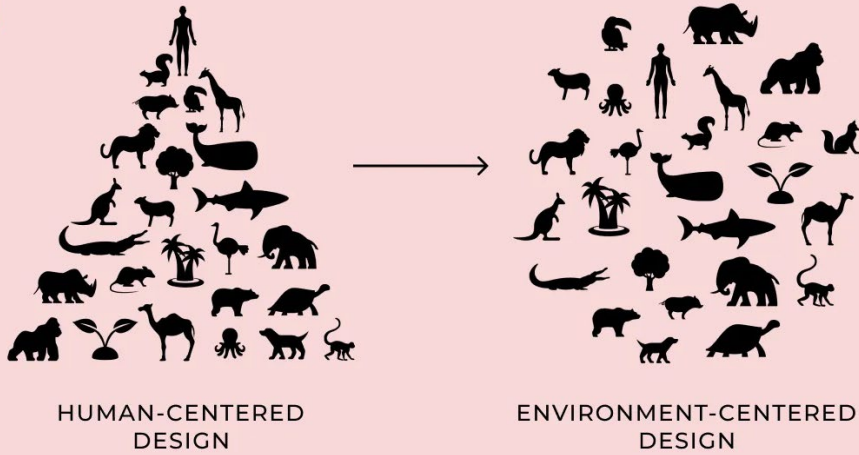


Figure 1.
From human-centered to
environment-centered
design (Author: Monika
Sznal, 2020).

This shift has significant implications for design education. If designers are to meaningfully contribute to sustainability transitions, climate adaptation, and regenerative futures, they must be trained to recognize distributed agency, to account for long-term consequences, and engage ethically with uncertainty and irreversibility. As UNESCO (2021) argues, this requires not simply new tools, but a shift in world-view – from extractive and solutionist orientations toward relational and regenerative ones. Although such perspectives are increasingly visible in experimental practices, regenerative, multispecies, speculative, and pluriversal design (Escobar, 2018; Tsing *et al.*, 2017; Akama *et al.*, 2020), they remain marginal within formal curricula.

Importantly, this transformation is also mirrored in emerging labour market expectations. The World Economic Forum (2025) identifies environmental stewardship as one of the fastest-growing skill demands by 2030, even though it is not yet considered a core competence in most organisations. This mismatch highlights a critical challenge for both educational institutions and businesses: the need to anticipate future skill requirements and cultivate capabilities before they become urgent. Design education, as a field that explicitly operates at the intersection of imagination, problem framing, and future-making, is particularly well positioned to address this anticipatory role. Yet to fully embrace this potential, it must expand

its temporal horizons, diversify its epistemological foundations, and integrate futures literacy and post-anthropocentric perspectives into its core pedagogical structures.

1.2 Bridging the Gap: Towards a New Educational Approach for Design

Taken together, these dynamics reveal a structural gap in contemporary design education. Designers are increasingly expected to engage with systemic, long-term, and ethically complex challenges shaped by technological acceleration, ecological limits, and societal transformation. However, dominant educational models remain anchored in short-term, human-centred, and solution-driven paradigms.

The core problem is therefore not a shortage of creativity, but an educational logic that privileges optimisation over transformation, immediacy over anticipation, and human preference over planetary interdependence.

Adopting a futures lens has been increasingly identified as a critical strategy for addressing this gap. Futures thinking can expand design toward more holistic and systemic perspectives (Ollenburg, 2018). Futures Literacy, as defined by UNESCO (2018), equips individuals to interrogate how assumptions about the future shape present action. When integrated structurally rather than superficially, futures approaches reposition design itself as a consciously future-making practice - one accountable for the trajectories it enables. Despite this potential, futures thinking is rarely treated as a core competency. When introduced, it is often framed as a speculative exercise, a creative workshop, or an optional add-on rather than epistemological foundation. This misalignment points to the urgent need for new educational approaches that move toward structural transformation by:

- Integrating futures thinking and Futures Literacy as core design competencies rather than peripheral enhancements.
- Equipping students to work constructively with uncertainty, complexity, and long-term consequences.

- Fostering critical engagement with emerging technologies – including AI – from systemic and ethical perspectives.
- Embracing post-anthropocentric and more-than-human worldviews that recognize interdependence across species and systems.
- Supporting designers in acting as facilitators of societal and ecological transformations toward desirable futures.

The challenge is not to append new methods to existing curricula, but to reconfigure the temporal, ethical, and ontological foundations of design education itself. This book responds to these challenges by proposing an integrated pedagogical framework that combines futures methodologies, experiential and reflective learning, and more-than-human perspectives into the structural core of design training. Rather than treating futures thinking as speculative extension, the framework positions it as the organizing principle through which design problems are framed, explored, and evaluated. By weaving together design practice, futures studies, and post-anthropocentric thinking, this approach seeks to expand design education – from shaping artifacts and services toward cultivating responsibility, imagination, ethical awareness, and care for the futures collectively brought into being.

2. Design Futures: Bridging Anticipation, Design, Futures Thinking, and AI Potential

Periods of profound transition demand new ways of thinking and acting. When “the previous order has been shaken or dissolved, but a new order is not yet in sight” (Roth, 2025), the capacity to imagine, question, and shape possible tomorrows becomes essential. Today, social, technological, political, and environmental transformations are unfolding at unprecedented speed and with increasing interconnectedness.

Climate change interacts with economic systems, artificial intelligence reshapes labour markets, geopolitical tensions influence technological development. In such a context, change is not only accelerated but also deeply entangled, making it difficult to isolate problems or anticipate consequences through linear thinking.

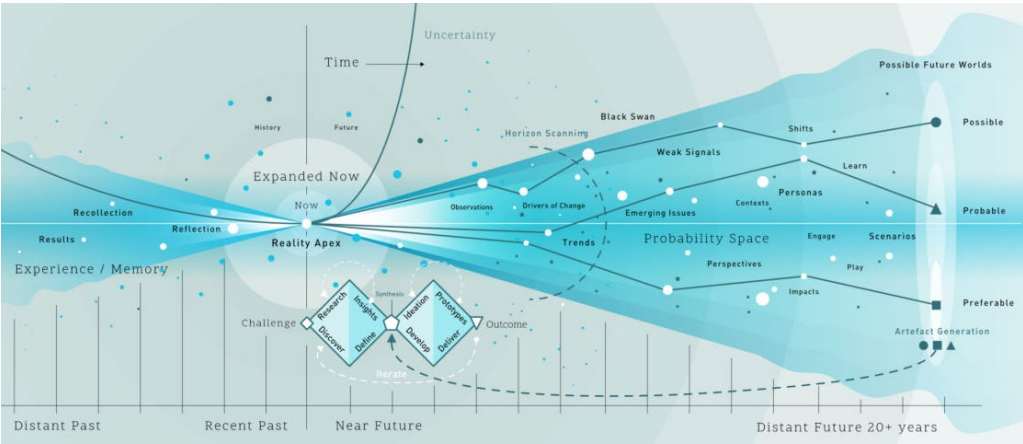
In these conditions, the core challenge is no longer simply to “solve problems”, but to design responsibly under uncertainty – with awareness of long-term consequences, contested values, and systemic interdependencies.

This shift signals a broader transformation in the role of design itself:

from a discipline focused on responding to present needs to one increasingly concerned with shaping evolving conditions. In this context of radical uncertainty, *Futures Thinking* offers a critical complement to traditional design approaches. It enables individuals and organisations to look beyond immediate pressures and envision longer-term consequences, systemic implications and emerging opportunities. Rather than treating the future as a distant endpoint or a predictable extension of the present, Futures Thinking invites people to see it as a space of inquiry, imagination, and responsibility.

Importantly, this does not replace design practice but expands it – introducing temporal depth and systemic awareness into processes that have traditionally been present-oriented (Figure 1).

Figure 1.
Comparison of time-
scales and activities
between Futures
Thinking and Design
Thinking processes.
Source: Steven Santer,
2019.



In education and design, this shift is particularly relevant: designers are no longer called only to solve present-day problems but to engage with emerging conditions, long-term consequences, and systemic transformations. Design Futures emerges at this intersection. It integrates anticipatory practice, Design Thinking, and speculative methods to prepare designers not merely to solve present problems but to navigate uncertainty and actively participate in shaping preferred futures (Evans & Sommerville, 2007; Dunne & Raby, 2013). Through the hybridisation of Future Thinking and Design Thinking, this approach expands the temporal, ethical, and imaginative horizons of design practice. In doing so, Design Futures reframes design as a form of *anticipatory practice*: a way of rehearsing, questioning, and

shaping futures before they fully materialise. In this chapter, Design Futures is defined as a structured approach that connects foresight (to expand what futures are thinkable), design (to materialise and test implications), and critical reflection (to make values and power structures visible).

This chapter first introduces the foundations of Futures Thinking, its purpose, evolution, tools, and key concepts, and then explores how it can be meaningfully integrated with Design Thinking. It explains how anticipation differs from prediction, clarifies the distinction between possible and preferred futures, and presents frameworks such as Voros' Futures Cone to visualize degrees of plausibility and desirability. Ultimately, it demonstrates how Design Futures, particularly when supported by AI as a critical and creative collaborator, can generate more resilient, plural, and value-explicit design directions. In this sense, Design Futures is not only a methodology, but a shift in mindset: from designing for the present to designing with the future.

Design Futures is operationalised in practice through an iterative workflow that typically moves through five stages: (1) scanning and sensemaking (signals, drivers, uncertainties) (Könnölä *et al.*, 2012; Hiltunen, 2008, 2010); (2) scenario framing (alternative futures and their logics) (Schwartz, 1991; van der Heijden, 1996; Bishop & Hines, 2007, 2012); (3) speculative materialisation (artefacts, narratives, prototypes) (Dunne & Raby, 2013; Sterling, 2009); (4) evaluation and critique (ethics, consequences, stakeholders, more-than-human impacts) (Bühring & Liedtka, 2018; Haraway, 2016; Puig de la Bellacasa, 2017); and (5) backcasting and intervention design (actions in the present aligned with preferable futures) (Inayatullah, 2008; Dreborg, 1996). This iterative movement between present analysis and future imagination allows moving back and forth across time to inform action.

2.1 Anticipation as an Approach: from Prediction to Exploring Possibility

A central shift in contemporary futures studies is the move from prediction to anticipation. This distinction is crucial for understanding how Futures Thinking complements and transforms design practice.

Although the two terms are often used interchangeably in everyday language, they represent fundamentally different ways of relating to the future. Prediction assumes that the future can be forecast through extrapolation from past data, trends, or models. While predictive approaches are valuable in stable or controlled systems, they become increasingly unreliable in complex, open, and rapidly changing contexts.

Anticipation, by contrast, does not seek to determine what *will* happen. Instead, it asks: *What could happen? What might this mean? And how should we respond today?* It is an exploratory and reflexive approach aimed at understanding a range of possible outcomes and their implications for present action. Anticipation recognises uncertainty as an inherent condition and treats it not as a limitation, but as a productive space for learning, imagination, and decision-making. Rather than reducing uncertainty, it works with it – expanding the range of possibilities that can be considered and discussed. It does not attempt to forecast a single future; instead, it explores multiple possible outcomes to understand how present decisions shape emerging trajectories.

Contemporary Futures Thinking, particularly in what Schultz (2016) describes as the fifth wave of futures studies, embraces complexity, emergence, and non-linearity. It draws on anticipatory systems theory, which suggests that organisms, organizations, and societies act in the present based on how they imagine and interpret the future (Rosen, 2012). UNESCO's concept of Futures Literacy further strengthens this perspective by defining anticipation as the human capacity to imagine and use the future in order to inform present decisions and actions (Miller, 2018).

The goal, therefore, is not accuracy but readiness and responsibility: using futures to test assumptions, expand options, and make consequences discussable before they become irreversible.

In Futures Thinking, anticipation serves three key functions:

- *Sensemaking*, by helping individuals and organisations interpret signals of change and emerging patterns.

- *Preparedness*, by exploring how different futures might unfold and what responses they may require.
- *Agency*, by enabling actors to consciously influence trajectories toward more desirable outcomes.

These functions are particularly relevant for design, where decisions made today often have long-term and systemic consequences. In design contexts, anticipatory thinking expands the designer's horizon. It invites designers to consider the implications, risks, and opportunities associated with emerging trends, technologies, and sociocultural dynamics.

Crucially, it shifts design from “responding to needs” toward “shaping conditions”, including conditions that are not yet fully visible or widely understood.

2.2 Futures Thinking as a Multidisciplinary Approach to Long-term Change

Futures Thinking is defined as a “method for informed reflection on the major changes that will occur in the next 10, 20 or more years in all areas of social life”. Importantly, it is not a single technique or tool, but a multidisciplinary field that has evolved over decades. It draws from diverse disciplines, including social sciences, cultural studies, participatory methods, sociology, economics, political science, philosophy, systems theory, design, natural sciences and technology studies. This multidisciplinary nature is essential, as understanding the future requires integrating multiple perspectives, scales, and forms of knowledge.

The origins of Futures Thinking can be traced back to post-World War II strategic foresight and systems analysis, initially developed for military and policy planning purposes. Early futures work was largely technocratic and expert-driven, focused on prediction, modelling, and risk management. Over time, the field expanded to incorporate social sciences, cultural studies, participatory methods, and critical approaches. Today, its ambition is not only to analyse signals of change, but also to support strategic reflection, ethical deliberation, and informed decision-making in complex and uncertain contexts.

Broadly speaking, three major waves can be identified in the evolution of futures studies:

- *Predictive and technocratic futures*, focused on forecasting, modelling, and expert-driven analysis. The emphasis was on anticipating what is most likely to happen.
- *Exploratory and plural futures*, emphasising scenarios, alternative futures, and systemic uncertainty. This wave acknowledged that the future is not singular but multiple.
- *Critical and participatory futures*, which foreground power, values, ethics, and the role of imagination in shaping futures. Here, futures are understood as socially constructed and politically contested rather than neutral projections.

This progression reflects a fundamental shift, from viewing the future as something to be predicted, to understanding it as something to be explored, debated, and actively shaped. Contemporary Futures Thinking operates within this third wave. It acknowledges that futures are socially constructed, culturally embedded, and politically contested. As a result, the central question shifts from *What will happen?* to *Whose future is being imagined, and who benefits from it?*

For design, this shift is decisive: it transforms futures work from a purely analytical exercise into a value-driven practice of world-making.

Plurality of futures and conceptual frameworks

A key principle in Futures Thinking is that the future is plural. One of the most widely used frameworks to illustrate this purpose is Voros' *Futures Cone* (2003), which visualises the expanding range of potential futures radiating outward from the present (Figure 2):

- *Probable futures*: those likely to occur if current trends, trajectories, and power structures continue unchanged.
- *Plausible futures*: those that could reasonably happen within known constraints.
- *Possible futures*: those that might happen, including radical, unexpected transformations.
- *Preferable futures*: those that should happen based on societal, ethical, and personal values and aspirations.

This taxonomy highlights how uncertainty increases over time, expanding the space of possibilities and making the future inherently open rather than predetermined.

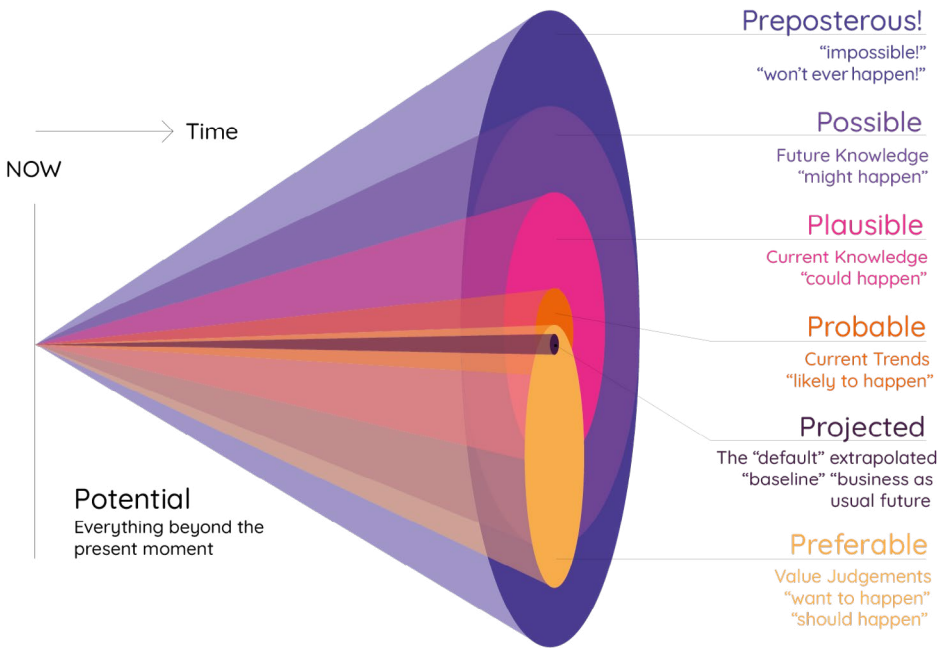


Figure 2.
Readapted Voros Cone.
Source: Authors, 2024.

Preferable futures differ fundamentally from probable ones, as they are guided by normative choices rather than statistical likelihood. This distinction is particularly relevant for design, which is inherently concerned with shaping desirable outcomes rather than merely describing likely ones. Thus, Design Futures aims not simply to describe change, but to guide it by articulating desirable trajectories. While Design Thinking traditionally operates within the space of the plausible and feasible in the near term, Futures Thinking expands the design space toward the possible and the preferable. The integration of these perspectives enables designers to develop concepts that are not only innovative today but also resilient and meaningful across time.

Another influential classification is Dator's (2009) "four generic futures": *Grow/Continuation*, *Collapse*, *Discipline*, *Transform* (Figure 3). These archetypes provide narrative structures that help designers and researchers explore fundamentally different systemic trajectories, rather than variations of the same future.

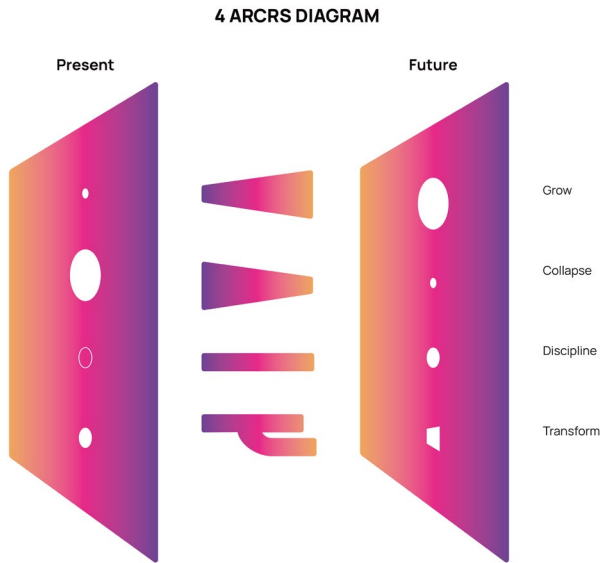


Figure 3.
Readapted Dator's
Four Futures. Source:
Authors, 2024.

Together, these frameworks support deeper reflection on what kinds of futures we consider likely, desirable, or dangerous and why. They reveal the assumptions guiding present decisions and open space for alternative imaginaries. They also help designers locate where “preferred futures” might conflict – across stakeholders, generations, and species – and therefore require negotiation rather than consensus.

From frameworks to tools: operationalising futures thinking

Beyond conceptual frameworks, Futures Thinking relies on practical tools that structure exploration and inquiry. Among the most widely used are:

- *Drivers of change*, such as technological, social, environmental, economic, and political forces shaping long-term transformations.
- *Weak signals*, early and often ambiguous indicators of emerging change that may grow in significance over time.
- *Horizon scanning*, a systematic process for identifying trends, signals, and uncertainties across multiple domains.
- *Scenario building*, which combines research and imagination to construct coherent narratives of alternative futures.

Rather than providing definitive answers, these tools support structured questioning, collective sensemaking, and strategic imagination. They enable practitioners to move from abstract reflection to

actionable insight, bridging analysis and creativity. Scenario building, in particular, plays a central role. Scenarios are not predictions, but narrative constructions that describe how different futures might unfold, allowing organisations and designers to explore implications, test assumptions, and prepare for uncertainty. When combined with design practices, these tools become powerful instruments for future-oriented innovation, enabling ideas to be explored, materialised, and critically evaluated.

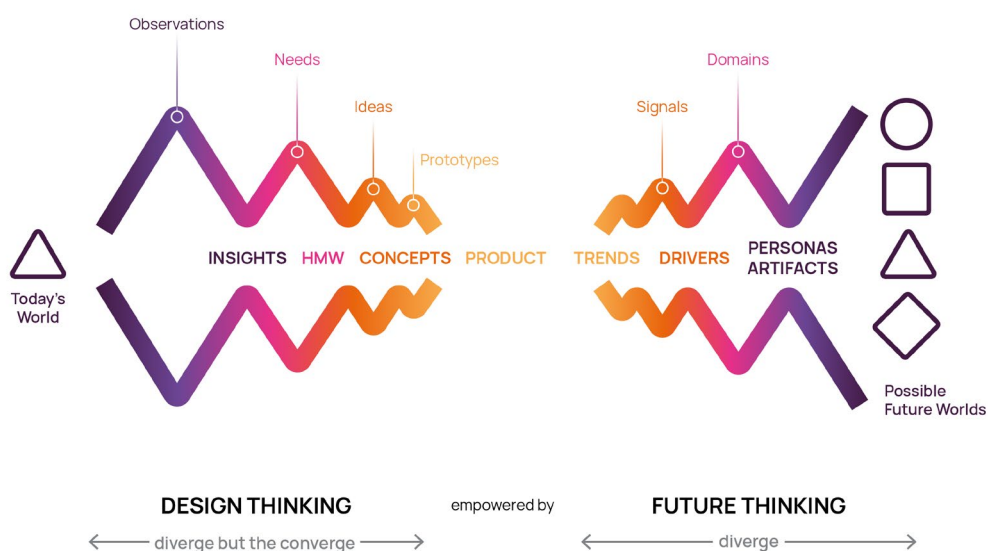
2.3 From Design Thinking to Design Futures: Expanding the Temporal and Methodological Scope

Design Thinking has profoundly influenced design education and practice over the past decades. Popularised by IDEO and academic institutions like Stanford d.school, it foregrounds empathy, iteration, prototyping, and human-centred problem-solving and has enabled designers to address complex challenges in tangible and actionable ways (Brown, 2009; Liedtka, 2018), making innovation more accessible and iterative. However, this methodological strength is also a structural limitation. Design Thinking is primarily oriented toward the present or the near future, focusing on existing user needs, current contexts, and immediate constraints (Figure 4). While highly effective for incremental and short-term innovation, it can struggle to address:

- long-term systemic consequences;
- structural and political dimensions of change;
- emerging issues without clearly defined users or problem definitions.

In rapidly changing socio-technical and ecological contexts, this present-centred orientation risks reinforcing existing systems rather than transforming them. As Fry (2009) argues, much contemporary design remains “defuturing” sustaining patterns that undermine future possibilities. By contrast, Futures Thinking examines long-term systemic dynamics and constructs hypothetical scenarios that extend decades

into the future (Inayatullah, 2008). Rather than starting with present users, it begins with uncertainty, complexity, and the multiplicity of possible trajectories. This shift allows designers to explore not only what is needed today, but what might become necessary tomorrow. The integration of Futures Thinking with Design Thinking addresses this gap between short-term problem solving and long-term transformation. Futures Thinking expands the temporal horizon of design, while Design Thinking grounds futures exploration in action, materialisation, and lived experience (Figure 5).



Within Design Futures, this integration operates in a complementary way:

- *Futures Thinking* introduces temporal depth, systems awareness, and multiple perspectives.
- *Design Thinking* contributes human-centredness, experimentation, and the capacity to turn abstract visions into tangible artefacts.

In practice, this means that futures exploration stretches the problem space, while design practice brings it back into actionable form. This integration allows designers to move fluidly between analysis and imagination, speculation and prototyping, reflection and action. Futures scenarios become not endpoints, but contexts within which design concepts can be developed, tested, and critiqued.

Figure 4. Positioning of Design Thinking as a starting point followed by Futures Thinking (readapted from *Design Thinking meets Future Thinking* by Anna Roumiantseva). Source: Authors, 2021.

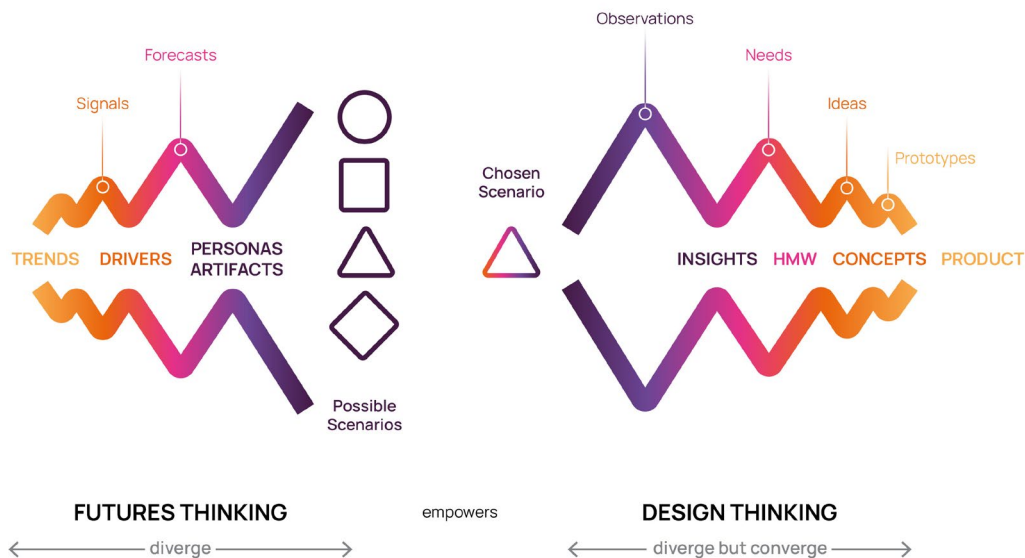


Figure 5. Futures Thinking as a starting point for Design Thinking.
Source: Authors, 2021.

Toward a hybrid design-futures practice

The convergence of these approaches generates a hybrid methodology in which:

- *Foresight methods* extend the divergent phase of design processes, destabilising present-centred biases and enabling the exploration of alternative worldviews (Cuhls, 2020; Inayatullah, 2008).
- *Design processes* materialise speculative insights and transform abstract future scenarios into experiential forms of inquiry (Dunne & Raby, 2013; Candy & Dunagan, 2017).

This hybridisation transforms both disciplines: futures thinking becomes more tangible and actionable, while design becomes more reflective, systemic, and future-oriented.

This integration aligns with Evans and Sommerville's (2007) conception of Design-Led Futures, which argues that design can serve as a mode of inquiry into long-term change, enabling learners to "open windows on the future" to better understand present conditions. It also reflects Paraboschi and Della Rosa's (2016) definition of Design Futures as a discipline situated at the intersection of design fiction,

interaction design, ethnography, and foresight. Within this framework the design process becomes a temporal process, an iterative movement between analysing the present, expanding into alternative futures, and returning to the present to design interventions informed by long-term perspectives.

Design Futures adopts the anticipatory stance, recognising that designers must engage not only with current user needs but with systemic transformations, weak signals, and emerging drivers of change (Saritas & Smith, 2011). As Taleb (2007) suggests, extreme and improbable events are not exceptions but structuring forces in contemporary society. Anticipation thus becomes a creative core competency for Design Futures: a way of engaging with discontinuities, expressing values, and rehearsing transformations.

2.4 Integrating Generative AI in Futures-Oriented Creativity

Having established how Design Futures bridges Futures Thinking and Design Thinking, it becomes necessary to consider how emerging technologies further expand this integration. Building on the increasing relevance of digital systems to design practice, the Design Futures methodology incorporates generative AI not as an instrumental add-on but as a co-creative cognitive partner. This integration reflects a broader paradigm shift in creative disciplines, where human-machine collaboration augments, rather than replaces, human imagination (Boden, 2014; Floridi, 2014). In this context, AI does not sit outside the Design Futures process, but becomes embedded within it, contributing to how futures are explored, interpreted, and materialised.

Contemporary generative systems demonstrate how algorithmic models can produce text, images, and speculative artefacts that meaningfully contribute to ideation processes. Rather than functioning solely as automation tools, these systems increasingly operate as dialogical interfaces capable of reframing questions, recombining knowledge domains, and surfacing latent associations. This dialogical nature aligns closely with the anticipatory stance described earlier, where the goal is not to generate definitive answers but to expand the

space of possibilities. The integration of AI into Design Futures aligns with theories of *distributed cognition* (Hutchins, 2006), which conceptualise thinking as extending beyond the individual mind into networks of artefacts, systems, and social interactions. Within this perspective, AI becomes part of the cognitive ecology of design – an active participant in sensemaking, future speculation, and creative exploration.

AI across the Design Futures process

Within the Design Futures method developed at Politecnico di Milano, generative AI tools support multiple phases of the process:

- Enhancing immersion through AI-generated voices and narratives, enabling experiential futures (Candy & Dunagan, 2017).
- Supporting exploration by adopting expert or non-human personas, echoing more-than-human design approach (Braidotti, 2013).
- Aiding sensemaking by clustering patterns and synthesising signals.
- Provoking imagination with novel “what-if” questions.
- Facilitating communication by generating visual representations of scenarios.

These roles mirror and extend the phases of the Design Futures process itself, demonstrating how AI can accompany the full trajectory, from early exploration to final communication. In this sense, AI acts not as a separate tool, but as a transversal layer that enhances each stage of futures-oriented design. Used well, this hybrid human-AI creativity can accelerate divergence, reveal alternative framings, and help students prototype futures as experiential objects rather than abstract descriptions. It supports the movement between imagination and materialisation that lies at the core of Design Futures.

From a futures thinking perspective, AI plays a particularly significant role in amplifying anticipation. By generating unexpected combinations, simulating alternative perspectives, and proposing speculative scenarios, AI expands the range of possible, plausible, and even preferable futures that can be explored. It enables designers to move more fluidly across different levels of uncertainty, supporting the exploration of futures that might otherwise remain inaccessible. In this way, AI contributes directly to futures literacy, helping learners engage

more deeply with complexity, multiplicity, and long-term thinking. At the same time, AI lowers the threshold for creative exploration. By reducing the friction of ideation and visualisation, it allows students to iterate more rapidly, experiment more freely, and engage with ambiguity more confidently. This reinforces creative confidence and supports a more exploratory, less constrained approach to futures-oriented design.

Critical engagement and limitations

However, scholarly discourse on AI in education emphasises the need for critical engagement, addressing issues of bias, transparency, and responsible use (Luckin, 2018). This critical dimension is particularly important in futures work, where the outputs of AI can shape how futures are imagined and interpreted. Within Design Futures, this critical dimension becomes pedagogically significant: students not only use AI to enhance creativity but also learn to interrogate the socio-technical systems shaping their future worlds. AI thus acts simultaneously as an imaginative catalyst and an object of anticipatory critique.

This is particularly important in futures work, where AI can unintentionally amplify dominant narratives (e.g., techno-solutionism), collapse plural futures into familiar storylines, or generate “hallucinated” signals that appear credible but lack evidence. Without critical reflection, these tendencies risk narrowing rather than expanding the space of futures exploration. For these reasons, Design Futures treats AI outputs as hypotheses to be tested – not as insights to be accepted. This reinforces the role of human judgment, ethical reflection, and collective sensemaking within the process.

By integrating AI into the Design Futures framework, the relationship between Futures Thinking and Design Thinking is further extended into a hybrid human-machine creative practice. By bridging anticipation, Futures Thinking, Design Thinking, and generative AI potential, Design Futures offers a framework for developing more future-proof design practices. It equips designers with the capacity to:

- Navigate uncertainty rather than eliminate it.
- Engage with complexity across social, economic, political, and ecological dimensions.
- Imagine and prototype preferable futures grounded in ethical reflection.

Ultimately, Design Futures is not only a methodology but a shift in design's temporal orientation: from designing “for users now” toward designing with accountability to futures, values, and interdependence.

In this expanded perspective, AI becomes part of the ecosystem through which futures are imagined, debated, and shaped, reinforcing design as a collective, anticipatory, and responsible practice. It repositions design as a form of futures literacy and civic responsibility, empowering designers to act not only as problem-solvers, but as *future-makers*.

The Design Futures approach outlined in this chapter establishes a conceptual and methodological foundation for integrating anticipation, futures thinking, design practice, and AI-supported creativity. However, for these principles to become meaningful, they must be experienced, enacted, and embodied within learning environments. In this sense, futures-oriented design cannot remain purely analytical or speculative: it requires pedagogical frameworks that enable learners to actively engage with uncertainty, inhabit alternative futures, and collaboratively shape possible trajectories. The following chapter introduces one such framework, the Ministry for the Future, an immersive, narrative-based educational model that translates the principles of Design Futures into an experiential learning environment, where students move from imagining futures to actively performing and negotiating them.

3. The Ministry for the Future: an Experiential Framework for Futures-oriented Design Education

The Ministry for the Future framework was created to address a central pedagogical challenge: how can futures thinking be taught not only as an analytical exercise, but as a lived, collective experience that reshapes students' sense of responsibility and agency?

Developed within the *Design Futures* course at Politecnico di Milano, the framework transforms futures thinking into an immersive, embodied, and collaborative learning journey. It emerged from a clear realisation of the gap in educational practices: while traditional design pedagogy provides powerful tools, and futures thinking offers valuable analytical methods, neither alone is sufficient to prepare designers for the complexity of contemporary transformation. The Ministry for the Future addresses this gap by introducing a “third element” that complements design pedagogy and futures thinking: institutional fiction. It transforms the classroom into a speculative governance space – a coordinated microcosm of interdependent departments – positioning learners as members of a fictional institution tasked with imagining and shaping desirable futures. This narrative structure draws on theories of design fiction (Dunne & Raby, 2013) and experiential

futures practice (Candy & Dunagan, 2017), making futures “thinkable” through enactment, worldbuilding, and lived experience rather than prediction. The result is a future-oriented learning journey that moves coherently from immersion to exploration, horizon scanning, scenario generation, worldbuilding, and strategic design action.

The framework takes inspiration from *The Ministry for the Future* (2020) by Kim Stanley Robinson – a novel imagining a global institution dedicated to defending future generations in the face of climate crisis. However, the Ministry framework presented here is not a gamified retelling of the book. It is an original pedagogical construct, while the novel serves only as a conceptual spark: the idea of a future-oriented institution as a narrative framework for learning. This idea also resonates with a growing global movement in anticipatory governance. Alongside fictional imaginaries, real governments worldwide have established institutions dedicated to strategic foresight, anticipatory governance, and long-term policymaking. Examples include the Institute for the Future in the United States, the United Arab Emirates’ Ministry of Possibilities (2019) with the Dubai Future Foundation, Finland’s Committee for the Future (1993), the Future Generations Commissioner for Wales (2016), Singapore’s Centre for Strategic Futures (2009), Canada’s Policy Horizons, South Korea’s National Assembly Futures Institute (2018), the UK Government Office for Science’s Foresight programme, Japan’s NISTEP (active since the 1970s), and the Competence Centre on Foresight as part of the EU Policy Lab. Such bodies reflect a growing recognition that navigating 21st-century challenges requires new organisational forms capable of addressing uncertainty, interdependence, and long-range societal transformation.

Within this global landscape, the Ministry for the Future educational framework translates the logic of anticipatory governance into a structured pedagogical model. It offers a replica of an institutional body in which students learn to think and act as future decision-makers. This approach draws from and extends different foundational theories in design pedagogy: studio-based learning (Schön, 1983; Lawson, 2005), experiential learning theory (Kolb, 1984) and design fiction (Dunne & Raby, 2013). This philosophical grounding converges around the idea that learners build knowledge more deeply when

they engage emotionally, socially, and imaginatively with complex issues. The framework transforms the classroom into a speculative governance environment, an institution composed of interdependent departments, positioning learners as members of this fictional governance body tasked with imagining and shaping desirable futures.

3.1 Why a Ministry? The power of Institutional iction

Many contemporary critiques argue that design education is increasingly misaligned with societal needs: it focuses on linear processes, short-term projects, and solutionism, rather than cultivating the capacity to navigate complexity, ethics, and long-term thinking (Fry, 2009; Manzini, 2015; Willis, 2020). The choice of a “ministry” responds to this critique by functioning more than a narrative device – it is a pedagogical structure that enables responsibility, coordination, and negotiation under uncertainty. Institutions carry symbolic and emotional weight – they evoke responsibility, ethics, power, and long-term stewardship. When students enter the classroom and are appointed as future Ministers, Advisors, Analysts, or even non-human representatives, they confront the ethical and political implications of design decisions. Their work is framed as governance rather than “a project”, a shared mandate to imagine and defend the futures of entire populations, ecosystems, or specific domains: they must justify trade-offs, negotiate priorities, and defend consequences across time. This framing encourages students to work collectively toward shared missions, simulating the complexity of negotiating across departments, conflicting priorities, and value systems.

The structure introduces systemic thinking from the beginning: each fictional department represents a crucial dimension of a socio-technical system, and their interdependence mirrors the complexities of real-world governance. This institutional fiction, therefore, creates the conditions for deep engagement and cognitive reframing, a known trigger for transformation in experiential and constructivist learning models. Learners come to see how futures are socially constructed, negotiated, and shaped by cultural, political,

and ethical dynamics. Through this approach, the Ministry for the Future addresses several limitations of traditional design education by offering: a coherent learning narrative that replaces fragmented exercises; a temporal expansion, moving from immediate problem solving to multi-horizon thinking; a collective governance model, emphasising teamwork instead of individualised design work; an environment that supports reflection-in-action (Schön, 1983), agency, responsibility, and future literacy.

In short, the “ministry” functions as an affective and organisational interface between abstract futures concepts and the lived practice of designing under uncertainty.

3.2 Pedagogical Foundations

Design education has long relied on the studio model, in which learning unfolds through iterative making, reflection, and collaborative exploration (Schön, 1983; Lawson, 2005). The Ministry framework builds on this tradition but expands it into a future-oriented studio. Rather than focusing on present-centred briefs, students collectively explore systemic challenges – the kinds of “wicked problems” Buchanan (1992) describes, which resist simple solutions. Departments within the Ministry function as interconnected project studios, each contributing to a shared, long-term vision.

This future-oriented studio expansion is intertwined with constructivist and constructionist perspectives (Vygotsky, 1978; Papert, 1993), which emphasise that knowledge emerges through active engagement, dialogue, interpretation, and the creation of shared artefacts. Within the Ministry, students construct meaning by negotiating roles, responsibilities, narratives, and visions, making learning an inherently social, situated, and participatory process, mediated by artefacts, precisely the kind of environment in which futures literacy can flourish. At the heart of the Ministry for the Future educational framework is a deep experiential learning system, fully aligned with Kolb’s learning cycle (1984, 2014). The framework intentionally guides students through all four stages:

- **Concrete Experience:** entering the Ministry Storyworld, adopting roles, participating in theatrical introductions and guided “time-travel” meditations. This aligns with experiential futures methodologies, which have demonstrated that futures literacy develops more deeply when learners experience futures rather than merely analyse them (Candy & Dunagan, 2017).
- **Reflective Observation:** debriefs, interdepartmental exchanges, value-mapping activities, and shared reflections create the cognitive dissonance that Mezirow (2000) describes as foundational to transformative learning. Students are encouraged to reflect critically on their beliefs, aspirations, and responsibilities toward long-term change.
- **Abstract Conceptualisation:** engaging with horizon scanning, sensemaking, domain mapping, and scenario development helps to stimulate reflection and abstraction, by fostering systems thinking, ethical sensitivity, and an understanding of how future visions emerge from negotiation rather than prediction.
- **Active Experimentation:** insights are then translated into new forms of action through worldbuilding, speculative prototyping, policy envisioning, strategic action and creating artefacts from future contexts.

This cyclical, iterative movement – from experience to reflection, abstraction, and experimentation – forms the pedagogical core of the Ministry for the Future.

By experiencing and questioning futures, students undergo the developmental transformation described by Kolb: they not only acquire knowledge but also reshape how they make sense of the world and their agency within it.

The framework further integrates the main principles of design fiction (Dunne & Raby, 2013) to strengthen the narrative structure (Candy & Dunagan, 2017) and anticipatory practice (Inayatullah, 2008), activating the following pedagogical cornerstones:

1. **Experiential learning as a catalyst for futures literacy:** through narrative immersion, theatrical introductions, and guided time-travel meditations, students enter an alternative temporal and conceptual space. Experiencing the future

in this way situates learning in the body and emotions, not purely in the intellect. This approach cultivates “temporal imagination” (Inayatullah, 2008) and expands cognitive flexibility. By feeling the future, learners internalize foresight more deeply, making futures literacy an embodied and actionable skill.

2. ***Transformative learning through narrative disruption***: by stepping into fictional roles and responsibilities, students experience a mild but productive form of cognitive dissonance. They set aside present-day assumptions, confront alternative worldviews, and re-examine their values – a core mechanism of transformative learning (Mezirow, 2000). The Ministry thus becomes a “threshold experience”, guiding students toward new ways of perceiving change, possibility, and agency.
3. ***Creativity as a collective, distributed phenomenon***: the Ministry’s role-play and worldbuilding position students as co-creators of futures. This immersive format is structured to activate all four dimensions of the Future Creativity Loop, that will be described in depth in the following chapter: it nurtures a Creative Futures Mindset (openness and exploration), strengthens Creative Futures Confidence (agency-driven futures work), enhances Creative Futures Teamworking (distributed roles and responsibilities), and creates a Creative Futures Atmosphere conducive to negotiation and responsible speculation. Learning becomes socially distributed – futures are co-constructed rather than individually imagined.
4. ***Governance as a pedagogical metaphor***: by simulating governance structures, the framework enables learners to think systemically, ethically, and in a long-term perspective. Students navigate tensions and trade-offs inherent to policy-making: economic versus ecological priorities, technological innovation versus equity, human versus multispecies perspectives, and short-term needs versus long-term resilience. Futures literacy becomes inseparable from ethical literacy, ensuring students understand not only how to imagine the future, but how to act responsibly within it.

To avoid the common weakness of immersive pedagogy, and the lack of clear assessment, the Ministry framework can be evaluated through transparent criteria across four domains: (1) futures literacy – range and coherence of scenarios; ability to articulate assumptions; (2) systems insight – drivers, feedback loops, interdependencies across departments; (3) ethical and political reasoning – trade-offs, justice, more-than-human impacts; and (4) design enactment – quality of speculative artefacts, narrative consistency, and ability to communicate futures as discussable propositions. Collaboration and reflexivity can be assessed through peer feedback, role-based reflection logs, and documented negotiation decisions.

3.3 The Core Pillars of the Ministry for the Future Educational Framework

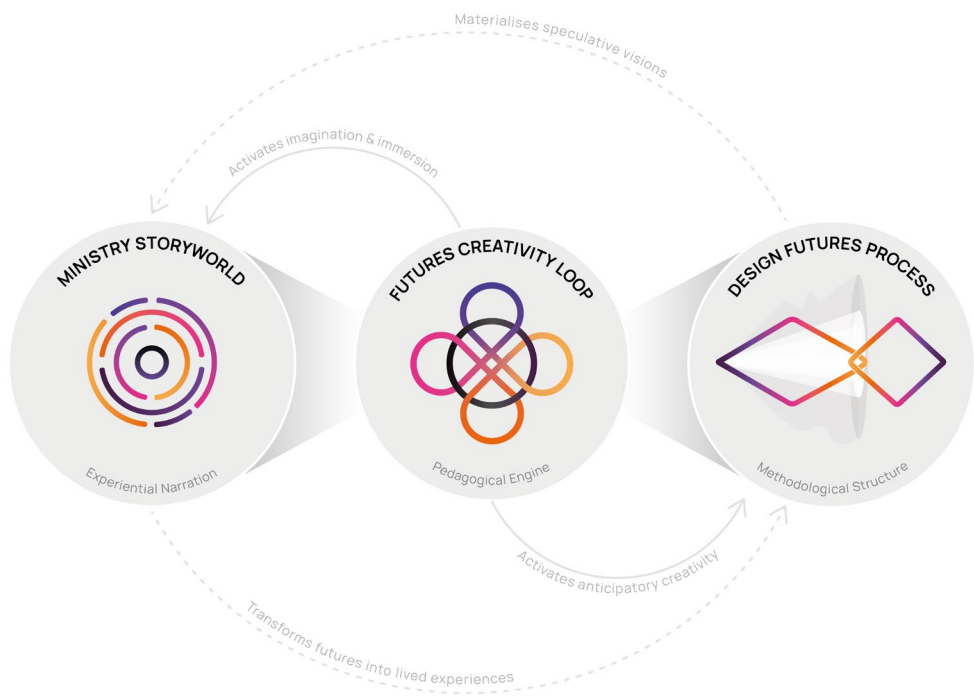
The Ministry for the Future educational framework serves as the integrative backbone of the Design Futures course. It is built upon three interconnected pillars that together create a coherent, immersive, future-oriented learning journey: (1) the *Future Creativity Loop*, (2) the *Ministry Storyworld*, and (3) the *Design Futures process* (Figure 1). Each pillar plays a distinct role, yet they operate as an interconnected system supporting students in developing futures literacy, systemic awareness, and creative agency. Rather than functioning at the same level, these three pillars operate across different layers of the learning experience – the Future Creativity Loop as the pedagogical foundation that remains continuously active in the background, the Ministry Storyworld as the experiential framework which supports the narration throughout the course, and the Design Futures process as the operational and methodological structure enacted in practice.

The first pillar, the Future Creativity Loop, functions as the pedagogical engine of the framework, ensuring that creativity unfolds intentionally throughout the process. By activating dimensions of Creative Futures Mindset, Creative Futures Confidence, Creative Futures Teamworking, and Creative Futures Atmosphere, it ensures that future thinking is not only analytical but also imaginative, collaborative, and people-and-planet-centred. Importantly, this pillar does

not correspond to a specific moment or activity but acts as a continuous underlying layer that informs how all activities are experienced, designed, and reflected upon. As students navigate uncertainty, the Loop supports them in expanding anticipatory imagination and developing confidence to engage with long-term social, cultural and technological transformations.

The second pillar, the Ministry Storyworld, provides an experiential framework that reframes the design studio classroom as a speculative governance environment. Through roleplay and departmental organisation, students step into future-facing identities, negotiate responsibilities, develop an understanding of systemic complexity, and collectively imagine long-term transformations. This narrative device acts as an “entry mechanism” – it turns futures from a topic into a lived context.

Figure 1.
Three pillars of the
Ministry for the Future
Educational Framework.
Source: Authors, 2025.



The third pillar, the Design Futures process, provides the methodological backbone of the course. It structures a nonlinear workflow that moves from understanding the present to exploring alternative

futures and ultimately generating future-oriented concepts. Through horizon scanning, visioning, and worldbuilding, students engage in iterative cycles of exploration and synthesis.

These three pillars converge and become operative within the Futures Atelier, which represents the classroom setting and environment, where the framework is activated in practice. The Futures Atelier can be understood as a temporal and spatial container in which the Ministry Storyworld and the Design Futures process are enacted, while the Future Creativity Loop continuously shapes the learning dynamics in the background.

3.4 Toward a Pedagogy of Future-Making

The Ministry for the Future framework ultimately embodies a broader shift in design education: from training problem-solvers to cultivating futures-makers. It teaches students to embrace long-term thinking, ethical responsibility, and collective imagination. By situating learning within a narrative of governance and long-term stewardship, it cultivates the capacities young designers will need to address the uncertainties and transformations of the 21st century. Through immersive storytelling, collaborative worldbuilding, and strategic design practice, the Ministry for the Future educational framework reframes the classroom as a rehearsal space for tomorrow – a place where learners experience the future not as something that happens to them, but as something they have the agency and responsibility to shape. Ultimately, the Ministry for the Future is more than a teaching tool – it represents a philosophical stance on the role of design education in times of uncertainty. When the future feels fragmented and contested, the framework helps learners cultivate the agency, imagination, and responsibility needed to engage with long-term change. By bringing students into a shared storyworld where futures are negotiated, embodied, and enacted, the Ministry reframes education as a *rehearsal space for tomorrow*. The classroom becomes a place where designers learn not only to anticipate change but to become stewards of the futures they choose to create.

3.5 A Replicable Model for Educators

The Ministry for the Future educational framework is designed not only as a course format, but also as a pedagogical structure, that educators can adapt, expand, and reinterpret within their own teaching contexts. At its core, it offers a structured yet flexible way to orchestrate an immersive and coherent futures-oriented learning journey. One of the framework's greatest strengths is its adaptability. It can be implemented in its entirety or used modularly, depending on curricular needs. Educators may adopt the full framework of the Ministry or integrate selected elements into existing studio courses.

For educators, the framework provides a foundation that can (1) establish a shared purpose and narrative cohesion from the very start of the course; (2) create immersive conditions that open students to future imaginative and anticipatory thinking; (3) support teamwork, negotiation, and interdisciplinarity, reflecting real-world complexity; (4) elevate design work from problem-solving to speculative, systemic thinking; (5) anchor futures practice in embodied, emotional learning. Its structure can be tailored according to course objectives, time-frame, class size, or thematic focus. The framework is equally adaptable to undergraduate courses, professional training, innovation labs, or futures workshops. A crucial step in implementation is defining the Ministry's overarching topic and departmental structure. Educators may choose familiar domains, or design more speculative departments aligned with emerging challenges. In both cases, the structure remains robust enough to support complexity while flexible enough to encourage creative interpretation.

This chapter has introduced the Ministry for the Future as an experiential and narrative-driven framework that enables students to engage with futures not only intellectually, but through action, imagination, and collaboration. To understand how this framework operates in practice, the following chapters unpack its three core pillars: the *Future Creativity Loop*, the *Ministry Storyworld*, and the *Design Futures process*. Together, they form an integrated learning ecosystem that bridges creativity, anticipation, and design, supporting learners in becoming active agents in shaping preferable futures.

4. Future Creativity Loop pillar

Creativity, when intentionally structured and guided through the design process, becomes a fundamental and powerful tool for innovation that is not only effective but also human- and planet-centred (Leopold *et al.*, 2018). In rethinking contemporary educational paradigms, this chapter positions creativity not as an isolated talent or spontaneous moment of inspiration, but as a central capability that can be cultivated deliberately, systematically, and inclusively. To do so, we draw upon the Creativity Loop, a framework developed at the IDE-Activity Center that synthesises years of research into four interdependent dimensions *Creative Mindset*, *Creative Confidence*, *Creative Teamworking*, and *Creative Atmosphere*. Together, these dimensions constitute a dynamic ecosystem that nurtures creative capacities across diverse learning environments. At the core of this ecosystem lies the *Design Process*, which provides structure and direction. In the context of Design Futures, however, creativity must expand beyond idea generation. It must become an anticipatory capability – the capacity to imagine, evaluate, critique, and materialise alternative futures responsibly.

Within this book, therefore, the Creativity Loop becomes more than a framework for creative development. It evolves into the pedagogical foundation of the Design Futures process. As the methodology incorporated futures thinking, anticipatory practice, post-anthropocentric perspectives, immersive experiential modalities, and generative AI as a co-creative partner, the original Loop required conceptual expansion. Creativity is no longer cultivated solely to address present needs, but to explore uncertainty, imagine long-term transformations, and build the capacity to articulate, critique, and inhabit alternative futures.

This evolution marks the emergence of the *Future Creativity Loop* – a reconfiguration of the original model that aligns creativity with temporal depth, systemic awareness, ethical responsibility, and speculative imagination. While the original Loop is centred on the four creativity dimensions interconnected through a human-centred design process, the future-oriented version integrates design thinking with futures methodologies and a more-than-human perspectives. The Future Creativity Loop reframes creativity as a strategic capability for navigating complexity rather than merely solving problems. It supports students as they move from analysing current conditions to envisioning radically different worlds and materialising them through worldbuilding, provotypes, and experiential artefacts.

This chapter introduces the evolution of the Loop, outlines its theoretical foundations, and positions it as the analytical and pedagogical lens through which the Design Futures process operates. By understanding how each dimension is activated within the Ministry for the Future educational framework, educators can intentionally design learning pathways that strengthen not only creativity but also the anticipatory, ethical, and collaborative capacities essential for shaping preferable futures.

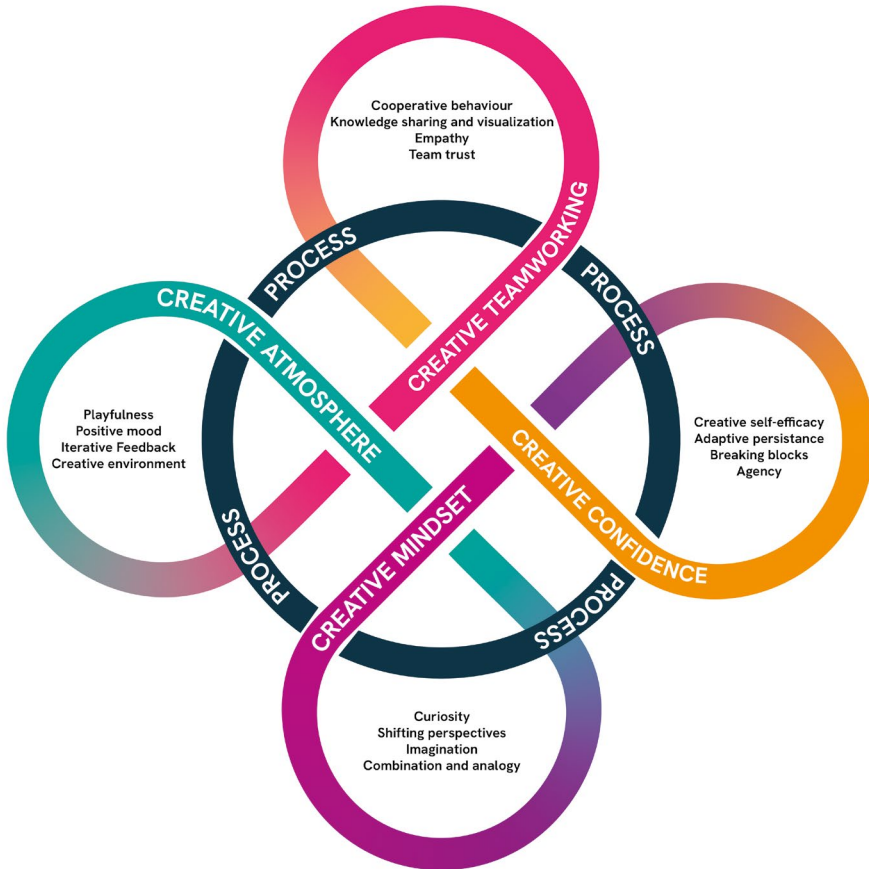
4.1 The Creativity Loop and its Evolution into the Future Creativity Loop

The Creativity Loop was originally conceived as a never-ending cycle that brings together the key elements of creativity and the design process. It acts as a compass for understanding how creativity

emerges, strengthens, and becomes actionable within learning and innovation contexts. The model is composed of four interdependent dimensions (Figure 1):

- *Creative Mindset* nurtures curiosity, flexibility, and the ability to approach challenges from multiple perspectives.
- *Creative Confidence* sustains the belief that creative potential can be developed through practice, experimentation, and reflection.
- *Creative Teamworking* emphasises the relational nature of creativity, fostering empathy, trust, and shared purpose as groups work toward collective goals.
- *Creative Atmosphere* provides the emotional and spatial conditions that allow creativity to flourish, enabling playfulness, openness, and psychological safety.

Figure 1.
The Creativity Loop.
Authors: Marita Canina
and Carmen Bruno, 2022.



These four dimensions are activated through specific creativity factors – competences that contribute to the outcomes of a creative process – and are continuously engaged through the Design Process dimension: a human-centred design workflow that channels creative energy toward meaningful innovation. As Design Futures expands the horizon of design education, the Loop requires a conceptual evolution. Futures-oriented challenges are rarely confined to immediate contexts, stable user needs, or clearly bounded problem spaces. Instead, they unfold across long-term temporal scales, complex socio-technical systems, and contested imaginaries. Responding to this shift, the Creativity Loop evolved into the *Future Creativity Loop*. While retaining its four dimensions, the model extends them into expanded temporalities, post-anthropocentric perspectives, immersive narrative worlds, and anticipatory practice (Figure 2).

In this evolved form, the Design Process dimension becomes the Design Futures process itself: an expanded and hybridised design-futures workflow that merges horizon scanning, sensemaking, visioning, scenario building, worldbuilding, experiential futures, and AI-supported creativity. This expanded process aligns creative development with anticipation: learners are supported in moving between immersion and reflection, exploration and synthesis, speculation and materialisation. Within this framing, creativity is understood as a learnable, observable, and relational capability that can be intentionally cultivated through designed experiences and collaborative inquiry.

Each of the four dimensions takes on a futures-oriented expression:

- **Creative Futures Mindset** emphasises anticipatory imagination, enabling learners to sense emerging signals, question dominant narratives, and explore alternative futures.
- **Creative Futures Confidence** is expressed through speculative courage and future agency, empowering learners to embrace ambiguity, take risks, and materialise provocative ideas.
- **Creative Futures Teamworking** activates collective futures literacy, as learners co-construct knowledge, negotiate perspectives, and align visions and responsibilities across difference.
- **Creative Futures Atmosphere** becomes an immersive gateway, enabling learners to inhabit future worlds through narrative, experiential, and sensory engagement.



Figure 2.
The Future Creativity
Loop. Source: Authors,
2025.

Together, these dimensions function as interdependent domains of creative and anticipatory growth, supporting the development of futures literacy (Miller, 2018), creative literacy (Ferrari *et al.*, 2009), and an expanded sense of agency within complex socio-technical systems. The Loop therefore operates simultaneously as an *analytical lens* (to understand what enables or blocks future-oriented creativity) and a *pedagogical engine* (to intentionally design conditions that cultivate it).

Through this evolution, the Future Creativity Loop shifts from a model for cultivating creativity to a model for cultivating future-making: positioning creativity as the capacity to imagine, critique, and

materialise alternative futures with responsibility, collaboration, and temporal depth.

4.2 Creative Futures Mindset

A Creative Futures Mindset forms the cognitive and attitudinal foundation of futures-oriented design education. It expands the original *Creative Mindset* into an explicitly anticipatory and temporal orientation. It encompasses openness, imaginative flexibility, and the willingness to navigate ambiguity. It enables students to explore multiple temporal trajectories, reframe present conditions and imagine alternative futures (Dweck, 2006; Runco, 2004).

Within the Future Creativity Loop, this mindset is reinterpreted through an anticipatory lens: learners are encouraged not only to think divergently and convergently (Guilford, 1950; Sawyer, 2012) but also to perceive emerging changes, identify early signals, and question dominant narratives shaping the present. This enables them to envision systemic transformations that move beyond linear projections and present-centred thinking (Masini, 2011; Sawyer, 2012).

A Creative Futures Mindset extends beyond classical creativity into futures literacy. It cultivates the capacity to interpret patterns, recognise systemic connections, and explore alternative futures without premature constraints of feasibility. Cultivating this mindset requires encouraging learners to suspend judgment, remain open to contradictory or unfamiliar ideas, and examine problems from human and non-human perspectives. Imagination becomes a strategic cognitive tool that enables students to reframe the present, explore the contours of possible and plausible worlds, and envision radical transformations.

Growing this mindset requires immersive and reflective learning experiences that foster anticipatory sensemaking. Through immersive activities such as the Theatrical Intro, Journey into the Future, and Horizon Scanning learners develop the ability to synthesise and interpret complex information, connect weak signals and emerging insights, and construct meaningful futures narratives (Glăveanu, 2018). Within the Future Creativity Loop, the Creative Futures mindset thus acts as a

cognitive engine guiding learners across expanded temporal, systemic and speculative landscapes of the Design Futures process.

Specific Creativity Factors activated in Creative Futures Mindset

Within the Creative Future Mindset, particular emphasis is placed on creativity factors that are specific to futures-oriented design:

- **Anticipatory thinking:** the capacity to envision long-term consequences, second-order effects, and systemic transformations across time. This factor supports learners in shifting from reactive problem-solving to proactive futures exploration (Miller, 2018; Klein & Snowden, 2011; Poli, 2019).
- **Futures imagination:** the ability to imagine, construct, and explore possible, plausible, and preferable future worlds through speculative narratives and alternative worlds. Futures imagination expands the horizon of what can be conceived as designable (Masini, 2011; Dunne & Raby, 2013).
- **Futures sensemaking:** the capacity to interpret weak signals, emerging patterns, and complex dynamics by connecting fragmented information into coherent understandings of changes. This factor enables learners to navigate ambiguity and complexity in futures-oriented inquiry (Weick, 2012; Masini, 2011).
- **Perspective expansion:** the ability to adopt multiple viewpoints, including human and more-than-human perspectives, in order to imagine plural futures and challenge dominant narratives. This factor supports ethical and inclusive futures thinking (Runco, 2004; Glăveanu, 2018).

Alongside these futures-specific factors, the Creative Futures Mindset continues to activate foundational creativity factors inherited from the Creativity Loop, such as curiosity, cognitive openness, divergent and convergent thinking, lateral thinking, and a growth mindset, which remain essential for engaging with uncertainty, embracing ambiguity, and sustaining creative exploration throughout the Design Futures process (Amabile, 1996; De Bono, 2009; Dweck, 2014; Guilford, 1950; Sawyer, 2012).

4.3 Creative Futures Confidence

Creative Futures Confidence refers to the belief in one's capability to imagine and materialise futures not yet present. Rooted in self-efficacy (Bandura, 1997) and creative confidence (Kelley & Kelley, 2013), it becomes essential in futures-oriented design, where ambiguity and uncertainty are inherent. Students must be willing to engage with ambiguity, take intellectual and creative risks, and propose visions that may challenge existing paradigms. This dimension evolves into a futures-specific form of agency grounded in speculation and responsibility.

Experiential and iterative practices, such as those described by Schön (1983) in reflection-in-action, strengthen learners' capacity to act under uncertainty and encourage them to treat failure as a critical component of the design process. Research shows that creative confidence grows through repeated experimentation, iteration and exposure to open-ended creative challenges (Ulibarri *et al.*, 2014; Liu *et al.*, 2023).

Within Design Futures education, this confidence develops in safe-to-fail environments supported by activities such as prototyping, alternative futures exploration, and the creation of future artefacts. These practices reinforce the understanding that futures thinking is not a predictive endeavour but a creative and ethical exploration. Here imperfect attempts become crucial steps toward meaningful insights and learning rather than failures to be avoided.

AI integration can enhance Creative Futures Confidence by reducing fear of the blank page and enabling rapid visualisation, synthesis, and reframing. When learners dialogue with AI personas, generate speculative imagery, or collaboratively explore provocative "what-if" scenarios, they develop, adaptability, confidence in their own agency and a willingness to push creative boundaries.

Importantly, however, AI-supported confidence must be accompanied by critical reflection to ensure that agency remains with the learner rather than being displaced onto the tool. Ultimately, Creative Futures Confidence empowers students to move from imagining futures to actively shaping them, fostering agency, initiative, and reflective responsibility throughout the Design Futures process.

Specific Creativity Factors activated in Creative Futures Confidence

Within the Creative Futures Confidence, particular emphasis is placed on creativity factors that are specific to futures-oriented design:

- **Future agency:** the belief in one's capacity to actively shape and influence future outcomes and shape futures worth designing for, rather than passively adapt to them. This factor underpins learners' willingness to engage in futures-making as a meaningful form of action (Bandura, 1997; Miller, 2018).
- **Speculative courage:** the readiness to propose and explore ideas that challenge dominant assumptions, normative expectations, and present-centred constraints. Speculative courage enables learners to move beyond safe or incremental futures (Kelley & Kelley, 2013; Dunne & Raby, 2013).
- **Adaptive perseverance:** the capacity to sustain creative engagement despite incomplete, uncertain, or contradictory information and persist through iteration, failure, and reframing, treating unsuccessful or partial outcomes as learning opportunities rather than endpoints. This factor is essential for working within open-ended futures processes where outcomes remain indeterminate (Ulibarri *et al.*, 2014).
- **Future reflexivity:** the ability to engage in reflection-in-action while designing and exploring future visions, in order to critically examine biases, ethics, and imagined future (Rosa *et al.*, 2021; Schirrmeister *et al.*, 2020; Schön, 1983), fostering deeper self-awareness.

Alongside these futures-specific factors, the Creative Future Confidence continues to rely on foundational creative confidence factors inherited from the Creativity Loop, such as risk-taking and ambiguity tolerance, which remain essential for stepping beyond comfort zones to engage with radical futures possibilities (Puccio *et al.*, 2011).

4.4 Creative Futures Teamworking

Creative Futures Teamworking is the relational core of the Future Creativity Loop. It transforms creativity from an individual skill into a distributed, collective, and collaborative capability, essential for

navigating the systemic, ethical, and socio-cultural complexity of futures-oriented design. Imagining and constructing futures requires the interplay of diverse perspectives, disciplinary insights, lived experiences, and personal values. This makes teamworking not optional but foundational: futures thinking is inherently social, and plausible futures emerge from the negotiation of multiple interpretations, desires, and worldviews.

Effective teamworking depends on psychological safety, where participants feel free to express unconventional, speculative, or provocative ideas without fear of judgment (Edmondson, 1999). It grows through empathy, active listening, and perspective-taking (Paulus & Nijstad, 2003), enabling teams to engage constructively with difference, navigate tensions, and build shared meaning. These dynamics support collective imagination, the ability of groups to think together, integrate distributed knowledge, and generate richer insights than individuals could achieve alone (Sawyer, 2007; Glăveanu, 2014).

In futures-oriented projects, teamworking becomes the engine for collective imagination and distributed cognition. Teams collaboratively identify signals, interpret complexity, build speculative worlds, and prototype future artefacts. Within the Ministry for the Future framework, students inhabit organisational roles, participate in departmental decision-making, and negotiate interdependencies through futures thinking and scenario building. Through co-creation, students learn to mediate contradictions, align motivations, and manage group dynamics, key conditions for systemic, inclusive, and long-term thinking (Johnson & Johnson, 2009; de Villiers Scheepers & Maree, 2015).

This immersive environment mirrors the social complexity of real-world governance, policy-making, and collaborative work on future scenarios. Through dialogue and collective sensemaking, different voices contribute to the emergence of richer, more inclusive, and more resilient visions of the future. As teams learn to navigate disagreement, align motivations, and integrate distributed knowledge, they develop a collective form of futures literacy. Shared digital and analogue tools, speculative artefacts, visual narratives, and AI-generated representations act as mediating objects that facilitate negotiation and support distributed cognition. Within this relational ecosystem, learners experience futures-making as a col-

laborative endeavour grounded in co-creation, ethical dialogue, and collective responsibility.

By fostering shared decision-making, constructive feedback, and collaborative exploration, teamworking elevates individual creativity into collective futures literacy. It equips learners to generate richer, more inclusive, and more resilient visions of the future than any individual could create independently.

Specific Creativity Factors activated in Creative Futures Teamworking

Within the Creative Futures Teamworking, particular emphasis is placed on creativity factors that are specific to futures-oriented design:

- **Empathy and Perspective Sensing:** the capacity to sense, understand, and integrate diverse emotions, values, worldviews, and temporal perspectives, including human and non-human agents. This factor enables teams to imagine futures that are plural, inclusive, and ethically situated, rather than driven by a single dominant viewpoint (Paulus & Nijstad, 2003; Miller, 2018).
- **Shared Sensemaking:** the collective ability to interpret complexity, uncertainty, and ambiguity by connecting signals, negotiating meanings, and constructing coherent narratives about possible futures. Shared sensemaking allows teams to move from fragmented insights to structured scenario logics (de Villiers Scheepers & Maree, 2015; Weick, 1995; Inayatullah, 2008).
- **Collective Imagination:** the ability to generate, articulate, and evolve shared visions of the future through dialogue, synthesis, and speculative exploration. Collective imagination transforms individual ideas into common imaginaries that can be discussed, challenged, and refined (Glăveanu, 2014; Appadurai, 2013; Dunne & Raby, 2013).
- **Collective agency:** the shared capacity to negotiate power, priorities, and responsibilities among diverse actors, and to act together toward preferable futures by translating collective imaginaries into coordinated action (Sawyer, 2007; Emirbayer & Mische 1998; Poli, 2019).

Alongside these futures-specific factors, this dimension continues to rely on foundational collaborative factors inherited from the Creativity Loop, such as psychological safety and team trust, which

enable open, non-judgmental exploration, vulnerability, and trustful collaboration across extended and diverse groups of actors involved in futures-making (Edmondson, 1999).

4.5 Creative Futures Atmosphere

Creative Futures Atmosphere refers to the emotional climate, spatial environment, and narrative framing that enable creativity and futures thinking to flourish. It creates the affective and physical grounding necessary for learners to navigate uncertainty, confront complex challenges, and explore future possibilities. Research indicates that creativity thrives when learners experience positive emotions, playfulness, and a sense of play (Isen, 1999; Mainemelis & Ronson, 2006), while immersive and playful environments support flow and deep engagement (Csikszentmihalyi, 1990), all of which reduce inhibition and reinforce exploration.

In Design Futures pedagogy, atmosphere is deliberately shaped through narrative immersion, experiential storytelling, guided meditation, and the physical aesthetics of the studio space. These elements work together to establish imaginative readiness because learners must be both emotionally grounded to confront difficult or disruptive futures, such as climate breakdown or inequality, and playful enough to experiment with unconventional, speculative ideas (Barrett, 1998).

Environmental affordances play a significant role in shaping this atmosphere. Flexible layouts, visual stimuli, and shared digital spaces support collaborative exploration and worldbuilding (Mor-Avi & Scott-Webber, 2022). Narrative immersion further amplifies Creative Futures Atmosphere. Storyworlds, such as the Ministry for the Future, offer an intense entry point into futures thinking, enabling learners to suspend their disbelief and inhabit alternative contexts with depth and empathy.

Through these immersive narrative cues, students feel empowered to inhabit roles, explore alternative worlds, and prototype future artefacts with confidence and imagination. Activities such as guided meditation, role-play, and speculative exhibitions amplify this immersive quality (Candy & Dunagan, 2017), helping students move

beyond intellectual analysis into embodied, affective engagement with futures.

A well-crafted atmosphere thus acts as the experiential threshold through which futures become thinkable, feelable, and discussable, and learners step into the unfamiliar terrains of futures thinking, ready to explore and create with openness and agency.

Specific Creativity Factors activated in Creative Futures Atmosphere

Within Creative Futures Atmosphere, key creativity factors are particularly significant for futures-oriented design education:

- **Positive Future Orientation:** an affective and motivational stance toward the future that fosters care, curiosity, and commitment to imagining alternative futures beyond purely dystopian or deterministic framings. This factor supports hopeful yet critical engagement with uncertainty, enabling learners to approach futures as spaces for possibility rather than inevitability (Hopkins, 2025; Polak, 1973; Inayatullah, 2008; Miller, 2018).
- **Emotional Presence:** the capacity to emotionally connect with future imaginaries, enabling learners to engage futures not only cognitively but also through affect, intuition, and embodied awareness. Emotional presence grounds speculative thinking in lived experience, enhancing empathy for future stakeholders and deepening narrative coherence (Barrett, 1998; Damasio, 1994; Glăveanu, 2014).
- **Playful Exploration:** the willingness to suspend present-day constraints and experiment with unconventional, speculative, and non-linear ideas. Playfulness lowers creative inhibitions, encourages risk-taking, and supports divergent thinking within future scenarios (Isen, 1999; Mainemelis & Ronson, 2006; Sutton-Smith, 1997).
- **Experiential Immersion:** the capacity to inhabit future narratives and speculative worlds through embodied and experiential engagement. Experiential immersion enables learners to experience futures “from within,” supporting flow, sustained attention, and deeper imaginative investment (Woodgate, 2019; Dunne & Raby, 2013; Candy & Kornet, 2019).

Alongside these futures-specific factors, Creative Futures Atmosphere is supported by enabling factors inherited from the Creativity Loop, such as well-designed spatial and digital environments and sensory-rich settings, which facilitate engagement, collaborative storytelling and visual thinking, positive mood and imaginative exploration (Mor-Avi & Scott-Webber, 2022).

Table 1.
Future Creativity Loop
dimensions and factors
summary.

Dimension	Core Role	Factors from Futures Creativity Loop	Factors from original Creativity Loop
Creative Futures Mindset	Cognitive & attitudinal engine	• Anticipatory thinking • Futures imagination • Futures sensemaking • Perspective expansion	• Curiosity • Cognitive openness • Divergent & convergent thinking • Lateral thinking • Growth mindset
Creative Futures Confidence	Agency & activation driver	• Future agency • Speculative courage • Adaptive perseverance • Future reflexivity	• Risk-taking • Ambiguity tolerance
Creative Futures Teamworking	Relational & collective intelligence core	• Empathy & perspective sensing • Shared sensemaking • Collective imagination • Collective agency	• Psychological safety • Trust • Collaboration
Creative Futures Atmosphere	Experiential & environmental enabler	• Positive future orientation • Emotional presence • Playful exploration • Experiential immersion	• Spatial quality • Sensory richness • Enabling environments

4.6 Futures-Oriented Creative Process

The future-oriented creative process is the activating core of the Future Creativity Loop. It is an expanded and hybridised creative process that integrates creative practices with Futures Thinking to turn creative potential into actionable, future-oriented outcomes, as discussed in Chapter 2. This approach builds on a range of creative methodologies, foresight practices, and experiential learning approaches to foster a more anticipatory, reflective, and future-oriented form of creativity.

Within the loop, the process acts as the operative structure through which creativity is activated, navigated, and transformed into futures-making.

Like many creative processes, it unfolds through iterative cycles of divergence and convergence, alternating open exploration with phases of synthesis and meaning-making (Lawson, 2005; Kolb, 2014). Futures Thinking enriches this process by introducing an explicit temporal and anticipatory dimension that expands the space of possibilities and challenges present-centred assumptions (Bühning & Liedtka, 2018). In turn, creative practices centred on experimentation, storytelling, and making ground speculative insights in tangible forms, enabling the exploration of how futures can be experienced, tested, and shaped.

The process is nonlinear, iterative, and abductive. It loops continuously between exploration, anticipation, experimentation, and reflection, enabling learners to move fluidly between imagining futures and materialising them through narratives, prototypes, and experiential artefacts. Learners begin by developing a deep understanding of the present through horizon scanning and domain exploration, synthesising signals of change into meaningful insights. They then expand into temporal and speculative exploration, constructing alternative futures and scenario narratives that challenge dominant assumptions and open space for new possibilities. Through worldbuilding and experiential futures techniques, these possibilities become tangible, immersive, and emotionally resonant. Through this process, learners develop systems awareness, ethical sensitivity, and the capacity to navigate and shape long-term transformations.

Within the Future Creativity Loop, the futures-oriented creative process dimension orchestrates the other four dimensions: it activates the *mindset* that fuels exploration, the *confidence* that sustains experimentation, the *teamworking* that enables collective imagination, and the *atmosphere* that nurtures immersion and play.

The process is therefore not merely a sequence of activities but a transformative learning journey in which creativity becomes future-making, and learners develop the agency to shape the worlds they envision.

Distinctive characteristics of the Futures-Oriented Creative process

Rather than representing creativity factors, the following elements describe the unique characteristics of the process through which creativity is activated and sustained:

- **Temporal reframing:** the systematic shift beyond present-day constraints, from present-centric issues to long-term opportunities, redefining challenges through future-oriented lenses (Jaratt *et al.*, 2009).
- **Expanded futures divergence-convergence:** the extension of the divergent phase through exploration of Horizon Scanning via the Voros cone, followed by informed convergence and choices toward preferred and responsible futures.
- **Iterative anticipation:** the continuous testing of future hypotheses through cycles of reflection, prototyping, and prototyping for tangible future-making, materialising abstract scenarios into artefacts, experiences, or installations.
- **Narrative construction:** the development of coherent, relatable, and meaningful future narratives that enable sense-making, engagement, and shared understanding of complex futures (Woodgate, 2019; Marshall *et al.*, 2023).

Authorship Attribution

This chapter was jointly written by Marita Canina and Carmen Bruno, building on research and teaching activities the authors carried out together on this topic.

5. Ministry Storyworld Pillar

The Ministry Storyworld is the narrative pillar of the educational framework, building upon the institutional fiction introduced in the previous chapter to deepen the experiential and narrative dimensions of learning. It reinforces the immersive aspect of the learning process by transforming the classroom into a coherent narrative environment in which futures are not only analysed but enacted and communicated. In this context, storytelling functions not only as a communication tool but also as a fundamental cognitive process that helps designers make sense of the world and construct their sense of self (Parkinson, 2025).

Storytelling has long been recognized as a powerful pedagogical tool across disciplines because it connects knowledge with meaning, memory, and experience. Early scholars like Egan (1986) emphasised that narratives stimulate curiosity, imagination, and emotional engagement, which are essential for meaningful learning. Human knowledge is largely constructed of past experiences situated within the context of personal stories; essentially, memory is *memory for stories* (Landrum *et al.*, 2019). Indeed, as Fisher (1987) argued, humans are fundamentally storytelling animals (*homo narrans*) who

evaluate information through narrative coherence and narrative fidelity – whether a story makes sense and whether it resonates with lived experience. In learning environments, storytelling can support these processes by enabling learners to interpret knowledge through relatable scenarios and human-centred perspectives.

The *pedagogical power* of storytelling, therefore, lies in its ability to create interest, provide a structure for remembering material, and foster a deeper personal connection between students and teachers (Landrum *et al.*, 2019). Key arguments for its educational value include:

- **Enhanced memory and recall:** Stories are considered *psychologically privileged* because our brains evolved to process experiences in sequential, narrative scripts (Landrum *et al.*, 2019). Studies show that information presented in a narrative format leads to significantly higher recall than traditional rehearsal-based methods (Landrum *et al.*, 2019). Furthermore, techniques such as the *bizarreness effect* – incorporating unusual or memorable narrative content – can further improve student retention of complex information.
- **Narrative immersion:** A well-crafted story can elicit *narrative transportation*, where learners become temporarily situated within the logic of an alternative world, feeling immersed in the narrative. This immersion allows students to learn from distant events and others' experiences without direct risks, positioning storytelling as a form of experiential simulation aligned with futures-oriented learning (Hopkins, 2025).
- **Bridging lived experience and formal knowledge:** Storytelling acts as a *non-textual pedagogy* that bridges a student's inner lived experience with outer academic knowledge (Deniston-Trochta, 2003; McDowell, 2018). It moves education away from the *banking method*, where students passively store information, toward a constructivist dialogue where knowledge is actively co-created through the dynamic interaction of teller, listener, and tale (Deniston-Trochta, 2003; McDowell, 2018).

Within the Ministry for the Future educational framework, storytelling evolves from a pedagogical technique into a structuring logic of the learning experience itself. For designers navigating complex future systems, storytelling becomes essential for mediating between

diverse stakeholders' perspectives and temporalities. It enables the construction of shared imaginaries through which teams can explore, negotiate, and communicate alternative futures. Storytelling can reinforce a deep sense of empathy for the human and more-than-human experience, helping to understand how products or services integrate into the life of others (Parkinson, 2025). Moreover, narratives provide a considered way to represent complex and controversial themes, enabling designers to address societal issues and engage audiences meaningfully (Parkinson, 2025).

Incorporating digital storytelling into the curriculum offers new opportunities for critical thinking, digital literacy, and student engagement (Barber, 2016). Digital formats allow students to practice rapid iteration, versioning, and collaborative thinking. Within the storyworld of the Ministry, these narrative outputs – ranging from scenarios to artefacts and performative moments – become vehicles through which futures are explored, tested, and shared. By making things through story, students engage in *action research*, where theoretical issues are tested and reflected upon through the design of practical narrative implementations.

Ultimately, embedding storytelling as a pillar in design education equips students with a futures-oriented narrative mindset, allowing them to communicate intent, explore implications, and articulate the significance of their ideas more effectively while deepening their overall design and futures thinking (McDowell, 2018; Parkinson, 2025). The following activities described in this section operationalise the Ministry Storyworld pillar, translating narrative immersion into concrete pedagogical practices that sustain the experiential, collaborative, and speculative nature of the Ministry for the Future educational framework.

5.1 Theatrical Intro: Experiential Storyworld Entry

The Theatrical Intro inaugurates the experiential narrative of the Ministry for the Future educational framework, immersing students in a speculative governance scenario that frames the entire Design Futures learning journey. The activity positions learners as newly

appointed members of a fictional governmental body tasked with addressing emerging ecological and societal challenges. Through embodied storytelling, it establishes the course's overarching world-building logic, enabling students to suspend disbelief and enter a future-oriented mindset from the outset. The Theatrical Intro can be adapted to a broad range of themes (e.g., mobility, health, climate resilience) and educational contexts, making it a flexible and powerful gateway into futures-oriented design pedagogy.

By introducing the Ministry through a performative announcement in the classroom, such as the establishment of the Ministry for the Future (e.g. of Food) in response to systemic crises, the activity creates an immediate sense of urgency and agency. This approach functions as both narrative framing and a cognitive-emotional threshold, transitioning students from their everyday academic identity into a role-play environment operating within a speculative governance structure. This shift invites them to role-play and enact the politics, ethics, and ambiguities of long-term decision-making rather than merely analysing them (Candy & Kornet, 2019). The Ministry for the Future is structured into different departments, each addressing a distinct dimension of the chosen theme. This organisational structure mirrors real-world governance systems and encourages systemic exploration and interdependency awareness.

Pedagogical Rationale

The Theatrical Intro is designed to make the transition from the conventional learning environment into an imaginative landscape required for Design Futures course setting. By inviting students to perform futures, it activates an immersive atmosphere that establishes the emotional and narrative conditions necessary for creativity, curiosity, and psychological safety (Csikszentmihalyi, 1990; Isen, 1999). Through narrative enactment, learners suspend disbelief and adopt roles that expand their perspectives, a core mechanism of anticipatory learning (Inayatullah, 2008).

Indeed, when students enter the classroom and encounter a Minister addressing them as future decision-makers, they are encouraged to shift from observing futures to embodying them. This performative mode cultivates Creative Futures Mindset, enabling learners to explore

alternative worldviews, question assumptions, and temporarily accept imaginative hypotheses as plausible truths (Dunne & Raby, 2013). The collaborative aspect of the activity, including the formation of departments, the adoption of roles, and the design of a shared visual identity, cultivates early team cohesion, activating the Creative Futures Team-working dimension by fostering trust, empathy, and collective responsibility (Sawyer, 2007). At the same time, this ritual establishes the narrative infrastructure that anchors the entire Design Futures process, stimulating curiosity, cognitive openness, and perspective-shifting -key components of the Creative Futures Mindset. It lays the foundation for the iterative movement between imagination, exploration, and creation that characterises the Future Creativity Loop. Pedagogically, the Theatrical Intro functions as an immersive call to action, enabling learners to internalise purpose, agency, and accountability, qualities essential for developing futures literacy and anticipatory design practice.

5.2 Interdepartmental Peer Learning Sessions

The Interdepartmental Peer Learning Sessions constitute a recurring and structurally essential activity within the Ministry for the Future educational framework. Distributed throughout the course, these sessions create regular moments of collective exchange in which students, remaining in character as members of their respective Ministry departments, present their ongoing research, thematic domains, and futures visions to one another. Speaking as members of their departments, they also put forward and communicate the values of their fictional ministry unit to the other departments. Rather than functioning as conventional academic presentations, these sessions operate as institutional briefings within the Ministry Storyworld.

The structure of these sessions mirrors the logic of real-world governmental coordination, in which ministries are required to communicate across areas of expertise, negotiate priorities, and develop a shared understanding of systemic interdependencies. Students are not simply sharing findings – they are acting as future-facing advisors, analysts, and ministers. This role-embedded form of peer

learning transforms knowledge exchange into an ethical act, one in which learners experience firsthand how futures are socially constructed through dialogue, negotiation, and the alignment of competing visions (Berger & Luckmann, 1966; Slaughter, 1995).

Pedagogical Rationale

The Interdepartmental Peer Learning Sessions are grounded in a rich body of research on peer learning, collaborative knowledge construction, and socially distributed cognition. Vygotsky's (1978) concept of the zone of proximal development establishes that learners advance most effectively when working in collaboration with peers whose perspectives and competencies differ from their own. By requiring departments to share research across disciplinary domains, for example mobility, health, food, ecology, governance, or whichever themes structure the Ministry's departments, the sessions generate productive encounters across different knowledge areas.

Peer learning has been consistently shown to enhance critical thinking, communication skills, and metacognitive awareness (Boud *et al.*, 1999; Topping, 2005). When learners must articulate and defend their emerging futures visions to their peers, they are compelled to clarify assumptions, identify gaps, and anticipate questions – cognitive demands that accelerate both individual and collective sensemaking. The act of teaching or presenting to peers is itself one of the most effective strategies for consolidating understanding (Bargh & Schul, 1980), and within the Ministry Storyworld, this process is further enriched by the narrative and institutional frame in which it takes place.

The Interdepartmental Peer Learning Sessions further develop the dimension of Creative Futures Teamworking within the Future Creativity Loop. By distributing research across departments and requiring structured exchange, the sessions activate collective imagination – the capacity of groups to generate richer, more inclusive, and more systemically coherent futures visions than any single team could produce independently (Glăveanu, 2014; Sawyer, 2007). They also cultivate shared sensemaking, as students collaboratively interpret signals, negotiate meanings, and align their emerging scenarios in response to one another's perspectives (Weick, 1995).

5.3 Manifesto of the Future: Translating Future Visions into Commitments

The Manifesto of the Future constitutes the culminating activity of the Ministry Storyworld pillar, marking the transition from futures exploration to the Ministry's futures commitment. At the end of the course, each department within the Ministry is tasked with producing a Manifesto. This document articulates a future vision of the Ministry and translates it into a set of specific and accountable actions. These actions are concrete commitments that their departments engage to pursue as part of its mandate and may range from research and advocacy to design interventions, policy proposals, regulations, and community engagements. The Manifesto is not a speculative sketch or a provisional outline, but it is a declaration of intent that gives form, clarity, and institutional weight to the futures each department advocates for. The choice of the manifesto as a culminating format is deliberate and theoretically grounded.

Manifestos have historically served as instruments through which communities articulate their values, name the conditions they refuse to accept, and commit to the transformation they wish to bring about (Lyon, 1999). From political declarations to artistic movements, manifestos perform the function of making public a vision of the world that does not yet exist and asserting the intention to make it real. This culminating act of declaration engages what Inayatullah (2008) describes as the deepest level of futures inquiry – the examination of worldviews and the articulation of preferable futures rooted in values, ethics, and agency.

The Manifesto requires students to move through and beyond the analytical and speculative modes that characterise the earlier phases of the course, into a mode of commitment that makes their futures work consequential and ethically situated. In this sense, it completes the Future Creativity Loop, activating all four dimensions: Creative Futures Mindset in the articulation of a coherent futures narrative; Creative Futures Confidence in the courage to make public declarations; Creative Futures Teamworking in the collective negotiation of shared values and actions; and Creative Futures Atmosphere in the ceremonial and performative context of the final presentation.

Pedagogical Rationale

The Manifesto of the Future draws on a significant tradition of activist and critical pedagogy in which student work is understood not merely as an academic exercise but as a form of genuine agency and social participation (Freire, 1970; hooks, 1994). By positioning the Manifesto as a real communicative act, the activity situates students as responsible futures-makers rather than passive recipients of knowledge.

Research in design education has highlighted the importance of culminating projects that require students to take a position, not only to demonstrate competence (Cross, 2011; Fry, 2009). The Manifesto format responds to this need by demanding not only analytical and creative capacity but also ethical clarity and communicative courage. As Manzini (2015) has argued, designers working within complex systems must be capable of articulating not only what they are designing but why, for whom, and according to what values. The Manifesto makes these stakes explicit and performative.

The activity also engages the transformative learning mechanisms described by Mezirow (2000) – by requiring students to reflect on the entirety of their learning journey, distill its core insights, and express them as commitments, the Manifesto prompts a form of perspective transformation, a consolidation of the cognitive and ethical shifts that the course has cultivated. The act of collective authorship is equally significant. Within each department, the Manifesto requires negotiation, synthesis, and shared ownership – practices that reflect the relational and political dimensions of real-world futures work. Students must agree on what their department stands for, which futures they are prepared to defend, and what actions they commit to taking. This collective deliberation activates shared sensemaking and collective agency (Emirbayer & Mische, 1998; Sawyer, 2007), making the production of the Manifesto as pedagogically valuable as the document itself.

The Manifesto format also resonates with recent scholarship on speculative and critical design as a form of public discourse (Dunne & Raby, 2013; DiSalvo, 2012). Like the discursive objects of critical design practice, manifestos are designed to provoke, invite reflection, and create space for alternative imaginaries to enter public conversation. The Manifesto of the Future thus functions simultaneously as

a reflective synthesis, a creative artefact, and a futures-making act. It closes the Ministry Storyworld pillar by translating the experiential, narrative, and analytical learning of the course into a form of responsible agency – one in which students articulate not only what futures they imagine, but what futures they choose to work toward.

6. Design Futures Process Pillar

The Design Futures process constitutes the operational pillar of the Ministry for the Future framework. As introduced in Chapter 2, the Design Futures process integrates Futures Thinking and Design Thinking into a unified framework. From Futures Thinking, it adopts the exploration of alternative futures, anticipatory capacity, and systemic awareness. From Design Thinking, it retains the divergent-convergent logic, iterative experimentation, and learning-by-doing approach. This integration expands the design space both temporally and conceptually: design is no longer confined to solving present problems but becomes a practice concerned with shaping long-term transformation.

Conceptually, the process aligns in the Horizon Scanning Phase with the expanded taxonomy of alternative futures visualised in the Voros Cone (Figure 1).

In futuring practice, time horizon can range from near-term perspectives (5-10 years) to speculative projections extending to 50 years or more. In the Ministry for the Future educational framework, a 10-year horizon is adopted. This timeframe is distant enough to allow meaningful transformation of systems, behaviours and values, yet

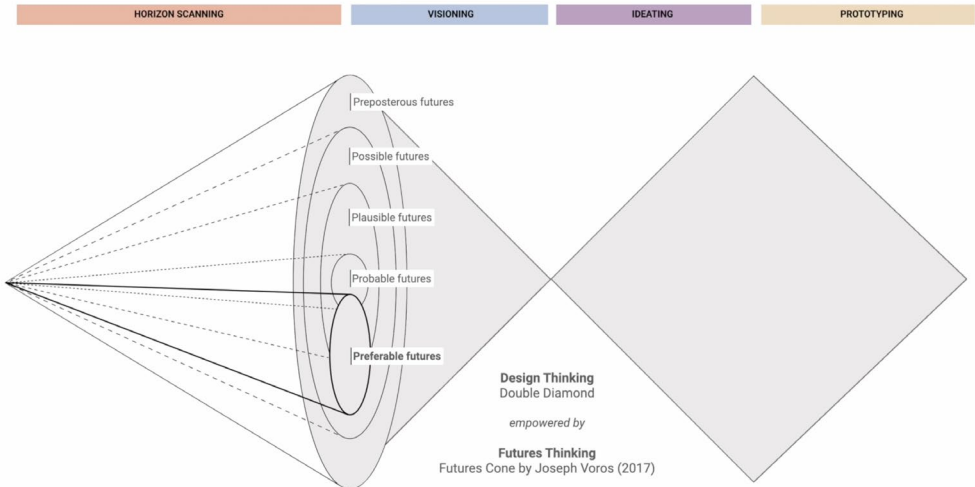


Figure 1.
Visualization of Voros
Cone integrated in the
Design Futures method.
Source: Authors, 2024.

close enough to remain grounded in current trends. For students, this balance supports both visionary thinking and grounded plausibility.

Structurally, the Design Futures process is organised into two macro-phases: Explore and Generate (Figure 2). These phases echo the logic of the Double Diamond model, while being extended through futures-oriented methodologies. The Explore phase is dedicated to understanding the present, expanding the horizon of possibilities, and building a future scenario grounded in research and imagination that articulates a coherent and meaningful vision of how a specific domain might evolve over time. The Generate phase translates this future vision into action and develops concepts, artefacts, and experiences that could inhabit the envisioned future. The process is non-linear and abductive. Students move iteratively between observation, interpretation, imagination, and creation. Across both macro-phases, collaboration is central: students, educators, external stakeholders, and AI-powered tools interact as agents within the process, contributing different forms of expertise, imagination, and interpretation. AI is integrated as a co-creative partner that supports immersion, exploration, sense-making, provocation, and communication, while keeping judgment, ethics, and meaning-making in human hands.

Both macro-phases are further subdivided into subsequent phases: Explore includes Horizon Scanning and Visioning and Generate comprises Ideating and Prototyping (Figure 3). The Explore phase

unfolds as a progression from framing, understanding and imagining, structured through Horizon Scanning and Visioning. In this phase, students move from collecting trends, weak signals, and emerging dynamics, to identifying a specific domain for exploration, to generating alternative futures and building scenarios, and finally to constructing tangible representations of a preferable future.

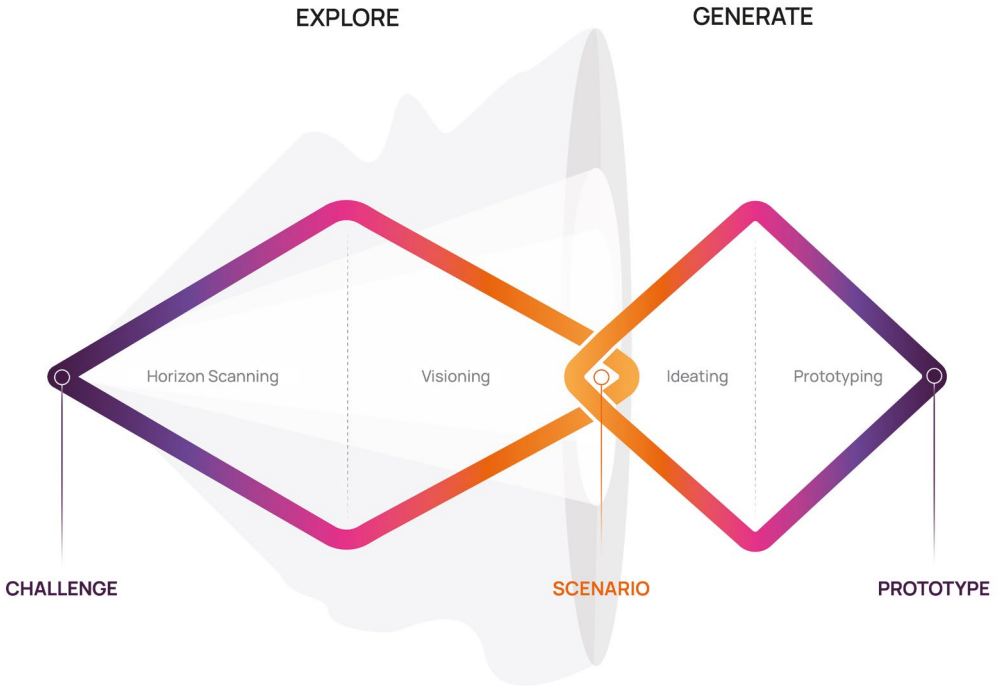


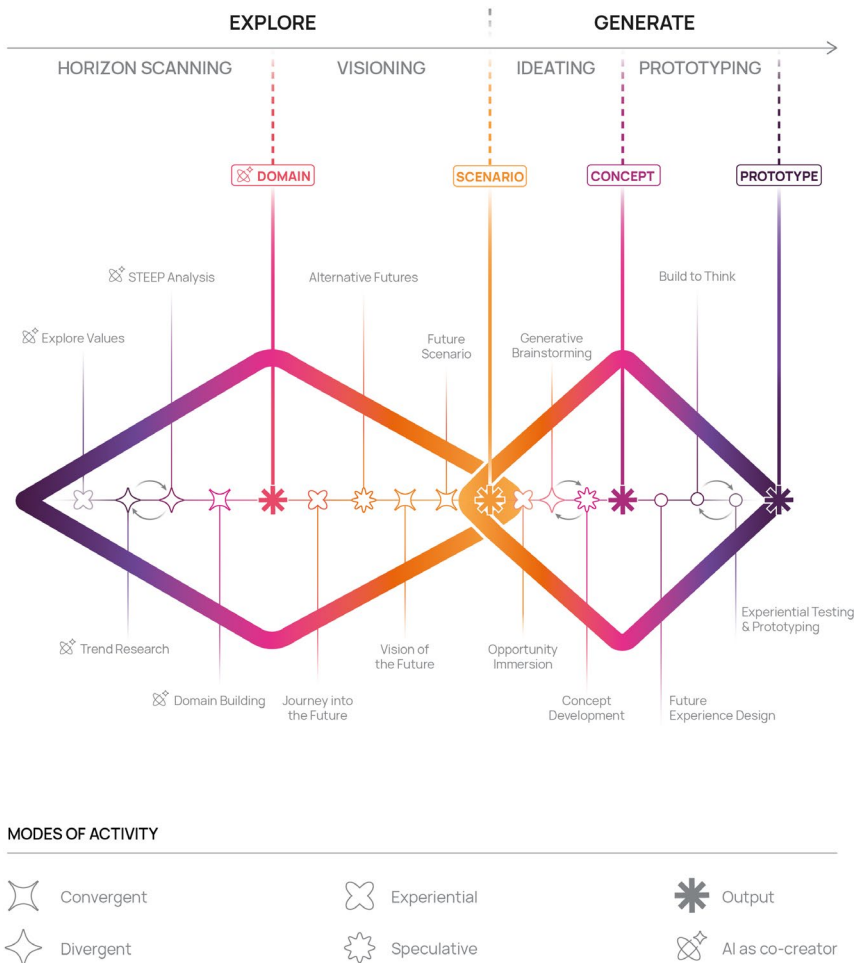
Figure 2. Design Futures process, divided into Explore and Generate phases. Source: Authors, 2023.

Horizon Scanning in the Design Futures process is structured through four interconnected methods: Explore Values, Trend Research, STEEP analysis, and Domain Building while Visioning is articulated through four interrelated activities: Explore Futures, Alternative Futures, Vision of the Future, and Future Scenario. These phases and methods are explained in detail in the following paragraphs.

The Generate phase builds directly on the future scenario developed during Explore. Its purpose is to translate speculative insight into tangible design propositions. This phase consists of Ideation and Prototyping, where Ideation focuses on generating concepts that are situated within the logic of the future scenario, ensuring that ideas

are not merely novel but coherent with the envisioned world. Through opportunity immersion, brainstorming, clustering, evaluation, and selection, teams converge on a strong concept that balances originality, feasibility, and relevance. Prototyping then enables the iterative development of this concept through tangible artefacts, speculative objects, or experiential representations. Prototyping in Design Futures is not limited to validation but serves as a reflective practice that allows continuous reinterpretation and refinement of priorities. Ideation is structured around three activities: Opportunity Immersion, Generative Brainstorming, and Concept Development, while the Prototyping phase is organised into the next three activities: Future Experience Design, Build to Think, and Experiential Testing & Prototyping.

Figure 3.
Design Futures process
with the steps and
activity. Source: Authors,
2023.



Within the Ministry for the Future educational framework, the Design Futures process has been developed and refined in the context of design education at Politecnico di Milano, with a particular focus on the Explore phase. However, the Design Futures method has also been applied and adapted in professional and organisational settings, where both Explore and Generate phases are applied (see Part III). The following paragraphs describe the theoretical background of the first phase, including the key literature and concepts, as well as collection of the tools used in the classroom.

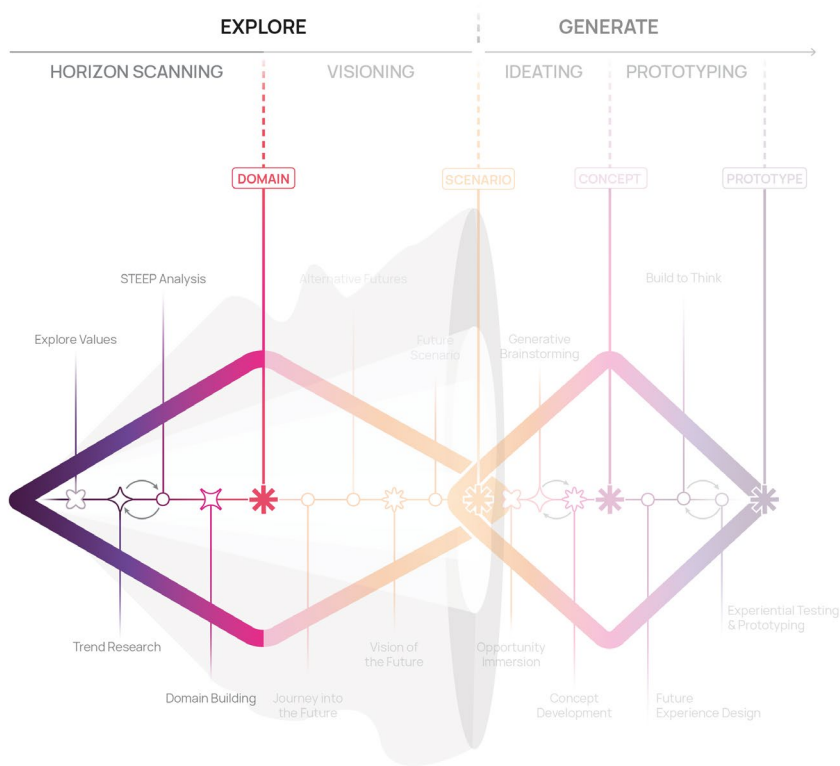
6.1 Horizon Scanning

Horizon Scanning is the first phase of the Design Futures process. It begins by establishing a shared value-based perspective on the topic and continues through the systematic observation and interpretation of signals of change that may shape the future of a specific domain. The origins of Horizon Scanning can be traced back to Ansoff's (1975) work on recognising weak signals. Since then, it has evolved into a widely used foresight practice. Van Rij (2010a) describes Horizon Scanning as the "systematic examination of potential threats, opportunities, and future developments – including those at the margins of current thinking". Crucially, it is "neither about forecasting nor fortune telling", but rather a process that supports the development of actionable insights and informed decisions. Thus, its purpose is to contribute to informed decision-making by providing a broader systemic perspective.

Horizon Scanning is not a linear search for information but an iterative and exploratory process (Palomino *et al.*, 2012). It requires continuous movement between data collection, clustering, interpretation, and reflection. Interpretation is often the most challenging step, demanding creativity, intuition, and interdisciplinary awareness (Dekoninck & Meythaler, 2019). Collaboration enhances this interpretative capacity, as diverse perspectives enrich sense-making (Könölä *et al.*, 2012). For this reason, within the Design Futures process, Horizon Scanning is typically conducted collectively, enabling teams to build shared understanding and richer interpretations. Teaching

these skills in design education today not only trains students to identify trends and signals but also develops their capacity to interpret, contextualise, and critically reflect - competencies increasingly valued in professional settings. Within the Design Futures process described in this book, Horizon Scanning unfolds through four interconnected activities (Figure 4):

- Explore Values.
- Trend Research.
- STEEP Analysis.
- Domain Building.



Explore Values acts as an entry point into the Horizon Scanning phase of the Design Futures process, helping students build a shared understanding of the topic before moving into imaginative and spec-

Figure 4. Horizon Scanning phase of the Design Futures process. Source: Authors, 2023.

ulative work. By surfacing values, assumptions, and experiences, it establishes a common interpretative lens that guides subsequent phases of exploration and scenario building. Rather than beginning with desk information, the activity is based on collective meditation and asks learners to step back and examine the values, assumptions, and experiences that shape how they understand the topic. Within the Ministry for the Future educational framework, Explore Values functions as a structured exploration across time. Inspired by experiential futures approaches developed by Candy and Dunagan (2017) and informed by speculative design practices articulated by Dunne and Raby (2013), the activity encourages students to treat the future not as an abstract endpoint but as something rooted in lived experience and present choices. The primary objective of the activity is to establish a shared conceptual framework among students by constructing a Future Compass, which captures the group's shared values, hopes, and fears related to the topic.

The Explore Values serves as the emotional and cognitive foundation of the Design Futures process, embodying a transformative learning approach (Mezirow, 2000). It helps learners reconsider their assumptions and develop a more nuanced awareness of the temporal and ethical dimensions of design. By connecting past, present, and future experiences through introspection and dialogue, students cultivate both empathy and agency, essential capacities for designing future-oriented solutions. Equally important, the activity strengthens the collective dimension of learning. Through dialogue and shared value mapping, the classroom becomes a space of collaborative meaning-making. Creativity emerges from dialogue about what matters. It bridges emotional intelligence and futures literacy, creating the conditions for students to move forward with a deeper sense of purpose, connection, and imaginative responsibility, which is required to navigate uncertainty and change.

Trend Research is a method used to identify and understand patterns of change shaping the present and influencing the future developments. It is widely applied in design, business, innovation, and futures studies to anticipate what may emerge next and to inform strategic decisions, creative practices, and policymaking. In Design

Futures, trend research functions not only as an analytical investigation but also as a creative lens. In traditional design processes, designers are expected to respond to emerging needs, which already require an understanding of the future. In Design Futures, this expectation goes further: designers are invited to anticipate and actively shape possible futures. In this context, trend research becomes a gateway into *futuring*, a structured exploration of signals and emerging patterns across multiple domains. The purpose of Trend Research is anticipation rather than prediction. Students observe and interpret the changes and developments in their selected topics. This provides a foundation for anticipating future needs, informing scenario construction, identifying opportunities for innovation, and ensuring that design outputs remain relevant and forward-looking. In the Trend Research, different types of information can be identified and analysed. These include weak signals, trends, macrotrends (or megatrends), and wild cards, all of which have the potential to influence or disrupt the status quo. Through this practice, students learn not only to “see what is coming,” but to develop a critical and creative gaze that connects present conditions with possible future transformations. Especially when working with weak signals and wild cards, creativity becomes essential. Since these signals often lack historical precedent, imagination, rather than data alone, is necessary to interpret and explore their potential implications (Könnölä *et al.*, 2012). Trend research plays several key roles within the Design Futures process:

- **Exploratory:** it expands the field of investigation by surfacing emerging directions of change that may not be immediately visible within the initial project scope.
- **Sensemaking:** it helps interpret weak and fragmented signals by connecting them into meaningful clusters, patterns, and narratives.
- **Scenario-building:** it provides the raw material for constructing possible, plausible, and preferable futures by projecting trend trajectories into scenario narratives and worldbuilding processes.
- **Design activation:** it inspires new design directions and reframes project questions by reflecting on how trends may affect the area of investigation in the future.

Trend research can be done in different modes, depending on the objective, it may involve:

- secondary desk research (scientific and industry publications, foresight reports, white papers, patents, policy briefs, trend agencies, media coverage);
- expert interviews (specialists from different domains, practitioners, stakeholders);
- Delphi or participatory methods (structured exercises to build consensus about future developments);
- observation and fieldwork (ethnography, cultural probes, scanning local practices).

STEEP analysis is a structured framework used to identify and explore external forces that shape a specific topic or domain. It invites students to examine change through five interconnected dimensions: Social (S), Technological (T), Economic (E), Environmental (E), and Political (P). By mapping insights across these areas, it becomes possible to build a more comprehensive understanding of the interactions, tensions, and dynamics, shaping the present and influencing the future of the topic.

STEEP is widely used in education, policy-making, and organizational strategy to monitor change, identify opportunities, and anticipate potential risks. Over time, several variations of the framework have emerged. For example, PESTLE adds a legal dimension (L) (UNDP, 2022), while STEEP+V introduces values (V) to highlight ethical, cultural, and moral considerations. Regardless of the variation, these models encourage learners to move beyond narrow viewpoints and to recognise the broader systemic forces that shape behaviours, systems, and global dynamics.

Within the Design Futures process, students investigate data, signals, and insights that show how these drivers are reshaping the present and how they may expand, transform, or interact in the future across the five STEEP dimensions. Macro-trends rarely produce only positive or negative consequences, their impact can generate complex and often contradictory effects, depending on context and perspective (Moesgen *et al.*, 2023). Recognising this complexity prepares students for nuanced scenario development.

Domain Building represents the convergent moment of Horizon Scanning. It comes at the end of the Horizon Scanning phase, after students have collected a diversity of trends, signals, and macro-trends during Trend Research and STEEP analysis. This is the point where the research starts to come together – students move from lots of scattered information toward a specific topic or “domain” to explore in depth. In simple terms, a domain is the central theme of a futuring activity. A domain is narrow enough to be manageable, yet broad enough to allow multiple perspectives and possible futures. A good domain gives students a clear area to explore, while leaving space for creativity and imagination. It is used to outline the boundaries for further research and design futuring process.

In strategic foresight, similar activities are called driver selection or driver mapping (Copenhagen Institute for Futures Studies, 2025b). However, in Design Futures, Domain Building is more interpretative, creative and collaborative. It is a moment where meaning is collectively constructed, what Wilner and Stein (2025) describe as a “shared mental model”.

In a nutshell, domain mapping determines what is “in” and what is “out” of the bounds of a futures exploration (Wilner and Stein, 2025). Creation of a well-defined domain is a crucial step, as in the further steps of the Design Futures process it will be the focus of imagining possible futures. Wilner and Stein (2025) note that domain mapping is often neglected in foresight research, yet it is critical. Poorly defined domains risk result in “less creative, unintentionally narrow in scope, and potentially mired in traditional, status quo thought, assumptions, and practice” (p. 2). Instead, a well-constructed domain provides a solid platform for imagination and scenario development, enabling students to explore futures with both depth and breadth.

Domain Building resonates with both approaches in design and futures studies. In *futures studies*, sense-making is positioned as a central step in foresight, where weak signals and trends are interpreted and clustered into themes that later inform future scenarios (Voros, 2003; Hines & Bishop, 2015). Horizon Scanning methodologies highlight the importance of converging research into domains of interest, ensuring thematic coherence and avoiding scattered, disconnected drivers (Cuhls *et al.*, 2015). In *design research*,

synthesis and interpretation are essential for moving from raw data to meaningful design opportunities (Kolko, 2010). From these perspectives, Domain Building is not simply organizational; it is an activity, where meaning is constructed through dialogue, interpretation, and reflection.

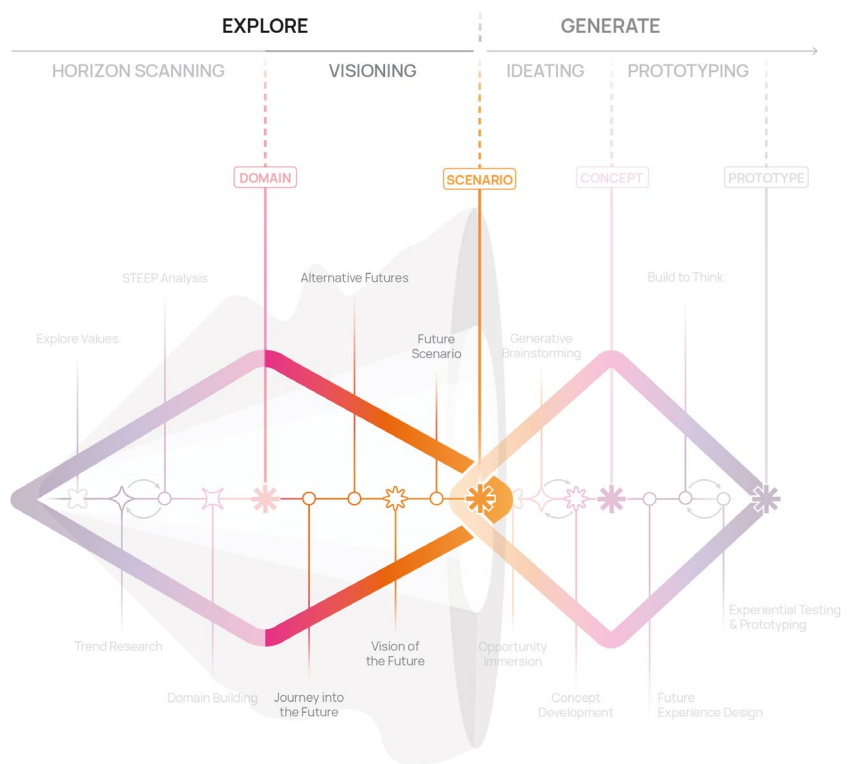
6.2 Visioning Phase

Visioning aligns with core futures studies principles that futures are indeterminate and socially constructed (Inayatullah, 2008; Voros, 2017). Its aim is not to predict a single future but to rehearse multiple possibilities generating multiple images of what the future could become. Moesgen *et al.* (2023) describe such future rehearsal as essential for building anticipatory capacity, enabling individuals and organisations to explore risks and opportunities before they materialise.

In Design Futures process, the Visioning phase provides distinctive creative and strategic value. It actively challenges existing assumptions and dominant narratives, creating space for radically different imaginaries and alternative modes of co-existence to emerge (Hines & Bishop, 2015). Rather than reinforcing present-day logics, Visioning invites students to articulate values, aspirations, and potential interventions that exceed the constraints of current systems. By situating design decisions within broader social, political, ecological, and technological contexts, this phase shifts the focus of design from immediate problem-solving toward problem-seeking, ethical reflection, and world-building practices (Dunne & Raby, 2013; Akama, 2015; Di Salvo, 2015).

Through Visioning, designers are able to identify leverage points for innovation, uncover alternative pathways that challenge dominant paradigms, and foreground the ethical, political, and ecological implications of design choices. At the same time, the process supports the co-creation of shared futures narratives that help align diverse stakeholders and communities around common visions. In doing so, Visioning becomes central for responsible innovation and future-oriented design. Within the Design Futures process described in this book, Visioning includes four activities (Figure 5):

- Journey into the Future .
- Alternative Futures.
- Vision of the Future.
- Future Scenario.



Journey into the Future marks the entry point to the Visioning phase of the Design Futures process: from analytical thinking to actively imagining alternative futures. It enables students to activate their imagination, emotional engagement, and speculative curiosity as they begin to expand their understanding of how futures may unfold. It draws on experiential futures (Candy & Dunagan, 2017), diegetic prototyping, and provotyping, where bodily, sensory, and affective modes of knowing have an equal place alongside rational analysis. By engaging senses, emotions, and embodied cognition, learners

Figure 5.
Visioning phase of the Design
Futures process. Source:
Authors, 2023.

imagine themselves inhabiting future food systems, environments, and social dynamics. Journey into the Future consists of two complementary activities:

- **A Glimpse into the Future:** an immersive, guided visualisation activity in which students imagine themselves living in a future world.
- **Food from the Future Exhibition:** a material exploration in which students design, prototype, and present speculative food artefacts that concretise and communicate alternative futures.

While the example presented here focuses on food topic, the structure can be applied to any thematic focus chosen by the educator. The key objective is not the topic itself, but the cultivation of experiential engagement with possible futures. Together, these activities cultivate the capacity to imagine, sense, and materialise futures, providing students with both emotional resonance and imaginative depth in the Visioning phase.

A Glimpse into the Future is a guided visualisation in which students are invited to imagine themselves living in a future context. The activity leverages meditation and sensory imagination, where the facilitator leads learners through a sensory exploration: What do you see? What do you hear? What does the environment smell or taste like? How do people behave? What daily rituals have changed? Importantly, imagination here is not treated as fantasy. It is framed as a cognitive tool for exploring uncertainty. By mentally “walking into” a possible future world, students temporarily suspend present-day constraints. This suspension allows them to explore unfamiliar behaviours, social norms, technologies, and cultural dynamics without immediately judging feasibility. This guided journey strengthens their ability to access a freer, more playful mode of thinking, crucial for design futures and futures literacy.

The Food from the Future Exhibition is a hands-on speculative design activity in which students collaboratively imagine and create food artefacts representing near-term (5-10 years) and long-term (50 years) futures. The exhibit is intentionally playful, sensory, and provocative. It requires students to stretch their imagination while grounding their visions in ongoing trends such as climate impacts, cultural shifts, technological development, or behavioural patterns.

Unlike traditional product design, which focuses on feasibility and practical constraints, this speculative making invites students to think in terms of futures potential. They are encouraged to design objects, dishes, rituals, and ingredients that illustrate how food might evolve under different trajectories of change. Positioned around the mid-point of the course, the exhibition acts as a creative booster, which helps students break cognitive patterns, unlock imagination, and develop visual and material languages for communicating future visions. This activity often influences and gives new input to students for the subsequent scenario building phase.

Alternative Futures activity explores the plurality of futures, including Voros' (2003) spectrum of futures (possible, plausible, probable, preferable futures), but also more speculative and disruptive ones. Alternative Futures draw directly from its definition: they create openings for imagining divergent outcomes and enable students to explore the implications of change. The practice aligns with Inayatullah's (2008) view of extending futures thinking beyond predictions towards challenging assumptions, questioning power structures, and reframing worldviews. By helping designers understand that the future is not fixed but negotiable, the activity fosters critical and creative thinking.

Alternative Futures tools designed to stimulate imagination and disrupt conventional thinking patterns. Provocative tools such as *What If Cards* and *One Day Cards* disrupt conventional thinking and act as provocations to generating shifts in assumptions and mental models and broaden participants' futures literacy (Miller, 2018). These methods resonate with speculative design (Dunne & Raby, 2013) and design fiction (Sterling, 2009), encouraging exploration beyond likelihood into possible, plausible, or even impossible futures to happen.

Vision of the Future activity involves crafting short narrative descriptions of imagined futures. These narratives help establish the foundational ideas, values, and logic of the vision of the future world vision. Vision descriptions function as what Dator (2009) calls "images of the future": generative imaginaries that reveal how people might live, what they might value, and how social, ecological, and technological systems may operate in relation to one another. They also support

collective sense-making by offering a shared language through which students can discuss and refine emerging visions. The Vision of the Future activity serves as a converging moment. It translates fragmented insights into a coherent, directional statement that frames subsequent scenario building. Within the Design Futures process, it occupies a pivotal role as the convergent counterpart to the divergent expansiveness of the Alternative Futures phase. Where Alternative Futures deliberately multiplies possibilities and suspends evaluation, Vision of the Future calls for synthesis and direction.

Narrative is central to the Vision of the Future activity, as it communicates not through data or prediction, but through the plausibility of a world imagined from within. This makes these narratives powerful tools for shared sense-making, allowing diverse stakeholders to inhabit and evaluate a possible future together rather than debating it from the outside (Ramirez & Wilkinson, 2016). As a convergent moment in the Design Futures process, the Vision of the Future activity prepares students for the analytical rigour of Scenario Building, providing the directional clarity and narrative grounding from which structured, internally consistent scenario worlds can be developed.

Future scenario mark a key transition point in which insights generated through Horizon Scanning and Visioning are synthesised into coherent, plausible, and diverse representations of the future. This phase consists of two main activities:

- **Scenario Matrix:** a structured analytical tool used to define the space of uncertainty by identifying and positioning key driving forces.
- **Scenario Worldbuilding:** an immersive and narrative-driven activity in which each scenario is developed into a rich, lived-in future world.

Scenario Matrix is used to identify two critical uncertainties derived from the Vision of the Future, forces that are both highly significant for the domain under investigation, and to plot them against one another as axes. The four resulting quadrants each represent a distinct future world, defined by a specific configuration of these uncertainties. The matrix functions as a thought experiment, compelling students to explore a wide range of implications that emerge from

different combinations of key forces, thereby resisting the tendency to focus only on the most probable or familiar trajectories.

Once the matrix is constructed, students develop each quadrant into a scenario – a named, narratively rich, and internally coherent world. A scenario is a detailed and consistent description of a possible future. Shoemaker (1998) defines it as a script-like characterisation with emphasis on causal connections and concreteness. Scenarios make intangible futures more accessible, supporting what Ramirez and Wilkinson (2016) call "strategic reframing" – the restructuring of mental models in order to perceive change differently.

Importantly, scenarios are not predictions; rather, they are thinking tools that enable the exploration of systemic behaviour and alternative trajectories (van der Heijden, 2005; UNDP, 2022).

Scenarios support futures thinking in several ways:

- *Reduce complexity*: Scenarios allow a focus on key uncertainties and their possible developments based on current trends.
- *Support structured thinking about the future*: Scenarios help define strategic directions, identify key areas for R&D, innovation, and risk mitigation, and test decisions across a range of plausible futures.
- *Initiate dialogue*: Scenarios encourage discussion of strategic issues within a shared frame of reference, helping to build a collective vision of future directions.

Scenario Worldbuilding shifts the focus toward experiential, performative, and creative exploration, examining how a future world might exist and be lived. It represents a bridge between futuring and action, enabling students to translate abstract futures into concrete representations that inform both design practice and societal imagination. Originally rooted in literature and cinema – particularly science fiction and fantasy – worldbuilding refers to the construction of coherent, immersive, and plausible alternative worlds.

In recent decades, designers, futurists, and researchers have increasingly adopted it as a methodological tool to explore complex futures, test ideas, and communicate systemic change (Bleecker, 2022; Dunne & Raby, 2013; Candy & Dunagan, 2017). Worldbuilding gives experiential form to scenarios, using designed artefacts to provoke reflection and immersion. It extends Shoemaker's (1991) and

Schwartz's (1996) scenario logic by enabling participants to interact with future worlds. The artefacts produced by students – whether material objects, spatial installations, narrative scenarios, visual maps, or performative enactments – function as what Schön (1983) calls "design experiments": externalised representations of systemic hypotheses that can be examined, critiqued, revised, and shared. Each artefact is not merely an illustration of a future world but a proposition about how that world operates – an invitation to ask what it would mean to live within it, how it would feel to inhabit its logics, and what it would take to move toward or away from it. This propositional quality aligns worldbuilding with the tradition of critical and speculative design (Dunne & Raby, 2013; DiSalvo, 2012), in which designed objects function as arguments rather than solutions to predefined problems.

One of the major strengths of worldbuilding is its capacity to support systemic thinking. Rather than analysing trends in isolation, it encourages designers to consider how technological, social, ecological, and economic factors interact within a broader ecosystem. This perspective aligns with contemporary design research emphasising complexity, interdependence, and long-term thinking (Manzini, 2015). Through worldbuilding, designers can explore how multiple forces combine to produce new cultural practices, infrastructures, and social norms.

Recent debates in design theory have expanded worldbuilding beyond anthropocentric perspectives. Scholars such as Donna Haraway (2016) and Arturo Escobar (2018) argue that future imaginaries must acknowledge the interconnectedness of humans, nonhumans, and ecosystems. In this context, worldbuilding becomes a method for imagining futures that include nonhuman actors, regenerative ecological practices, and alternative knowledge systems. This expanded scope connects worldbuilding to what Fry (2009) calls "design futuring", the practice of designing not simply for a future, but toward futures that are sustainable, just, and ecologically coherent.

Design futuring requires practitioners to consider the long-term consequences of their choices, including impacts on communities and ecosystems. Worldbuilding makes this thinking tangible by constructing futures that are ecologically situated, relationally complex, and epistemically plural. In doing so, it enables students to develop the capacity to design across an expanded field of responsibility – not

only for present users, but also for future generations, nonhuman communities, and the living systems on which all futures depend (Raworth, 2017; Escobar, 2018).

6.3 Ideating Phase

The Ideating phase marks the transition from imagining futures to designing interventions within them. Building upon the future scenarios developed during Visioning, students move from exploring what the future might look like to identifying how design can actively contribute to shaping it. Rather than generating ideas for present-day contexts, Ideation encourages students to think from within the logic of the envisioned future world, ensuring that concepts emerge from its values, dynamics, challenges, and opportunities.

Within the Design Futures process, Ideating serves as a bridge between speculative exploration and design action. It transforms future scenarios from narrative constructs into spaces for intervention, where opportunities for innovation can be identified and translated into meaningful design propositions. This shift requires students to move beyond conventional problem-solving approaches and engage in a form of future-oriented creativity that is both imaginative and situated. Concepts are not evaluated solely on their novelty, but also on their coherence with the future world they inhabit and their potential to contribute to preferable futures.

The Ideating phase retains the divergent-convergent logic characteristic of design processes. Students first immerse themselves in the future scenario to identify opportunities and generate multiple possibilities before progressively refining and developing selected concepts. Through this process, they learn to navigate ambiguity, connect futures thinking with design practice, and transform speculative insights into actionable propositions. Within the Design Futures process described in this book, Ideation is structured around four interconnected activities (Figure 6):

- Opportunity Immersion.
- Generative Brainstorming.
- Concept Development.

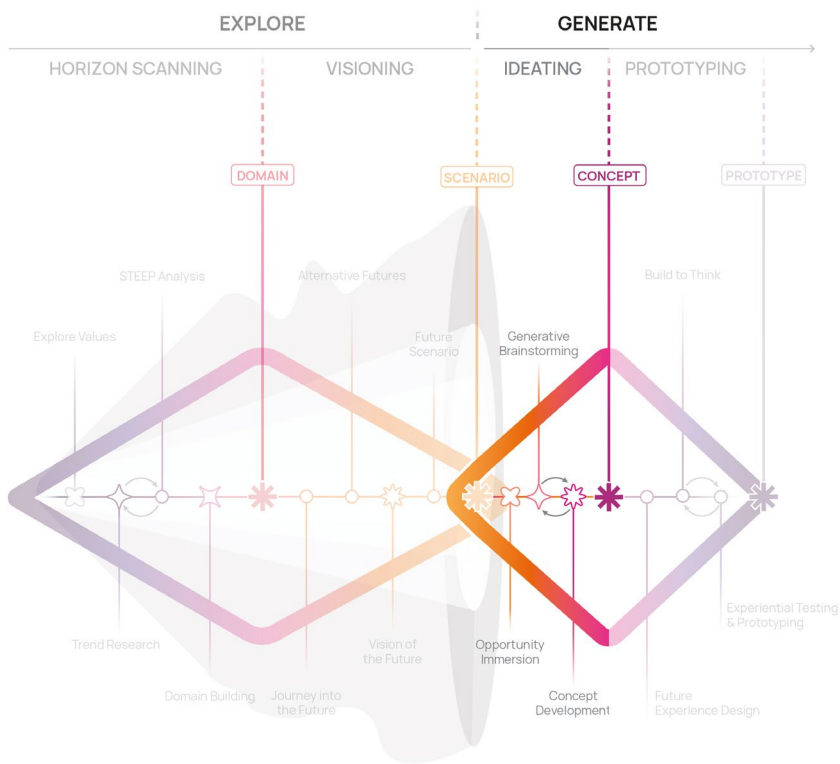


Figure 6.
Ideating phase of the
Design Futures process.
Source: Authors, 2023.

Opportunity Immersion activity allows students to return to the future world they have created, before generating concrete ideas. A brief guided immersion exercise, inspired by the meditative activities used in previous phases, reactivates the experience of “inhabiting” the scenario. Students are invited to re-enter the future world emotionally and cognitively, observing it from within and exploring the needs, tensions, and opportunities that emerge in everyday life. The aim is to identify meaningful areas for intervention where design can contribute to shaping preferable futures and to translate broad scenario insights into actionable directions for design interventions.

Generative Brainstorming activity engages students in divergent ideation to generate multiple concepts inspired by the future scenario. Rather than solving present-day problems, concepts are developed from the perspective of the envisioned future world, ensuring

coherence with students' values, dynamics, and conditions. Students are encouraged to ask questions such as: *What products, services, rituals, relationships, or experiences might exist in this world?* Through an iterative process of exploration and inspiration, students enrich their ideas by collecting reference projects, case studies, speculative examples, emerging technologies, and relevant stories. These inspirational stimuli act as creative triggers, helping students expand their thinking and develop more imaginative, future-oriented design propositions. After, students cluster ideas into affinity groups, creating visual maps that reveal patterns, relationships, and emerging themes. Rather than functioning as a simple categorization exercise, this process reflects the complexity and interconnectedness of the future scenario. Concepts are then evaluated according to criteria such as relevance, originality, impact, feasibility, and coherence with the envisioned future. Through discussion, negotiation, and synthesis, teams converge on one or more future propositions that represent meaningful interventions within the future context.

Concept Development Building upon the selected future proposition, students begin transforming an initial idea into a fully articulated design concept. This phase focuses on developing the concept in greater depth by exploring its form, functionality, technological foundations, interactions, stakeholders, and future user experience. Students define how the concept operates within the scenario world, what value it creates, and how it responds to the opportunities and challenges previously identified. Through sketches, diagrams, storyboards, system maps, AI visualisations, and design narratives, the concept progressively evolves from a speculative proposition into a coherent and detailed design solution. The objective is to create a concept that is not only desirable and innovative, but also deeply embedded in the logic, values, and conditions of the future world in which it exists.

6.4 Prototyping Phase

The Prototyping phase transforms future-oriented concepts into tangible, experiential, and discussable representations. While traditional

design processes often use prototypes primarily for validation and testing, prototyping in Design Futures serves a broader purpose. It becomes a reflective and exploratory practice through which students materialise ideas, interrogate assumptions, and deepen their understanding of the future worlds they have envisioned.

Within the Design Futures process, prototyping is closely connected to experiential futures approaches (Candy & Dunagan, 2017), which emphasise making futures tangible and accessible through direct experience. Students do not simply represent a concept; they create opportunities for others to encounter, interpret, and engage with future possibilities. Through artefacts, experiences, narratives, and immersive interactions, abstract futures become concrete, enabling reflection on their implications, desirability, and transformative potential.

The process remains iterative and reflexive. Making is understood as a form of thinking, where each prototype generates new insights that can reshape both the concept and the underlying future scenario. In this way, prototyping supports continuous learning and reinterpretation, encouraging students to critically assess how their proposals might operate within complex future contexts and how they may influence behaviours, systems, and values.

Within the Design Futures process described in this book, Prototyping is organised around four interconnected activities (Figure 7):

- Future Experience Design.
- Build to Think.
- Experiential Testing & Prototyping.

Future Experience Design activity invites students to design the experience surrounding the concept, before actually designing it physically. They explore how individuals, communities, institutions, or other actors might interact with the proposed intervention, considering behaviours, emotions, rituals, relationships, and social dynamics within the future world. This step helps students move beyond the artefact itself and focus on the lived experience it generates.

Build to Think activity encourages working with physical materials, visual representations, speculative artefacts, or experiential formats to explore and test different aspects of the concept.

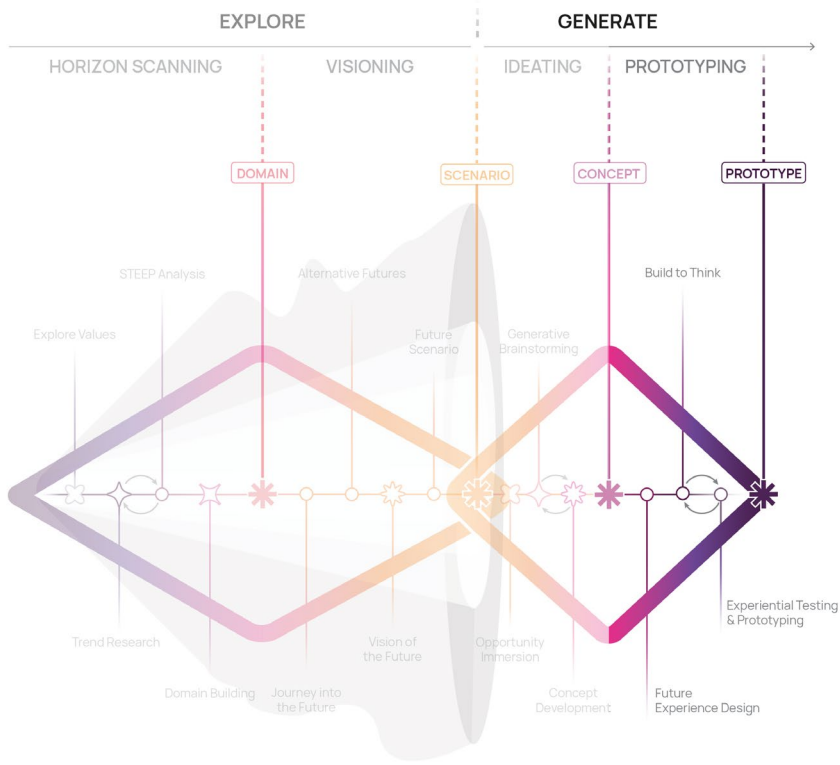


Figure 7.
Prototyping phase of the
Design Futures process.
Source: Authors, 2023.

Through the Build to Think approach, making becomes a tool for thinking: ideas are externalised, questioned, refined, and reinterpreted through material experimentation. Before developing a final prototype, students use rapid iterations and exploratory models to further develop the concept and transform it into a clearly defined design solution. The outcome of this phase is a prototype that embodies the core characteristics, interactions, and future implications of the concept.

Experiential Testing & Prototyping is an activity where the prototypes are transformed into immersive experiences. Through storytelling, exhibitions, simulations, roleplay, they make the future solution tangible and discussable, enabling others to engage directly with the proposed future. Unlike traditional testing, the objective is not only to evaluate functionality but also to explore emotional, behavioural, and social responses. Students collect reactions, interpretations, and

reflections from participants, gaining insights into how the concept is perceived, experienced, and understood within the context of the future scenario. The process concludes with a critical reflection on both the concept and the prototype. At this stage, the prototype is not simply improved but reinterpreted. Students examine what the process of making, testing, and experiencing has revealed about the future scenario, the concept itself, and the assumptions that guided its development. This step creates space for reframing priorities, reconsidering design choices, and identifying new opportunities for development. Students assess assumptions, reflect on lessons learned, and evaluate the desirability, implications, and transformative potential of their proposal. As the most reflective stage of the Generate phase, it reinforces futures literacy by connecting speculative exploration with critical and ethical evaluation, and responsible action.

PART 2

Educational Framework: From Theory to Practice

7. The Design Futures Learning Journey: from Theory to the Classroom

This chapter translates the theoretical foundations of the Ministry for the Future educational framework into a concrete learning journey that unfolds in the classroom. While previous chapters introduced the conceptual pillars of the approach, this section focuses on how those notions take shape in practice. It illustrates how futures thinking, design practice, and creativity are enacted through a structured, sequential pathway of activities that mirrors the actual progression of the course in the classroom. Rather than presenting a collection of isolated exercises, the chapter frames the Design Futures course as a step-by-step learning journey, in which each activity is positioned as part of a coherent sequence. Each activity builds upon the previous one, guiding students from an initial orientation toward the development of articulated future scenarios.

The chapter is designed as a practical guide for educators who wish to implement the Ministry for the Future framework in their own teaching contexts. For each activity, it provides practical steps of how the activity is implemented in practice, clarifying the role of the educator, the expected student engagement, and the types of outputs

produced along the way. The intention is not to prescribe a rigid sequence of steps. Instead, it provides a step-by-step narrative of how the framework has been applied in a real educational setting, offering a narrated walkthrough of the classroom process. This highlights both the pedagogical logic connecting all activities and the specific pillar – either the Ministry Storyworld or the Design Futures process – to which each activity belongs within the overall sequence. The activities described in this chapter are presented according to the two operational pillars of the Ministry for the Future educational framework: the Ministry Storyworld and the Design Futures process. These are the two pillars that educators and students work with directly, as they are translated into concrete activities, tools, and step-by-step actions implemented in the classroom. Each activity in this chapter is explicitly linked to one of these two pillars, making it immediately clear which operational dimension it activates.

The Ministry Storyworld provides the narrative, experiential, and institutional scaffolding of the learning experience. It defines the context in which students operate, assigns roles, and creates a shared storyworld that gives meaning and coherence to all activities. For educators, this pillar is essential for fostering engagement, motivation, and a sense of purpose, as it frames students not simply as learners but as active agents in a future-oriented context. Running in parallel, the Design Futures process structures how students move through the learning journey, from exploration to synthesis, from imagination to scenario building and materialisation. For educators, this pillar offers a clear sequence of phases, tools, and methods to guide students step by step, ensuring that future thinking is grounded in a rigorous and iterative design process. While the Ministry framework defines the “why” and the “who” of the experience, the Design Futures process defines the “how,” supporting facilitation, timing, and the progression of activities.

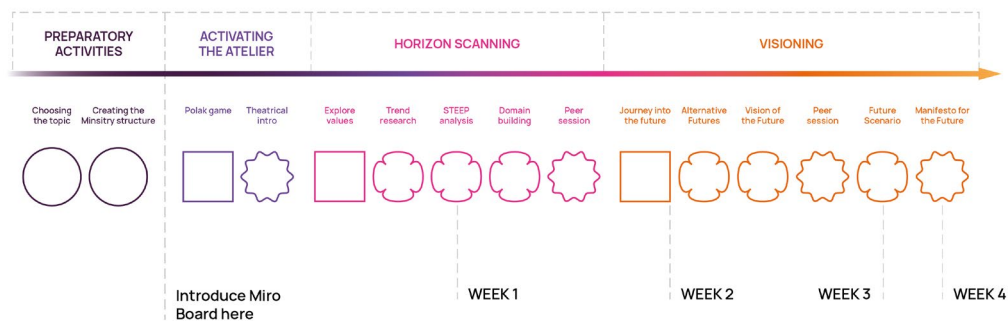
Alongside these, the Future Creativity Loop represents the third pillar of the framework, but with a different function. It is not directly translated into activities or steps that students follow. Instead, it acts as a conceptual lens and a pedagogical engine that remains in the background of the entire learning journey. It informs how the activities are experienced, facilitated, and reflected upon. As described in the

theoretical part, the Loop articulates creativity through interconnected dimensions – Creative Futures Mindset, Creative Futures Confidence, Creative Futures Teamworking, and Creative Futures Atmosphere – intertwined with the futures-oriented creative process. For this reason, while each activity in this chapter is tagged to one of the two operational pillars, the Future Creativity Loop is instead discussed within each activity's theoretical rationale, showing how its dimensions are activated in the background.

Within the activities described in this chapter, these dimensions are continuously activated and reinforced, even if not explicitly visible as standalone tasks. Each moment of the process, whether narrative, analytical, or speculative, contributes to the development of the creative capacities, shaping how students engage with uncertainty, collaborate, and imagine futures. For educators, this means that the Future Creativity Loop should not be “taught” as a separate activity, but rather used as a guiding framework to observe, design, and evaluate the learning experience. In practice, the Loop helps educators answer key pedagogical questions: *Which dimensions of creativity are being activated in this activity? How can the atmosphere support imaginative engagement? How can teamworking be strengthened? How can students build confidence in proposing future-oriented ideas?* By using the Future Creativity Loop as a reflective and design tool, educators can ensure that creativity is continuously nurtured across the entire process, rather than treated as a one-off moment. In this sense, while students primarily engage with the Ministry Storyworld and the Design Futures process, the Future Creativity Loop operates as an underlying layer that shapes how they think, collaborate, and create throughout the experience, supporting the development of futures literacy as an integrated and evolving capability.

Within this layered structure, the Futures Atelier establishes the classroom as a studio-based environment in which students work collaboratively over time, going through each phase of the Design Futures course (Figure 1). Within this space, theory is continuously translated into practice: concepts introduced by the educator are immediately tested through collective research, mapping, discussion, scenario- and world-building. The Futures Atelier allows the two operational pillars to converge in practice, while the Future Creativity Loop

continuously amplifies their impact by shaping the conditions under which learning, imagination, and anticipation unfold. It thus operates as a living laboratory for futures-oriented design, where learning unfolds through a process of doing, reflecting, and iterating.



HOW TO READ THIS MAP

- Preparatory activities by Educators
- Immersive activities
- ☆ Ministry Storyworld activities
- ⬡ Design Futures Process group activities

Overview of the Design Futures learning journey

The Design Futures learning journey begins even before classroom activities start, with a preparatory step for educators who must make two foundational decisions that shape the entire learning journey. The first is the choice of theme: the broad topic on which students will focus throughout the course. While the Design Futures course at Politecnico di Milano is built around food as its central theme, as discussed in previous chapters, the framework is fully adaptable to other domains: mobility, health, education, climate resilience, and more. The theme should be broad enough to allow multiple perspectives and systemic inquiry, yet specific enough to give focus and direction to the research and scenario-building work. The second decision is the definition of the Ministry's departmental structure. Based on the chosen theme, educators define a set of departments within the Ministry for the Future, each representing a key dimension of the topic and later becoming the working groups for students – see example from the

Figure 1.
Futures Atelier. Source:
Authors, 2024.

Ministry for the Future of Food (Figure 2). The choice of departments directly shapes the interdisciplinary perspectives students bring to their future explorations. Both decisions should be made before the first session, as they define the storyworld context that students will inhabit throughout the course.

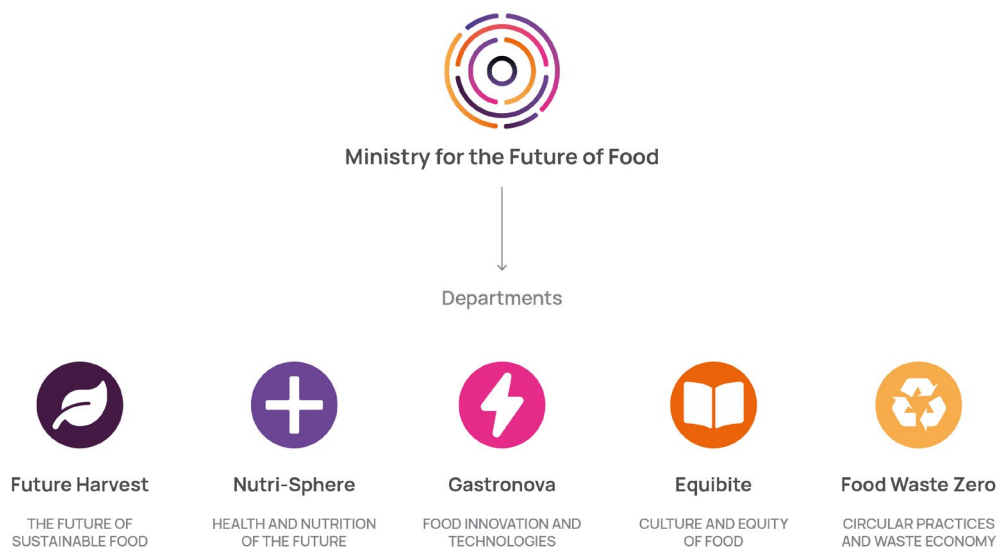


Figure 2.
The Ministry for the
Future of Food structure.
Source: Authors, 2024.

Once the course begins, the learning journey unfolds through a set of entry activities designed to prepare students cognitively, emotionally, and socially for futures thinking. The first step is the formation of groups through the Polak Game, which enables students to reflect on their orientations toward the future while also ensuring the creation of diverse and balanced teams. These teams will later correspond to the departments of the Ministry for the Future.

Following group formation, the Futures Atelier is officially activated through the Theatrical Intro, the key entry activity of the Ministry Storyworld pillar. This moment marks the transition into the immersive learning environment: students are introduced to the Ministry for the Future, assigned to their departments, and take on specific roles that they will maintain throughout the course. From this point onward, the narrative layer remains active across all activities, providing continuity, meaning, and engagement. Students operate within the Futures Atelier as collaborative foresight teams, assum-

ing roles, responsibilities, and perspectives that shape how they engage with research and speculation.

Immediately after the narrative activation, the Design Futures process begins, starting with the initial immersive phase of Explore Values, which sets the emotional and conceptual foundation for the Horizon Scanning phase. This first activity takes place within the same session, ensuring continuity between narrative immersion and analytical work. The smooth transition ensures that the emotional and imaginative energy generated by the Theatrical Intro is directly channelled into the first step of structured futures inquiry.

As the course progresses, the Future Atelier becomes the space in which the Design Futures process unfolds on a weekly basis. The activities in this phase belong to the *Design Futures process pillar* and follow a structured sequence of steps that build progressively on one another. After the initial Explore Values activity, the Horizon Scanning phase continues with Trend Research, STEEP Analysis, and Domain Building, enabling students to construct a structured and systemic understanding of the present and identify the key forces shaping possible futures. Insights gathered during this phase are visualised and organised within a shared digital workspace, allowing patterns, tensions, and emerging dynamics to surface collectively. This shared MIRO board ensures continuity across sessions and supports the accumulation of knowledge rather than fragmented outputs.

Midway through the journey, the Futures Atelier shifts toward more imaginative and speculative modes of inquiry. Through immersive and experiential activities, still anchored in the Design Futures process pillar, students explore alternative futures, experiment with scenario building and worldbuilding. These activities expand the imaginative horizon of the groups while remaining grounded in the research conducted earlier, reinforcing the iterative movement between analysis and imagination that characterises the Design Futures approach.

In the later stages of the course, the Futures Atelier supports the materialisation of futures through the creation of scenarios, narratives, and speculative artefacts. Students translate abstract insights into tangible forms, such as visual narratives, experiential installations, and manifestos of the future, which make future worlds communicable and discussable. Continuous interdepartmental

peer learning sessions and educator facilitation enable teams to refine their visions and deepen their systemic and ethical reasoning. Throughout this progression, the Future Creativity Loop remains active in the background, strengthening students' creative confidence, fostering collective imagination, and sustaining an atmosphere that facilitates experimentation and ethical reflection.

By the end of the learning journey, each group will produce a coherent future scenario, supported by narrative and artefacts that reflect the cumulative work completed in the Atelier. These outcomes are not conceived as final answers, but as situated explorations that demonstrate students' capacity to think critically, creatively, and collaboratively about long-term change. Throughout the process, the educator adopts the role of facilitator, coach, and provocateur, moving between teams to challenge assumptions, support sensemaking, and help students connect individual activities into a meaningful whole.

In the following sections, the activities are presented in the same sequence in which they are carried out in the classroom, from group formation and department setup to storyworld activation and the progressive steps of the Design Futures process, allowing educators to follow the learning journey step by step. For each activity, the connection to the relevant operational pillar is made explicit, clarifying its role within the overall process.

The description of each activity begins with a brief recap of the *theoretical rationale*, introduced earlier in the Part I, and explicitly links the activity to futures studies, experiential learning, and narrative-based pedagogy. Then, a card is provided for each activity with a "*how-to*" description for its implementation in the classroom and how educators can facilitate the process effectively. Within the card, tools and materials required to run the activity are introduced, highlighting both physical and digital resources that support its execution. Finally, *practical tips* are provided for educators to address common challenges, manage group dynamics, and facilitate future orientation of students' projects.

This book is imagined not as a standalone publication, but as the entry point to a broader educational ecosystem designed to support the teaching and implementation of Design Futures in diverse learning environments. To help educators move from theory to practice, the

book is accompanied by a set of complementary resources that transform the framework into a ready-to-use educational experience.

The first is the Ministry for the Future Educational Framework resource pack, an educator's guide that expands the concepts presented in the book into a comprehensive pedagogical system. It provides methodological guidance, implementation strategies, timing, facilitation recommendations, and practical advice for adapting the framework to different educational formats: classrooms, workshops, and collaborative learning environments.

The second is the *Miro Toolbox* (1→), a comprehensive digital resource designed to support the full learning journey. Developed and refined through years of teaching experimentation, the toolbox serves as a complete operational environment for educators, enabling them to facilitate Design Futures activities with minimal preparation while maintaining flexibility for customisation. It contains the necessary materials required to implement the course, including:

- **Introduction** to the educational pathway and course structure.
- **Resource pack** with the guidelines and activity cards.
- **Templates**, downloadable files for activities and exercises.
- **Miro Board**, designed as a collaborative workspace for students.
- **Miro board with a completed example of a group project**, demonstrating the *Ministry for the Future* framework in action.

Together, the book, the resource pack, and the Miro Toolbox form an ecosystem as a platform for empowering educators to design transformative learning experiences and equip learners with the skills needed to actively imagine and shape preferable futures.

[Link 1→](#)
MIRO Toolbox.

7.1 Activating the Futures Atelier

The Futures Atelier is the working core of the Design Futures course and represents the moment in which the educational framework is activated in practice. Once the theme and the Ministry departments have been defined, the educator's role is to set up and enable the Atelier as a studio-based learning environment in which students can work collaboratively and iteratively throughout the entire course. The Atelier should be understood not as a traditional classroom, but as

a design studio for futures practice. This requires both a spatial and a pedagogical shift. Physically, the space should be organised to support teamwork and interaction: tables arranged in clusters for each group, and vertical surfaces (walls, boards, windows) used as active thinking spaces where materials can be displayed, moved, and discussed. This setup helps make thinking visible and shared, reinforcing a transition from passive reception to active co-creation.

Once the space is configured, students begin working in stable teams that will remain consistent throughout the course. These teams function as foresight units, and, through the activation of the Ministry Storyworld, become departments within the Ministry for the Future. Each group adopts specific roles and perspectives that will guide how they interpret signals, construct scenarios, and develop future-oriented proposals. From this moment onward, the Atelier operates as a continuous, role-based design environment, where narrative immersion and analytical work evolve together.

Within this setting, the educator introduces and facilitates the Design Futures process as a sequence of interconnected activities. Each step is not assigned as homework but activated directly in the classroom: after a short methodological explanation, students immediately begin working in teams. This ensures that learning is grounded in practice and that concepts are continuously tested, discussed, and refined in real time. The role of the educator is therefore to act as a facilitator and process guide. Rather than delivering content, the educator moves between groups, observing progress, asking questions, challenging assumptions, and supporting connections across different phases of the process. This ongoing interaction helps maintain momentum and ensures that each activity builds coherently on the previous one. To support this dynamic, the Atelier should be structured around a rhythm that alternates between:

- *teamwork sessions*, where groups develop their outputs;
- *collective reflection moments*, where insights are shared and discussed;
- *peer-to-peer exchanges*, where teams present intermediate results to each other and receive feedback.

These moments of exchange are essential, allowing students to confront different perspectives, refine their ideas, and develop a

more critical and systemic understanding of the futures they are constructing. In this way, the classroom begins to mirror real-world foresight and design practices, where ideas evolve through dialogue, comparison, and iteration. The physical studio is complemented by a shared digital workspace, which is prepared in advance by the educator as a structured template of the Design Futures process, allowing students to organise research, map insights, and develop scenarios within a single, coherent environment. This shared space functions as a collective memory of the process, making the evolution of each team's work visible, traceable, and open to continuous revision.

Ultimately, the purpose of the Futures Atelier is to create the conditions in which students can learn by doing futures. Rather than studying futures as abstract concepts, they actively construct them through research, discussion, and design. Each activity becomes part of a continuous process of exploration, sensemaking, and materialisation.

For educators, enabling the Futures Atelier means designing and maintaining this environment over time: a space where collaboration, iteration, and reflection are sustained, and where students progressively develop futures literacy, creative confidence, and the ability to navigate complexity.

Implementation

1. **Configure the space as a studio:** Arrange the tables into group islands, with one island for each team, to support collaboration. The space has to support discussion, movement, and collaborative work rather than frontal teaching. Use walls and vertical surfaces as active thinking spaces where ideas can be displayed and discussed. Ensure that materials such as post-its, prints, and markers are readily available and clearly visible so that students can work fluidly and make their thinking tangible.
2. **Form the teams:** Use the Polak Game to create diverse and balanced groups that bring different perspectives together. Once the teams are formed, ask each group to select a Ministry department, which will guide their role and approach throughout the process. These teams should remain stable throughout the course, functioning as small foresight units

responsible for developing a future scenario and its associated outputs. Introduce their role as Ministry departments.

3. **Activate the Ministry Storyworld:** Run the Theatrical Intro to introduce the Ministry for the Future and establish the narrative context. Invite students to step into the storyworld by adopting roles within their departments, allowing them to engage both analytically and imaginatively with the work.
4. **Prepare the shared digital workspace:** Provide access to a shared digital workspace, such as a Miro board, structured around the Design Futures process. Introduce students to the template and explain how it will be used to collect research, document insights, visualise connections, and develop outputs throughout the course.
5. **Start the Design Futures process:** Begin with Explore Values to transition directly from narrative immersion to structured inquiry. Clarify how each subsequent activity builds on the previous one and contributes to the development of the final future scenario. For every phase of the course, present the method briefly and immediately transition into hands-on group work.
6. **Facilitate the Atelier over time:** Introduce each activity of the process step by step and activate it immediately during class time so that learning remains practice-based. Move between teams in the role of facilitator, coach, and critical interlocutor, supporting their progress, reflection, challenging assumptions and helping students connect outputs across activities. Encourage teams to prioritise iteration, dialogue and to revisit and refine previous outputs as new insights emerge.
7. **Structure the learning rhythm:** Maintain a consistent rhythm by alternating between teamwork, collective reflection, and peer review. This dynamic allows students to develop ideas, share insights, and refine their work through feedback and comparison. Encourage regular presentations of intermediate outputs to foster cross-team learning and critical discussion.
8. **Use the digital workspace as collective memory:** Ensure that all materials, decisions, and outputs are documented on

the shared board and remain visible, connected, and cumulative. The workspace should function as a collective memory of the process, making the evolution of ideas traceable and open to continuous revision.

9. **Conclude with scenario and manifesto presentations:**

Guide teams toward the production of a coherent future scenario and a Manifesto for the Future. Organise a final presentation session in which departments share their visions, strategic actions, and key insights with the wider group, encouraging reflection on both process and outcomes.

7.1.1 Polak Game

The Polak Game is the activity that opens the Futures Atelier and marks the transition from course setup to active classroom work. It provides an immediate, accessible entry point into futures thinking by inviting students to reflect on how they perceive the future and their role in it.

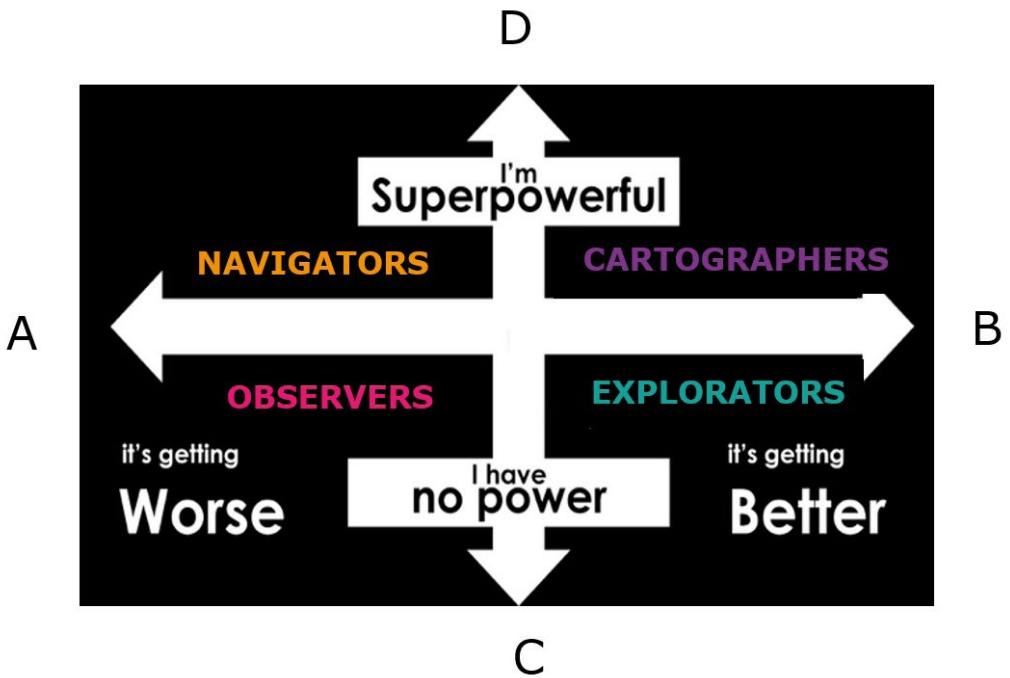
In the context of the Ministry for the Future educational framework, the activity is used in an adapted form, building on Fred Polak's concept of "Images of the future" (1973). The underlying premise is that how individuals imagine the future, whether open or closed, desirable or threatening, actionable or predetermined, shapes how they think and act in the present. Rather than approaching futures as abstract concepts, the Polak Game makes these underlying assumptions visible and discussable from the very beginning of the course.

Students are asked to position themselves along two key dimensions: their level of optimism about the future and their perceived agency in shaping it. This positioning generates four archetypal orientations: Active Optimists, Passive Optimists, Passive Pessimists, and Active Pessimists; each representing a distinct anticipatory stance shaped by differing levels of hope and perceived influence over change. In this adapted version, these archetypes are reframed using the Teach for the Future (2018) categorisation as Navigators, Cartographers, Explorers, and Observers (Figure 3). This shift avoids normative labelling and instead highlights the diversity of attitudes through which individuals interpret and engage with uncertainty and transformation. Through facilitated discussion, students begin to recognise how different worldviews influence interpretations of

change, uncertainty, and responsibility. At the same time, the Polak Game serves a crucial operational function within the Design Futures learning journey. The activity is used to compose intentionally diverse teams, combining different attitudes toward the future. These heterogeneous groups become the Ministry departments that will work together throughout the course, ensuring a plurality of perspectives in research, sensemaking, and scenario development.

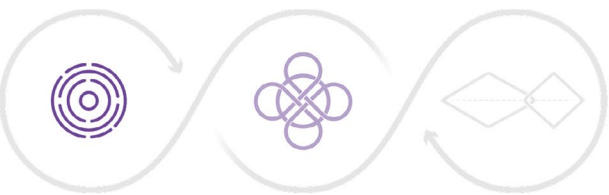
In this way, the Polak Game operates on two levels: it establishes an initial moment of individual and collective reflection, and it provides the structural foundation for collaborative work in the Futures Atelier. By making implicit assumptions explicit, the activity activates a first sense of agency and responsibility, preparing students to engage more consciously with the Design Futures process.

Figure 3.
Four quadrants of
archetypes. Source:
Authors, 2024 (adapted
from the Institute for the
Future).



POLAK GAME

Mapping images of the future
and anticipatory agency



PURPOSE

To make students' individual images of the future visible by exploring their levels of optimism or pessimism and their perceived agency in shaping the future. The activity supports self-awareness, collective reflection, and the formation of student teams with different attitudes towards the future.

ARCHETYPES PROFILE

THE OBSERVER



Observers are better able to perceive the signals of change and are the first to follow them.

THE EXPLORER



Explorers are often dreamers who try to see the best in every situation.

THE NAVIGATOR



Navigators are often confident and decisive people who always try to reduce uncertainty in every situation.

THE CARTOGRAPHER



Cartographers are often imaginative, optimistic, and natural-born leaders.



EXPERIENTIAL



TIME

30-60 minutes



TEAM

Individual reflection →
group discussion

CREATIVITY DIMENSIONS

★ Mindset

- anticipatory thinking
- futures sensemaking
- perspective expansion

● Teamworking

- empathy & perspective sensing
- shared sensemaking

● Confidence

- future agency
- future reflexivity



OUTPUT

- Mixed-archetype student teams



MATERIALS

- Polak axis
- Archetypes profile

Figure 4.
Polak Game card (description of the activity). Source: Authors, 2026.

STEPS FOR THE ACTIVITY

Introduction and framing

The room is divided into four quadrants representing different future orientations. Using the Polak Game, students position themselves according to their beliefs about the future by reflecting on two questions:

- *Will the future be better or worse?* (optimism (B) vs. pessimism (A))
- *Can I influence it?* (agency (D) vs. determinism (C))

Physical positioning in the room

After answering two questions, students identify their archetype and physically position themselves in the space according to their type (AC, AD, BC or BD). This embodied action reinforces reflection, commitment, and makes differences visible within the group.

Individual reflection

Students reflect silently on their position using prompts, suggested by the educator, such as: *Why do I feel this way about the future? What past experiences shape my view? How do I feel about my ability to influence change?*

Intra-archetype dialogue

Within each quadrant, students discuss the motivations, emotions, and experiences that informed their positioning. This step helps them articulate their worldview and recognise shared orientations.

Inter-archetype sharing

Representatives from each quadrant present their group's perspective to the whole class. This collective debrief highlights how multiple, often contrasting, images of the future coexist within the same learning community.

Formation of mixed-archetype teams

The educator introduces the four archetypes – Navigators, Explorers, Cartographers, and Observers – highlighting their strengths and complementarities. Students form teams by combining different archetypes to ensure a diversity of perspectives. This diversity enriches discussion, sensemaking, and scenario-building.

Transition to the Ministry for the Future framework

The mixed-archetype teams later become departments within the Ministry for the Future during the Theatrical Intro (see the next activity). Students are encouraged to retain awareness of their archetypal orientations as they adopt institutional roles.

TIPS FOR EDUCATORS

- Emphasise that there is no “right” position in the Polak Game.
- Encourage honesty rather than performative optimism.
- Revisit the archetypes later in the course to help students reflect on how their anticipatory stance evolves through research, scenario-building, and future artefact creation.

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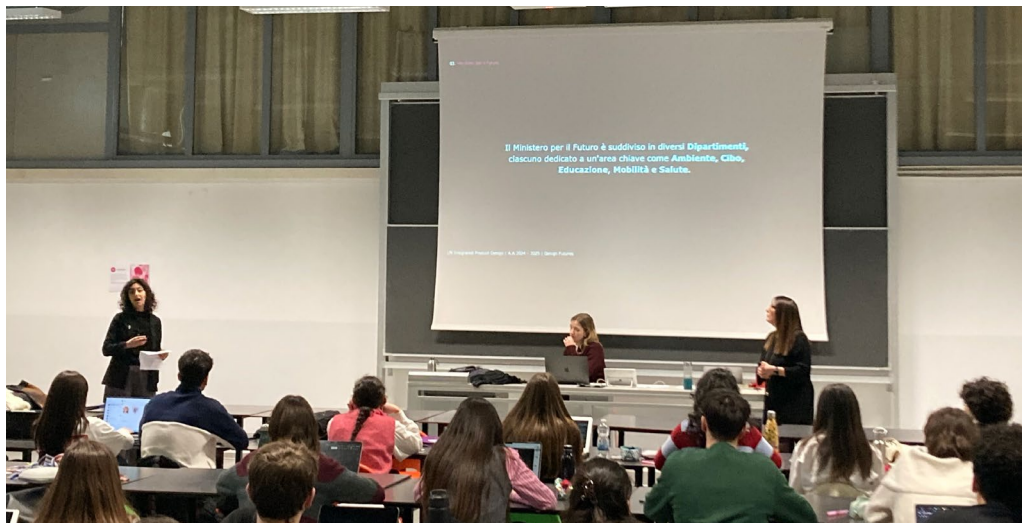
Figure 5.
Polak Game card (steps of the activity). Source: Authors, 2026.

7.1.2 The Theatrical Intro

The Theatrical Intro activates the Ministry Storyworld and marks the key beginning of the Futures Atelier. It shifts the learning experience from preparatory reflection to immersive engagement, enabling students to enter a shared narrative space in which futures thinking can be actively practised. Within the Ministry for the Future educational framework, this activity functions as a performative and experiential gateway. Through storytelling and role-play, students are no longer positioned as external observers of future scenarios, but as participants within a fictional yet plausible institutional context. This transition is essential: it allows learners to suspend present-day assumptions and engage with futures as lived, situated experiences rather than abstract projections. The activity unfolds as a staged narrative moment in which the Ministry for the Future is officially introduced. Through this performance, the classroom is reframed as a speculative governance environment, and students are invited to take on roles within newly defined departments. These roles and departments, prepared in advance by the educator, provide a structure through which students will interpret signals, construct scenarios, and propose interventions throughout the course.

This shared storyworld establishes a common frame of reference that gives coherence and meaning to all subsequent activities. By embodying roles and perspectives, students begin to engage with complexity in a more relational and situated way. The storyworld becomes a scaffold for interpretation and decision-making, supporting the development of more nuanced and multidimensional futures. At the same time, it strengthens group identity, as each team operates as a department within a larger institutional system, mirroring the interdependencies of real-world contexts. In this sense, the Theatrical Intro does not simply introduce a narrative – it creates the conditions for the Futures Atelier to function as a living laboratory, where imagination, research, and design are continuously interwoven. The Theatrical Intro unfolds through four primary phases:

- narrative entrance by the Minister;
- distribution of the Government report;
- formation of Departments and role assignment;
- role assignment within the departments.



MINISTRY FOR THE FUTURE

FutureFood Department

In response to a world marked by rapid technological change, environmental emergencies, and socio-economic uncertainty, the Presidency of the Council of Ministers of the Italian Government established the Ministry for the Future. This new governmental body was created to anticipate and govern future transformations, ensuring forward-looking policies and resilient solutions for the wellbeing of society and the planet.

Aware that **imagining the future does not mean predicting it with certainty**, but rather preparing for a plurality of possible scenarios, the Ministry has adopted a systematic and scientifically grounded approach to building the future. A **committee of experts** has identified **Design Futures** as a rigorous method that integrates analytical and creative tools, making it possible to:

- Explore alternative scenarios and identify emerging opportunities.
- Map long-term risks and socio-technological implications.
- Design solutions that respond to future needs in an equitable, ethical, and sustainable way.
- Integrate the concept of **more-than-human**, considering not only human wellbeing but also that of other species and ecosystems.

The Ministry for the Future is organized into several Departments, each dedicated to a strategic area: **Food, Health, Environment, Education, Mobility, Technology, Labour**, and many others.

CORRIERE DELLA SERA

BREAKING NEWS!



L'Italia istituisce un Ministero per il Futuro sulla scia della crisi climatica

In risposta all'escalation della crisi climatica e al suo profondo impatto sulla sicurezza alimentare, il governo italiano ha intrapreso un'azione senza precedenti istituendo un Ministero dedicato al Cibo per il Futuro. Questa mossa storica avviene in un contesto di crescenti preoccupazioni sulla sostenibilità delle pratiche agricole, sulla resilienza dei sistemi alimentari e sulla necessità di adattarsi a modelli meteorologici sempre più imprevedibili.

La decisione di creare questo nuovo ministero sottolinea l'urgente necessità di misure proattive per affrontare le molteplici sfide poste dal cambiamento climatico. L'Italia, rinomata per il suo ricco patrimonio culinario e le tradizioni agricole, si trova in prima linea in questa crisi globale, affrontando minacce ai suoi paesaggi iconici, alla biodiversità e alla produttività agricola.

Alla luce di queste sfide, l'istituzione del Ministero per l'Alimentazione per il Futuro segnala un cambio di paradigma nell'approccio italiano alla politica e alla governance alimentare.

Disordini globali: le proteste aumentano in tutto il mondo mentre i cittadini chiedono un cambiamento



I leader globali si impegnano a eliminare gradualmente la produzione di carne

In un enorme cambiamento verso la sostenibilità e la tutela ambientale, i leader delle nazioni di tutto il mondo si sono uniti in un accordo rivoluzionario per eliminare gradualmente la produzione di carne. Questo storico accordo segna un passo coraggioso verso la risposta alle sfide urgenti del cambiamento climatico, della deforestazione e della perdita di biodiversità, promuovendo al tempo stesso diete più sane e favorendo il benessere degli animali.

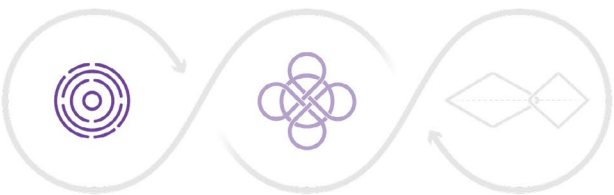
Figure 6.
Narrative entrance by the Minister at Politecnico di Milano, 2024.

Figure 7.
Government report.

Figure 8.
Speculative artefact of the news announcement of the Ministry.

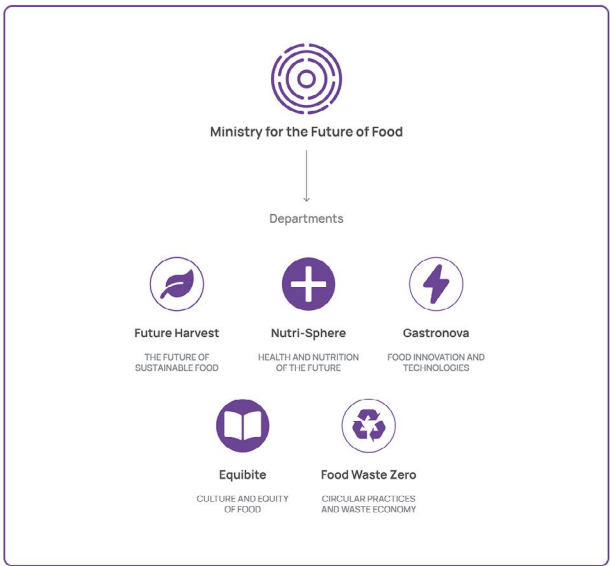
THEATRICAL INTRO

Entering the Ministry for the Future
through performative worldbuilding



PURPOSE

To immerse students in a shared speculative scenario that frames the course as a real-world response to a systemic crisis. Through performative storytelling and role-play, the activity positions students as institutional actors, activates engagement, and establishes a coherent narrative context for the Design Futures process.



EXPERIENTIAL



TIME

30-60 minutes



TEAM

Group discussion

CREATIVITY DIMENSIONS

★ Atmosphere

- positive future orientation
- emotional presence
- playful exploration
- experiential immersion

● Mindset

- futures imagination
- perspective expansion

● Teamworking

- collective imagination
- shared sensemaking
- collective agency



OUTPUT

- Shared fictional-institutional narrative
- Thematic Ministry departments with specific roles



MATERIALS

- Government report
- Minister speech script

Figure 9.
Theatrical Intro card (description of the activity). Source: Authors, 2026.

STEPS FOR THE ACTIVITY

Narrative entrance by the Minister

Using techniques from immersive theatre and live-action role-playing (LARP), a person enters the classroom “in character” as the Minister for the Future. The Minister delivers an official speech announcing the creation of a new governmental body in response to a systemic crisis (e.g. food, energy, health). In the Future of Food version, the Minister declares the formation of the Ministry for the Future of Food, highlighting the urgency of the food and climate crisis and formally appointing students as expert advisors responsible for shaping future food systems.

Distribution of the Government Report

Students receive an official-looking government dossier detailing the Ministry’s mission, values, structure, and departmental mandates. This speculative artefact anchors the narrative in credible detail, enhancing realism and enabling students to inhabit their roles more fully. Additional artefacts created by the educator (e.g. mock newspapers, press releases, etc.) may be introduced to reinforce the narrative world and strengthen the sense of institutional authenticity.

Formation of Departments and Role Assignment

Teams (previously formed through the Polak Game) select or are assigned to the Ministry departments based on their interests and competencies. Each department develops a shared identity (name and logo), and students take on specific roles (e.g. Policy Advisor, Scientist, Designer, Environmentalist). These roles shape how they engage with research, scenario work, and decision-making throughout the course.

Activation of roles

Students immediately begin acting within their roles, discussing responsibilities, challenges, and interdependencies. From this moment onward, roles are maintained across all activities. By embodying institutional roles, students engage with the politics, ethics, and long-term implications of futures-making. This marks the activation of the Futures Atelier as a continuous, role-based design environment.

TIPS FOR EDUCATORS

- Commit fully to the **performative aspect** of the introduction. The credibility of the Minister and the quality of the speculative artefacts strongly influence student engagement.
- Emphasise that the **fiction is a tool**, not a distraction: its purpose is to create a safe yet meaningful space for exploring uncertainty, power, responsibility, and systemic complexity.
- **Allow students time to transition into their roles**. The effectiveness of the activity depends not only on the performance itself, but also on the moment when students begin to inhabit the storyworld and recognise their position within it.

1

2

3

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Figure 10.
Theatrical Intro card (steps of the activity). Source: Authors, 2026.

7.2 Horizon Scanning Phase: Understanding the Present to Sense the Future

The Horizon Scanning phase is the first stage of the Design Futures process, establishing the empirical and conceptual foundation upon which all later futures-oriented activities are built. Positioned after the initial immersive and narrative entry into the Ministry for the Future educational framework, Horizon Scanning guides students through a systematic exploration of signals, trends, and contextual dynamics that shape the present and influence long-term change. It enables learners to develop a 360-degree understanding of their topic, examining it across social, technological, economic, environmental, and political dimensions while surfacing emergent developments, latent tensions, and systemic interdependencies.

The phase begins with the Explore Values activity, where students engage with the chosen theme across multiple temporal dimensions – past, present, and future – through a guided and immersive experience. It is followed by an analytical activity – Trend Research, in which students explore academic publications, news sources, reports, social media signals, thematic databases, and experimental techniques such as roleplaying different stakeholders or non-human actors.

Through this exploration, learners identify weak signals, emerging behaviours, technological shifts, cultural changes, and global drivers shaping their topic. Building upon this exploratory inquiry, students conduct a STEEP Analysis, systematically organising signals into Social, Technological, Economic, Environmental, and Political dimensions helping to uncover interconnections within the analysed context.

The phase culminates in Domain Building, an integrative activity in which students cluster the signals, trends, and drivers they have collected into meaningful domains of change. These domains represent thematic constellations, such as “Food as Memory” or “Multisensory Gastronomy” which define the conceptual landscape for subsequent visioning phase. Throughout the Horizon Scanning phase specific dimensions and factors of the Future Creativity Loop are activated and demonstrated in Table 1.

Implementation

1. **Introduction to the Horizon Scanning Approach:** educators present the aims and structure of the phase, introducing the four core activities and explaining how they support the development of future scenarios.
2. **Explore Values Activity:** educators run the first activity by playing the meditative audio and let students immerse in the reflective meditation. After, the students discuss their insights and emerged reflections and create a shared Future Compass.
3. **Trend Research Exploration:** students independently and collaboratively gather signals and trends from multiple sources. Educators encourage the use of both classical methods (academic research, databases, foresight reports) and experimental ones (persona prompting with AI, alternative viewpoints). Findings are uploaded to the shared digital board, organised with short interpretive notes.
4. **STEEP Analysis Mapping:** teams reorganise their collected signals into STEEP categories and enrich them to broaden the knowledge. Facilitators guide students to identify cross-domain relationships, tensions, contradictions, and early patterns emerging from the analysis.
5. **Collective Sensemaking Discussion:** groups engage in dialogue to interpret STEEP maps, surface key insights, and debate which developments may have the strongest implications for the future.
6. **Domain Building Synthesis:** students cluster signals and drivers into emergent thematic domains that will guide subsequent work. Domains are labelled, described, and visually represented through trends, images, keywords, and interpretive summaries.
7. **Interdepartamental Peer Sessions:** groups engage in dialogue to discuss intermediate outputs, such as STEEP maps and Domains to surface any questions, doubts and suggestions from their peers, acting as the department of the Ministry for the Future. Educators should plan these sessions ahead and ask students to be prepared.

8. **Documentation on the Shared Digital Workspace:** all findings, maps, and insights are documented on the Miro board (or another digital space) for future reference during Visioning phase. Educators also use this digital shared space for evaluation of the students' work at the end of the course.
9. **Review and Feedback:** groups present their domains and receive feedback from peers and educators, refining their conceptual frameworks before advancing into the Visioning Phase.

Table 1.
Future Creativity Loop dimensions and factors activated in the Horizon Scanning phase.

Main FCL dimension(s) and factors	Theoretical Connection and Explanation
Creative Futures Mindset → anticipatory thinking → futures sensemaking → futures imagination → perspective expansion Creative Futures Teamworking → shared sensemaking → collective imagination → empathy & perspective sensing → collective agency Creative Futures Atmosphere → positive future orientation → emotional presence → experiential immersion Creative Futures Confidence → adaptive perseverance → future agency	The Horizon Scanning phase primarily activates the Creative Futures Mindset by developing learners' capacity to interpret the present as a source of future possibilities. Beginning with Explore Values and continuing through Trend Research, STEEP Analysis, and Domain Building, students engage in a progressive process of anticipation that moves from personal reflection and value exploration to the identification of signals, interpretation of trends, and construction of coherent domains for future inquiry. This process strengthens anticipatory thinking, futures sensemaking, futures imagination, and perspective expansion, enabling learners to recognise emerging patterns, understand systemic interdependencies, and explore how current developments may shape multiple future trajectories. The phase also strongly activates Creative Futures Teamworking. Throughout the activities, students continuously negotiate meanings, compare interpretations, and co-construct shared understandings of complex systems and future possibilities. Through collective reflection, trend interpretation, STEEP mapping, and domain definition, teams develop shared sensemaking, collective imagination, empathy and perspective sensing, and collective agency. These collaborative processes progressively align values, assumptions, and strategic directions, creating a common foundation for subsequent futures exploration. Horizon Scanning additionally supports Creative Futures Atmosphere, particularly through Explore Values, which establishes an emotionally safe and reflective environment for futures inquiry. Through guided immersion, dialogue, and value-based reflection, learners develop positive future orientation, emotional presence, and experiential engagement with the future. This emotional grounding helps students connect with futures not only analytically but also affectively, creating the conditions for deeper engagement throughout the process. Finally, the phase contributes to the development of Creative Futures Confidence, particularly through adaptive perseverance and future agency. Working with ambiguity, incomplete information, and emerging signals requires learners to tolerate uncertainty and continuously refine their interpretations. As students progressively transform dispersed observations into meaningful insights and shared domains, they gain confidence in their capacity to navigate complexity and actively contribute to futures-oriented inquiry. Horizon Scanning becomes a bridge between reflection, observation, and anticipation. Rather than simply gathering information, learners develop the emotional, cognitive, collaborative, and interpretative capacities required to construct informed and meaningful visions of the future.

7.2.1 Explore Values

The Explore Values activity is the first step of the Design Futures process in which the course transitions into design-oriented exploration. While the previous activities established the narrative context and collaborative structure of the Futures Atelier, Explore Values introduces the first intentional design move – grounding future exploration in shared values of the students.

As discussed in the theoretical framework, the Design Futures process integrates Futures Thinking and Design Thinking, combining anticipatory inquiry with creative, people and planet-centred design practice, enabling students to explore multiple preferable futures through a structured yet iterative sequence of activities. Explore Values initiates this process by establishing a value-driven foundation that will orient all subsequent phases.

Within this approach, futures are not treated as neutral or purely analytical constructs. They are shaped by beliefs, assumptions, and normative orientations. For this reason, Explore Values translates this principle into practice by enabling students to surface, articulate, and align their values before engaging in research and scenario construction.

The activity invites students to engage with the chosen theme across multiple temporal dimensions – past, present, and future – through an immersive experience. By revisiting memories, analysing current conditions, and imagining future possibilities, students begin to recognise how their perspectives are shaped over time. Through collective dialogue, teams translate individual insights into a shared set of guiding values, which are materialised in a Future Compass. This output functions as a design orientation tool, supporting coherence and intentionality throughout the Design Futures process.

In this sense, Explore Values establishes the starting point of the Design Futures process by connecting anticipation with intention. It ensures that the futures students will explore are not only analytically grounded, but also ethically and creatively oriented.

The Explore Values comprises two interrelated sub-activities:

- **Emotional Journey** – designed to surface and synthesize individual and collective values through guided introspection;
- **Future Compass** – facilitating the articulation of shared hopes and fears that orient the group's subsequent explorations.

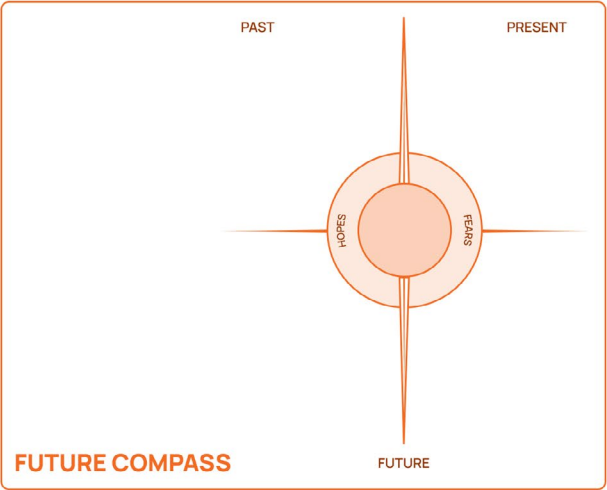
EXPLORE VALUES

From emotional immersion to shared values:
grounding futures in what matters



PURPOSE

To support students in exploring a shared topic through an emotional and temporal immersion, and to translate these insights into a collective set of guiding values. The activity moves from intuitive and affective exploration (past, present, future) to a structured visual synthesis (Future Compass), creating a shared foundation that orients all subsequent futures thinking and design work.



EXPERIENTIAL



TIME

30-60 minutes



TEAM

Individual reflection →
group discussion

CREATIVITY DIMENSIONS

★ Atmosphere

- positive future orientation
- emotional presence
- playful exploration
- experiential immersion

● Mindset

- futures sensemaking

● Teamworking

- empathy & perspective sensing
- shared sensemaking
- collective imagination



OUTPUT

- Future Compass



MATERIALS

- Meditation audio track
- Meditation script
- Future Compass template

Figure 11.
Explore Values card (description of the activity). Source: Authors, 2026.

STEPS FOR THE ACTIVITY

Immersive Emotional Journey

The educator guides students through an audio-based reflective journey designed to support deep immersion into the topic of focus (e.g. food).

Participants are invited to move across three temporal dimensions:

- **Past** – recalling personal and collective memories, traditions, and experiences that shaped their understanding of the topic;
- **Present** – recognising current conditions, tensions, biases, and challenges;
- **Future** – imagining hopes, fears, and desired directions for changes in the topic.

Collective sharing and sensemaking

Following the immersion, students engage in an open group discussion to share impressions, emotions, and insights that emerged during the journey. The dialogue highlights recurring patterns, contrasts, and shared concerns, fostering empathy and enabling the first layer of collective sensemaking.

Introduction to the Future Compass

The educator introduces the Future Compass as a tool for translating emotional insights into shared values and emphasizing its role as a navigational artefact that will guide the Design Futures process.

Collective mapping of values

Building on the previous discussion, students collaboratively identify and map key values, hopes, and fears onto the Future Compass. Through dialogue and negotiation, individual perspectives are synthesised into a shared visual framework that represents what the group considers important for the future. The Future Compass becomes a living reference that supports coherence between values, visions, and future scenarios throughout the course.

TIPS FOR EDUCATORS

- **Create a calm, safe, and quiet environment** for the immersion. Allow moments of silence during and after the audio journey to support deeper reflection.
- Emphasise that there are no "right" or "wrong" emotions, this is a space for openness and exploration.
- **Encourage dialogue when building the Future Compass**: differences are valuable and should be made visible. Remind students to revisit the Future Compass during later phases (e.g. *scenario building, artefact development*) to evaluate coherence with their shared values.

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Figure 12.
Explore Values card (steps of the activity). Source: Authors, 2026.

7.2.2 Trend research

Trend Research is the first hands-on activity in the Horizon Scanning phase of the Design Futures process. Its purpose is to map emerging change by identifying signals, trends, macro-trends, and potential disruptions in a specific topic. Rather than analysing the future in abstract terms, students work directly with real-world evidence to understand how change is already taking shape.

In this activity, students practice anticipation: they learn how to read the present with a future-oriented lens. The focus is on recognising that futures are not sudden or distant events, but processes that begin in the margins – through weak signals, early experiments, niche practices, and subtle shifts in behaviour, technology, or culture. By identifying and interpreting these early indicators, students explore how current conditions and decisions can influence future outcomes. Students are tasked with collecting, documenting, and interpreting different types of change signals, including:

- **Weak signal** is an early sign of change or an emerging phenomenon that might have an impact in the future (Hiltunen, 2010), or a disruptive effect on the status quo. They may seem marginal, but with time they can grow into significant shifts.
- **Trend** is a direction of change that has already started and persist over time (Evans, 2004). It is often formed by the convergence of multiple weak signals and usually responds to human needs (Future Today Institute, 2020).
- **Macrotrends (or megatrends)** are broader, structural forces that operate on a global scale and across decades – such as climate change, demographic shifts, or AI-driven automation.
- **Wild card** is an unpredictable event with low probability but high impact, capable of radically disrupting systems (Sytnik and Proskuryakova, 2024).

The outcome of Trend Research is not a static list of trends, but a shared knowledge base that supports collective sensemaking during the whole Design Futures process. This material becomes the foundation for subsequent activities in Horizon Scanning, enabling students to move from observation to interpretation and, ultimately, to informed future exploration. In an educational setting, there is no single “right” way to do trend research. The choice of the method de-

depends on the available resources, time frame, team composition, and learning objectives. In the Design Futures course, two approaches have proven particularly effective doing trend research – *exploratory trend research* and *role-based trend research*. Both techniques support the development of futures literacy, but they emphasize different skills: open exploration vs. perspective-driven analysis. These are two techniques which educators can suggest students to use and support them by providing tailored suggestions and help.

In this activity, the research process is supported by the use of generative AI (GenAI) as a co-creative tool. Rather than replacing critical thinking, GenAI is used to help students broaden their search, surface unexpected connections, and open up perspectives that might not emerge through traditional desk research alone.

To support this, students are provided with a curated set of prompt templates designed to guide their interaction with GenAI tools at different stages of the research. These prompts are structured around three types of inquiry: identifying *signals* (early, marginal indicators of change), *trends* (directions of change already underway), and *emerging behaviours* (new practices or attitudes taking shape in specific communities or contexts).

A distinctive feature of this AI-supported approach is the use of *perspective-driven prompting*. Students are encouraged to frame their questions not only from a neutral or general standpoint, but by adopting specific points of view, such as a farmer, a chef, an urban planner, or a policymaker. Going further, students can also explore *non-human perspectives*, imagining how an animal, a plant, a forest, a microbe, an AI system, or an ecosystem might “observe” and respond to the changes under investigation. This technique helps students defamiliarise familiar topics, challenge anthropocentric assumptions, and generate more diverse and imaginative signal sets.

The prompt framework also invites students to probe deeper by asking contextual questions, such as *Why is this trend emerging now?* or *What is driving this change?*, as well as action-oriented questions like *How can individuals or communities support this emerging trend?* These prompts encourage students to move beyond listing phenomena and begin interpreting their underlying dynamics. Used in this way, GenAI becomes a thinking partner in the early stages

Figure 14.
Trend card created by
students.

of Horizon Scanning – one that can rapidly surface a wide range of signals, stimulate lateral thinking, and help students approach their topic from multiple angles before they engage with more structured analysis.

↓ TREND TITLE

The Digitization of Nature



↓ Brief description of the trend

The trend in which nature is no longer observed solely through human field surveys, but is continuously monitored in a distributed and data-driven manner using technologies such as bioacoustics, eDNA, remote sensing, IoT sensors, robotics, and AI. In practice, ecosystems, species, and habitats become “sensing environments” that generate data that can be interpreted almost in real time.

We are shifting from an episodic, human-centered approach to monitoring to one of constant listening for biological and environmental signals, which is useful for detecting biodiversity, ecological stress, the presence of species, seasonal changes, and disturbances invisible to the human eye.

↓ Relevance

- It highlights the multispecies networks behind food;
- It transforms the ecosystem into narrative information;
- It shifts gastronomy from an anthropocentric experience to a relational one;
- It enables new forms of awareness, design, and care within food systems.

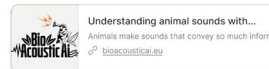
↓ Potential

The main potential lies in the fact that the digitization of nature provides a means of translating feedback on the behaviors and existence of other species, making it intelligible to humans.

↓ Sources

<https://www.ajeonline.org/content/73/2/93>

<https://undark.org/2020/03/11/environmental-dna-asian-carp/>



SOCIAL

TECHNOLOGICAL

ECONOMIC

ENVIROMENTAL

POLITICAL



EXPLORATORY TREND RESEARCH

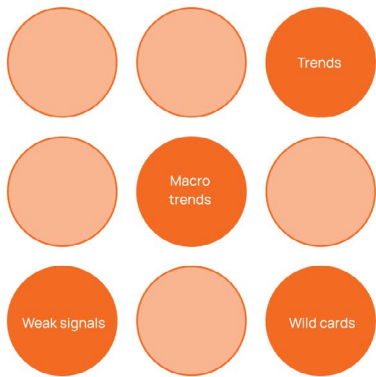
Open exploration to discover emerging signals and patterns



PURPOSE

To explore a specific topic broadly and identify emerging trends, signals of change, both strong and weak, and unexpected patterns that could influence possible futures of the topic through open, curiosity-driven research.

MAPPING TRENDS



DIVERGENT



TIME

From 1-2 hours
to 1-2 months



TEAM

Individual search →
group collaboration

CREATIVITY DIMENSIONS

★ Mindset

- anticipatory thinking
- futures sensemaking
- futures imagination
- perspective expansion

● Confidence

- future agency
- adaptive perseverance

● Teamworking

- empathy & perspective sensing
- shared sensemaking



OUTPUT

- Trend cards;
- 3-6 thematic clusters;
- Initial interpretations and future implications.



MATERIALS

- Trend card
- Trend sources
- AI co-creator in Trend Research

Figure 15.

Exploratory Trend Research card (description of the activity). Source: Authors, 2026.

STEPS FOR THE ACTIVITY

Search

Students independently explore a broad topic through diverse sources (reports, articles, scientific research, blogs, art projects, social media, start-ups, cultural movements, and everyday practices), collecting as many relevant signals, trends, and case studies as possible. The goal is diversity, and the strength lies in the richness and variety of the stimuli gathered, which bring multiple perspectives into the process. Students are encouraged to look beyond obvious or mainstream developments and pay attention to unexpected, marginal, or provocative phenomena that may indicate future transformations.

1

Cluster

Collected trends and signals are grouped into thematic clusters based on similarities, shared drivers, or emerging narratives. Clustering helps students move from fragmented observations toward broader patterns of change and early forms of sensemaking. Clusters should remain provisional and open to evolution as new insights emerge.

Each cluster should include:

- **Title** – a short and clear name that captures its essence
- **Description** – a brief narrative explaining the meaning of the cluster, its significance today, and its potential future implications
- **Case studies** – concrete examples (start-ups, policies, cultural practices, scientific discoveries, patents, etc.)

2

Interpret

Groups reflect on what the clusters might mean for the future by critically discussing their implications, contradictions, and possible evolutions. Students have to enrich the interpretation through: critical questions (*e.g. What forces could accelerate or slow down this trend? Who benefits from it? Who might be excluded?*), provocations (*e.g. What if this trend evolves in the opposite direction? What if it becomes dominant?*), quotes or references (from experts, reports, books, or cultural artefacts) and early hypotheses.

3

TIPS FOR EDUCATORS

- Encourage students to avoid “safe” or obvious trends. Quantity matters more than accuracy at first. Clusters should remain flexible and open to change as new insights emerge.
- Students should feel free to explore contradictory, ambiguous, or unusual signals without immediately trying to validate them. Encourage iterative re-clustering throughout the process.
- To cluster, ask students questions such as: *What do these trends have in common? What underlying change or driver connects them? Do they reflect a larger transformation in society, technology, or culture? What future possibilities or risks might emerge from this cluster?*

Figure 16.
Exploratory Trend Research card (steps of the activity). Source: Authors, 2026.

ROLE-BASED TREND RESEARCH

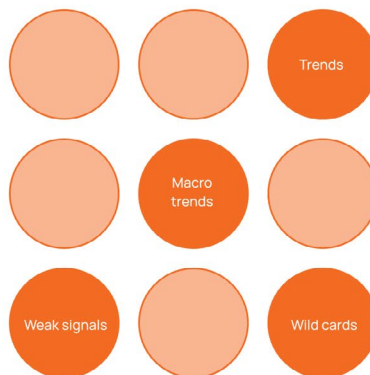
Exploring trends through the lens of specific roles



PURPOSE

To collect trends and signals by each student through the lenses of their specific role, enabling them to observe and interpret emerging trends through diverse lenses. This approach fosters systems thinking, interdependence awareness, and insight into how changes in one domain influence others.

MAPPING TRENDS



DIVERGENT



TIME

From 1-2 hours
to 1-2 months



TEAM

Individual search →
group collaboration

CREATIVITY DIMENSIONS

★ Mindset

- anticipatory thinking
- futures sensemaking
- futures imagination
- perspective expansion

● Confidence

- future agency
- adaptive perseverance

● Teamworking

- empathy & perspective sensing
- shared sensemaking



OUTPUT

- Trend cards;
- 3-6 thematic clusters;
- Initial interpretations and future implications.



MATERIALS

- Trend card
- Trend sources
- AI co-creator in Trend Research

Figure 17.

Role-based Trend Research card (description of the activity). Source: Authors, 2026.

STEPS FOR THE ACTIVITY

Scanning through the lenses of the roles

Each student conducts trend research through the perspective of their assigned role, whether linked to a Ministry department or representing a specific stakeholder, expertise, or non-human entity (e.g., *Designer, Biologist, Policy-maker, AI system, Forest, Microbe*). Students explore signals, weak signals, and emerging trends while considering how their role would perceive and respond to these changes. This approach encourages perspective expansion and helps participants engage with the system through different values, priorities, and viewpoints.

1

Clustering

After individual research, students share the trends and signals identified through their roles. Together, they organise them into thematic clusters that combine insights from multiple perspectives, highlighting recurring themes, systemic drivers, and emerging narratives. Unlike exploratory clustering, however, these clusters intentionally combine perspectives coming from different roles and viewpoints. This allows students to recognise how the same phenomenon may be interpreted differently depending on social position, expertise, values, or even species perspective.. Each cluster should include:

- **Title** – a short name capturing the core dynamic
- **Description** – a brief explanation of the cluster and its future implications
- **Role perspectives** – how different roles interpret or relate to the cluster
- **Case studies** – examples, references, or relevant signals

2

Interpretation based on roles

Students interpret the clusters while remaining grounded in their assigned perspectives. This phase encourages dialogue, comparison, and negotiation between viewpoints, helping students uncover systemic interdependencies, conflicts, and opportunities. Each student reflects on questions such as: *How does this cluster affect my role? How might my role contribute to or resist this transformation? How does it impact other actors or entities in the system? What tensions or synergies emerge between perspectives?* This discussion highlights interdependencies, potential conflicts, and opportunities, strengthening systems thinking and preparing students for scenario-building and cross-domain collaboration.

3

TIPS FOR EDUCATORS

- Encourage students to **fully embrace their roles**, especially when working with non-human or unconventional perspectives.
- **Focus on perspective expansion, empathy, curiosity, and open dialogue** rather than finding “correct” answers.
- **Keep clusters flexible and iterative**, allowing new connections and emerging patterns to develop throughout the activity.

Figure 18.
Role-based Trend Research card (steps of the activity). Source: Authors, 2026.

7.2.3 STEEP Analysis

While Trend Research opens up the field of exploration, STEEP Analysis brings structure and systemic focus. It is a practical framework used to examine the external forces shaping a specific topic or domain by organising signals of change across five interconnected dimensions: Social, Technological, Economic, Environmental, and Political.

The purpose of STEEP Analysis is to help students move from fragmented observations to systems thinking. Instead of treating trends as isolated phenomena, students use the framework to identify relationships, contradictions, and feedback loops. They begin to see how a shift in one dimension, such as technological innovation or policy change, can trigger ripple effects across social behaviours, economic models, or environmental conditions.

In practice, students begin by taking the signals, trends, and disruptions identified during Trend Research and organising them across the five STEEP categories. However, this is not simply a remapping activity. The STEEP framework also becomes a lens for deepening and expanding the research itself: students are encouraged to investigate dimensions that remain underexplored, seek out new evidence, and actively look for connections that were not visible during the initial phase of horizon scanning.

This process of structured inquiry prompts comparison, discussion, and reinterpretation of the material, pushing students to move beyond surface-level observations. By exploring how societal values, technologies, markets, ecosystems, and governance structures interact and influence one another, they begin to uncover the deeper dynamics and interdependencies that shape possible future trajectories.

The goal of the activity is not to produce a definitive or “correct” analysis. Instead, STEEP Analysis generates a shared interpretative map that makes systemic dynamics visible. It highlights emerging tensions, areas of uncertainty, and potential leverage points where design intervention or strategic action could have a meaningful impact. Variations of the framework, such as PESTLE or STEEP+V, may be introduced to foreground ethical, cultural, or value-based dimensions within the analysis.

Within the Design Futures course, STEEP Analysis is typically approached in two complementary ways – *Topic-based STEEP Analysis*

and *Trend-based STEEP Analysis*. Both support systemic thinking but serve different purposes. Topic-based approach is used to analyse a well-defined broad theme (e.g. Food as Medicine, Food Waste, or Future of Universities), while Trend-based approach is used to analyse separate trends or cluster of trends (e.g. AI application in restaurants, Multisensory Gastronomy) through the STEEP categories. Both techniques are efficient when supported by visual mapping, which can be done either in circular shape (STEEP Wheel) or linear shape (STEEP Matrix). These visual formats encourage the exploration of relationships and interdependencies between forces of change, working particularly well in collaborative workshops and group discussions.

As with Trend Research, GenAI serves as a co-creative tool to support and enrich the STEEP Analysis process. Students are provided with a set of prompt templates designed to guide their use of AI at different stages of the analysis. These prompts are structured around two main types of question. The first focuses on *exploring the external context*: students can ask GenAI to apply the full STEEP framework to a given topic, surfacing signals, behaviours, recurring patterns, and developments across all five dimensions simultaneously. Alternatively, they can zoom into a specific STEEP area to explore it in greater depth, asking for a more detailed account of, for example, the social or technological forces at play around a particular macrotrend.

The second type of inquiry focuses on *exploring impacts*, both positive and negative, that external factors may have on a chosen topic or trend. Here, the perspective-driven prompting approach introduced in Trend Research is extended further: students are encouraged to frame their queries from the viewpoint of specific human stakeholders (such as a farmer, a policymaker, or an entrepreneur) or non-human actors (such as an ecosystem or a species affected by the changes under analysis). This technique helps students uncover a wider range of implications and challenges assumptions that might otherwise go unquestioned.

Used in this way, GenAI supports students in building a richer and more multidimensional interpretative map – one that reflects not only the complexity of the systems they are studying, but also the diversity of perspectives that futures thinking requires.

TOPIC-BASED STEEP ANALYSIS

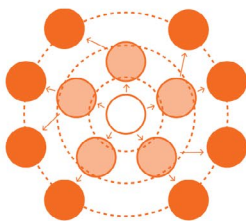
Mapping external forces shaping the future of the topic



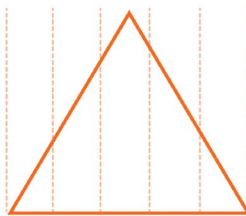
PURPOSE

To examine a broad topic through five interconnected dimensions – Social, Technological, Economic, Environmental, and Political – revealing the macro-trends, drivers, and interactions that shape the present and influence possible futures. This structured framework supports comprehensive understanding and informed scenario-building.

STEEP TEMPLATES



STEEP wheel



STEEP matrix



DIVERGENT



TIME

From 3 hours
to 1-2 months



TEAM

Group collaboration

CREATIVITY DIMENSIONS

★ Mindset

- anticipatory thinking
- futures sensemaking
- futures imagination
- perspective expansion

● Confidence

- future agency
- adaptive perseverance

● Teamworking

- empathy & perspective sensing
- shared sensemaking



OUTPUT

- STEEP wheel or matrix of macro-trends and drivers



MATERIALS

- STEEP Wheel template
- STEEP Matrix template
- AI co-creator in STEEP Analysis

Figure 19.

Topic-based STEEP Analysis card (description of the activity). Source: Authors, 2026.

STEPS FOR THE ACTIVITY

Place a broad topic at the centre

Students select a theme of their research broad enough to encourage exploration but clear enough to guide analysis (*e.g. Food as Medicine, Future of Universities*) and position this topic at the centre of the STEEP Wheel or at the top of the STEEP Matrix template to anchor the investigation. This topic acts as the focal point through which students analyse external forces and emerging dynamics shaping possible future developments.

1

Identify STEEP macro-trends and drivers

For each STEEP category students map the key drivers, macro-trends, signals, and emerging dynamics influencing the topic. Students should include both visible and less obvious forces of change. If some STEEP areas remain underexplored, they are encouraged to return to the Trend Research and look for additional trends, signals or perspectives in the underrepresented categories. The goal is not simply to “fill” categories, but to develop a broad and multidimensional understanding of the system surrounding the topic.

2

Explore relationships and interdependencies

Students identify connections, tensions, and feedback loops between the STEEP categories, analysing how developments in one dimension may influence or generate consequences in another. This step helps students move from isolated observations toward systems thinking by revealing interconnected patterns of change.

3

Sensemaking

Students collectively reflect on what the identified drivers and interconnections might affect the topic in the future. They discuss: risks and opportunities; positive and negative impacts; interactions across categories, emerging tensions or contradictions, areas of uncertainty, possible long-term implications. This interpretative step transforms the STEEP map into a shared systemic framework that can later support Domain Building, Alternative Futures, and Future Scenario.

4

TIPS FOR EDUCATORS

- Encourage students to identify less obvious trends and connections, not just visible drivers. Focus on indirect effects, interdependencies, tensions, and systemic dynamics rather than simple categorisation.
- Encourage iterative movement between Trend Research and STEEP Analysis as new insights emerge. Visual mapping (STEER Wheel or Matrix) supports clarity, comparison, discussion, and systems thinking.

Figure 20.
Topic-based STEEP Analysis card (steps of the activity). Source: Authors, 2026.

TREND-BASED STEEP ANALYSIS

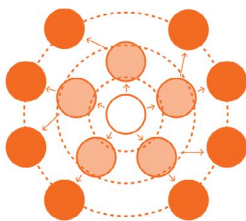
Examining trends within systemic forces



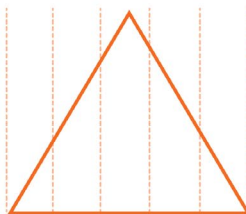
PURPOSE

To analyse a trend or cluster through the Social, Technological, Economic, Environmental, and Political dimensions. This approach reveals the broader forces shaping the trend's evolution, enabling deeper insight into its interactions, implications, and future trajectories.

STEEP TEMPLATES



STEEP wheel



STEEP matrix



DIVERGENT



TIME

1-3 hours per trend



TEAM

Group collaboration

CREATIVITY DIMENSIONS

★ Mindset

- anticipatory thinking
- futures sensemaking
- futures imagination
- perspective expansion

● Confidence

- future agency
- adaptive perseverance

● Teamworking

- shared sensemaking
- collective imagination
- empathy & perspective sensing



OUTPUT

- STEEP wheel or matrix of macro-trends and drivers



MATERIALS

- STEEP Wheel template
- STEEP Matrix template
- AI co-creator in STEEP Analysis

Figure 21.

Trend-based STEEP Analysis card (description of the activity). Source: Authors, 2026.

STEPS FOR THE ACTIVITY

Place a specific trend or cluster of trends at the centre

Students select a trend or a small cluster of related trends identified during the Trend Research (e.g., *Biodegradable packaging*, *Remote work culture*, *AI tutors*) and position it at the centre of the STEEP framework to anchor the analysis.

1

Identify STEEP macro-trends and drivers

For each STEEP category – Social, Technological, Economic, Environmental, Political – students map the larger forces and drivers that could influence the evolution of the selected trend over time. It is important to consider both direct and indirect influences to better understand systemic interactions. If some STEEP dimensions remain underexplored, students are encouraged to return to the Trend Research phase and identify additional trends, signals or perspectives in the underrepresented categories.

2

Explore relationships and interdependencies

Students examine how the STEEP dimensions interact around the selected trend. They identify tensions, reinforcing dynamics, constraints, and possible feedback loops shaping the future development of the trend. This step encourages systems thinking and helps students understand how trends evolve within broader social, technological, economic, environmental, and political systems.

3

Sensemaking

Students compare the STEEP analyses across multiple trends or clusters, reflecting on how the forces of change intersect and generate broader future implications. For example: *How do political drivers (Political dimension) affecting AI development (Technological dimension) intersect with social changes linked to remote education (Social dimension)? What environmental or economic tensions may accelerate or constrain the trend?* This reflective step supports cross-trend awareness, systemic understanding, and preparation for scenario-building activities.

4

TIPS FOR EDUCATORS

- Encourage students to analyse each trend independently before comparing clusters. Highlight indirect effects, interdependencies, and feedback loops between STEEP dimensions.
- Use the activity to move beyond isolated trends toward a broader understanding of how multiple forces interact over time.
- Visual mapping (STEEP Wheel or Matrix) is recommended to support clarity, comparison, and synthesis.

Figure 22.
Trend-based STEEP Analysis card (steps of the activity). Source: Authors, 2026.

7.2.4 Domain Building

Domain Building is the convergent activity that closes the Horizon Scanning phase. At this stage, students move from exploration to focused synthesis by clustering signals, trends, and STEEP insights into a small number of meaningful thematic constellations. The aim is to reduce complexity without oversimplifying it.

In the Design Futures process, a domain is more than a topic. It works as a shared interpretative frame, a conceptual boundary that clarifies what the futures exploration will concentrate on and what it will intentionally leave aside. Well-defined domains are deliberately broad, allowing multiple future directions and scenario trajectories to emerge, yet specific enough to provide focus, coherence, and depth. In this sense, Domain Building represents the first concrete outcome of the Design Futures process: the moment where dispersed observations begin to crystallise into a collective direction for future-oriented inquiry.

Unlike purely analytical driver selection, Domain Building is an interpretative and creative act. Students work together to identify patterns, tensions, contradictions, and connections across their research, negotiating meaning and relevance as a group. Through dialogue and collaborative synthesis, they begin transforming fragmented information into a structured understanding of the system they are exploring. This process enables learners to move beyond isolated trends and recognise broader dynamics of transformation, interdependencies, and emerging thematic narratives. By clustering insights into domains, students actively construct what futures studies describes as a shared mental model (Wilner & Stein, 2025): a collectively negotiated understanding of how the present is evolving and where future change may emerge. This shared frame helps align perspectives within the team, supports collaborative decision-making, and establishes common conceptual ground for the speculative work that follows.

Domains are not intended to define a single future direction or predict an outcome. Instead, they function as fertile territories of exploration, spaces where uncertainties, opportunities, and tensions coexist and from which multiple alternative futures can later be developed. The quality of the domain strongly influences the richness of the scenarios that emerge afterward.

This collective framing becomes foundational for the phases that follow. A clearly articulated domain provides conceptual infrastructure for coherent visioning, alternative futures exploration, and scenario building, ensuring that future visions grow from a shared understanding rather than fragmented interpretations. It acts as a bridge between research and imagination: grounding speculative thinking in evidence while simultaneously expanding the possibility space for future-oriented design exploration.

The importance of this activity is also recognised in futures and design research, where processes of synthesis and thematic convergence are considered essential for transforming raw data into actionable foresight (Voros, 2003; Hines & Bishop, 2015; Kolko, 2010). Domain Building aligns with these approaches by positioning synthesis not as a reductive exercise, but as a collaborative act of interpretation that enables deeper anticipation, creativity, and systemic understanding.

As in the previous phases of Horizon Scanning, GenAI serves as a co-creative partner during Domain Building, supporting students in identifying stakeholders and deepening their understanding of the domains they are constructing. Students are provided with prompt templates structured around two complementary types of question. The first focuses on *identifying stakeholders within the emerging domains*, both human and non-human. Students can ask to map the range of actors involved in a given theme, considering who might be affected by the forces of change at play and whose perspectives are often overlooked, including non-human actors such as animal species or ecosystems. The second type of question invites students to *explore the point of view of specific stakeholders* in depth. By asking GenAI to inhabit the perspective of a chosen actor, whether a small-holder farmer or a microorganism in a future ecosystem, students can generate rich, situated accounts of how different actors experience the domain, what their needs and challenges are, and how they relate to the broader forces of change.

Used in this way, GenAI enriches the interpretative and creative dimensions of Domain Building, helping students populate their thematic constellations with diverse perspectives and deepen the conceptual quality of the domains they construct together.

DOMAIN BUILDING

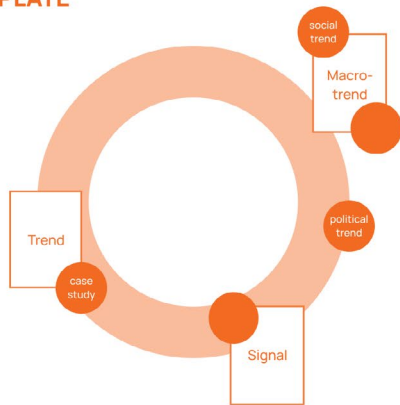
Defining and mapping a focused area of futures inquiry



PURPOSE

To create a coherent conceptual space by identifying key themes, actors, issues, relationships, and boundaries within a topic. Domain building organises scattered signals, trends, and forces into structured knowledge, providing a foundation for visioning, scenario development, and design action. The activity supports collective sensemaking, reveals connections and tensions across the system, and establishes a strong foundation for visioning, scenario development, and future-oriented design action.

DOMAIN TEMPLATE



CONVERGENT



TIME

1-3 days (or longer depending on scope)



TEAM

Group collaboration → Collective sharing

CREATIVITY DIMENSIONS

★ Mindset

- anticipatory thinking
- futures sensemaking
- futures imagination
- perspective expansion

★ Teamworking

- shared sensemaking
- collective imagination
- empathy & perspective sensing
- collective agency

● Confidence

- future agency
- adaptive perseverance



OUTPUT

- 4-5 domain maps



MATERIALS

- Domain Map template
- AI co-creator in Domain Building

Figure 23

Domain Building card (description of the activity). Source: Authors, 2026.

STEPS FOR THE ACTIVITY

Identify key concepts

Students review insights from previous activities and select trends, signals, and ideas that appear relevant for the future of the topic. It is important to ensure that the selection of insights reflect multiple dimensions of the field and open different directions for exploration. At this stage, students should look not only for recurring patterns but also for tensions, contradictions, and unexpected connections across their research, these are often the most generative starting points for domain construction.

Discuss and negotiate meaning

Before moving to clustering, students share and discuss their selected insights as a group. Through dialogue and collective sensemaking, they identify what feels most significant and develop a shared understanding of the topic.

Organise and create domains

Students cluster related concepts and explore connections between trends, signals, and observations. Through this process, broader thematic domains emerge, shaped by patterns, values, challenges, and future opportunities. Domains should be broad enough to allow multiple future directions to emerge, yet specific enough to provide focus and coherence.

Define and describe the domains

Students develop a clear and rich description for each domain. Domains should describe meaningful areas of transformation already emerging in the present while leaving space for multiple future developments. Each domain should include:

- **Title** – a concise name capturing the essence of the domain
- **Description** – explanation of what this domain is about, its significance, and current dynamics
- **Sources** – trends, signals, and research insights, or STEEP drivers informing the domain

Revisit and refine

Once domains are drafted, students should step back and evaluate them as a group. *Do they feel distinct from one another? Do they collectively cover the breadth of the research? Are they fertile enough to generate multiple, divergent futures?* This reflective step ensures that the domains are well-constructed before moving into visioning and scenario building.

TIPS FOR EDUCATORS

- Encourage students to **balance analysis with intuition and curiosity**. Domains should remain flexible and evolve as new insights emerge.
- **Remind students** that there is no single correct set of domains, different groups working on the same topic may arrive at legitimately different domain configurations, and this diversity is a sign of genuine interpretative engagement rather than a problem to be resolved.

1

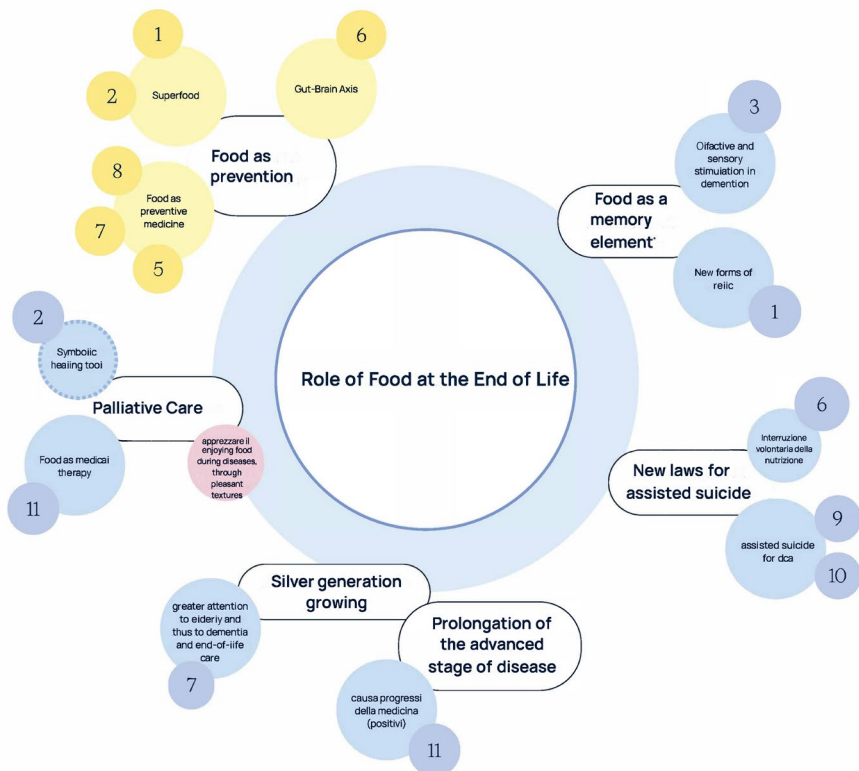
2

3

4

5

Figure 24.
Domain Building card (steps of the activity). Source: Authors, 2026.



Reflections

Over the next decade, end-of-life nutrition will become a tool for care, remembrance, and meaning, going beyond mere nourishment and performance. Superfoods, sensory stimulation, pleasant textures, and liquid diets support well-being, emotional processing, and symbolic therapy, even in cases of dementia. Nutrition is intertwined with palliative care, prevention, and end-of-life decisions, including legal issues such as assisted suicide, underscoring how nutrition remains central to the quality and dignity of a person's final moments.

Theme

Trend

Key trend

N. Article

The colors of the circles correspond to the respective themes, which can be identified in the preceding stages.

Figure 25.
Developed domain "Role of food at the end of life" by students.

7.3 Visioning Phase: from Insights to Future Scenario

The Visioning phase is the second phase of the Design Futures process and builds directly on the insights developed during Horizon Scanning. While the previous phase focuses on understanding the present and identifying signals of change, Visioning shifts attention toward imagining how these dynamics might evolve over time. This is a speculative and interpretive phase in which students transform research insights into alternative, plausible, and preferable futures. Here, imagination is used deliberately as a design capability, not as a tool for prediction. Visioning focuses on expanding the space of possibilities. This phase enables learners to explore multiple future trajectories, question dominant assumptions, and rehearse alternative ways the world could unfold. Through structured imagination, learners begin to understand that the future is plural, contingent, and shaped by choices made in the present.

Within the Design Futures process, Visioning unfolds through three closely connected activities. The phase begins with the Journey into the Future, where students are engaged in the meditative activity, *Glimpse into the Future*, where they travel mentally to imagine the future world. The meditation is followed by a hands-on exhibition (e.g. *Future of Food exhibition* in the context of this book), where students are asked to prepare and bring material artefacts, objects and experiences, representing the future of the specific topic in 10 and 50 years ahead. It is followed by Alternative Futures activity, in which students use speculative prompts to generate multiple future worlds grounded in the domains identified earlier. Through this exploration, they experiment with different trajectories of change, examining how social, technological, environmental, economic, and political dynamics might combine in unexpected ways. This step expands the space of possibility and prevents premature convergence on a single future.

Building on these explorations, students develop a Vision of the Future, which translates recurring patterns, tensions, and aspirations emerging from the alternative futures into a concise frame. The vision articulates key values, priorities, and questions that define a preferable future direction without closing down interpretative openness. It

functions as a conceptual anchor, aligning the team's imagination and providing coherence for subsequent scenario construction.

Finally, Future Scenario activity translates this vision into a set of plausible and internally coherent future scenarios. Using tools such as the 2x2 Scenario Matrix, teams identify critical uncertainties shaping their domain and explore how different combinations of these forces could give rise to distinct future worlds. Each scenario is developed as a narrative model that makes future dynamics tangible, comparable, and discussable, preparing the ground for the Scenario Worldbuilding and design intervention in later phases.

Throughout the Visioning phase, the classroom, which works as a speculative design studio, enables students to iteratively move between imagination and reflection, defining alternative futures, visions, and scenarios on their shared workspaces. Dialogue, negotiation, and collective sensemaking are central, as teams continuously test assumptions, refine narratives, and explore implications. By the end of the phase, each group has developed a set of differentiated scenarios, selected one scenario for in-depth exploration. The Visioning phase activates specific dimensions and factors of the Future Creativity Loop, which are demonstrated in Table 2.

Implementation

1. **Introduction to the Visioning Approach:** educators introduce the purpose, structure and activities of the Visioning phase, explaining how it builds on Horizon Scanning and how the three activities support the creation of future scenarios.
2. **Journey into the Future Activity:** educators facilitate the first activity by playing a meditative audio that invites students to immerse in a future world and envision everyday life, environments, behaviours, and systems. Following the immersion, a thematic exhibition (for example, *Future of Food*) is organised, although not on the same day. The exhibition is only introduced at this stage, since after the meditation, it is important not to interrupt the immersive flow and to move directly into the Alternative Futures activity; otherwise, the benefits and depth of the technique are diminished.

3. **Alternative Futures Exploration:** students generate multiple future worlds within their domains using speculative prompts such as What If Cards or One Day narratives. Teams explore contrasting trajectories and document social, technological, environmental implications on the shared digital workspace.
4. **Thematic exhibition:** students prepare and present food artifacts that they imagine could exist 10 years and 50 years from now. The activity enables participants to translate abstract trends and future scenarios into tangible experiences, encouraging reflection on how emerging changes may evolve, materialise, and shape everyday life in the future.
5. **Collective Reflection and Pattern Identification:** groups review their alternative futures to identify recurring themes, contradictions, tensions, shared fears, and desirable values that align with the Future Compass. Educators facilitate discussion to support critical reflection and synthesis.
6. **Vision of the Future statement:** based on selected elements from the Alternative Futures, teams formulate a shared Vision of the Future in the form of a short narrative or focal question. This vision is refined collaboratively, aligned with the shared values of the Future Compass, and positioned as a guiding frame rather than a fixed endpoint.
7. **Scenario Matrix Development:** students identify two critical uncertainties shaping their domain and Vision of the Future and define their extreme conditions, preparing the ground for scenario construction. After, teams build a 2x2 scenario matrix and develop four distinct scenario worlds, articulating narratives, naming scenarios, and supporting them with keywords and visual references. Each group selects one scenario for deeper exploration and worldbuilding.
8. **Interdepartmental Peer Sessions:** groups engage in dialogue to discuss intermediate outputs, such as Vision of the Future and Scenario Matrix to surface any questions, doubts and suggestions from their peers, acting as the departments of the Ministry for the Future. Educators should plan these sessions ahead and ask students to be prepared. Groups present their scenarios to peers and educators, receiving

feedback to refine clarity, differentiation, and coherence before moving forward in the Design Futures process.

- 9. Scenario Worldbuilding:** students develop the worldbuilding of their chosen scenario by translating abstract futures into a rich, tangible world. They construct narratives, artefacts, personas, and performative elements that collectively bring the scenario to life. Students give form to everyday details and lived experiences, shaping not only what the future looks like, but how it feels and functions. Through storytelling, prototyping, and embodied representation, the scenario becomes a shared experiential space.

Table 2.
Future Creativity Loop dimensions and factors activated in the Visioning phase.

Main FCL dimension(s) and factors	Theoretical Connection and Explanation
Creative Futures Mindset → anticipatory thinking → futures imagination → futures sensemaking → perspective expansion Creative Futures Confidence → future agency → speculative courage → adaptive perseverance → future reflexivity Creative Futures Teamworking → collective imagination → shared sensemaking → collective agency → empathy & perspective sensing Creative Futures Atmosphere → positive future orientation → emotional presence → playful exploration → experiential immersion	The Visioning phase represents the moment in the Design Futures process where learners move from understanding change to actively imagining and constructing alternative futures. It primarily activates the Creative Futures Mindset by encouraging students to explore multiple future trajectories, challenge dominant assumptions, and transform research insights into speculative yet plausible future worlds. Through activities such as Journey into the Future, Alternative Futures, Vision of the Future, and Scenario Matrix development, learners strengthen anticipatory thinking, futures imagination, and futures sensemaking, expanding their ability to envision systemic transformations and recognise that futures are plural, contingent, and shaped by choices made in the present. Perspective expansion is further reinforced as students explore alternative worldviews, future contexts, and more-than-human perspectives. The phase also strongly activates Creative Futures Confidence. Visioning requires learners to move beyond analysis and commit to imaginative propositions, encouraging speculative courage and future agency. Students are invited to articulate provocative possibilities, develop visions that challenge present-day assumptions, and construct future scenarios despite uncertainty and incomplete knowledge. Through iterative refinement of futures narratives and scenario logics, they develop adaptive perseverance and future reflexivity, learning to critically examine assumptions, values, and implications embedded within their visions. At the same time, Visioning is deeply collaborative and therefore strongly activates Creative Futures Teamworking. The development of alternative futures, shared visions, and scenario worlds depends on collective imagination and shared sensemaking. Through dialogue, negotiation, and synthesis, teams co-create future narratives, align values, and collectively interpret uncertainty. Activities such as interdepartmental peer sessions and collaborative scenario construction strengthen empathy and perspective sensing while fostering collective agency in shaping preferred future directions. Finally, the phase is supported by Creative Futures Atmosphere, particularly through positive future orientation, emotional presence, playful exploration, and experiential immersion. Activities such as Glimpse into the Future and the thematic exhibition invite learners to emotionally and sensorially engage with future possibilities, creating an immersive environment that lowers creative barriers and enables deeper imaginative exploration. Together, these dimensions transform Visioning into a bridge between anticipation and future-making, allowing learners not only to imagine futures but to collaboratively construct and inhabit them.

7.3.1 Journey into the Future

Following Horizon Scanning, students have developed an evidence-based understanding of the present and its emerging trajectories. Journey into the Future marks the first moment in which these insights are transformed into lived and imagined futures. Rather than analysing change from the outside, students are invited to experience what future worlds might feel like, activating imagination, emotion, and sensory exploration as tools for futures thinking.

Journey into the Future consists of two complementary activities that help students move from analytical understanding to experiential engagement with the future. The first activity, *Glimpse into the Future*, invites participants to immerse themselves in a future world through guided imagination and sensory exploration. The second activity, *Food from the Future Exhibition*, transforms these imagined futures into tangible artefacts and experiences. Together, they bridge abstract futures thinking and material speculation, creating a richer foundation for subsequent scenario-building and worldbuilding activities.

In *Glimpse into the Future*, an educator leads students through an immersive meditation that asks them to project themselves into a specific temporal horizon. Students are invited to imagine their surroundings, behaviours, social interactions, and everyday life within this future context. Through sensory cues, narrative prompts, and guided imagination, they explore multiple dimensions of future life, including technological, ecological, cultural, and emotional aspects.

Following the meditation, students engage in a collective reflection phase. They share the images, sensations, insights, and tensions that emerged during the journey, identifying both shared themes and divergent experiences. This exchange helps externalise individual imaginaries and transforms them into a collective space of interpretation. It expands the group's imaginative capacity and supports the recognition of multiple, coexisting possible futures.

Food from the Future exhibition extends this speculative exploration by inviting teams to design and create physical representations of future food artefacts. The exhibit is intentionally playful, sensory, and provocative. It requires students to stretch their imagination while grounding their visions in ongoing trends such as climate impacts, cultural shifts, or behavioural patterns. Unlike traditional

product design, which prioritises feasibility and immediate constraints, this speculative making approach shifts the focus toward future potential rather than present limitations. Students are encouraged to design objects, ingredients, food systems, and rituals that speculate on how food might evolve under different trajectories of change. These creations, ranging from transformed agricultural products to entirely new eating practices, embody both near-term (5-10 years) and long-term (50+ years) futures. Together, they explore how intersecting forces such as technological innovation, environmental pressure, systemic constraints, and cultural evolution may reshape what people eat, how they eat, and what food means.

The exhibition, typically placed at the midpoint of the course, transforms the classroom into a speculative marketplace of future food cultures, stimulating dialogue and deepening participatory engagement and acts as a creative disruption before the Alternative Futures. As a deliberately playful and provocative moment within the Design Futures process, it helps students suspend present-day assumptions, break cognitive routines, unlock imagination, and develop visual and material languages for communicating futures.

This two-part activity creates a continuum between imaginative exploration and creative tangible expression, offering a rich foundation for subsequent scenario design and futures-oriented experimentation.



Figure 26.
The Food from the future “ZIP. The meal in an instant” created by students

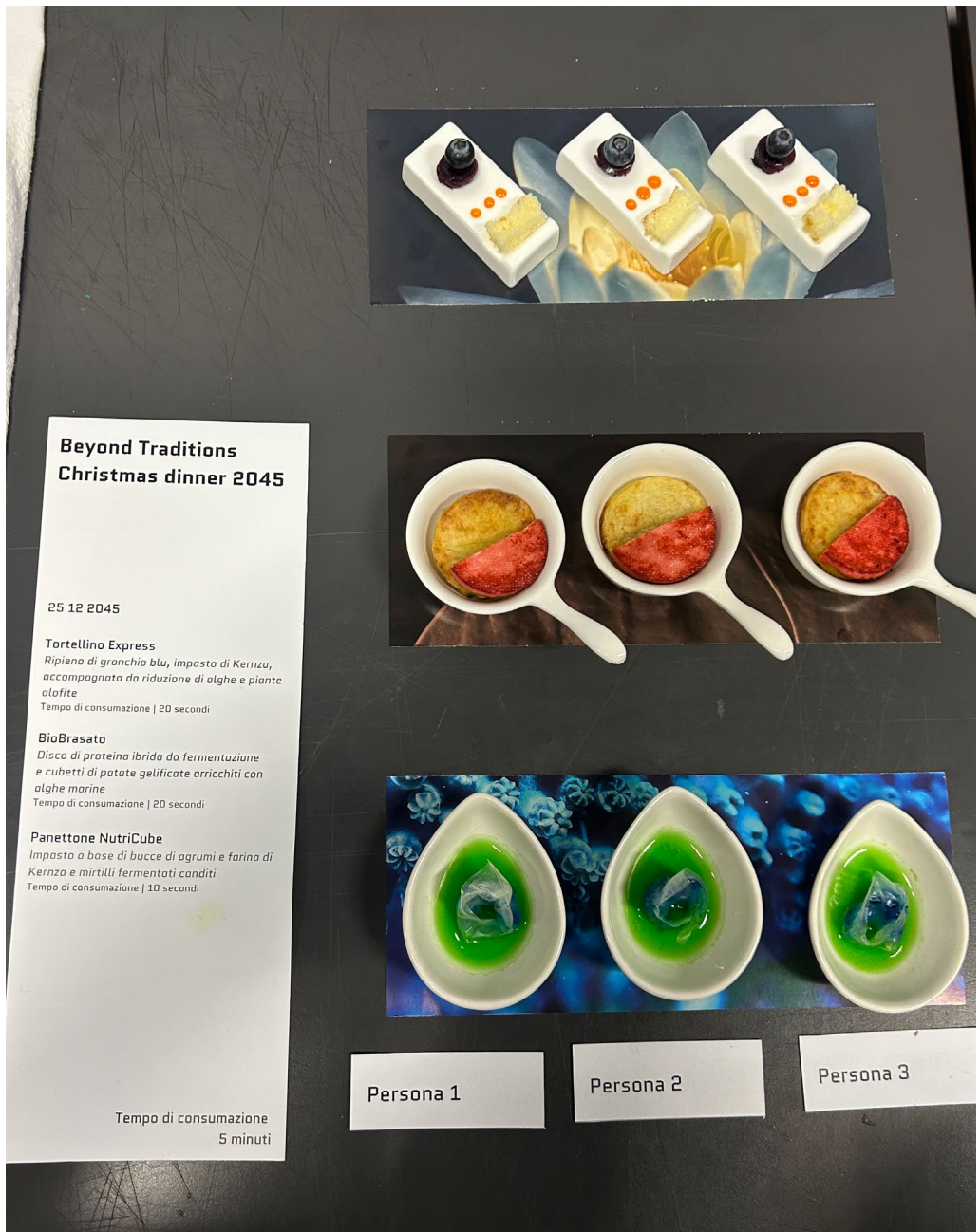
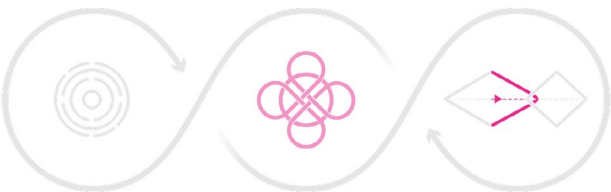


Figure 27.
Food from the Future "Beyond traditions Christmas dinner 2045" created by students.

JOURNEY INTO THE FUTURE

Glimpse Into The Future

Guided imaginative immersion
into the future world



PURPOSE

To support students in imaginatively inhabiting future worlds through an audio-guided meditation. The activity invites participants to explore future conditions through sensory, emotional, and imaginative dimensions, generating intuitive insights and shared imaginaries. Rather than analysing possible futures from a distance, students experience them from within, allowing embodied perception, emotion, and imagination to emerge as valid forms of knowledge.

MEDITATION AUDIO & SCRIPT



EXPERIENTIAL



TIME

15 min → 45 min



TEAM

Individual reflection →
group discussion

CREATIVITY DIMENSIONS

★ Mindset

- futures imagination
- perspective expansion
- futures sensemaking

★ Atmosphere

- emotional presence
- experiential immersion
- positive future orientation

● Teamworking

- empathy & perspective sensing
- shared sensemaking



OUTPUT

- Shared reflections, images, emerging future impressions



MATERIALS

- Meditation audio
- Guided meditation script

Figure 28.
Glimpse into the Future card (description of the activity). Source: Authors, 2026.

STEPS FOR THE ACTIVITY

Introduction to futures meditation

The educator introduces the activity and prepares students for an imaginative exploration of the future. Participants are invited to suspend judgment, let go of present-day assumptions, and engage openly with sensory impressions, emotional feelings, and emerging images.

Glimpse into the Future (immersive meditation)

Students take part in an audio-guided meditation that transports them 50 years into the future. Through sensory prompts and narrative cues, they explore future environments, behaviours, technologies, and everyday experiences. The focus is on embodied and affective imagination rather than analysis.

Individual reflection

After the meditation, students reflect individually on the future they experienced. They note images, emotions, tensions, and surprising elements that emerged, beginning to articulate their intuitive understanding of how the domain may evolve.

Collective dialogue

Students share their reflections and discuss common themes, contrasts, and underlying values. This exchange expands collective imagination and surfaces insights, recurring patterns, aspirations, and dilemmas that can inform later alternative futures and scenario-building activities.

TIPS FOR EDUCATORS

- Create a **safe and quiet environment** that supports concentration and emotional openness.
- Allow **moments of silence during and after the meditation** to encourage reflection.
- Invite students to **prioritise sensory richness, emotional resonance, and imagination over realism or feasibility**. The goal is not to predict the future, but to expand the range of futures they can imagine.

1

2

3

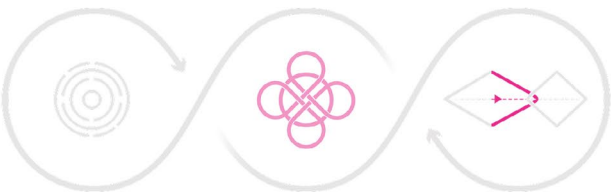
4

Figure 29.
Glimpse into the Future card (steps of the activity). Source: Authors, 2026.

JOURNEY INTO THE FUTURE

Food From The Future Exhibition

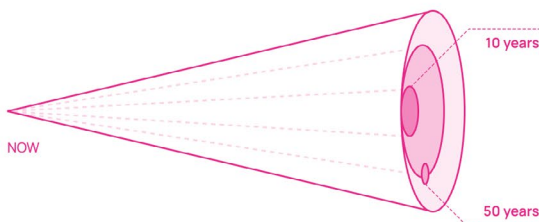
Materialising speculative futures through making and exhibition



PURPOSE

To enable students to collaboratively imagine and materialise speculative artefacts that represent near-term and long-term futures. While the example presented here focuses on food, the activity can be adapted to any topic. Through hands-on making and exhibition, students transform abstract futures into tangible, sensory, and discussable artefacts, supporting reflection on how systems and behaviours may evolve across different future trajectories.

FUTURE TIMESPAN



EXPERIENTIAL



TIME

2 days → 1 week
(preparation of the exhibition)



TEAM

Collaborative making

CREATIVITY DIMENSIONS

★ Confidence

- speculative courage
- future agency
- adaptive perseverance

★ Atmosphere

- playful exploration
- experiential immersion
- positive future orientation

● Teamworking

- collective imagination
- shared sensemaking
- empathy & perspective sensing

● Mindset

- futures imagination
- perspective expansion



OUTPUT

- Speculative future food artefacts (near-term and long-term)
- Curated exhibition of future food concepts

Figure 30.
Food from the Future Exhibition card (description of the activity).
Source: Authors, 2026.

STEPS FOR THE ACTIVITY

Introduction to speculative making

The educator introduces the activity, explaining the purpose of materialising futures and clarifying the difference between speculative artefacts and traditional product design. Students are encouraged to prioritise imagination, provocation, and storytelling over feasibility, using questions such as: *What and how might people eat in 5–10 years? What and how might people eat in 50 years?*

Group ideation and artefact creation

Students work in teams to imagine future artefacts inspired by trends, signals, and insights from previous activities. They design and create speculative artefacts representing both near-term and long-term futures through prototyping, crafting, cooking, modelling, or mixed-media approaches.

Exhibition setup

Students curate their artefacts within a shared exhibition space. Titles, narratives, labels, and performative elements help communicate the future context, time horizon, and ideas behind each artefact.

Walkthrough and collective discussion

Students present, observe, and discuss the exhibited artefacts, comparing interpretations and reflecting on the desirability, implications and consequences of the futures represented. Students identify elements from the exhibition that resonate with them and may inform further scenario-building and worldbuilding activities. The exhibition becomes a shared space for exploration and dialogue.

1

2

3

4

TIPS FOR EDUCATORS

- **Encourage experimentation and playfulness.** Imperfect or provocative artefacts often generate richer conversations than highly polished outcomes.
- **Avoid framing the exhibition as an evaluation of feasibility.** Instead, **emphasise its role as a collective imagination space** and catalyst for discussion.
- **Use the exhibition as a transition moment**, helping students move from open-ended future exploration toward more structured scenario development.

Figure 31.
Food from the Future Exhibition card (steps of the activity). Source: Authors, 2026.

7.3.2 Alternative Futures

Alternative Futures is the first major visioning activity of the Design Futures process. Building on the domains identified during Horizon Scanning and the experiential insights generated through Journey into the Future, students begin to explore how the future might unfold in different and sometimes contradictory ways. The activity shifts the focus from understanding change to imagining its consequences, enabling students to move from evidence-based analysis toward speculative exploration.

Alternative Futures is a structured yet creative activity which helps students generate multiple future worlds of their chosen domains by working with uncertainty, emerging signals, and systemic change. Rather than extending present-day assumptions into the future, the activity creates space to step outside familiar frames and explore how the world might unfold in fundamentally different ways.

At this stage, the goal is not to identify a single “best” or “most likely” future. Instead, Alternative Futures is designed to produce divergence, a wide range of contrasting possibilities that expand the students’ imaginative and anticipatory capacity. By exploring multiple trajectories rather than converging too early on one vision, students learn to embrace uncertainty, challenge assumptions, and recognise that the future is plural rather than predetermined. A set of complementary tools supports this transition from analysis to speculation.

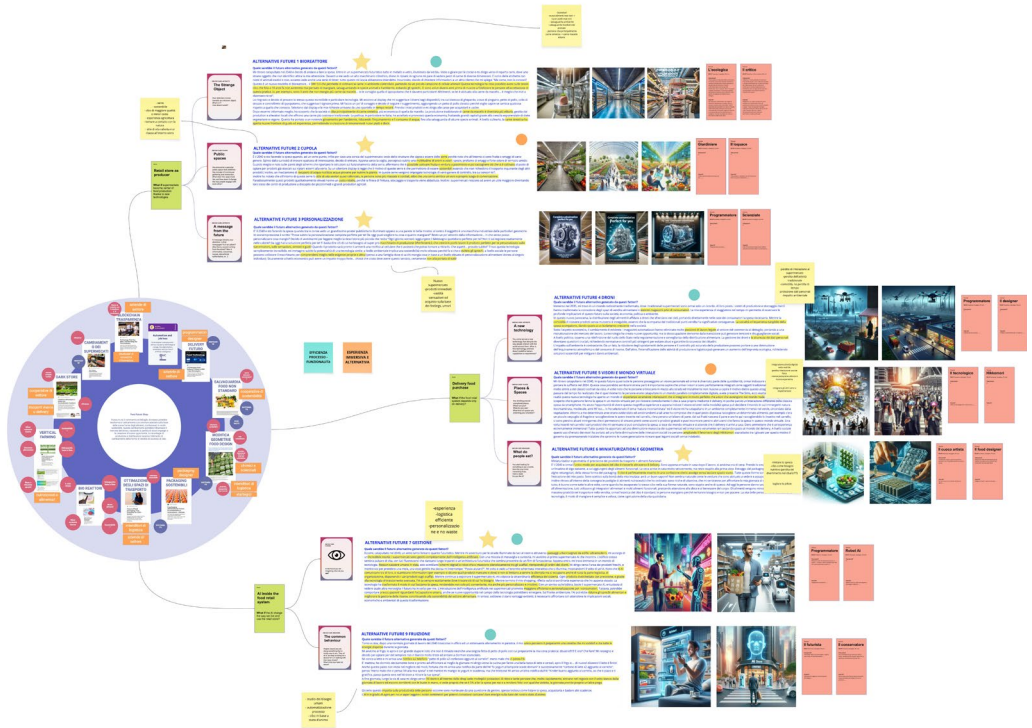
What If Cards act as creative triggers: each card introduces a hypothetical condition framed as a “What if...” statement, prompting students to explore how systems, behaviours, and environments might transform if that condition became reality. These prompts are not intended to define scenarios, but to open generative entry points for unexpected futures.

One Day Cards complement this approach by introducing short narrative prompts that imagine an ordinary day in that future world. By focusing on everyday life, they make abstract futures tangible through concrete rituals, behaviours, spaces, objects, and relationships (Bleecker, 2009; Lindley & Potts, 2019). This emphasis on “everydayness” helps students translate systemic change into lived experience. The futures generated during this phase are intentionally provisional and exploratory. Their purpose is not to produce complete scenarios,

but to expand the space of possibilities that will later be synthesised and structured through Future Scenario activities.

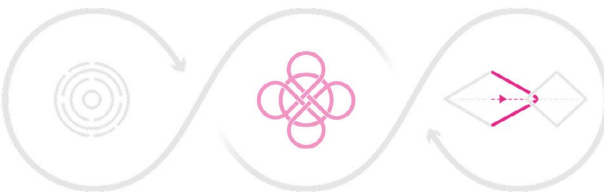
Visioning relies on a combination of narrative, visual, and speculative tools that support both expansion and synthesis. In the Design Futures course, this work typically takes place on a shared Miro board, where alternative futures gradually emerge through the addition of layered content, including short texts, images, diagrams, sketches, and AI-generated visuals. This shared workspace allows ideas to evolve collectively and remain connected to the research generated during Horizon Scanning.

Figure 32.
Eight alternative futures
emerged from one
domain described with
images, narratives,
with some elements
(highlighted by stars)
selected for the future
scenario.



ALTERNATIVE FUTURES

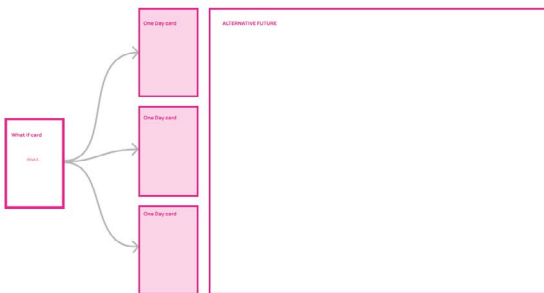
Exploring multiple possible futures through
“What If...?” and everyday narratives



PURPOSE

To generate a multiplicity of divergent futures for a specific domain by combining emerging signals, trends, and uncertainties with imaginative storytelling. The activity expands futures literacy, challenges assumptions, and provides material for subsequent scenario development and design ideation.

WHAT IF CARDS



SPECULATIVE



TIME

2-4 hours → 1 week



TEAM

Group collaboration

CREATIVITY DIMENSIONS

★ Confidence

- speculative courage
- future agency
- adaptive perseverance

★ Mindset

- futures imagination
- anticipatory thinking
- perspective expansion
- futures sensemaking

● Teamworking

- collective imagination
- shared sensemaking
- empathy & perspective sensing

● Atmosphere

- playful exploration
- positive future orientation



OUTPUT

- 4-6 alternative future narratives
- Visual or textual artefacts (stories, sketches, collages)



MATERIALS

- What If Cards
- One Day Cards

Figure 33.
Alternative Futures card (description of the activity). Source: Authors, 2026.

STEPS FOR THE ACTIVITY

Select a “What If...?” Card

Students begin with their chosen domain and select a “*What if...?*” card from the deck, or create a new one inspired by trends, signals, or drivers identified during Horizon Scanning. Guiding questions to choose what-if questions: *Which questions could be most impactful for this domain? Which amplify weak or emerging signals? Which feel uncomfortable, counterintuitive, or surprising?* The selected question becomes the entry point for exploring alternative futures.

Anchor the future with One Day Card(s)

For each “*What if...?*” card, students select either one One Day card that strongly resonates with their What-if, or a combination of three One Day cards from different categories to investigate multiple aspects of everyday life. These prompts help ground futures in concrete routines, behaviours, places, relationships, and experiences.

Create stories

Using the combination of What If and One Day cards, students develop 4–6 short future narratives. Stories should include: *Year / time horizon; Key actors (humans, institutions, non-humans, technologies); Places and settings; Everyday routines; Emotions, tensions, and desires.* Students can use multiple media including written narratives, sketches, diagrams, collages, or conceptual artefacts, to communicate and explore possibilities and express nuances.

Reflect and extract elements

Students review the futures they generated and identify inspiring, surprising, provocative, or concerning elements. These insights become inputs for the next activities – Vision of the Future, Scenario Matrix and Scenario Worldbuilding.

TIPS FOR EDUCATORS

- Encourage students to explore **unusual, uncomfortable, or counterintuitive futures**. Focus on diversity and exploration rather than accuracy or desirability.
- Whenever possible, invite students to **create their own What If cards based on signals and trends** identified during research.
- **Revisit extracted elements** in later activities to maintain coherence between visioning and scenario-building.
- Use different media to communicate futures and avoid evaluating ideas too early. The objective is divergence and imagination, not validation.

1

2

3

4

Figure 34.
Alternative Futures card. Source: Authors, 2026.

7.3.3 Vision of the Future

A Vision of the Future is a clear, concise statement or guiding question that captures the preferred conditions, values, and dynamics of an imagined future world. Emerging from the exploration of multiple Alternative Futures, it represents the first moment of convergence within the Visioning phase, helping students move from a broad landscape of possibilities toward a shared future direction and therefore the next stages of the process.

Rather than describing a fixed or predictive outcome, a vision operates as a strategic and imaginative orientation. It articulates what a team considers desirable, meaningful, or worth exploring within a specific domain, while remaining open to uncertainty and multiple pathways of development. In this sense, it aligns with futures thinking traditions that view visions as anticipatory narratives capable of shaping collective imagination and guiding action and design intention (Voros, 2003; Inayatullah, 2008, Candy & Kornet, 2019).

The vision helps students synthesise insights generated during Horizon Scanning and Alternative Futures into a coherent future aspiration, without closing down possibilities. It sets direction, highlighting strategic priorities, key values, tensions, and emerging opportunities, creating a common direction that enables a more focused and meaningful speculation. Within the Design Futures process, the Vision of the Future acts as a bridge between the exploratory generation of futures and the structured development of scenarios. It provides the conceptual foundation from which critical uncertainties can be identified and organised into the Scenario Matrix, ultimately supporting the construction of diverse yet coherent future worlds.

Importantly, a vision is not a final statement of truth or a definitive solution. It remains a generative hypothesis: a preferred future condition that can be questioned, refined, and reinterpreted as students engage in scenario building and worldbuilding. Its purpose is not to predict what will happen, but to clarify what kind of future is worth exploring and why.

Ultimately, the Vision of the Future provides a shared narrative compass that keeps the Design Futures process purposeful and aligned, while still allowing for multiple trajectories, uncertainties, and creative expansions to emerge in the scenarios that follow.

In 2040
we will have food services personalized based on each individual's Food Genetic Identity
to prevent neurodegenerative diseases through nutrigenomics and improve health and well-being,
because food can function as a preventive tool for this type of illnesses.

Figure 35.
Vision of the Future developed by students.



Figure 36.
The connection between Alternative Futures and the Vision of the Future developed by students.

VISION OF THE FUTURE

Synthesising insights into a futures statement or focal question



PURPOSE

To translate fragmented insights from alternative futures into a coherent conceptual anchor that frames the scope, values, and intentions of future exploration. A Vision of the Future identifies strategic priorities and emerging opportunities, providing a foundation for scenario development and design interventions.

FUTURE VISION STATEMENT

In _____,

we will _____,

to _____,

because _____,



CONVERGENT



TIME

2-4 hours



TEAM

Group collaboration

CREATIVITY DIMENSIONS

★ Confidence

- future agency
- future reflexivity

★ Mindset

- anticipatory thinking
- futures sensemaking
- futures imagination

● Teamworking

- collective imagination
- collective agency
- shared sensemaking
- empathy & perspective sensing

● Atmosphere

- positive future orientation



OUTPUT

- Future Vision Statement (descriptive narrative or focal question)



MATERIALS

- Future Vision Statement Template

Figure 37.

Vision of the Future card (description of the activity). Source: Authors, 2026.

STEPS FOR THE ACTIVITY

Explore the Alternative Futures

Students revisit the alternative futures created in the previous activity and analyse them carefully. They identify distinctive elements such as: *New social norms and behaviours; Emerging or speculative technologies; Ecological transformations and environmental conditions; Shifts in governance, economy, and power.* Students discuss recurring patterns, tensions, contradictions, surprises, shared aspirations, and common concerns emerging across the different futures.

1

Identify key elements for the future vision

Based on this reflection, students collectively select the elements they consider most meaningful, desirable, or strategically relevant for the future of the domain. The aim is not to choose the "best" future, but to identify the values, opportunities, transformations, and directions that should inform the future vision.

2

Formulate the Vision of the Future Statement

Using the selected elements, students formulate a Vision of the Future Statement, which should:

- **Specify a time horizon** – anchor the vision in a particular year
- **Describe experiences and transformations** – convey how life might be lived, sensed, and experienced
- **Articulate values and purpose** – clarify why this future matters and for whom
- **Remain open and generative** – allow multiple interpretations and pathways

3

Using these elements, students can formulate the statement in the form of:

- **A descriptive narrative**, e.g.: *"In 2045, urban neighborhoods operate as multispecies commons, where humans, plants, fungi, and microbes co-create regenerative systems of care, food, and waste."*
- **or a focal question**, e.g.: *"How might urban food systems evolve into multispecies, regenerative infrastructures by 2045?"*

TIPS FOR EDUCATORS

- Emphasise that a Vision of the Future is not a prediction but a strategic and imaginative shared direction for exploration.
- Encourage students to focus on values, transformations, and desired conditions rather than specific solutions. A meaningful vision should remain grounded in present signals and trends while acting as a bridge between current realities and future possibilities.

Figure 38.

Vision of the Future card (steps of the activity). Source: Authors, 2026.

7.3.4 Future Scenario

Future Scenario marks the transition from exploring possibilities to constructing coherent future worlds. Building on the insights generated during Horizon Scanning and Visioning, students begin to transform signals, uncertainties, values, and emerging dynamics into structured representations of how the future might unfold. Rather than extending present trends linearly, this phase encourages students to explore how different combinations of forces may produce fundamentally different futures. Through this process, futures become more tangible, discussable, and open to critical reflection. The goal is to move beyond isolated trends and ideas, developing richer understandings of how systems, behaviours, technologies, and environments may evolve together. Students move from imagining possibilities to constructing detailed worlds that can support design exploration and futures-oriented decision-making. The Future Scenario phase consists of two interconnected activities: Scenario Matrix and Scenario Worldbuilding. Together, they guide students from structured analysis of uncertainty to immersive narrative construction, enabling students to both *map* and *inhabit* the future worlds.

The Scenario Matrix provides a framework for mapping uncertainty and generating multiple future trajectories. Starting from the Vision of the Future, students identify two critical uncertainties, forces that are highly influential yet difficult to predict, and position them as intersecting axes. The resulting matrix creates four distinct future worlds, each representing a different configuration of these uncertainties. This process challenges assumptions, expands the range of possibilities considered, and encourages exploration beyond familiar futures. Once the matrix is defined, each quadrant becomes the basis for a future scenario. Students develop these scenarios into coherent and internally consistent descriptions of how life, systems, relationships, and environments might evolve under those conditions.

The second activity, Scenario Worldbuilding, brings these futures to life. Students develop each scenario into a richer and more immersive world by exploring its environments, behaviours, technologies, values, systems, and everyday experiences. Through storytelling, visualization, artefacts, personas, maps, performances, and speculative representations, abstract futures are transformed into lived realities that can be

experienced, discussed, and critically examined. Worldbuilding also encourages students to think systemically and relationally, considering how social, technological, economic, political, and environmental forces interact within broader ecosystems. Within the Design Futures approach, this exploration extends beyond human-centred perspectives to include non-human actors and more-than-human relationships, supporting futures that are imaginative, ecologically situated, and open to multiple forms of life and agency. By including such entities in the narrative landscape, students are encouraged to rethink agency and responsibility beyond anthropocentric worldviews.

Together, Scenario Matrix and Scenario Worldbuilding create a bridge between futures thinking and design action, providing a structured yet imaginative foundation for subsequent concept generation, prototyping, and futures-oriented design interventions.

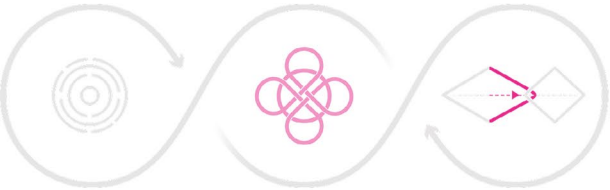
Figure 39.
Scenario Matrix with
polarities, narratives and
images.



FUTURE SCENARIO

Scenario Matrix

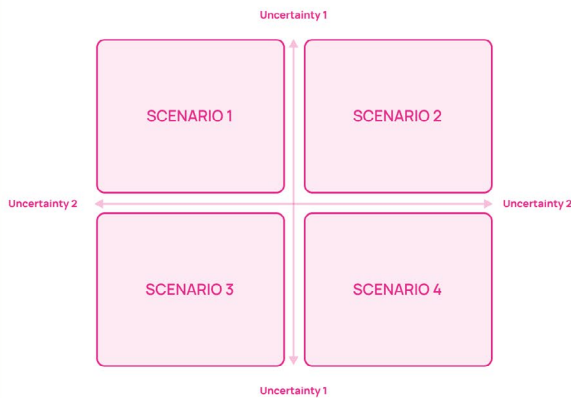
Structuring uncertainties into future scenarios



PURPOSE

Scenario Matrix translates the Vision of the Future into a structured space of uncertainty from which multiple scenarios can emerge. By identifying and combining critical uncertainties, students develop four distinct future pathways that explore how the future might unfold under different conditions. The activity helps reveal how variations in key drivers can generate different futures, highlighting both risks and opportunities for design intervention.

2X2 SCENARIO MATRIX



CONVERGENT



TIME

6 hours → 1 week



TEAM

Group collaboration

CREATIVITY DIMENSIONS

★ Mindset

- anticipatory thinking
- futures imagination
- perspective expansion
- futures sensemaking

★ Confidence

- future agency
- future reflexivity

● Teamworking

- collective imagination
- shared sensemaking
- collective agency

OUTPUT

- Four different scenarios based on a 2x2 matrix
- One scenario selected for the Scenario Worldbuilding

MATERIALS

- 2x2 Scenario Matrix template

Figure 40.
Scenario Matrix card (description of the activity). Source: Authors, 2026.

STEPS FOR THE ACTIVITY

Identify the key uncertainties

Students choose two critical uncertainties that are central to their domain and Vision of the Future and assign each variable to an axis of the 2x2 matrix. Critical uncertainties are highly influential forces of change whose future evolution remains difficult to predict (*for example, governance models, levels of technological adoption, resource availability, cultural values, degrees of environmental stability, and others*). Then students define two extreme states for each uncertainty (*e.g., centralized vs. distributed governance; high-tech vs. low-tech food systems*). The resulting matrix creates four quadrants, each representing a different combination of the two uncertainties and a potential future world. It provides a visual framework for students to map how different futures emerge from the same forces.

1

Create the scenarios worlds

For each quadrant, students:

- Interpret how the two uncertainties interact and shape the future world
- Write a short narrative, including key actors, dynamics, and conditions
- Identify keywords that capture the essence of the scenario
- Choose a name using metaphors or evocative imagery to convey the scenario's identity and tone
- Select visual representations, such as sketches, mood boards, or AI-generated illustrations, to make the future world tangible

Students ensure that each scenario is distinct, coherent, and internally consistent. If scenarios begin to resemble one another, they may revisit the critical uncertainties to increase contrast and differentiation.

2

Select a Scenario for Worldbuilding

Students select one scenario to explore in depth through Scenario Worldbuilding. This choice does not eliminate the remaining scenarios; rather, it enables students to focus on one future world, examining its implications, opportunities, tensions, and design potential. The selected scenario becomes the foundation for subsequent worldbuilding activities and the development of future-oriented interventions.

3

TIPS FOR EDUCATORS

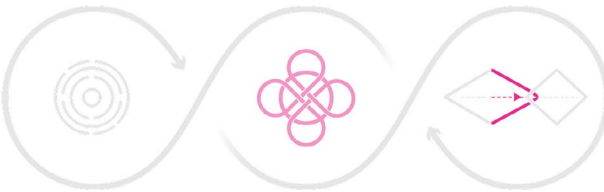
- Encourage students to prioritise clarity and contrast between scenarios rather than excessive details. Reinforce that scenarios are exploratory tools, not forecasts; their purpose is to stimulate reflection, imagination, and critical discussion.
- Prompt students to consider social, technological, environmental, economic, and political dimensions in each quadrant and to explore second- and third-order consequences rather than only immediate effects.

Figure 41.
Scenario Matrix card (steps of the activity). Source: Authors, 2026.

FUTURE SCENARIO

Scenario Worldbuilding

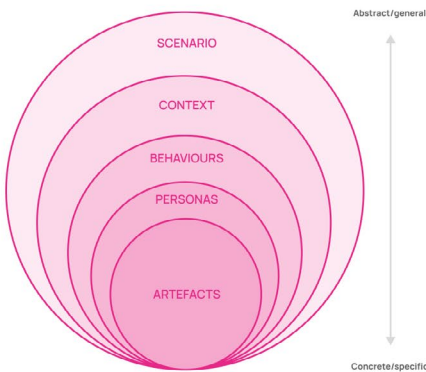
Designing future worlds
through narrative and experience



PURPOSE

To help students transform a selected future scenario into a rich, coherent, and multi-dimensional world. Rather than describing isolated events or technologies, students construct a world: a system of relationships, practices, environments, values, and tensions that make the future scenario tangible and inhabitable. This process integrates insights generated throughout the Design Futures process into a situated context that informs the development of future personas, speculative artefacts, immersive experiences, and future-oriented design interventions.

SCENARIO



SPECULATIVE



TIME

1 day → 1 week



TEAM

Collaborative making →
Collective sharing

CREATIVITY DIMENSIONS

★ Atmosphere

- positive future orientation
- experiential immersion
- emotional presence

★ Teamworking

- collective imagination
- collective agency
- shared sensemaking
- empathy & perspective sensing

● Confidence

- future agency
- speculative courage

● Mindset

- futures imagination
- perspective expansion



OUTPUT

- Rich narrative of the future world (STEEP-based)
- Future personas
- Future artefacts and speculative prototypes
- Performative or media-based scenario materials

Figure 42.
Scenario Worldbuilding card (description of the activity). Source: Authors, 2026.

STEPS FOR THE ACTIVITY

Define the Future World

Students describe the overall conditions of their future world by situating the scenario within a coherent context of everyday life. The exploration can be structured using STEEP:

- **Social:** key actors, cultural norms, values, rituals, and forms of coexistence.
- **Technological:** dominant or absent technologies, access, control, and exclusion.
- **Environmental:** ecological conditions, climate dynamics, biodiversity.
- **Economic:** production, distribution, resource flows, and value systems.
- **Political:** governance structures, power relations, and emerging forms of agency.

Populate the Future World

Students populate their future world with different actors to explore different perspectives and lived experiences within the scenario. For each persona, students define: identity (*human, organisation, AI system, ecosystem, animal, plant, etc.*), role in the system (*function, agency, or position*), daily routines and interactions, as well as motivations, hopes, fears, and vulnerabilities. They can include both human and more-than-human perspectives to better understand the relational dynamics of the scenario. Role-playing can be used to explore interactions, conflicts, collaborations, and ethical tensions within the future world.

Materialise the Future World

Students translate the future world into tangible artefacts situated within the everyday life of the future world, such as products, services, infrastructures, policies, rituals, or media content. For each artefact, they define:

- **What the artefact is** and how it functions
- **Who (or what) uses it**
- **What needs, tensions, or values it reveals**
- **What assumptions about society, ecology, technology, or power it exposes**

Experience the World

Students communicate the future world through immersive and performative formats that allow others to experience it from within. Through **videos, role-play, events, rituals, or future media**, **abstract scenarios** are transformed into lived experiences that can be explored, discussed, and critically reflected upon.

TIPS FOR EDUCATORS

- Remind students that worldbuilding is about creating plausible and meaningful worlds that support exploration and discussion.
- Emphasise the importance of adopting "from within the future" perspectives rather than explaining the future retrospectively.
- Encourage speculative tension, ambiguity, and complexity, and avoid pushing students too quickly toward solution-oriented design.

1

2

3

4

Figure 43.
Scenario Worldbuilding card (steps of the activity). Source: Authors, 2026.

7.3.5 Strategic Actions: Manifesto of the Ministry for the Future

The *Manifesto of the Ministry for the Future* is the culminating activity of the Design Futures process, grounded in the Ministry Storyworld pillar. At the end of the course and scenario worldbuilding, each department within the Ministry produces a manifesto that articulates its future vision and translates it into a set of concrete, accountable actions. These commitments may take the form of research agendas, advocacy strategies, design interventions, policy proposals, regulatory ideas, or community engagements. Rather than functioning as an exclusively speculative exercise, the manifesto is a declaration of intent: a public, positioned statement that gives form, clarity, and institutional weight to the futures each department chooses to support. It shifts students from imagining possible futures to actively articulating what they are willing to stand for and act upon.

The process is inherently collective. Within each department, students must negotiate priorities, integrate perspectives, and co-author a shared statement of action. This collaborative authorship reflects the relational dimension of real-world futures practice, where meaning-making and decision-making emerge through dialogue and shared responsibility (Emirbayer & Mische, 1998; Sawyer, 2007). The manifesto also resonates with traditions of critical and speculative design as forms of public discourse (Dunne & Raby, 2013; DiSalvo, 2012), where designed artefacts operate not as solutions but as provocations that open space for reflection and debate. Similarly, the Manifesto of the Future functions as a reflective synthesis, a creative artefact, and a futures-making act.

By the end of the course, it transforms the learning journey into a public-facing declaration of responsibility. Students do not only describe futures – they articulate which futures they choose to advocate for, and what actions they commit to pursuing. In this sense, the manifesto becomes both the final output of the Ministry Storyworld and a symbolic bridge between futures imagination and real-world agency.



Agenda 2060

Progressi Effettuati e Proiezioni Future

#Agenda2060EU

Figure 44.
Book with strategic actions "Agenda 2060" created by students.

STRATEGIC ACTIONS: MANIFESTO

Connecting future visions to present-day actions and responsibility



CONVERGENT



TIME

From 2 hours to several days



TEAM

Group collaboration

PURPOSE

To translate future scenarios and visions into actionable strategic directions by inviting students to operate as Departments within the Ministry for the Future. Through the creation of a Manifesto, students develop concrete actions that their department could take in the present to move toward their envisioned future scenario, reinforcing the link between imagination, responsibility, and agency.

MANIFESTO

MANIFESTO OF THE
MINISTRY OF THE FUTURE

action n° 1	
action n° 2	
action n° 3	
...	

CREATIVITY DIMENSIONS

★ Confidence

- future agency
- speculative courage
- future reflexivity
- adaptive perseverance

★ Teamworking

- collective agency
- collective imagination
- shared sensemaking

● Atmosphere

- positive future orientation

● Mindset

- anticipatory thinking
- futures sensemaking



OUTPUT

- At least three strategic actions, that could be implemented today, to reach the future vision

Figure 45.

Strategic Actions: Manifesto of the Ministry for the Future card (description of the activity). Source: Authors, 2026.

STEPS FOR THE ACTIVITY

Re-entering the role of the Ministry

Students re-enter their assigned Department roles within the Ministry for the Future. They revisit the scenario that they have built and clarify the department's mandate, responsibilities, and sphere of influence within the future world they have constructed. The objective is to reconnect future visions with institutional agency and decision-making, positioning students as active stewards of the futures they have envisioned.

1

Defining strategic actions

Students reflect on their scenario to identify key areas, where interventions could influence long-term change (e.g. policy, infrastructure, culture, education, governance). Students define at least three strategic actions that could realistically begin in the present day. Actions may be framed as policies, programs, regulations, pilot projects, or cultural initiatives. Each action should:

- **Align** with the values and vision of the future scenario
- **Address** a specific systemic challenge or opportunity
- **Acknowledge** constraints, trade-offs, and uncertainties
- **Demonstrate** how present actions can contribute to shaping the preferred future

2

Write the Manifesto

The manifesto is written as an official document, where students as departments articulate their vision and actions toward the future through:

- A short **declaration of intent**
- **Core principles and values** guiding the department
- **Strategic actions** and their anticipated impact
- A **statement of responsibility** and commitment toward future generations

3

Presentation of the Manifesto

Departments present their Manifestos to others, creating a space for dialogue and critique, mirroring real-world policy-making dynamics and highlighting interdependencies between departments. Students discuss potential synergies, tensions, and conflicts between different visions and priorities.

4

TIPS FOR EDUCATORS

- Encourage students to **avoid generic or idealised actions**. Strong manifestos balance ambition with awareness of political, social, and ecological constraints.
- Remind students that **strategic actions are directional commitments** rather than implementation plans. Their value lies in clarifying priorities, responsibilities, and ethical positions.
- Use the Manifesto as a closing moment to reflect on how speculative thinking can **inform real-world decision-making and long-term change**.

Figure 46.

Strategic Actions: Manifesto of the Ministry for the Future card (steps of the activity). Source: Authors, 2026.

8. Festival of Memories: an Example of a Future Scenario

This chapter presents a future scenario developed by students as the outcome of the course based on the *Ministry for the Future* educational framework. The scenario illustrates how insights gathered throughout the course are integrated into a coherent and rich representation of a possible future world. It also demonstrates how structured exploration, research, and creative inquiry enable students to imagine innovative and thought-provoking futures, while translating theoretical knowledge into tangible and experiential outputs.

The scenario *Festival of Memories* was created by a group of students working within the Department of Food Culture in the Ministry for the Future storyworld. This department explored strategies to promote culinary traditions, cultural awareness, and food diversity, ensuring that culture remains a central dimension of future food policies. The group consisted of five members representing key roles within the Ministry: the Minister of Food Culture, an AI Specialist, a Food Anthropologist, an Ethnologist, and the Director of Gastronomy Promotion. This diversity of perspectives enabled a multi-layered exploration of the topic, combining technological, social, and cultural lenses.

The students began their work with Horizon Scanning activities, exploring trends related to the conservation of culinary traditions, immersive food experiences, and the role of food as a social practice. Through Trend Research and STEEP analysis, they identified a focused domain: Food as Identity. This lens allowed them to approach food not only as a source of nutrition, but as a medium of cultural expression and human connection. They recognized that food embodies memories, places, relationships, and creativity – nourishing not only the body, but also imagination and the senses. In this sense, food can be understood as a cultural artifact that carries stories, evokes emotions, and connects individuals across time and space.

Building on this exploration of alternative futures within the *Food as Identity* domain, the students formulated a guiding vision question: “How can we define ourselves through food in an increasingly hyper-connected and hybrid world?” This question situated the scenario within a plausible global context characterized by strong governmental efforts to preserve biodiversity and cultural heritage, alongside a societal shift toward sharing, exchange, and collective practices over isolation. From this starting point, the *Festival of Memories* scenario emerged as a vivid glimpse into a possible future. During the Scenario Worldbuilding activity, students further developed the narrative through detailed storytelling, speculative artifacts, and evocative visual elements, constructing an immersive vision of how food, memory, and identity might evolve in the near future.

On the following pages, as you read the scenario, you will encounter its different components, such as trends, artifacts, and personas, developed throughout the course. Each element is accompanied by a link to the students' working space on the Miro board, illustrating how it emerged through their design process. These elements are marked to illustrate how each step of the Design Futures process contributed to building a scenario that is both grounded in real-world signals and deeply imaginative. This approach demonstrates how the Design Futures process enables students to translate research and reflection into a coherent and compelling vision of the future. All visuals representations were created by the team of students that developed the scenario “Festival of Memories”.

Festival of Memories

Future scenario "Festival of Memories" created by Alida Gazzotti, Bianca Reale, Marco Peroni, Marta Marino, Paola Novelli

Ten years from now, food is no longer what it used to be. A decade of crises has reshaped the world's relationship with eating. Rising temperatures, extreme droughts, and relentless storms have pushed agriculture to the brink. *Entire species of plants and animals have vanished* (1→). Fields that had once fed millions turned to dust or drowned in rising waters. Supermarkets, once overflowing with options, now offer only the essentials – standardized meals enriched with nutrient pills to meet daily needs. *Meals have become functional* (2→), stripped of diversity and taste, designed to preserve resources and prevent waste.

It all started 10 years ago, when the Earth reached a tipping point. Temperatures rose sharply, and violent weather events – droughts, floods, storms – began wiping out crops across the globe. Fields that had once fed millions turned to dust or drowned in rising waters. Scientists tried to respond to the crisis. Research groups worldwide rushed to develop solutions to preserve what biodiversity was left. At the same time, people took to the streets. Food prices had soared, and basic goods were disappearing. From New York to New Delhi, *massive protests erupted* (3→) – acts of desperation from those who could no longer afford to eat. This moment became known as the *Mass Rebellion* (4→).

[Link 1→](#)
Macro-trend:
Biodiversity Loss.

[Link 2→](#)
Trend:
Functional Food.

[Link 3→](#)
Macro-trend: Growing
Socio-economic Gap.

[Link 4→](#)
Alternative Futures:
Fictional Event.

Figure 1.
Mass Rebellion.



In two years from then, the crisis could no longer be ignored. The United Nations and the FAO declared a global food emergency. Together, they launched *new international directives* (5→) to tackle the twin challenges of climate collapse and food insecurity. People started to understand that global cooperation was the only path forward. That is when the governments introduced the *Food Reform* (6→) – a global initiative that drastically restricted available ingredients and promoted regulated, identical meals. It was a measure of survival. Slowly, humanity adapted. This shift wasn't just about feeding people; it was about fairness, efficiency, and trying to give the planet time to heal. Children born after the Food Reform have known no other way of living. For them, food has always been a fuel. But in the middle of all this, people still longed for the flavors of the past – the joy of biting into a ripe fruit, the smell of fresh basil, or the simple happiness of a chocolate bar.

After few years, a breakthrough arrived: GustAI. It was a powerful *artificial intelligence* (7→) designed to recreate the smells and flavors of extinct foods. Using data from across the world, *GustAI* (8→) allowed people to “taste” what was lost. At the same time, something beautiful began to bloom – a tradition that honored memory, culture, and hope.

Around the globe, cities began organizing *Festivals of Memories* (9→), celebration dedicated to the forgotten joys of food. During these few days, people are invited to reconnect with ancient flavors and foreign dishes, brought back to life through the combined magic of preserved crops and the latest food simulation technologies like GustAI. Though many ingredients are now extinct, sensory simulations allow visitors to experience their taste, smell, and texture as if they were real.

For *sixteen-year-old Sarah* (10→), the Festival is more than just a cultural event. It's a lifeline to her childhood. Sarah attends the High School of Arts and Multimedia. Her days are filled with sketches and colors, but mealtimes are always the same: a bland, textureless paste paired with flavor capsules. After judo practice, she takes the tech-bus – a low-emission vehicle – to pick up her younger sister, Aisha. The city is already buzzing. Holographic posters for the Festival of Memories glow along the buildings, flickering images of steaming dishes and ripe fruits lighting up the skyline (Figure 2).

[Link 5→](#)
Scenario-building:
Scenario Context.

[Link 6→](#)
Worldbuilding:
Future Policy.

[Link 7→](#)
Trend: Use of AI
in Gastronomy.

[Link 8→](#)
Alternative Futures:
Fictional Object.

[Link 9→](#)
Alternative Futures:
Fictional Event.

[Link 10→](#)
Worldbuilding:
Future Artefact.



Figure 2.
Street campaign of the
Festival of Memories.

Aisha runs to Sarah, her backpack bouncing with excitement. “Did you bring the pudding?” she asks.

Sarah smiles and hands her the small container: chocolate-flavored pudding, Aisha’s favorite, paired with a vitamin supplement. As they sit on a bench outside the school, Sarah begins to tell a story. “When I was your age, we used to eat chocolate eggs on Easter. Not from a pill, real eggs, made of actual chocolate, with surprises inside.”

Aisha’s eyes widen. “Like, big balls of chocolate?” she laughs. “That sounds like a fairy tale!”

To Aisha, Sarah’s stories are like visions from another world. She’s never seen an egg let alone tasted one. But through Sarah’s words, she begins to imagine (Figure 3).

Two days later, they arrive at the Festival of Memories.

The city is alive with music and light. Families wander between vibrant stalls, each dedicated to a different culinary memory. Sarah and Aisha start at the *Traditional Food Stands* (11→). These offer dishes made with ingredients from the last remaining farms (Figure 4). Carefully stored seeds and crops are used to bring old recipes to life. Sarah eats a slice of warm pizza and closes her eyes. For a moment, she is back at her childhood table, surrounded by family, with the smell of food filling the room. Around them, older people

[Link 11→](#)
Worldbuilding:
Future Artefact.

AISHA

6 YEARS OLD, **STUDENT**

INTERESTS: HYPERDOLL, SUPERKIDS VISOR

"I love learning about what Sarah's life was like. It seems like such a strange and funny world, and I'd really love to see it..."

FAVORITE STANDARD MEAL



share stories with the younger ones. They talk about Easter lunches, Sunday dinners, and small food rituals that once brought families together. The sense of belonging and shared history is strong here. Next, they walk to the *Foreign Foods Area*. These stalls serve dishes from other countries – meals once easy to find, now almost impossible to grow or transport. Aisha tastes something sweet and spicy. "This tastes like a story", she says with a grin.

Figure 3.
AI-generated image of a future persona - Aisha.

Figure 4.
Flyers and badges from the Festival of Memories.



Figure 5.
Traditional food stands at
the Festival of Memories.

[Link 12→](#)
Worldbuilding:
Future Artefact.

These dishes remind visitors of the wide world and all the cultures once connected by food. Now, with travel limited and many ingredients gone, these flavors feel magical.

Then, they enter the most emotional part of the Festival: the *Extinct Foods Zone* ([12→](#)). This area uses advanced technology to bring back the taste of foods that no longer exist.

With the help of GustAI, an artificial intelligence system, people can experience extinct foods using sensors and visors. There's no real chocolate or tomato here, but the simulation is so real that the brain believes it's tasting the real thing. People close their eyes and taste strawberries, bread, even truffles – foods that once filled markets and homes. Sarah watches someone try a simulated strawberry and laugh with joy. These moments are bittersweet. The food isn't real, but the emotions are.

Finally, Sarah and Aisha find what they've been looking for: the *Chocolate Egg Stand*. A few real chocolate eggs have been made with preserved ingredients and are offered as a rare treat.



Figure 6.
Foreign food area at the Festival of Memories.



Figure 7.
Extinct food zone at the
Festival of Memories.

They sit together on a high terrace overlooking the Festival. A gentle wind blows as they unwrap the egg and share it with their fingers sticky with chocolate. The taste is rich, deep, and unforgettable.

Sarah looks out over the city and the smiling people below. The Festival is full of joy, but also filled with longing. She remembers the world before the food crisis – colorful, diverse, full of smells and flavors. She glances at Aisha, still tasting the chocolate with wonder in her eyes. In that moment, Sarah feels a quiet hope. Maybe one day, Aisha will live in a world where food is joyful again, not just something to survive on – but something to celebrate, to share, and to remember.

Now it is your turn: What actions and strategies could be taken today to create, or avoid, this future?

PART 3

Applying Design Futures Process in Different Contexts

9. Adapting the Design Futures Process Across Educational and Innovation Contexts

Throughout the book, we have presented the Design Futures approach as a future-oriented educational framework that enables students to explore uncertainty, imagine alternative futures, and develop meaningful interventions through the integration of futures thinking, creativity, experiential learning, and design practice. In Part II, this framework was presented as a continuous journey of a semester-long classroom framed by the Ministry for the Future Educational Framework.

Yet one of the strengths of the Design Futures approach is that it is not tied to a single educational format, disciplinary field, or institutional setting. Rather than being a fixed methodology, Design Futures can be understood as a flexible framework that can be adapted, re-configured, and expanded according to different contexts, objectives, participants, and challenges.

As contemporary societies face increasingly complex transitions, such as digital transformation, climate change, demographic shifts and others, there is a growing need for methods that can help individuals and organisations navigate uncertainty while remaining capable of imagining and shaping preferable futures

(Gutarra Romero *et al.*, 2025). The ability to anticipate change, explore alternative possibilities, and translate future insights into action is valuable not only in design education but also in professional training, innovation ecosystems, public sector initiatives, and cross-sector collaborations (Benavides Rincón & Díaz-Domínguez, 2021; Linares-Barbero & De la Vega, 2024).

This adaptability is particularly important because futures challenges rarely fit neatly within disciplinary boundaries. Addressing complex societal issues requires collaboration among designers, engineers, creatives, entrepreneurs, policymakers, researchers, and citizens. Consequently, Design Futures must be capable of operating within multidisciplinary environments while maintaining its capacity to foster creativity, critical thinking, and long-term perspective.

This part of the book explores this adaptability through two case studies that demonstrate how the Design Futures process can be reconfigured in different contexts while preserving its fundamental principles.

The first case study presents the Digital Creativity for Developing Digital Maturity Future Skills (DC4DM) project, an Erasmus+ initiative that adapted the Design Futures process to support the development of future professionals capable of guiding digital transformation. In this context, the methodology was implemented through international Learning Labs involving multidisciplinary student teams, industry mentors, and real-world societal challenges. The focus shifted from a semester-long educational experience towards an intensive and challenge-based learning format designed to develop Digital Creative Abilities (DCAs) and prepare Digital Maturity Enablers capable of navigating technological change, fostering innovation, and supporting organisational transformation.

The second case study presents the MUSAE project, a Horizon Europe initiative that expanded the Design Futures approach into an art-driven innovation framework. Through collaborations between artists, SMEs, researchers, and technology experts, the Design Futures process evolved into the Design Futures Art (DFA) Method, integrating futures thinking with artistic inquiry to generate future scenarios and translate them into innovation opportunities and technological prototypes. Here, artistic inquiry became a central driver of futures

exploration and innovation, demonstrating how speculative imagination can contribute to responsible technological development.

Although these two applications differ considerably in duration, participants, objectives, and outcomes, they share a common foundation. Both use futures thinking to move beyond present-oriented problem solving. Both encourage participants to engage with uncertainty and complexity. Both employ future scenarios as tools for exploration and decision-making. And both seek to transform futures imagination into meaningful action.

Together, these examples demonstrate that Design Futures is not merely a teaching method, but a transferable framework for future-oriented learning, innovation, and collaboration. By examining how the process changes across contexts, readers can better understand which elements are essential, which elements can be adapted, and how the approach might be implemented within their own educational, professional, or organisational settings.

The chapters that follow therefore invite readers to look beyond the specific projects themselves and focus on the broader question that lies at the heart of this part of the book: *how can Design Futures be adapted to help different communities, organisations, and disciplines imagine and create preferable futures?*

10. Design Futures for Developing Digital Maturity Future Skills: DC4DM Project

The Design Futures process described throughout this book was originally developed and tested within academic design education contexts. However, one of its strengths is the adaptability to different educational settings, learner profiles, and innovation challenges. A particularly significant example is provided by the European Erasmus+ project *Digital Creativity for Developing Digital Maturity Future Skills (DC4DM)* ([1→](#)), coordinated by IDEActivity Center of Politecnico di Milano between 2020 and 2023.

[Link 1→](#)
DC4DM project website.

The project addressed a growing challenge faced by organisations across Europe: the need to develop new professional profiles capable of guiding digital transformation while maintaining a human-centred, ethical, and future-oriented perspective. While digital technologies are transforming every sector of society, organisations often struggle to identify talents capable of understanding technological opportunities, anticipating future developments, and translating them into meaningful innovations. The project therefore introduced the concept of the *Digital Maturity Enabler (DME)*, a professional capable of supporting organisations in achieving Digital Maturity through a

combination of digital knowledge, creativity, strategic thinking, and futures-oriented capabilities.

To support the development of these competencies, the project adopted and further evolved the Design Futures process presented in this book. Unlike the semester-long Design Futures course described in the Ministry for the Future framework, DC4DM implemented the methodology through intensive ten-day Learning Labs involving students from Design, Engineering, Architecture, and related disciplines coming from Italy, France, and Portugal. Participants worked in multidisciplinary and multicultural teams on real challenges proposed by startups, SMEs, and innovation organisations, while being supported by mentors from academia, industry, engineering, design, and entrepreneurship.

This context required a different configuration of the process. The immersive narrative dimension of the Ministry for the Future framework was replaced by real-world challenges provided by external organisations. The educational focus shifted from developing futures literacy alone towards empowering Digital Creative Abilities and preparing future Digital Maturity Enablers capable of navigating technological transformation. Despite these differences, the core logic of the Design Futures process remained unchanged: understanding the present, exploring alternative futures, constructing scenarios, and generating strategic concepts capable of responding to long-term challenges.

10.1. The DC4DM Educational Model of Competencies

The DC4DM Educational Model of Competencies model (Figure 1) was designed as a human-centred educational framework aimed at empowering learners to thrive within an increasingly complex and digitally enabled world and to support the development of future professionals capable of acting as **Digital Maturity Enablers**: individuals able to understand emerging digital technologies, anticipate their future implications, collaborate across disciplines, and guide organisations towards more responsible and mature forms of digital transformation. Rather than focusing exclusively on technical competences, the model em-

phasises the development of **Digital Creative Abilities** (DCAs), a set of cognitive, social, strategic, and future-oriented capabilities that allow individuals to creatively and responsibly leverage emerging technologies. The DC4DM action model translates the conceptual framework of digital creativity into an educational instrument. It is based on two interdependent parts: a methodology that defines the learning process and a training format that creates the conditions for that process to unfold.

The model is organised into three interconnected components: **Enabling DCAs**, **DCAs Application**, and **DCAs Iteration**. Together, these three areas describe a complete learning trajectory: from the development of foundational competences to their application within a Design Futures process, and finally to their consolidation and transfer into future professional contexts.

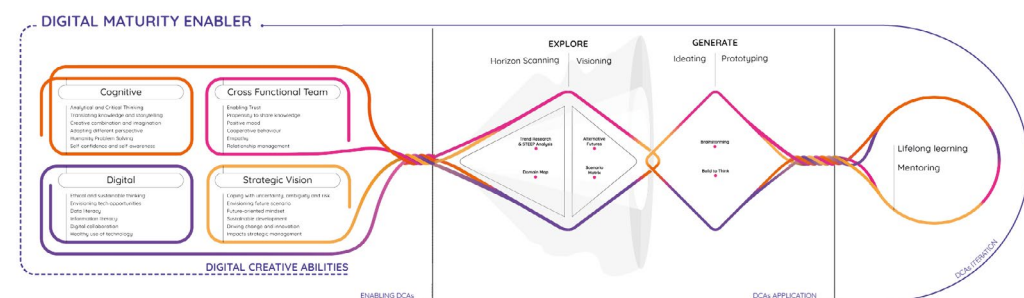


Figure 1.
Conceptual DC4DM
Educational Model of
Competencies to reach
Digital Maturity. Source:
Authors, 2023.

Component 1: Enabling DCAs: building the competence foundation

The first part of the model, *Enabling DCAs* (Figure 2), corresponds to the theoretical and competence-based foundation of DC4DM. It identifies the *Digital Creative Abilities* (DCAs) that learners need to develop in order to become capable of navigating digital transformation creatively and responsibly. These abilities are organised into four main dimensions:

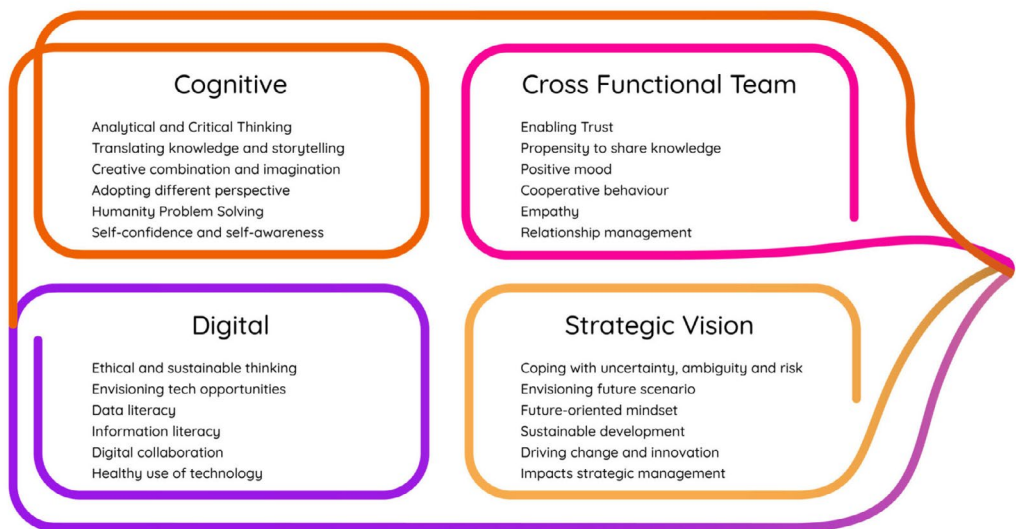
Cognitive Dimension. This dimension includes the abilities that support critical, creative, and reflective thinking. Learners are encouraged to develop analytical and critical thinking, creative combination and imagination, storytelling, divergent thinking, adaptive approaches, and self-awareness. These abilities allow them to interpret complexity, generate original ideas, and approach problems from multiple perspectives.

Digital Dimension. This dimension focuses on the capacity to understand and use digital technologies in a conscious and strategic way. It includes ethical and sustainable thinking, data literacy, information literacy, digital collaboration, envisioning technological opportunities, and healthy use of technology. The goal is not to train purely technical specialists, but professionals able to understand the implications and possibilities of digital technologies.

Cross-Functional Team Dimension. Digital transformation requires collaboration across different disciplines, roles, and cultures. This dimension therefore focuses on enabling trust, empathy, cooperation, positive mood, knowledge sharing, and relationship management. It prepares learners to work in diverse teams and to integrate different forms of expertise.

Strategic Vision Dimension. This dimension develops the ability to think in long-term, anticipatory, and systemic ways. It includes coping with uncertainty, ambiguity and risk, envisioning future scenarios, future-oriented mindset, sustainable development, driving change and innovation, and impact strategy management. This dimension is particularly important because it connects digital creativity with future-oriented decision-making.

Figure 2.
The first part of the model, Enabling DCAs.
Source: Authors, 2023.



In this first area, the DCAs are made explicit. Learners are not only exposed to creative and future-oriented activities but are also invited to recognise which abilities they are activating and why these abilities matter for Digital Maturity.

Component 2. DCAs Application: putting abilities into practice through Design Futures

In the second part of the model, *DCAs Application*, these dimensions converge within the *Design Futures process* (Figure 3), which acts as the operational mechanism through which Digital Creative Abilities are activated and applied. This part allows learners to move from understanding change to generating future-oriented solutions. The Design Futures process has the same integration of Futures Thinking and Design Thinking described in Part I of this book. This process is structured around two main movements: **Explore** and **Generate**.

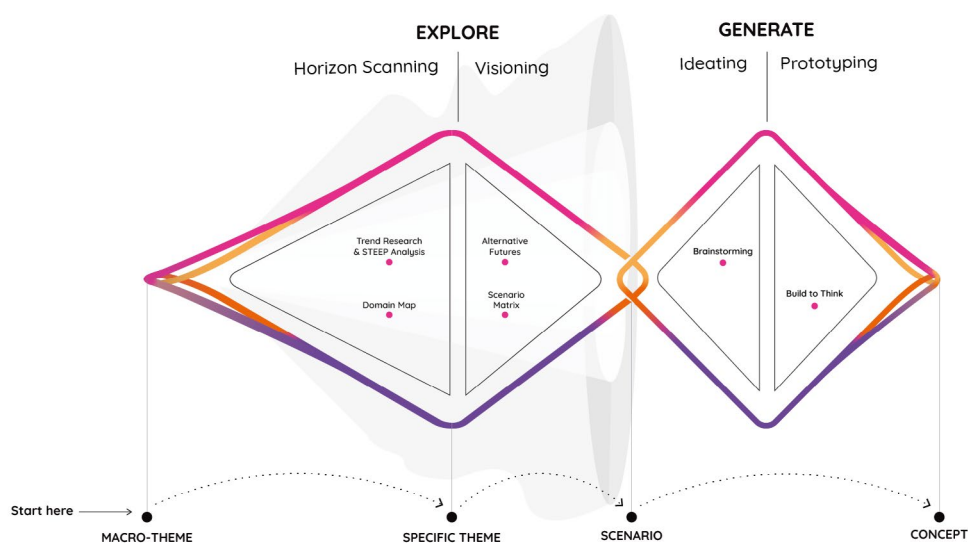


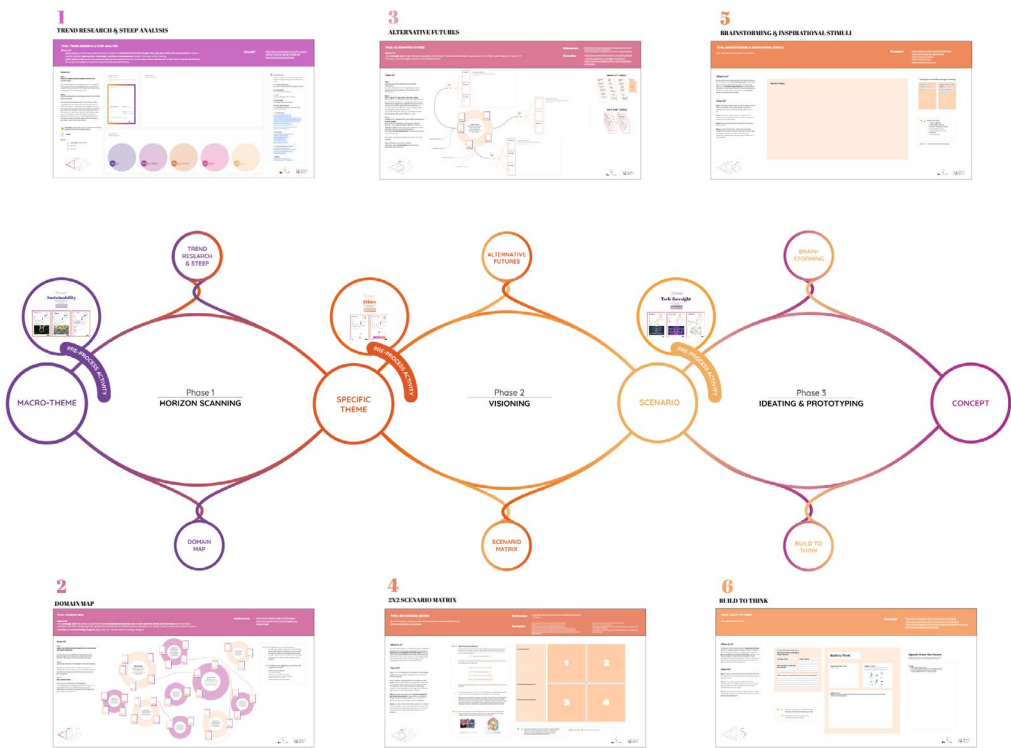
Figure 3.
The Design Futures
process of DC4DM model.
Source: Authors, 2023.

In the **Explore** phase, students engage in activities such as Horizon Scanning and Visioning. They investigate signals, trends, technologies, behaviours, and systemic transformations, then use them to construct alternative futures and scenario matrices. This phase activates abilities such as critical thinking, futures thinking, sensemaking, technological awareness, and strategic vision. In the **Generate** phase, students move from scenarios to ideas and prototypes. Through

Ideation and Prototyping activities, they translate future insights into concepts, services, strategies, or interventions. In this phase, the DCAs become practical: learners use creativity, collaboration, digital awareness, and strategic thinking to design proposals that respond to future challenges.

The process therefore functions as the space where competences are not only discussed, but enacted. Learners develop Digital Creative Abilities by applying them to real challenges, working in teams, and transforming future scenarios into actionable innovation concepts. In DC4DM, the Design Futures process also integrates three preparatory activities before each phase of the process, which correspond to the Drivers of Sustainability, Ethics, and Technology Foresight. These activities equip learners with the conceptual vocabulary and awareness of environmental, ethical and technological implications of their design solutions (Figure 4).

Figure 4. Operational DC4DM Educational Model of Competencies included in the Miroverse. Source: Authors: 2023.



Component 3. DCAs Iteration: consolidating and transferring learning

The third part of the model, *DCAs Iteration*, focuses on what happens after the process. It recognises that becoming a Digital Maturity Enabler is not the result of a single workshop or project, but an ongoing learning trajectory.

This final part includes two key dimensions: *lifelong learning and mentoring*. Through lifelong learning, learners are encouraged to continue updating their knowledge, reflecting on emerging technologies, and adapting their abilities to new contexts. Since digital transformation is constantly evolving, Digital Maturity cannot be understood as a fixed condition. It requires continuous learning, curiosity, and openness to change. Through mentoring, learners are invited to transfer what they have learned to others, supporting peers, teams, organisations, or communities in developing similar capacities. In this sense, the model becomes iterative: the Digital Creative Abilities developed during the process are reinforced, shared, and reactivated in new contexts.

The DCAs Iteration phase therefore extends the impact of the educational experience beyond the Learning Lab itself. It transforms the learning process into a continuous cycle of competence development, application, reflection, and dissemination.

Overall, the DC4DM Educational Model of Competencies can be understood as a structured pathway for transforming learners into Digital Maturity Enablers. The *Enabling DCAs* define what needs to be developed; the *DCAs Application* shows how these abilities are activated through the Design Futures process; and the *DCAs Iteration* ensures that the learning is consolidated, transferred, and continuously renewed. The Learning Labs represented the practical implementation of this model. During ten intensive days, students worked in multicultural teams on future-oriented challenges proposed by companies and organisations.

This model and approach form the educational ecosystem in response to a growing challenge faced by organisations undergoing digital transformation: identifying talent capable of interpreting technological change, anticipating future developments, and translating them into meaningful innovation pathways.

10.2 The Educational Ecosystem for Digital Creativity and Futures Thinking

A distinctive aspect of the DC4DM project is that it evolved beyond a single educational methodology into a complete learning ecosystem designed to support both educators and learners. At the centre of this ecosystem lies the DC4DM EduBox, an open-access collection of educational resources ([2→](#)) developed to facilitate the dissemination and adoption of the model across different institutions and contexts. The EduBox is conceived not as a static repository but as an interactive system of resources supporting the entire learning journey (Figure 5).

[Link 2→](#)
DC4DM EduBox.

The ecosystem includes:

- **An Open Book**, introducing the theoretical foundations of Digital Creativity and Digital Maturity.
- **A MOOC**, designed to train educators and students in the application of the model.
- **A Toolkit** containing activities, templates, exercises, and facilitation guidelines in which there are the Miroverse board with: 1) the *DC4DM Model*, describing the competencies and educational principles underpinning the framework; 2) the *Design Futures Process*, providing the methodological pathway through which learners apply DCA with process, tools, theoretical presentations, DCAs cards.
- **The Learning Labs format** that combines lectures, workshops, mentoring sessions, field research, and collaborative design activities templates to create a highly immersive environment where creativity, futures thinking, and digital transformation could be explored simultaneously.
- **A shared Vocabulary**, establishing a common language around digital creativity, futures thinking, and digital maturity.
- **A collection of Digital Maturity Pills**, short inspirational resources produced with international experts.

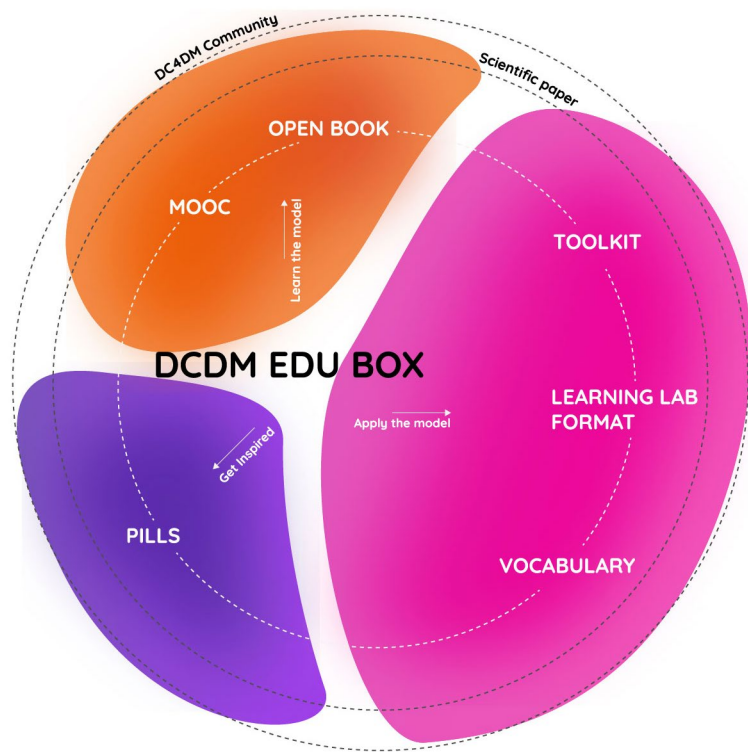
To facilitate practical implementation, indeed, the project developed a dedicated digital environment through *Miroverse* ([3→](#)), providing a structured collaborative workspace for both educators and students. The Miro is organised into two complementary pathways. The first pathway is dedicated to educators and mentors, providing facilitation

[Link 3→](#)
DC4DM Miroverse.

guides, teaching materials, workshop structures, and implementation strategies. This enabled teachers to understand not only the individual tools but also the pedagogical logic connecting them. The second pathway is designed for students and offers a guided experience through the Design Futures process. Participants could progressively move from horizon scanning to scenario development and concept generation while documenting their work within a shared space.

Together, these resources create a coherent educational infrastructure capable of supporting the development of Digital Maturity Enablers across different universities, countries, and disciplinary backgrounds. The ecosystem therefore transformed the Design Futures process from a single educational intervention into a scalable and transferable framework for digital creativity and future skills development.

Figure 5.
The Interactive DCDM
EDUBox. Source:
Authors, 2023.



10.3 The Learning Lab Format

The Learning Labs represented the most intensive and immersive implementation of the DC4DM model. Conceived as ten-day international workshops, they functioned as experimental environments where participants could apply the entire educational framework while working on real-world challenges proposed by startups, SMEs, and innovation organisations.

Three Learning Labs were organised during the project in Madeira (Portugal), Saint-Étienne (France), and Milan (Italy). Each edition brought together students from different countries and disciplinary backgrounds, including Design, Engineering, Architecture, Business, and Computer Science. This diversity was intentionally cultivated to mirror the cross-functional collaboration increasingly required within contemporary organisations. The Learning Labs compressed the Design Futures process into a highly intensive format. Students worked in multicultural teams and were supported throughout the process by a network of mentors coming from academia, industry, startups, SMEs, and innovation centres. The coexistence of different expertise created a rich learning environment in which technical, strategic, entrepreneurial, and design perspectives continuously intersected.

Each Learning Lab was organised around a future-oriented challenge connected to a specific societal and technological topic. The Learning Lab in Madeira “Feeding Madeira” was focusing on regenerative and distributive food systems for sustainable island futures; in Saint-Étienne “Future Mobility” explored directions towards a mobile future in a sustainable and intelligent environment; and in Milan “Futuring Care” revolved around rethinking well-being by envisioning digital solutions seamlessly integrated into daily life. In all LLabs, participants moved through successive phases of research, trend exploration, alternative futures, scenario building, and concept generation. Workshops, lectures, mentoring sessions, peer learning activities, and collaborative studio work alternated throughout the ten days, creating a dynamic balance between theoretical input and practical application.

From an educational perspective, the Learning Labs played a role similar to the Futures Atelier described in this book. However, while

the Design Futures course unfolds over an academic semester and is supported by the immersive narrative of the Ministry for the Future storyworld, the Learning Labs relied on intensive collaboration, real industrial challenges, and direct interaction with external stakeholders. The result was a highly accelerated version of the Design Futures process capable of generating meaningful futures-oriented concepts while simultaneously developing Digital Creative Abilities.

The Learning Lab format therefore demonstrates how the Design Futures process can be adapted to different educational configurations without losing its core objective: enabling learners to understand complexity, imagine alternative futures, and design strategic interventions to shape preferable futures.

10.4 Applying Design Futures Across Scales: Three Pathways from a Shared Challenge

The projects developed during the DC4DM Learning Labs covered a wide variety of themes, ranging from food systems and environmental regeneration to healthcare, mobility, and digital transformation. Rather than presenting a comprehensive overview of all the outcomes produced throughout the project, the following section focuses on three selected projects that exemplify different ways in which the Design Futures process can be applied to address complex societal and technological challenges.

All three projects originate from the same Learning Lab, *Feeding Madeira: Regenerative and Distributive Food Systems for Sustainable Island Futures*, held in Madeira in 2022. The Learning Lab challenged students to explore the future of food systems on an island territory characterised by strong ecological interdependencies, limited resources, and increasing environmental pressures. Starting from this broad and complex theme, students applied the Design Futures process to investigate signals of change, identify emerging domains of opportunity, and progressively narrow their focus towards specific areas of intervention.

The resulting projects demonstrate one of the strengths of the Design Futures methodology: its ability to move from a broad systemic challenge to multiple specialised domains, each representing a different entry point for innovation. Although all teams started from the same macro-theme, they identified distinct future opportunities and developed radically different trajectories for action.

The projects were selected because they illustrate three complementary scales of intervention and three distinct perspectives on future-oriented innovation.

U-Farm explores the future of agro-biodiversity through the lens of community resilience and collective stewardship. Emerging from the broader challenge of sustainable food systems, the team identified agro-biodiversity as a critical domain for future resilience and developed a concept centred on knowledge sharing, local participation, and biodiversity preservation.

Nascente – LauriLeaf investigates the relationship between water, ecosystems, and public infrastructures. Starting from the recognition that food systems depend fundamentally on ecological resource cycles, the team focused on freshwater accessibility and the relationship between the Laurisilva forest and Madeira's hydrological system. The project demonstrates how future scenarios can be translated into living architectures and experiential environments that combine environmental regeneration, technological innovation, and behavioural change.

Bis-Bis – Smart Forest Communities expands the perspective further by questioning the relationship between humans and non-human species. By exploring the ecological foundations that sustain food production, the project moves beyond anthropocentric perspectives and investigates how technologies, ecosystems, and communities might coexist within future multispecies societies.

Together, these three projects demonstrate the versatility of the Design Futures process across different domains and scales, from community-based systems to public infrastructures and ecological futures. They also illustrate how a single challenge can generate multiple futures pathways and design opportunities. More importantly, they reveal how the Design Futures methodology enabled students not only to imagine alternative futures but also to translate them into

strategic concepts capable of generating social, environmental, and technological value. In doing so, they exemplify the broader ambition of the DC4DM project: preparing future Digital Maturity Enablers capable of approaching complex challenges through creativity, futures thinking, and responsible innovation.

U-Farm: Reimagining Agro-Biodiversity Communities by Alina Panzetti, Clément Dumas, Greta Cappellini, Fanny Rabaud, Mikey Baptista, Yassine Kalaa

The U-Farm project explored the future of agro-biodiversity and community-based agriculture (Figure 6). Starting from concerns regarding biodiversity loss, resource scarcity, and the increasing fragility of food systems, the team investigated how agricultural communities might become more resilient and self-sufficient in the future.

Through Horizon Scanning activities, students identified emerging trends related to community farming, precision agriculture, hydroponics, local food production, and knowledge sharing between generations. These insights informed the development of future scenarios exploring different relationships between resources, technologies, and rural and urban communities.

Figure 6.
U-Farm concept.



The selected future scenario envisioned agricultural systems characterised by strong community participation, local resilience, and technologically supported biodiversity management. Based on this vision, the team developed **U-Farm**, a collaborative platform and toolkit designed to support farmers in sharing knowledge, preserving biodiversity, and strengthening local food ecosystems. The concept combined digital technologies – U-Pill a precision farming tool to collect and transfer data to the U-Farm platform – with urban farming community engagement, demonstrating how futures thinking can help create innovative solutions that reinforce both ecological and social sustainability.

Nasciente: Reconnecting Communities, Water and Forest Ecosystems by Marwa Adouani, Laurie Barenne, Giuseppe Di Frisco, Zakaria Legliti e Filippo Parolini

The Nasciente project emerged from the *Water & Forest: Island Life-Blood challenge* developed during the first DC4DM Learning Lab in Madeira. The challenge focused on the ecological relationship between the Laurisilva forest, a UNESCO World Heritage ecosystem, and the island's water cycle. The team investigated how future societies might ensure equitable access to freshwater while simultaneously strengthening the relationship between communities and the natural systems that sustain them. The starting question was not only technological but deeply social and ecological: how might future communities recognise water as a shared resource and actively participate in its stewardship?

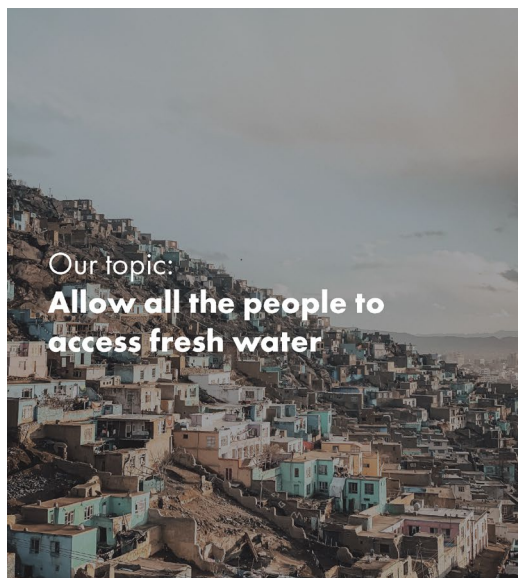
Through Horizon Scanning activities, the students explored emerging trends related to water management, circular economy practices, smart materials, algae-based technologies, urban regeneration, AI-supported environmental management, and community-centred approaches to sustainability. The research revealed a growing convergence between ecological restoration, distributed resource management, and behavioural change, highlighting the importance of combining technological innovation with social engagement.

From this exploration, the team identified a set of guiding values that would shape their future vision: social equity, community participa-

Figure 7.
Guiding values of
the scenario identified
by the team.

Figure 8.
Alternative futures of
the topic that the team
envisioned.

tion, education for sustainable behaviour, the integration of nature and artificial intelligence, and the use of algae as a strategic resource for environmental regeneration (Figure 7). These values informed a future vision in which water scarcity becomes a major societal challenge, requiring communities to adopt new collective habits and more equitable systems of resource distribution.



#KEYWORDS



SOCIAL EQUITY

It is important for the emerging generations to **learn** not only about the **inequities** faced by many communities related to water scarcity but also **how to combat** them.



COMMUNITY CENTERED APPROACH

"Do what you can, with what you have where you are"
All people should **believe** that the global effort is **worthy**.



SUSTAINABLE BEHAVIOURS

Changing **people's behaviour** will be empowered by the alternative solutions of water access. So that everyone can get **closer** to nature.



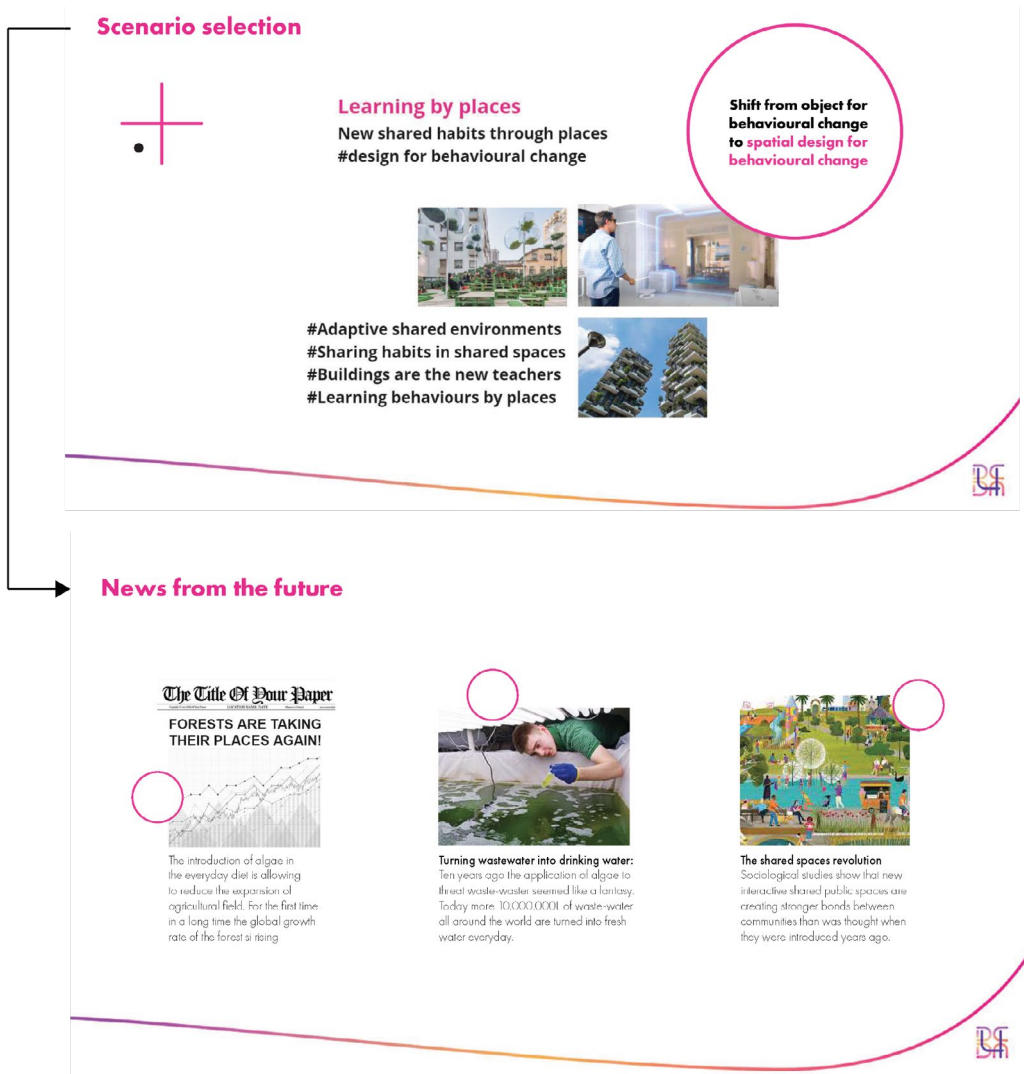
Alternative future

We have created our visions of the future and then we have identified our **shared values** to create a common future.



The resulting vision imagined a future where access to freshwater is supported by shared infrastructures, public participation, and a re-newed understanding of the relationship between humans and natural ecosystems (Figure 8). The scenario-building phase further developed this vision through a future world in which algae-based technologies become central to water purification and environmental management (Figure 9). Rather than focusing on individual products designed to change behaviour, the team explored how public spaces themselves could become educational and transformative environments.

Figure 9.
Scenario selection and
News from the Future of
LauriLeaf.



A key design question emerged: *what role could algae play in shaping future spaces that encourage sustainable behaviours and collective responsibility toward water resources?*

This reflection led to the development of *LauriLeaf*, a speculative living architecture inspired by the ecological functioning of the Laurisilva forest (Figure 10). The concept reproduces the forest's natural capacity to collect, filter, and redistribute water. The structure integrates a rainwater harvesting system, wastewater collection, and algae-based purification processes into a public installation where water becomes visible, accessible, and collectively managed. Citizens can directly collect freshwater from the structure while simultaneously learning about the ecological processes that sustain the island's water cycle.

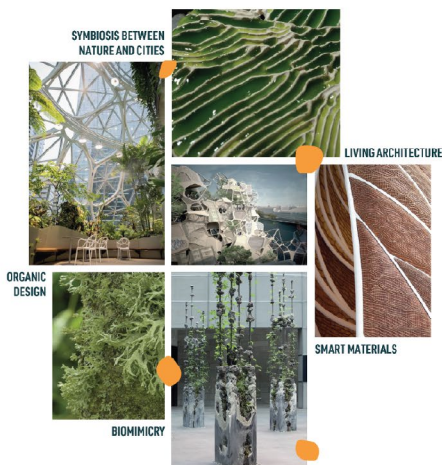
The project deliberately situates *LauriLeaf* within the Mercado dos Lavradores, one of Madeira's most important social gathering places. By positioning the intervention at the intersection of local communities, tourism, food culture, and public life, the team transformed the concept from a technological object into a social infrastructure. The marketplace becomes a living educational environment where visitors can discover algae-based solutions, access information about water systems, and replicate small-scale purification processes within their own homes. Digital technologies further enrich the experience. Through immersive interfaces and interactive educational content, visitors can explore the functioning of the Laurisilva ecosystem, understand the water-harvesting mechanisms embedded in the structure, and visualise how similar systems could be implemented at homes. The concept combines physical infrastructure, environmental education, public engagement, and digital interaction into a single integrated experience.

What makes *Nascente* particularly interesting from a Design Futures perspective is that the final outcome is neither a product nor a service in the conventional sense. Instead, it is a future-oriented socio-technical system that uses architecture, biology, public space, and digital technologies to reshape behaviours and relationships. By translating a future scenario into an experiential environment, the project demonstrates how Design Futures can move beyond technological innovation and support the creation of regenerative futures where environmental awareness, social equity, and collective responsibility become embedded within everyday life.

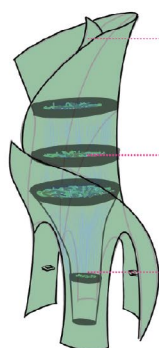
Living architecture

Putting nature's lessons into practise is the main message to share.

From combining **Symbiosis between nature and cities**, to creating a **new living architecture** using **smart materials** and **organic design**, the new structure is the **connection between humans and Madeira**.



Concept: The metaphor of Madeira



Water harvester/
Tree

Algae based
structure/
Forest

Water collector &
dispenser/
South of the island



Bis-Bis: Designing Multispecies Futures for Smart Forest Communities

The Bis-Bis project emerged from the *Forest & Water* domain explored during the Madeira Learning Lab. While several teams focused on resource management, biodiversity, or ecological regeneration, the Bis-Bis team chose to investigate a more fundamental question: how might future societies redefine their relationship with the ecosystems that sustain them?

Figure 10.
Concept of LauriLeaf
the speculative living
architecture.

The project originated from the observation that forests are often considered primarily through their utility for human activities, as providers of resources, ecosystem services, or recreational spaces. Through Horizon Scanning, however, the team identified emerging signals suggesting a broader transformation in the relationship between humans and nature. Trends related to biodiversity conservation, ecosystem restoration, environmental intelligence, biomimicry, regenerative design, and multispecies thinking pointed towards futures in which forests could no longer be understood solely as passive environments but as active participants within complex socio-ecological systems.

These explorations led the team to move beyond conventional sustainability narratives and investigate how future communities might coexist with non-human species in more reciprocal and interconnected ways. Rather than asking how humans could better manage forests, the project reframed the challenge by asking how humans, technologies, plants, animals, and ecosystems might collectively shape future forms of coexistence.

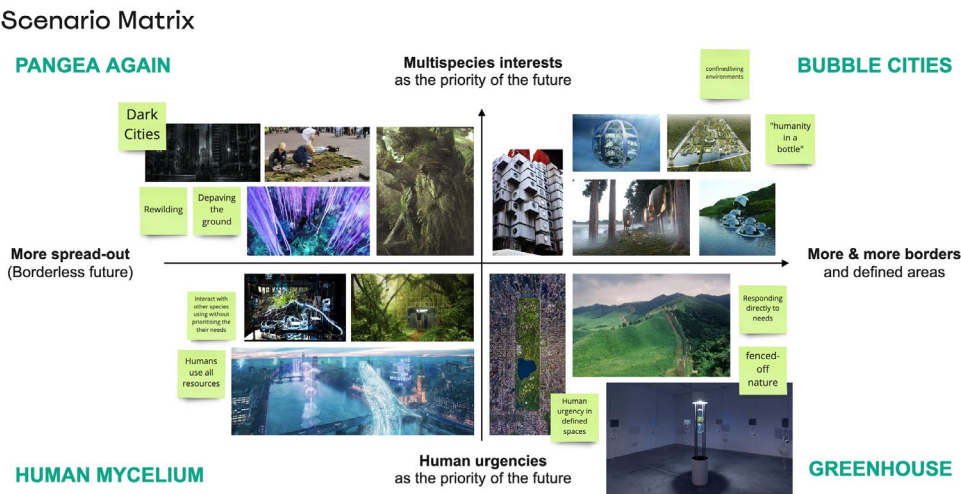
Through the Visioning phase, students developed a future perspective centred on ecological interdependence, mutual care, and collective stewardship. The future was imagined not as a world where technological systems dominate natural environments, but as one in which technologies support deeper understanding, communication, and collaboration between human and non-human actors.

The Scenario Building process explored multiple possible trajectories for this transformation (Figure 11). Among the alternative futures generated, the team selected a scenario that envisioned a future society characterised by strong ecological awareness and new forms of multispecies citizenship (Figure 12). Within this future, forests are no longer viewed simply as protected natural areas but as living communities whose wellbeing is directly connected to human prosperity. In the scenario, technologies operate as mediators that make ecological relationships visible, helping communities understand environmental dynamics and supporting more informed collective decisions.

The resulting concept, Bis-Bis – Smart Forest Communities, translates this vision into a socio-technical ecosystem designed to foster new forms of interaction between people and forest environ-

ments. The project envisions a future in which digital technologies are embedded within ecological systems to support environmental monitoring, collective learning, and active participation in ecosystem stewardship. Rather than positioning technology as a tool for control, the concept reframes it as an instrument for listening, learning, and building meaningful relationships with the more-than-human world.

Figure 11.
Bis-Bis Scenario Matrix.



PANGEA AGAIN

Changing the ways we interact with the other species in a **smart borderless more connected way** while prioritising the multispecies interests.



A fundamental aspect of the process was the requirement for students to ground their visions in evidence emerging from research. Although some of the technologies incorporated into the concept

Figure 12.
Bis-Bis chosen Scenario, Panagea Again.

are still in early stages of development, they are based on existing scientific and technological trajectories identified during the Horizon Scanning phase. For instance, the research of the ability of plants to communicate distress using their own nervous system (Pennisi, 2018) or the potential of plants and seeds in dna-based information storage (Fister *et al.*, 2017). This approach allowed students to move beyond pure speculation and construct plausible future scenarios, anticipating potential societal, environmental, and technological impacts while exploring how emerging innovations might evolve and shape future ecosystems (Figure 13).

A particularly distinctive aspect of the project is its educational dimension embedded in the future scenario. The concept encourages communities to engage directly with ecological processes, making environmental knowledge accessible and experiential rather than abstract. Through continuous interaction with forest systems, citizens develop a stronger understanding of ecological interdependencies and become active participants in preserving biodiversity and ecosystem resilience.

From a Design Futures perspective, Bis-Bis represents a significant shift from human-centred innovation towards a more-than-human approach in future-making. While many innovation projects focus on improving human experiences, Bis-Bis questions who and what should be considered when imagining preferable futures. The project demonstrates how Design Futures can support the exploration of alternative worldviews and expand the boundaries of design beyond human needs alone.

Together with U-Farm and Nasciente, Bis-Bis illustrates how the Design Futures process can move across different scales of intervention, from community resilience and public infrastructures to ecological and multispecies futures. In doing so, it highlights the capacity of futures-oriented design to generate not only new products or services, but new ways of understanding the relationships between society, technology, and the living world.

10.5 Adapting Design Futures Across Educational Configurations

The comparison between the Ministry for the Future Educational Framework presented in this book and the DC4DM model highlights an important characteristic of the Design Futures process: its capacity to operate as a transferable educational infrastructure. At first glance, the application on the Design Futures course and the Learning Lab appear significantly different. The Design Futures course unfolds over an academic semester and is embedded within the immersive narrative framework of the Ministry for the Future. Students progressively build futures literacy through a sequence of reflective, exploratory, and speculative activities supported by storytelling, role-play, and collaborative worldbuilding. The educational emphasis is placed on developing futures awareness, anticipatory thinking, systems thinking, and the ability to imagine and critically discuss alternative futures. The DC4DM Learning Labs, by contrast, were designed as intensive ten-day interventions addressing the urgent need to prepare professionals able to guide digital transformation processes. Rather than operating within a fictional storyworld, participants worked directly on real challenges proposed by start-ups, SMEs, and innovation organisations. The educational focus shifted from the exploration of future possibilities alone towards the explicit development of Digital Creative Abilities and the training of Digital Maturity Enablers capable of generating strategic innovation in technologically evolving contexts (Table 1).

This distinction reveals one of the most significant pedagogical differences between the two educational configurations. Within the Ministry Educational Framework described in this book, the Future Creativity Loop functions primarily as an underlying pedagogical framework. Activities are intentionally designed to activate and strengthen dimensions such as Creative Futures Mindset, Creative Futures Confidence, Creative Futures Teamworking, and Creative Futures Atmosphere, yet these dimensions remain largely implicit. Students develop them through the experience itself, but they are not explicitly presented as learning outcomes or competencies to be assessed. In the DC4DM model, by contrast, these creative capac-

ities become visible and intentional educational objectives. The Digital Creative Abilities are explicitly introduced as the competences required to achieve Digital Maturity and to support organisations in navigating technological transformation. Participants are encouraged to recognise, reflect upon, and deliberately strengthen these abilities throughout the Learning Lab experience.

To support this process, each phase of the Design Futures process is preceded by a series of preparatory activities organised around three foundational drivers: Sustainability, Ethics, and Technology Foresight. These drivers were introduced to cultivate awareness of the societal, environmental, ethical, and technological implications of innovation. In this way, students develop a broader understanding of the contexts within which future technologies operate, while simultaneously strengthening the Digital Creative Abilities required to engage with digital transformation responsibly and strategically.

Despite these differences, both educational configurations share the same conceptual foundation. In both cases, learners are invited to move beyond present-oriented problem solving and engage with uncertainty, long-term thinking, and systemic change. The process remains the core methodological stages through which participants progressively construct their understanding of the future and translate it into actionable interventions. The differences therefore are less in the process itself than in the pedagogical architecture surrounding it.

Within the Design Futures course, the Ministry for the Future storyworld functions as a narrative device that creates emotional engagement, imaginative immersion, and a safe environment for experimentation. Students are encouraged to temporarily suspend present-day constraints and explore future worlds through speculative thinking. The learning experience prioritises exploration, imagination, and futures literacy as foundational capabilities for future-oriented design practice. Within DC4DM, the Learning Lab format introduces a different pedagogical dynamic. Time compression, multidisciplinary collaboration, intensive mentoring, and direct engagement with external stakeholders create a stronger orientation towards action, implementation, and innovation. Futures thinking becomes a strategic capability applied to concrete organisational and societal challenges rather than primarily a vehicle for speculative exploration. Students

are required not only to imagine desirable futures but also to translate them into proposals to support digital transformation, organisational change, and future competitiveness.

From a pedagogical perspective, the two configurations can be understood as complementary expressions of the same educational philosophy. The Ministry for the Future Educational Framework prioritises the development of futures literacy through immersive and experiential learning, while the DC4DM model emphasises the explicit empowerment of creative and anticipatory competences through a competency-based educational framework oriented towards Digital Maturity. In this sense, the DC4DM model can be interpreted as an operationalisation of many of the same dimensions that underpin the Future Creativity Loop, translated into a structured system of competences, drivers, and learning activities.

Together, they demonstrate that Design Futures is not tied to a specific format, duration, or disciplinary setting. Instead, it operates as a flexible educational framework that can be adapted to different learning objectives while preserving its fundamental purpose: enabling learners to understand complexity, anticipate change, and actively participate in shaping preferable futures.

Table 1.
Comparing the Design
Futures course and
DC4DM Learning Labs.

Dimension	Design Futures Course	DC4DM Learning Lab
Duration	12-14 weeks	10 intensive days
Context	Academic course	International innovation workshop
Narrative framework	Ministry for the Future storyworld	Real challenges from SMEs and startups
Participants	Mainly design students	Multidisciplinary and multicultural teams
Mentorship	Course instructors	Academics, designers, engineers, entrepreneurs and SMEs
Main outcome	Future scenarios and concepts	Future-oriented concepts and Digital Maturity skills
Educational goal	Futures literacy and design futures capability	Training Digital Maturity Enablers

10.6 Conclusion

The DC4DM project demonstrates the adaptability of the Design Futures process across educational formats, cultural contexts, and thematic domains. While the Ministry for the Future framework described in this book relies on an immersive narrative storyworld and a semester-long educational pathway, DC4DM shows how the same methodological foundations can be reconfigured into intensive international Learning Labs focused on digital transformation and future skills development.

Across the three projects presented, students addressed challenges related to biodiversity, water management, ecosystem regeneration, and community resilience. Despite their diversity, all projects followed the same underlying logic: understanding complex systems, exploring alternative futures, constructing future scenarios, and generating strategic interventions capable of responding to long-term societal challenges.

More importantly, the experience demonstrates that Design Futures is not limited to design education alone. When integrated with multidisciplinary collaboration, industry mentoring, and real-world challenges, it becomes a powerful educational approach for developing the capabilities required to navigate uncertainty, technological transformation, and emerging futures. In this sense, the DC4DM project represents a compelling example of how Design Futures can contribute to training a new generation of future-oriented professionals capable of supporting organisations and societies in their transition towards more sustainable, responsible, and digitally mature futures.

11. Design Futures Art-driven Method: Art-tech Innovation in Food as Medicine

This chapter explores how Design Futures practice can be reconfigured when applied to a real-world socio-environmental challenge and expanded through artistic collaboration. To meet European sustainability goals and thrive in the digital era, organisations must integrate creativity, emotional intelligence, and critical thinking into their innovation processes alongside technological development (Leopold *et al.*, 2018; Vocke *et al.*, 2020; Klein *et al.*, 2021). Within this frame, artistic and creative inquiries emerge not as a supplementary layer but as a generative force, widening the perceptual field of technological development, surfacing assumptions that analytical approaches leave unexplored, and producing embodied, affective and speculative forms of knowledge that conventional R&D processes cannot easily generate on their own. Despite the growing recognition of art-technology collaboration as a driver of sustainable innovation, there remains a significant gap in structured, future-oriented frameworks to guide such interactions (Hochman & Reben, 2019). The MUSAE project responds to this gap by demonstrating how Design Futures can become an art-driven innovation framework,

capable of connecting artistic imagination, technological experimentation, and societal transformation.

While the previous chapter presented the DC4DM project as an example of how the Design Futures process can be adapted to train future professionals and Digital Maturity Enablers, MUSAE demonstrates a different evolution of the methodology. In this context, the Design Futures process moves beyond higher education and becomes a framework for art-driven innovation, bringing together artists, SMEs, researchers, technologists, and innovation hubs to collaboratively explore and prototype preferable futures.

MUSAE therefore represents a complementary application of Design Futures. Whereas DC4DM focuses on empowering future-oriented competences through educational experiences, MUSAE applies futures thinking as a catalyst for innovation, using artistic inquiry as a strategic resource for anticipating societal challenges and developing new technological opportunities.

MUSAE is a Horizon Europe project ([1→](#)) that ran for three years, from 2022 to 2025, as part of the S+T+ARTS initiative, the European Commission's flagship programme supporting art-technology innovation. The project was developed by a nine-partner interdisciplinary consortium spanning seven countries. Its central aim was to develop and test an innovative MUSAE Factory Model for integrating artistic collaboration into European Digital Innovation Hubs (E-DIHs), the network of hubs designed to support companies in navigating digital transformation. The Factory Model was conceived as a comprehensive innovation ecosystem designed to support and scale collaborations between artists, technology providers, SMEs, and E-DIHs. Rather than focusing on isolated artistic interventions, the model creates a structured environment in which futures thinking, artistic experimentation, and technological innovation operate as interconnected components of a broader innovation process. The core of the model is the Design Futures Art-driven (DFA) method, which provides step-by-step guidance for artists and companies to work together on future challenges and develop technological solutions grounded in future scenarios.

The MUSAE Factory Model consists of several complementary elements (Figure 1):

[Link 1→](#)
MUSAE Project Website.

- **The Design Futures Art-driven (DFA) method**, which acts as the methodological core of the entire ecosystem.
- **An open-call guidelines** for selecting artists and SMEs.
- **A structured residency programme** supporting collaboration between artistic and industrial partners.
- **Training and mentoring activities** focused on futures thinking, emerging technologies, and art-driven innovation.
- **A stakeholder network** connecting companies, artists, researchers, and innovation hubs.
- **A digital collaboration infrastructure** including online platforms and Miro workspaces.
- **A collection of use cases** developed during the residencies demonstrating how the model can be transferred and adapted.

Together, these components create a transferable framework capable of supporting organisations in integrating artistic intelligence into innovation processes while maintaining a strong focus on future-oriented thinking and societal impact.

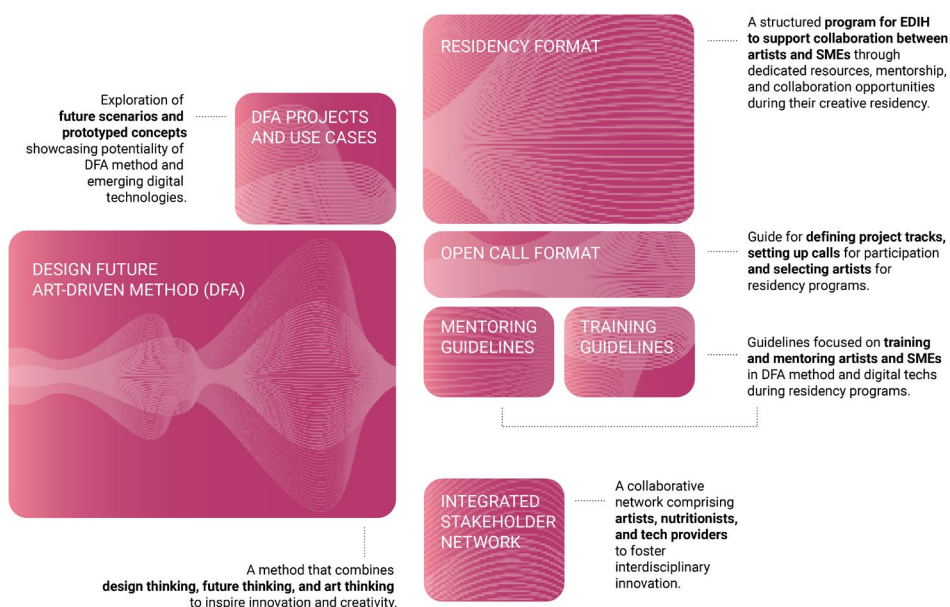


Figure 1.
MUSAE Factory Model.
Source: Authors, 2025.

The project involved twenty-three artists and eleven SMEs across food, robotics, AI, and wearable technology sectors, producing twelve future scenarios and eleven prototypes at Technology

Readiness Level 5 (TRL5) – a scale that indicates demonstration in an industrially relevant environment. The chosen domain for MUSAE project was Food as Medicine. Food represents one of the most complex and interconnected systems shaping contemporary society, linking human health, environmental sustainability, technological innovation, cultural practices, and economic development. For this reason, it provides an ideal context for applying Design Futures methodology, requiring participants to navigate multiple scales of complexity and explore long-term systemic transformations. Food systems are among the largest contributors to greenhouse gas emissions globally (accounting for approximately 20-30% of human-induced GHG emissions) (Fresán & Sabaté, 2019). At the same time, they are among the most powerful levers for improving population health, preventing non-communicable diseases, strengthening community resilience, and supporting more sustainable futures. The concept of Food as Medicine therefore extends beyond nutrition alone, framing food as a strategic entry point through which environmental, social, technological, and health challenges can be addressed simultaneously.

Building on this perspective, the MUSAE project identified three thematic tracks within the Food as Medicine area, each representing an area of urgent challenge, which are (1) *Challenges and opportunities in reducing carbon footprint in dietary behaviour*, (2) *Role of food in holistic wellbeing*, and (3) *Rethinking the food chain in our environment*. Together, these three tracks provided the thematic landscape within which artists and companies worked, applying the Design Futures Art-driven method to identify for signals of change, construct future scenarios, and ultimately develop prototypes that could inhabit those possible futures in material form.

11.1 Design Futures Art-driven (DFA) Method

The DFA method was developed with the goal of supporting artists, creative professionals, and technology-driven companies in collaboratively addressing complex societal challenges and developing

future-oriented innovations. The method can be understood as an evolution of the Design Futures process presented throughout this book. While preserving the fundamental logic of moving from exploration to future scenario creation and concept development, it expands the methodology through the integration of Art Thinking, enabling richer forms of speculation, emotional engagement, critical inquiry, and cultural interpretation.

Rather than positioning artists as communicators or aesthetic contributors to technological projects, the DFA method recognises them as co-creators of future scenarios and innovation trajectories. Artistic practice becomes an active mechanism for challenging assumptions, revealing hidden implications, and expanding the range of futures that organisations are able to imagine and prototype.

In addition to the advantages of the design futures approach described in Chapter 2 of this book, art thinking provides a sensitivity to the affective and cultural context of societal changes that analytical methods might underestimate or miss entirely. Artists are able to bring the ability to surface what is not explicit yet, to embody futures as sensory and emotional realities, and to challenge the assumptions that data-driven approaches can leave unexamined. Artists, particularly those working at the intersection of technology and social issues, demonstrate a unique capacity for what might be called *anticipatory attunement* – the ability to sense emergent cultural and emotional shifts before they consolidate into visible trends. The MUSAE project aimed to systematically integrate it into an innovation process to allow to produce richer, more socially embedded, and more transformative outcomes than either art or foresight could achieve independently.

The Design Futures Art-Driven (DFA) method (Figure 2) is a structured, open-source methodology that integrates Design Futures, Art Thinking, and technological innovation, supported by AI-integration. It is organised into four phases that move from broad contextual exploration of futures to concrete, prototype-level materialisation of preferred futures, which are Horizon Scanning, Visioning, Ideating and Prototyping.

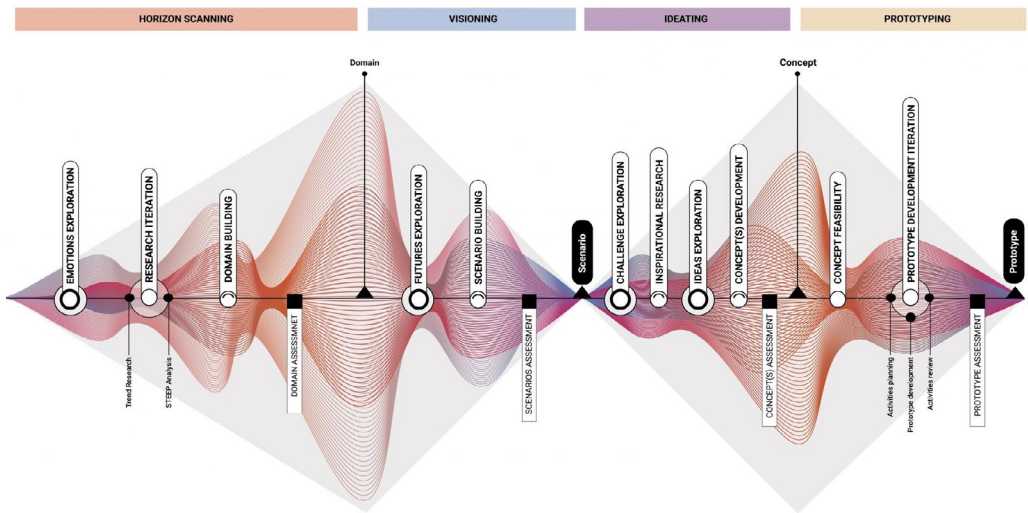


Figure 2.
Design Futures Art-driven (DFA) Method.
 Source: Authors, 2025.

In the Horizon Scanning phase, artists and companies build their guiding values, hopes and fears, then collaboratively research emerging technological, social, and environmental trends across the defined future horizon of 10 years ahead. This phase grounds creative exploration in rigorous futures research – participants identify weak signals and drivers of change, map the landscape of uncertainty, and begin to develop a shared vocabulary of the forces shaping the future of their domain. Unlike conventional trend research, the DFA Horizon Scanning phase integrates emotional and artistic exploration from the outset, recognising that how we feel about emerging changes is itself a form of signal.

The Visioning phase transforms this research into future scenarios – narrative constructions of possible worlds that are grounded in evidence but shaped by artistic speculation. Artists and companies collaborate to develop alternative futures that re-imagine how the domain might evolve, drawing on the scenario matrix logic described in previous chapters. Each scenario serves as shared imaginative infrastructure – a world detailed enough to inhabit, yet open enough to accommodate divergent interpretations and design directions.

The Ideating phase translates scenarios into opportunity spaces. Artist-company teams identify where their scenario creates needs, tensions, and openings for innovation, and collaboratively define concepts that address both near-term challenges and long-term fu-

tures. Here, the artistic contribution is particularly significant, where artists bring speculative disruption to the ideation process, proposing directions that technical or commercial logic might not reach. This is where the creative friction between artistic and industrial perspectives generates its most distinctive outcomes.

The Prototyping phase develops selected concepts into physical or digital prototypes at TRL5, demonstrating their viability and potential for real-world application. Teams are supported throughout by technology mentors, experts in AI, robotics, wearables, and other relevant technologies, who help bridge the gap between speculative vision and material realisation. An assessment process is built into each phase, ensuring quality, alignment between artistic vision and technological feasibility.

[Link 2→](#)
DFA Platform.

[Link 3→](#)
DFA Collaborative Space.

The method is supported by an open-source digital platform ([2→](#)), a structured Miro collaboration workspace ([3→](#)), and integrated AI tools that support artists and companies in using artificial intelligence as a co-creator throughout the process. All resources are freely available to enable organisations and Digital Innovation Hubs to adopt the method within their own contexts.

11.2 MUSAE Art-Tech Residencies

The DFA method was tested and developed through two art-tech residency programmes, both focusing on the Food as Medicine domain and structured around the DFA method, with methodological mentorship, technology training, and ongoing feedback throughout. The first residency was oriented toward scenario development and the creation of artistic representations of possible futures; the second toward the translation of those scenarios into working prototypes through artist-SME collaboration ([4→](#)).

[Link 4→](#)
DFA Case Studies.

First art-tech residency: Envisioning the futures of food

The first MUSAE residency engaged artists from across Europe, selected through a competitive open call that prioritised creative practitioners working at the intersection of art, technology, design and food systems. Guided by the DFA method and supported by men-

tors from across the MUSAE consortium, participating artists moved through the Horizon Scanning and Visioning phases over the course of the residency. Each artist worked within one of the three thematic tracks, conducting research, identifying personal areas of inquiry, and developing future scenarios as critical visions of what the Food as Medicine domain might become.

The residency produced twelve future scenarios, each accompanied by an artistic representation, such as an artwork, installation, visual narrative, or speculative artefacts, that made the scenario tangible and discussable. The range of thematic was wide, where some artists approached the future through the lens of microbial and ecological systems, exploring scenarios in which the boundaries between human health and soil health are progressively dissolved. Others focused on the social and emotional dimensions of food, as imagining futures in which personalised AI nutrition intersects with isolation, grief, or community ritual. Still others engaged with the politics of the food chain, constructing scenarios that explored the issues of agrobiodiversity loss, soil depletion, and the geopolitical dimensions of food security.

These scenarios did not attempt to predict the future of food. Rather, they expanded the space of what futures are thinkable, making visible emerging logics, hidden values, and underexplored possibilities that conventional market research and technology road mapping rarely surface. The scenarios became the imaginative foundation from which the second residency would continue.

Second art-tech residency: From Scenarios to Prototypes

The second MUSAE residency brought together artist-SME teams, each selected through a second open call and proposed to develop an innovation concept grounded in the scenarios produced during the first residency. The collaboration format was designed to be genuinely co-creative, where artists were not brought in at the end to communicate or work on aesthetic part of a technical concept. Rather from the beginning, artist and SME together explored the scenario, negotiated the brief, and shaped the concept, by drawing on the artist's capacity for speculative provocation and the SME's deep knowledge of what is technically and commercially feasible. The DFA method's built-in

assessment meetings at each phase ensured that this collaboration remained aligned, accountable, and productive.

The second residency generated eleven prototypes, each translating a future scenario into a tangible technological intervention and embodying a distinct vision of how technology might serve food, health, and wellbeing in a future shaped by the concerns the first residency scenarios have generated. Rather than presenting all the projects developed during the programme, the following section focuses on three selected cases that exemplify different ways in which future scenarios can influence innovation processes. The cases were selected because they illustrate three complementary relationships between futures thinking, artistic inquiry, and technological development.

- *Soil Skinships scenario and S.O.I.L. prototype* explore embodied futures by transforming environmental data into sensory experiences that reconnect humans with ecological systems.
- *What the World Eats scenario and Growing Futures prototype* investigate regenerative futures through collaborations between humans, biological organisms, and robotic systems.
- *Patterns that Persist scenario and Sprout to Flourish prototype* addresses biodiversity futures by supporting regenerative agricultural decision-making through algorithmic and ecological intelligence.

Together, these projects demonstrate how the DFA method enables future scenarios to move beyond speculative narratives and become actionable innovation pathways capable of informing technological development, organisational strategies, and societal transformation.

11.3 Three Examples of Transitioning from the Future Scenarios to Functional Prototypes

Case project 1: From Soil Skinships future scenario to S.O.I.L. prototype

The future scenario “Soil Skinships” was created by Lisa Mandemaker in the first art-tech residency. Like the future scenarios developed

through the Design Futures process presented in this book, the scenario emerged from a Horizon Scanning activity that investigated contemporary signals of change and extrapolated them into a coherent future world. The scenario projects people into 2034, into a world where the boundaries between human skin and soil have become intentionally, intimately porous. Soil Skinships begins from contemporary signals of the parallel decline of soil fertility and human reproductive health, both systems depleted by industrial extraction, chemical saturation, and the severing of organisms from the living environments they co-evolved with. In this future scenario, this link has become politically and scientifically prominent. Wearable augmentation devices have been developed that integrate directly with the body's surface, reading soil health data in real time through IoT sensors and translating that data into physical sensations, pressure, vibration, warmth, that the wearer experiences as proprioceptive information about the earth beneath their feet.

The scenario is populated by three future personas (Figure 3): the Midwife Gardener, who keeps both human birth and soil microbiome as care practices; the Underground Senstronaut, who cultivates sensory sensitivity to soil signals as a professional discipline; and the Planetary Dermatologist, who treats the skin of the planet with the same clinical attention given to human skin conditions. These personas function as forms of worldbuilding, making abstract

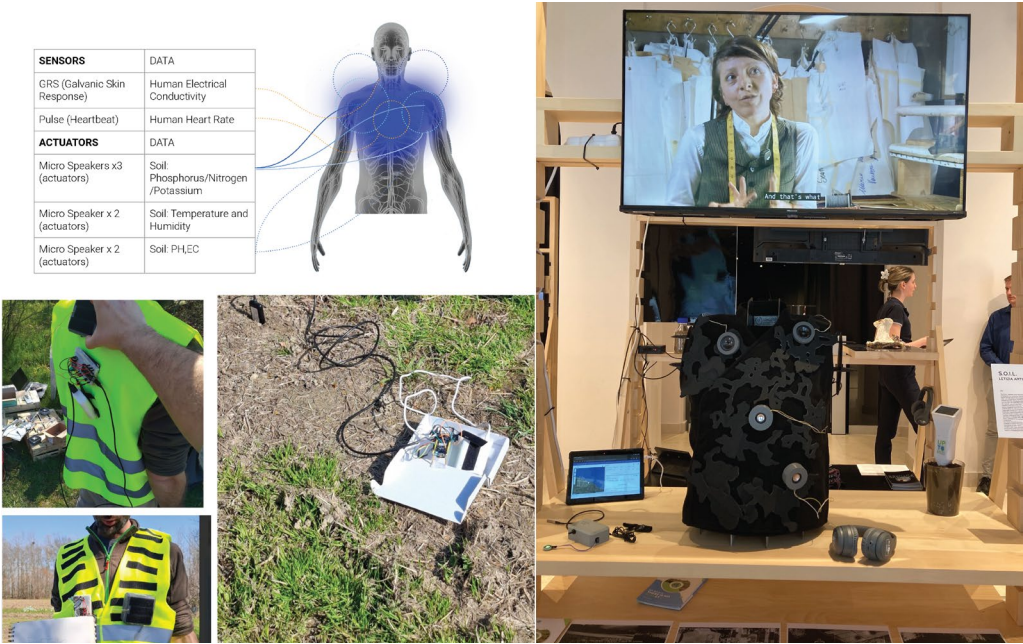
Figure 3.
Future personas –
Midwife Gardener,
Underground
Senstronaut, Planetary
Dermatologist (from
right to left). Source: Lisa
Mandemaker, 2024.



futures tangible through lived roles and practices. As discussed in the Worldbuilding chapters of this book, future personas help transform trends and values into inhabitable futures. They embody emerging values such as regenerative agriculture, posthuman perspectives, ecological interdependence, and care ethics, translating them into coherent ways of living. The resulting scenario is therefore not a prediction of what will happen but a richly constructed future world that invites reflection on alternative relationships between humans and ecosystems.

The S.O.I.L. (Sensing Outer Identities Landscape) prototype was developed Letizia Artioli & Uptoeearth Italia. It takes the affective and philosophical core of *Soil Skinships* and asks: what would it actually require for a human body to feel soil health rather than simply read data about it? The answer is a two-component wearable system (Figure 4). The first component is a network of IoT environmental sensors embedded in the ground, measuring biological and chemical indicators of soil vitality. The second is a wearable device worn on the body that receives this data and converts it into haptic signals – patterns of touch and sound that create what the designers call an *embodied proprioceptive awareness of the soil's condition*.

Figure 4.
SOIL Concept (on the left) and Prototype (on the right). Source: L. Artioli and Uptoeearth Italia, 2025.



Rather than presenting soil data as numbers or visualisations, S.O.I.L. delivers the information through somatic experience. It proposes registering a shift in soil pH, a drop-in microbial activity, a spike in chemical contamination as felt sensations in the wearer's skin and nervous system. In this case, the soil is not an external environment to be monitored from a distance. It is a living entity with which we share a relational and sensory life.

The S.O.I.L. team understood the future scenario not primarily as a story about technology but as a provocation about perception and human-environment relationships. This passage from future scenario to prototype closely reflects the Design Futures logic described throughout this book: scenarios are not final outputs but intermediate worlds that create new opportunity spaces for innovation. This is where the DFA method's integration of art thinking becomes visible as a design force rather than a decorative addition. The guiding question inherited from the scenario – *What if our bodies remembered their kinship with soil?* – remained active throughout the design process and prevented the team from converging on a conventional environmental monitoring device.

Instead, the resulting prototype materialises a more-than-human perspective, one that challenges traditional distinctions between technological sensing, environmental awareness, and bodily experience. In this sense, S.O.I.L. can be understood as a futures artefact: a functional prototype that not only demonstrates technological feasibility but also embodies the values, relationships, and assumptions of the future world from which it emerged. The project therefore illustrates how the Design Futures Art-driven method enables future scenarios to become innovation catalysts, transforming speculative imagination into tangible technological propositions while preserving the critical and reflective dimensions of futures thinking.

Case project 2: From What the World Eats future scenario to Growing Futures prototype

The future scenario "What the World Eats – Agro-technologies in Earthly Futures" was developed by Peter Andersen in the first MUSAE residency. Like the future scenarios generated through the Design Futures process described in this book, the project emerged from the

interpretation of multiple signals of change and their transformation into a coherent future world. Through Horizon Scanning, the scenario brought together environmental, technological, and biological trajectories to explore how food systems might evolve under conditions of ecological instability and planetary transformation. The scenario takes its provocation from a question that cuts across ecological and technological history: *can the machines we build for agriculture become, like the organisms they work alongside, compostable?* *What the World Eats* (Figure 5) traces the life cycle of technological infrastructures, from mineral extraction and production to use, decay, and reintegration into ecological systems. It draws upon intersecting trends such as climate change, the reconfiguration of agricultural biomes, biodiversity loss, and the emergence of hybrid ecological systems in which mycelium networks, bacteria, and other living organisms play increasingly active roles in shaping environments.

Figure 5.
What the World
Eats future scenario
visualisation. Source: P.
Andersen, 2023.



Rather than treating technology as something external to nature, the scenario proposes an alternative ontology in which technological artefacts are conceived as participants within biological cycles. This perspective resonates with the more-than-human approach discussed throughout this book, where future worlds are imagined not exclusively from a human perspective but as interconnected ecosystems involving multiple forms of agency. The scenario therefore asks whether the concept of technology can be expanded to include bio-

logical intelligence and living systems, and what food infrastructures might look like if such a shift occurred.

The future scenario functioned as a worldbuilding exercise, constructing a future in which distinctions between organism and machine become increasingly blurred. Rather than offering predictions, it created an experiential and conceptual space within which artists, technologists, and companies could explore alternative relationships between matter, intelligence, production, and regeneration. As discussed in the Worldbuilding chapter, the value of such scenarios lies not in forecasting what will happen, but in creating worlds rich enough to generate new questions and innovation opportunities.

During the second MUSAE residency, Daniela Amandolese and the Basque Biodesign Center translated this speculative world into the *Growing Futures* prototype. The project explores a symbiotic design system in which humans, mycelium, and robotic systems collaborate to produce biodegradable habitats from locally available waste streams (Figure 6). Inspired by the scenario's representation of mycelium as both material and intelligence, the prototype proposes a circular model in which organic waste becomes a growth substrate, mycelium becomes structural material, robots guide and monitor development, and the resulting structures eventually decompose and return nutrients to the soil.

The prototype was developed through four progressive experimental settings, each increasing the complexity of interaction between the three agents involved. In the first setting, sensors monitor unconstrained mycelium growth by collecting environmental data such as temperature, humidity, oxygen concentration, pH, and infrared measurements. The second introduces human interaction, allowing adjustments to casting forms and nutrient distribution. The third incorporates robotic systems capable of responding to sensor feedback to distribute nutrients along growth paths. Finally, the fourth setting establishes a collaborative ecosystem in which human design intentions, robotic actions and mycelium's own adaptive behaviour continuously influence one another, simultaneously shaping the outcome.

What becomes visible through this progression is a fundamentally different model of innovation. As the experiments evolve, mycelium

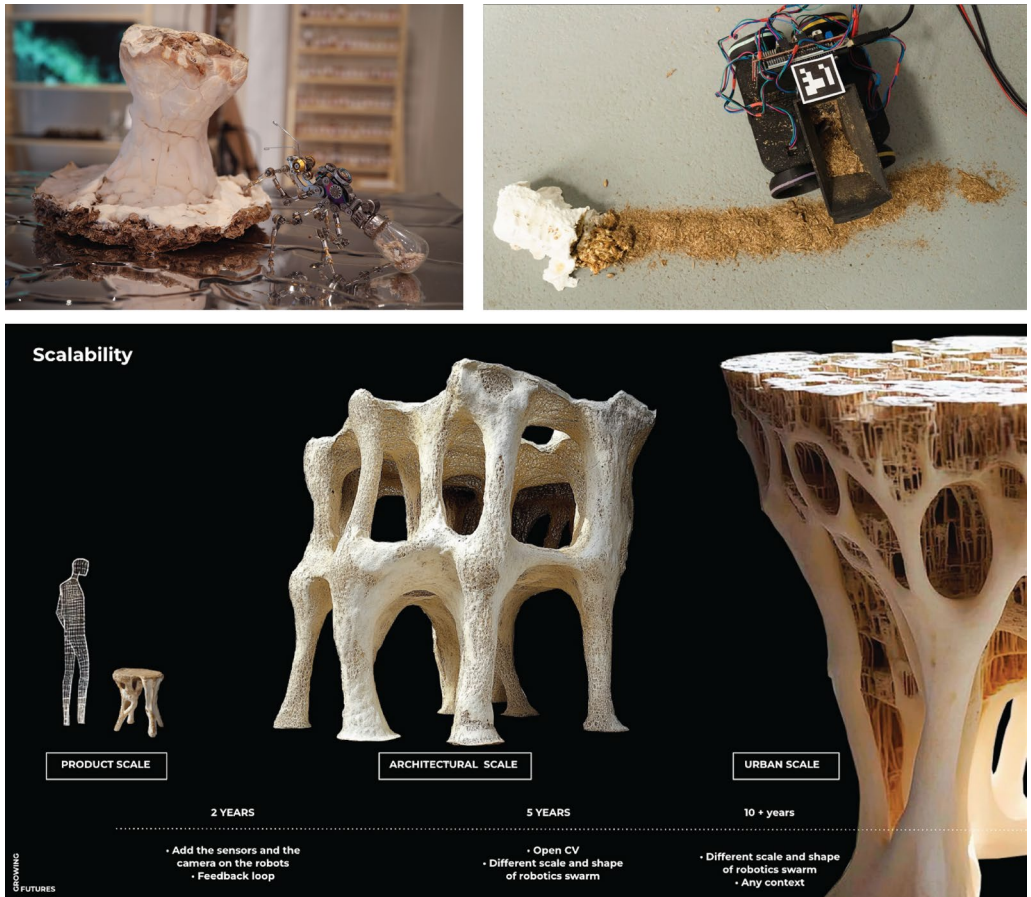


Figure 6.
Growing Futures
 prototype. Source: D.
 Amandolese & Basque
 Biodesign Center, 2025.

gradually shifts from being treated as a passive material to being recognised as an active participant within the design process, more akin to a co-designer with its own responsive intelligence. The project therefore challenges one of the dominant assumptions of industrial design: that intelligence and agency belong exclusively to humans and machines.

Andersen's future scenario posed a philosophical challenge: *can technology learn to express gratitude to its material origins?* The *Growing Futures* prototype responds by dissolving the traditional separation between technology and organism. Mycelium is not processed as a raw resource but engaged as a living system with its own growth logic, responsiveness, and regenerative capacity. Similarly, robotic systems do not replace biological intelligence; they become one actor within a broader ecological choreography.

From a Design Futures perspective, *Growing Futures* illustrates how future scenarios can function as bridges between speculative world-building and technological experimentation. The prototype does not simply implement a technology suggested by the scenario; it materialises the worldview embedded within it. In doing so, it demonstrates one of the key ambitions of the Design Futures Art-driven method: transforming future narratives into tangible interventions while preserving the ethical, ecological, and philosophical questions that generated them in the first place.

Case project 3: From Patterns that Persist future scenario to Sprout to Flourish prototype

The future scenario *Patterns that Persist – Biodiversity as the Measure of Healthy Human Food Systems* was developed by the collective Genomic Gastronomy during the first MUSAE residency. Like the previous scenarios presented in this chapter, it emerged from the exploration of weak signals, technological trajectories, and societal transformations identified through Horizon Scanning. However, rather than focusing primarily on technological possibilities, the scenario investigates the political, cultural, and ethical implications of measuring and governing biodiversity in future food systems.

The narrative unfolds in 2033 and follows a journalist named Max as he travels across Europe in the aftermath of a fictional European Commission directive called *Maximizing Biodiversity*. Introduced in 2028, the legislation establishes agricultural biodiversity as the primary indicator of a healthy food system. Through Max's encounters with farmers, educators, technicians, activists, and philosophers, the scenario explores how this policy has reshaped agriculture, food production, and social life across Europe.

The future world is populated by diverse actors and perspectives. A Polish farmer struggles with increasingly complex biodiversity requirements. A Portuguese food forest technician relies on AI-enabled audio ecology and open-source drones to qualify for biodiversity incentives. A Dutch teacher runs a school that rejects food produced in fully automated agricultural systems, while an Italian philosopher advocates for a movement known as *Air-Gapped Agriculture*. Across Europe, biodiversity has become not only an

environmental objective but also a source of social debate, cultural identity, and political conflict.

Unlike many future scenarios that present desirable futures as inherently positive, Patterns that Persist deliberately embraces ambiguity and contradiction. The scenario highlights both the benefits and unintended consequences of biodiversity-centred policies. Farmers experience new forms of dependency on algorithmic systems; they feel dispossessed and algorithmically controlled. Conflicts emerge around which forms of biodiversity should be preserved and how. The Cultivar Collector Community fractures into competing groups: retainers, who seek to preserve heirloom varieties, and retrainers, who embrace genetic editing technologies such as CRISPR, each claiming to represent the future of biodiversity, as well as new figures of teachers disseminating knowledge on biodiversity (Figure 7).

Figure 7.
The “Cultivar Collector Community” (on the left)
and the Persona of the Teacher on biodiversity
(on the right). Source:
Genomic Gastronomy,
2024.



This approach reflects one of the central principles of the Design Futures process discussed throughout this book: future scenarios should not simply promote preferable futures but also reveal tensions, trade-offs, and second-order consequences. The scenario therefore asks a deeper question than biodiversity itself: *who decides what*

counts as ecological value, and what forms of knowledge become legitimate when environmental complexity is increasingly mediated through technology?

New measurement technologies, such as AI-enabled audio ecology and environmental DNA analysis, create new kinds of legibility but also new dependencies. The current underlying trends in this scenario is not the rise of biodiversity as a policy priority. It is the possibility that the tools we build to measure ecological complexity will determine what counts as healthy, who has power over land, and what forms of agricultural knowledge are valued or erased – all tensions which could lead to public distress (Figure 8).



The *Sprout to Flourish* prototype, developed by Magda Mojsiejuk and Odd Data & Design Studio during the second residency, takes this future world as its starting point. Rather than addressing biodiversity as an abstract environmental objective, the team focused on a practical challenge revealed by the scenario: how can farmers navigate the increasing complexity of regenerative agricultural practices without becoming dependent on opaque technological systems?

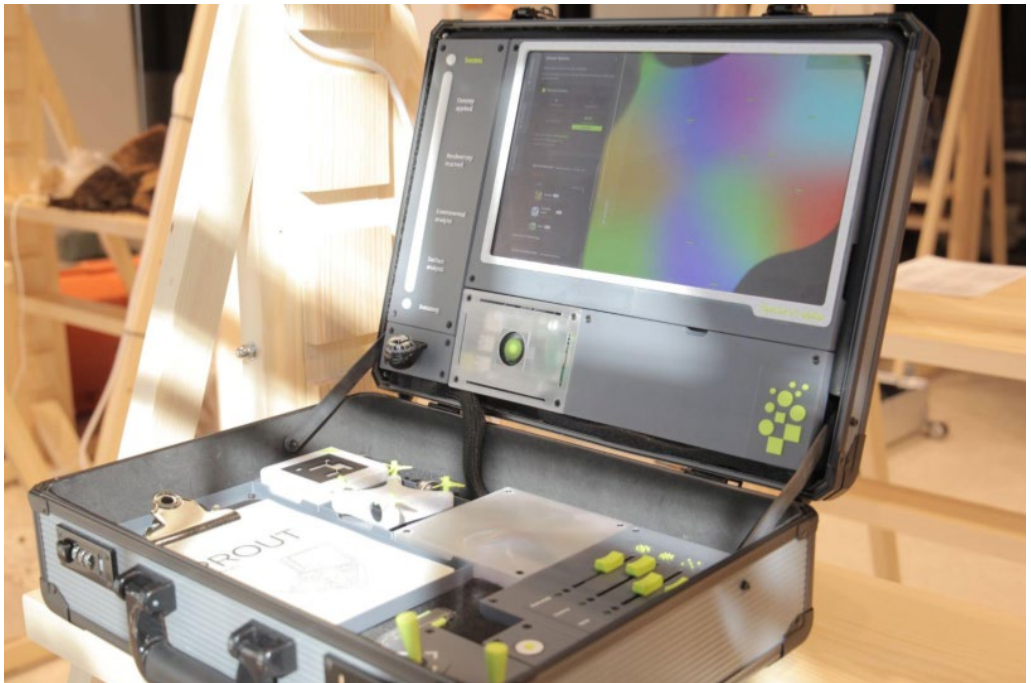
The resulting concept is an ***Algorithmic Simulator for Designing Regenerative Farming Practices***, initially focused on companion plant-

Figure 8.
Public protests for and
against the imposed
biodiversity policy.
Source: Genomic
Gastronomy, 2024.

ing. The system supports farmers and food system designers in creating planting configurations that maximise biodiversity, soil health, natural pest control, and ecological resilience through AI-assisted crop pairing grounded in regenerative agriculture and permaculture principles.

The prototype combines them with algorithmic optimisation and a user-friendly interface designed for small to medium-scale farming contexts in a shape of a portable suitcase (Figure 9). Technically, the system operates as a closed-loop algorithm-assisted design framework integrating four interconnected databases: a Macro Context Database containing large-scale environmental information; a Micro Context Database collecting local conditions; a Species Database describing plant and organism characteristics; and a Relationship Graph Database mapping ecological interactions such as nitrogen fixation, growth compatibility, and pest resistance (Figure 10). Taking user inputs alongside design guidelines, the simulator runs a continuous optimisation and generates a spatial layout rendered as a layered design map. Through iterative interaction with the system, users generate and refine planting strategies while maintaining direct control over decision-making.

Figure 9.
Sprout suitcase,
presented at the
exhibition in Belgrade.
Source: M. Mojsiejuk
& Odd Data & Design
Studio, 2025.



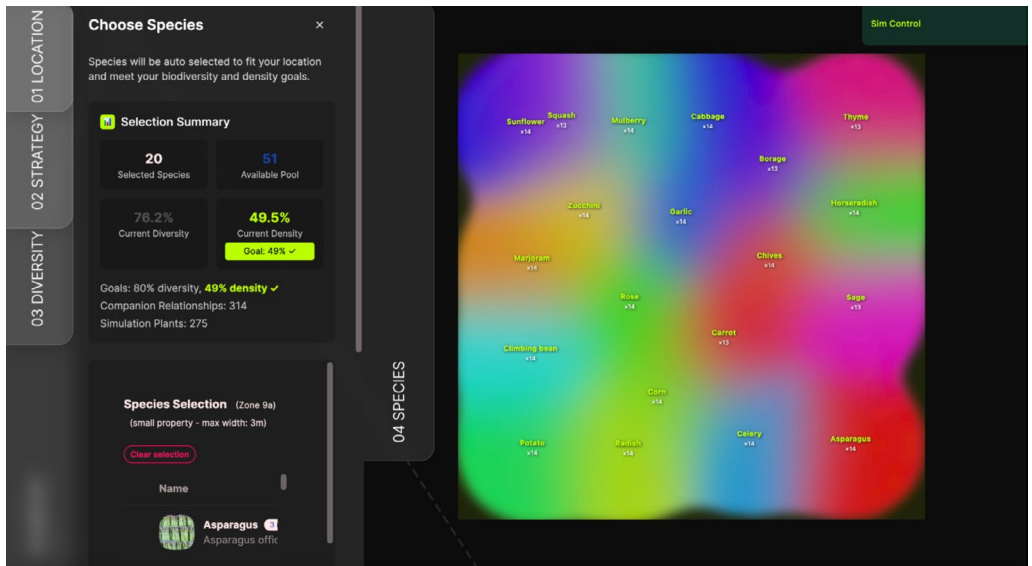


Figure 10. Screenshot of the Simulation, showcasing the status and species list. Source: M. Mojsiejuk & Odd Data & Design Studio, 2025.

The connection between the scenario and the prototype is particularly significant. The future scenario exposed a paradox: the farmers most in need of support in transitioning toward regenerative agriculture were often those most alienated from the technological and institutional systems promoting that transition. The central design question therefore became: *how can technological tools support ecological decision-making without displacing the knowledge and agency of farmers?*

The *Sprout to Flourish* simulator responds by positioning algorithms as collaborators rather than controllers. Instead of replacing ecological expertise, the system amplifies it, helping users navigate the combinatorial complexity of companion planting while keeping human judgment at the centre of the process. The prototype also embraces one of the scenario's underlying political ambitions: the idea that digital tools supporting biodiversity should function as shared infrastructure rather than proprietary systems controlled by a limited number of actors, using the open-source tools as a form of democratising the new biodiversity economy.

From a Design Futures perspective, *Sprout to Flourish* demonstrates how future scenarios can reveal not only technological opportunities but also governance questions, power dynamics, and ethical tensions that require design responses. The prototype does

not merely solve a technical problem identified in the scenario; it materialises a particular vision of the relationship between technology, knowledge, and ecological stewardship.

In this sense, the project exemplifies one of the core ambitions of the Design Futures Art-driven method: transforming speculative futures into tangible interventions while preserving the complexity, ambiguity, and critical questions that originally motivated them. Rather than resolving the tensions raised by the scenario, the prototype creates a practical space in which those tensions can be negotiated and explored through design.

11.4 Adapting Design Futures Through Art-Driven Innovation

The comparison between the Design Futures course presented in this book and the MUSAE Design Futures Art-Driven method highlights another important transformation of the methodology. While the Design Futures course frames futures thinking as an educational journey aimed at developing students' anticipatory and creative capacities, MUSAE reconfigures the same methodological foundation as an innovation infrastructure for art-technology collaboration.

In the Design Futures course, the Ministry for the Future framework provides an immersive narrative environment where students can suspend present-day assumptions, adopt roles, and collaboratively construct future worlds. Creativity is cultivated through the Future Creativity Loop, which operates as a pedagogical foundation supporting imagination, confidence, collaboration, and atmosphere. The primary goal is educational: enabling learners to develop futures literacy and become capable of thinking, discussing, and designing for alternative futures.

MUSAE, by contrast, shifts the centre of gravity from education to innovation. The fictional storyworld is replaced by artistic inquiry, art-tech residencies, mentoring, and collaboration with SMEs. Artists are not involved as visualisers or communicators of already-defined technological ideas; they become co-creators of future scenarios and

innovation trajectories. Art Thinking therefore becomes the explicit creative driver of the process, expanding what companies are able to perceive, question, and prototype.

This difference is conceptually significant. In the Design Futures course, futures are primarily used as learning environments, where students enter imagined worlds to develop anticipatory awareness and design capabilities. In MUSAE, futures become innovation environments, where artists and companies use scenarios as shared spaces from which technological concepts and prototypes can emerge. The future scenario is no longer only an educational artefact, but a strategic bridge between cultural imagination and technological development.

The role of technology also changes. In the Design Futures course, technologies are often explored as emerging signals, speculative possibilities, or elements within future worlds. In MUSAE, technologies become material partners in the process. AI, robotics, wearables, sensors, bio-based systems, and digital platforms are not only imagined, but they are developed into functional prototypes. This moves the Design Futures process closer to industrial experimentation while preserving its critical, speculative, and future-oriented nature.

From a pedagogical and methodological perspective, MUSAE demonstrates that Design Futures can extend beyond the classroom without losing its transformative potential. Its core logic remains intact: participants scan the horizon, construct future scenarios, identify opportunity spaces, and materialise concepts. What changes is the surrounding ecosystem. The student team becomes an artist-SME team; the course becomes a residency; the speculative concept becomes a TRL5 prototype; and the educational framework becomes a transferable Factory Model for innovation hubs.

In this sense, MUSAE does not replace the Design Futures approach described in the book. It expands it by showing how it can become an art-driven innovation framework in connecting imagination with technological development, critical inquiry with industrial feasibility, and future scenarios with tangible prototypes. Its contribution lies in demonstrating that artistic intelligence can enrich innovation by making technologies not only more advanced, but also more culturally sensitive, ethically aware, and socially meaningful (Table 1).

Dimension	Design Futures Course	MUSAE Art-Driven Model
Main context	Academic design education	Art-tech innovation ecosystem
Main actors	Students and educators	Artists, SMEs, technology mentors, researchers, Digital Innovation Hubs
Core framework	Ministry for the Future educational framework	MUSAE Factory Model
Main methodological driver	Design Futures process	Design Futures Art-driven method
Creative driver	Future Creativity Loop, mostly implicit	Art Thinking, explicitly integrated
Narrative structure	Fictional storyworld and role-play	Artist-led inquiry and future scenarios
Primary objective	Develop futures literacy and anticipatory design capabilities	Generate art-driven technological innovation
Learning/innovation setting	Semester-long course	Residency-based collaboration
Main outputs	Future scenarios, concepts, speculative artefacts	Future scenarios, artistic representations, TRL5 prototypes
Role of technology	Object of speculation and design exploration	Material partner for prototyping and industrial experimentation
Role of creativity	Pedagogical condition for future-making	Strategic force for reframing innovation
Final orientation	Educational transformation	Innovation transfer and ecosystem building

Table 1.
 Comparing the Design
 Futures Course and the
 MUSAE Art-Driven Model.

11.5 Conclusion

The MUSAE project demonstrates that integrating artistic collaboration and design futures approach, as a structural element of futures-driven innovation can be a new approach to technological innovation. Across two residency programmes, based on the Design Futures Art-driven method, artists and SMEs produced futures imaginations detailed enough to build from, and prototypes grounded enough to develop.

The three case studies examined in this chapter each illuminate a different dimension of this capacity. Soil Skinships and S.O.I.L. show how an artist’s capacity to work through metaphor and embodied experience – to ask what it would mean to feel soil health rather than

measure it – can redirect a design team away from a conventional sensor interface and toward a genuinely new form of human-environment relation. What the World Eats and Growing Futures show how a speculative scenario that poses a philosophical question about the life cycle of technology can give a design team permission to treat a biological organism as a collaborator rather than a substrate, arriving at a prototyping methodology that enacts its own values. Patterns that Persist and Sprout to Flourish show how a scenario that refuses to idealize a positive future, that instead explore the tensions, the losers, and the power questions inherent in a policy shift, can generate a design response that is honest about what it is trying to solve and for whom.

In each case, the prototype team had to inhabit the future scenario's atmosphere, carry its questions into the design process, and resist the simplifications. This is the educational significance of the DFA method for design futures pedagogy. It is not simply a process framework. It is a training in holding the open, disorienting complexity of futures long enough to let that complexity shape what gets built.

The DFA method extends the pedagogical function beyond the university classroom. With its open-source materials, guidelines and tools, the method can be taught to or self-learned by the variety of stakeholders, as indicated in this chapter. The open-source platform of the Factory Model Pack makes the method available to any organisation, Digital Innovation Hub, or educational institution willing to do the harder work of integrating artistic intelligence into how they think about what comes next.

Taken together, the experiences of DC4DM and MUSAE demonstrate the remarkable adaptability of the Design Futures process across radically different contexts. In DC4DM, futures thinking supports the development of future professionals capable of guiding digital transformation. In MUSAE, the same underlying process becomes a catalyst for art-driven innovation, enabling artists and technology providers to collaboratively imagine and prototype preferable futures.

These experiences suggest that Design Futures should not be understood as a fixed educational methodology, but as a flexible innovation framework capable of connecting education, industry, technology, creativity, and societal transformation through the shared practice

of imagining, discussing, and materialising future possibilities. The capacity to move across these contexts while maintaining a common methodological foundation represents one of the most significant strengths of the Design Futures approach and its potential contribution to future-oriented innovation ecosystems.

12. Conclusions

Rehearsing the Future

Throughout this book, we have argued that one of the most urgent challenges facing contemporary education is not simply helping students understand the world as it is, but enabling them to engage with the worlds that are emerging and those that might yet be created.

We are living in a period characterised by accelerating technological change, ecological instability, social fragmentation, and profound uncertainty. In such a context, education can no longer be understood solely as a process of transferring knowledge from one generation to the next. Knowledge remains essential, but it is no longer sufficient. Learners must also develop the capacity to navigate ambiguity, recognise emerging change, question dominant assumptions, imagine alternatives, and act responsibly within systems whose futures remain open and contested.

This book began with a simple question: how can design education help students move beyond problem-solving and become active participants in shaping the future?

The answer we have explored is not a single method, tool, or activity. Rather, it is a broader educational proposition: that futures thinking, creativity, experiential learning, storytelling, and design practice can be brought together to create learning environments where futures become tangible, discussable, and actionable.

The Ministry for the Future educational framework emerged from this ambition. It was developed not as a simulation of reality but as a space for rehearsing it. By entering a speculative storyworld, adopting future-oriented roles, exploring signals of change, constructing scenarios, and materialising future artefacts, students are invited to experience the future not as a distant abstraction but as something that can be explored, negotiated, and influenced.

In this sense, the framework is not primarily about forecasting what will happen. It is about expanding what learners believe is possible. The future, after all, is not a place waiting to be discovered. It is a space continuously shaped through imagination, decisions, actions, and relationships in the present.

Educating Future-Makers

A central idea running throughout this book is that futures literacy is not only a cognitive competence. It is also an emotional, ethical, and creative capability. Learning to think about the future requires more than analysing trends or constructing scenarios. It requires developing the confidence to engage with uncertainty, the imagination to envision alternatives, the empathy to consider perspectives beyond one's own, and the responsibility to reflect on the consequences of present choices. For this reason, the ultimate outcome of the Design Futures approach is not the production of scenarios, artefacts, manifestos, or speculative worlds. These are important outputs, but they are not the primary goal. The primary goal is the development of people capable of engaging constructively with uncertainty.

Future-makers are not individuals who predict what will happen. They are individuals who recognise that futures are multiple, that assumptions can be challenged, that systems can change, and that human action matters.

They understand that every design decision has certain implications in shaping possible futures. They are capable of moving between analysis and imagination, between critique and creation, between individual creativity and collective responsibility. In this sense, futures-oriented education is ultimately an education in agency.

At a time when many young people experience uncertainty as anxiety, complexity as paralysis, and the future as something imposed upon them, cultivating agency may be one of the most important educational responsibilities we have. Agency does not eliminate uncertainty. Rather, it transforms uncertainty from a source of fear into a space of possibility.

Beyond the Classroom

Although the framework presented in this book emerged within design education, its implications extend far beyond the classroom. The challenges societies face today do not respect disciplinary boundaries. Climate change, artificial intelligence, demographic transitions, food systems, mobility, health, governance, and social justice are deeply interconnected. Addressing them requires the ability to work across disciplines, perspectives, sectors, and temporal horizons.

For this reason, Design Futures should not be understood only as a pedagogical approach. It can also be understood as a broader cultural practice.

The case studies presented throughout this book demonstrate how futures-oriented approaches can support educational innovation, strategic foresight, organisational transformation, research projects, artistic experimentation, and collaborative innovation processes. In each of these contexts, the role of futures thinking remains fundamentally similar: helping people make sense of change, explore alternatives, and develop more informed and responsible responses to uncertainty.

The methods may evolve. Technologies will certainly evolve. Artificial intelligence, for example, will continue to reshape how we research, communicate, imagine, and design. New tools will emerge,

new challenges will arise, and new futures will demand new educational responses.

Yet the deeper purpose remains constant. What matters is not teaching students to adapt to a predetermined future. What matters is helping them participate in shaping futures that are more sustainable, inclusive, ethical, and desirable.

Limitations and Open Questions

The educational framework presented in this book was developed and refined within a specific institutional context: a design school characterised by dedicated studio time, project-based learning, collaborative assessment, and a faculty culture already open to experimental pedagogies. Its transfer to other educational environments will therefore require adaptation. Institutions shaped by rigid curricular structures, disciplinary boundaries, or individual assessment models may need to rethink how the framework's collective, role-based, and immersive approach can be integrated within their existing systems.

The full immersive format described in Part II also relies on conditions that are not universally available, including sufficient time, physical space, facilitation capacity, and institutional support. While shorter adaptations, such as individual activities, selected tools, or condensed storyworlds, can make the approach more accessible, they may also generate different and potentially more limited outcomes compared to the complete experience.

Another open dimension concerns the role of educators and facilitators. Guiding students through futures work involves more than introducing methods and tools; it requires previous knowledge in design and futures studies approaches, as well as the ability to facilitate uncertainty, support speculative thinking, manage collaborative dynamics, and create a space where emotions, values, and different perspectives can emerge. These forms of facilitation are not always part of traditional educator training. The case studies presented in Chapter 9 were developed and facilitated by the authors, and further exploration is needed to understand how the

framework performs when adopted by educators from different disciplines, with diverse levels of experience, and within varied institutional cultures.

Rather than defining fixed rules for implementation, these limitations point towards an ongoing area of experimentation. The framework is intended as an adaptable educational model that can evolve through new contexts, interpretations, and applications. The question is not whether the approach can be replicated exactly, but how it can be transformed to support different communities of learners in becoming active participants in shaping possible futures.

An Invitation

This book does not present a finished model. The Ministry for the Future framework, the Future Creativity Loop, and the Design Futures process should be understood as evolving propositions rather than definitive solutions. Like the futures they seek to explore, they remain open to adaptation, critique, reinterpretation, and transformation.

Every educator who adopts these approaches will inevitably modify them.

Every classroom will generate new questions.

Every cohort of students will imagine futures that differ from those imagined before.

This openness is not a weakness of the framework. It is one of its strengths. Futures-oriented education cannot rely on fixed recipes because the contexts in which it operates are themselves constantly changing. What matters is preserving the underlying intention: creating spaces where learners can explore uncertainty, cultivate imagination, engage with complexity, and develop the confidence to act.

Ultimately, the future cannot be taught as content. It can only be experienced as a practice. The activities, methods, scenarios, and examples presented throughout these pages are therefore best understood as invitations to experimentation. They are starting points rather than endpoints.

We invite educators to adapt them.

We invite researchers to challenge them.

We invite students to expand them.

And we invite all those working at the intersection of education, creativity, design, and futures thinking to continue building new ways of learning that are capable of responding to the complexity of the world that is emerging.

Because the future is not something we enter. It is something we continuously create together.

And perhaps the most important role of education is to help us do so with greater imagination, responsibility, and care.

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The future will not be designed by those who only know how to solve today's problems. Tomorrow's designers must do more than create products, services, and experiences. They must anticipate change, navigate uncertainty, imagine alternative futures, and make responsible decisions in a world transformed by artificial intelligence, climate change, and accelerating technological and social transitions. But how do we teach these capabilities? Educating Future-Ready Designers offers an exciting answer. Developed through years of research and experimentation at Politecnico di Milano, it introduces *Design Futures* an original educational approach that brings together Design Thinking, Futures Thinking, creativity, immersive storytelling, experiential learning, and AI as a creative collaborator. More than a teaching method, it is a complete learning ecosystem. Students do not simply study the future – they step inside it. Through the *Ministry for the Future* educational framework, they become ministers, researchers, policymakers, and future-makers, exploring emerging signals, constructing alternative futures, building speculative worlds, and transforming those visions into tangible concepts, artefacts, and strategic actions. Richly illustrated with classroom-tested activities, practical tools, facilitation techniques, templates, student projects, and applications developed in European innovation and research programmes, this book demonstrates how futures thinking can become a transformative educational practice. For educators, researchers, curriculum designers, and innovation leaders, this is more than a guide to teaching Design Futures. It is an invitation to redesign education itself – so that the next generation is prepared not simply to face the future, but to imagine it, shape it, and take responsibility for it.