9. An exploration of meta-design and a reflection on its actualisation for fostering inclusivity

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The world is shaped by design, and this is evident in every aspect of everyday life and social constructs; even elements perceived as natural bear the imprint of human influence (Norman, 2023). Recognising the interconnectedness of all beings within this complex system, where any alteration can impact the whole, requires a fundamental change in how humans exist on Earth (Norman, 2023).

The awareness of design's influence on societal structures is growing, leading to discussions on designers' skills (D'Ignazio and Klein, 2020; Berry *et al*., 2022). It is increasingly evident that all designs inherently embody bias, influenced by the subjective perspectives of their creators and the historical milieu in which they originated (Holmes, 2020). Whether acknowledged or not, this subjectivity permeates the design process, incorporating biases into the surrounding artefacts and materials (Del Gaudio and Chopra, 2023). When the design is finally available to the public, the inherent biases in the product feed the world and social consciousness and are reinforced (Prochner, 2014). Following this line of thinking, prejudices, norms, and stereotypes are embedded in many artefacts, and design

has the potential to strengthen them (Prochner and Marchand, 2018). This awareness catalyzes a profound shift in design consciousness, acknowledging the non-neutrality and power dynamics inherent in the field (Collins, 2017). Calls for greater awareness and accountability in addressing designer biases, privilege and positionality reverberate through the design literature (Goodwill *et al*., 2021).

This chapter examines two key concepts: meta-design and inclusive design. It explores how integrating an inclusive approach into meta-design can enable designers to raise awareness and address biases early in the design process. This alignment resonates with the overarching theme of redesigning design processes to adapt to a rapidly changing and uncertain world, emphasizing the central role of inclusivity and systems thinking (Hara, 2007; Costanza-Chock, 2020). The aim is to reflect on the need to prioritise inclusive design and generate discussions. In this, design education holds great promise as the training of new design generations encourages experimentation with these issues (Costanza-Chock, 2020; Berry *et al*., 2022).

9.1 Meta-design: a gateway to innovative design process

Originating from the intellectual discourse surrounding art, culture, and media, the term meta-design has found application across various practical domains, intertwining theoretical with practical implementation (Giaccardi, 2005). Since the term was first defined in industrial design in 1965 (Van Onck, 1965), different research approaches have been used, from the biological approach (Maturana, 1997) to the techno-social approach (Fischer *et al*., 2017). Historically, the term has always investigated the dimension of *designing the design* (Bentz and Franzato, 2017). Meta-design seeks to turn complexity into an opportunity to define new forms of innovation (Wood, 2022). From this perspective, meta-design promotes cultural development that can investigate new design spaces (Fischer *et al*., 2017). It extends traditional design to include a process of co-adaptation between people and broader design systems, in which users become part of the process itself (Giaccardi and Fischer, 2008; Bentz

and Franzato, 2017). Therefore, meta-design is finding the meaning behind the design idea (Arquilla *et al*., 2019) and what is meaningful to design to meet users' needs.

Rooted in the Greek prefix *meta*, the term signifies a change in place, order, or nature (Giaccardi and Fischer, 2008), encompassing concepts of reflection and transformation. In contrast to traditional design approaches, meta-design encourages exploration and adaptation, and embraces participation (Fischer *et al*., 2017).
Three key aspects or *declinations* of meta-design emerge from the word *meta*:

1) "Behind" involves designing design processes, generative principles, and tools. 2) "With" empowers users to act as designers. 3) "Between/among" includes designing spaces of participation and relational settings (Giaccardi, 2005).

Meta-design is a successful strategy for tackling complex design challenges (Ehn, 2008) because extending designed systems beyond their original nature enables an iterative process in which stakeholders become co-designers (Fischer and Scharff, 2000). It suggests a shift from designers controlling the design process to involving users (Fischer and Scharff, 2000). The meta-design process facilities change and involves three stages: 1) Seeding, 2) Evolutionary growth, and 3) Reseeding (Menichinelli and Valsecchi, 2016).

9.2 Meta-design and design research

An overlap in the definition of design research can be observed from previous discussions. Goldkuhl and Lind (2010) introduced a conceptual framework illustrating the relationship between meta-design and its interaction with design practice and research. While their representation simplifies the complex dynamics of design research and practice, it is valuable for explaining their respective roles and outcomes (Figure 1). Since design research involves the creation of diverse artefacts and generating design knowledge, without producing abstract knowledge, design research would lack scientific rigour

and resemble purely practical design endeavours (Goldkuhl and Lind, 2010). Therefore, design research represents a fusion of design practice and meta-design, wherein practical design informs meta-design and vice versa (Goldkuhl and Lind, 2010).
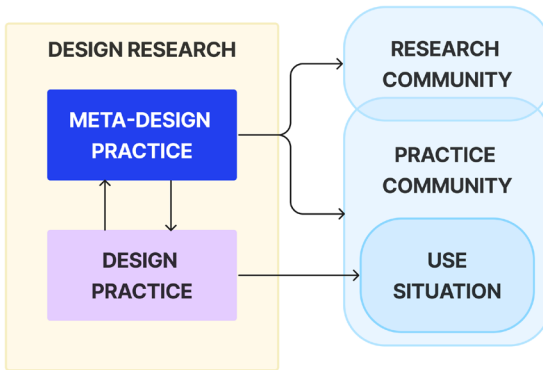
Design research is segmented into two layers of activity:
1. Design Practice: encompasses the generation of situational design knowledge and tangible artefacts.
2. Meta-Design: produces abstract design knowledge and fulfils three main functions:
   Preparatory Activity: Before executing the situational design.
   Continual Activity: operates alongside design practice, offering continuous insights and guidance.
   Synthesis activity: summarizing, evaluating, and abstracting results outside the studied design and use practices.

In conclusion, meta-design emerges as a dynamic and multifaceted approach that transcends traditional boundaries, intertwining theoretical discourse with practical implementation.

9.3 Meta-design value in the design process

Design process models and their representations have been developed to teach design principles, particularly in educational settings (Bravo and Bohemia, 2019). These models encapsulate concepts and ideas about design, serving as didactic materials (Bravo and Bohemia,

2019). However, one risk associated with using such frameworks is promotion of an illusion of linearity and cause-and-effect mechanisms. While models are valuable for visualizing complex processes, they must be applied critically and iteratively (Dubberly, 2005).
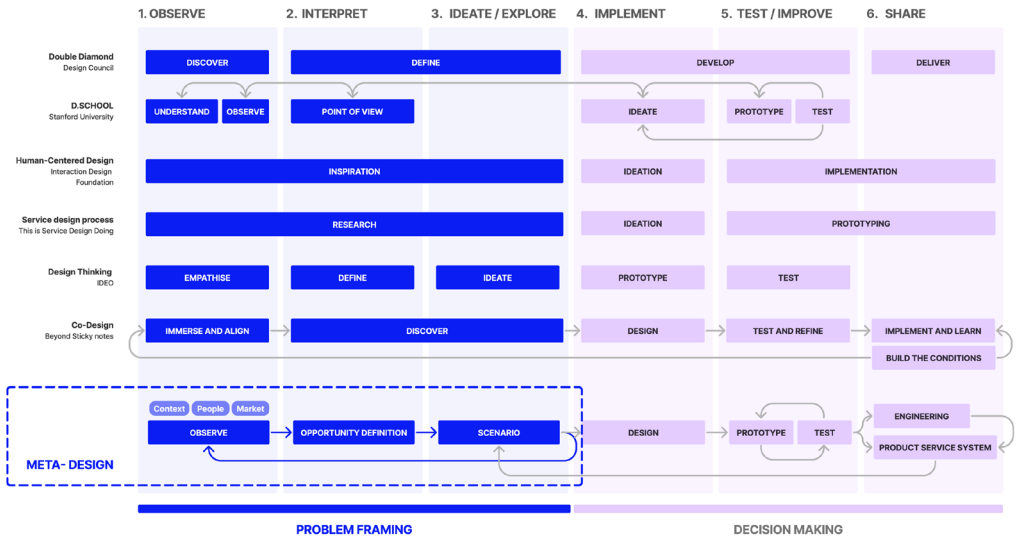

Figure 2.
List of design process models inspired by Bravo and Bohemia (2019). Meta-design acts as a problem-framing that is compared with other design processes.

Drawing on the research conducted by Bravo and Bohemia (2019), a comparative analysis was performed on meta-design in visually representing design processes. The objective was to highlight how meta-design facilitates and illustrates problem-framing dimensions within the design process (see Figure 2). In their research, Bravo and Bohemia (2019) compared design processes by identifying common stages, understanding the characteristics of these representations, and determining which elements are consistent across the models. In the review presented in this chapter, the design process is divided into two phases: problem-framing and decision-making, with meta-design identified throughout the preliminary part.

Meta-design is a methodological learning approach in design education that redefines the design brief or problem-framing (Deserti and Celaschi, 2007; Deserti and Meroni, 2018). Problem-framing helps designers define issues they want to focus on; it is a critical component of all design processes involving recognizing assumptions and rediscovering the design problem (Schön, 2017). Research has indicated that how designers frame a problem significantly impacts

the outcome and subsequent progress (Dorst, 2018), underscoring the critical importance of this stage in delineating the problem space.

The meta-design part is identified in Figure 2, which starts with carefully observation of the context, people, and market to identify an opportunity area to build various possible design scenarios.
This is an iterative process because observation and research can be repeated after identifying a design opportunity or scenario.
In this view, the meta-design approach acts as a *generator* of design actions, setting constraints and offering guidelines for emerging scenarios (Fischer *et al*., 2017). It represents a distinctive approach, proposing open solutions rather than delivering finalized ones (Nold, 2022). The meta-design process outlines essential elements for development in the design phase, establishing the *Rules and Grammar of the project* (Giaccardi, 2005; Nold, 2022) and acting as a catalyst for design actions. Therefore, meta-design in the educational framework contributes to achieving meaning-driven outcomes by involving users in the process and directly observing the context, learning and designing for and with people (Arquilla *et al*.,2019; Arquilla *et al*., 2021).

9.4 Overview of inclusive design and new prospects

In this chapter, the literature on inclusive design explores the shift from a *one-size-fits-all* approach to a more comprehensive understanding that necessitates redefining inclusivity to encompass diversity beyond visible traits (Buckley, 2020; Kille-Speckter and Nickpour, 2022; Place, 2022).

As defined by Clarkson and Coleman (2015), inclusive design was traditionally developed to encompass designing for disabled and elderly individuals. Known as *Design for All* in Europe and *Universal Design* in the US (Clarkson and Coleman, 2015), inclusive design was initially coined in 1994 (Clarkson and Coleman, 2015), though Maeda (2021) suggests that the roots of inclusive design practices can be traced back to the 1950s. During this period, designs for individuals with disabilities, like typewriters and telephones, were mass-produced. Initially targeting specific needs, these innovations benefitted

society due to the broader industrialization (Tauke *et al*., 2016). After World War II, inclusive design evolved, contributing to social and political justice and establishing welfare states in the UK and other nations (Clarkson and Coleman, 2015).

Additionally, the experiences of wounded veterans from both World Wars led to a growing demand for accessibility accommodations in the field (Kille-Speckter and Nickpour, 2022). Nevertheless, around the same time, Henry Dreyfus published *The Measure of Men*, which emphasized the importance of anthropometry as an indispensable tool for designers (Holmes, 2020). This notion is grounded in the idea that measurable average characteristics are essential to support industrial projects (Holmes, 2020). Diversity and variation in human beings were treated as degrees of error from the perfect. Dreyfus's ideas influenced the development of *one size fits all*, catering to the average person while marginalizing those who deviate from norms (Holmes, 2020).

All the approaches currently emerging in inclusive design challenge this principle (Bianchin and Heylighen, 2018; Luck, 2018; Donahue and Gheerawo, 2021) and build a *one-size-fits-one* to fit people who address the significant exclusions of using the designed solutions (Costanza-Chock, 2020; Donahue and Gheerawo, 2021). Contrary to inclusion, exclusion occurs when the object does not meet somebody's needs and creates a mismatch between them and things, physical or digital (Holmes, 2020).

To better frame the evolution of inclusive design, reference is made to Dong (2020), who investigates its trajectory across four overarching phases beginning in the 1990s and extending across three decades. These phases encompass products, interfaces, experiences, services, and systems. Additionally, Dong (2020) introduces the concept of inclusive design 4.0, reflecting new approaches in contemporary design practices. Starting with a focus on physical attributes, this evolves into a procedural and reflective dimension, prompting a re-evaluation of the entire system.

This chapter has attempted to summarize the principal approaches to inclusive design (Figure 3), building on the groundwork laid by Kille-Speckter and Nickpour (2022) in delineating the design milestones for disability. Select milestones relevant to approaches and

frameworks were included, omitting theoretical concepts. In addition, new approaches have been included in the literature that align with the trajectory towards inclusive design 4.0 (Dong, 2020).

Two essential conditions have emerged from the analysis of these emerging approaches, which are changing the landscape of inclusive design:

1. Growing awareness that «good intentions cannot be enough» (D'Ignazio and Klein, 2020; Del Gaudio and Chopra, 2023) recognizes how unconscious biases influence decisions (Wachter-Boettcher, 2018; Costanza-Chock, 2020). Unconscious biases are learned, natural, instinctive, unintentional preconceptions so deeply rooted that they quickly affect a person's behaviour (Canlı, 2018; Lillegård *et al.*, 2021). «Exclusion happens when we solve problems using our biases» (Holmes, 2020). Designers must recognize their biases and be open to questioning their perspectives to avoid tokenistic attempts at inclusivity and shifting to community-driven approaches instead of the traditional power dynamic (Place, 2022).

2. The literature highlights the need to expand the definition of exclusion, *moving beyond traditional accessibility* concerns (Lillegård *et al.*, 2021; Szlavi and Guedes, 2023). While issues like ageing have received attention, there is a growing imperative to address other critical issues and steer research towards a more holistic direction (Donahue and Gheerawo, 2021). Inclusive design should consider characteristics like race, gender, social status, sexual orientation, and others, acknowledging *intersectionality*[1]. This concept, introduced by Kimberlé Crenshaw (1989), recognises interconnected forms of oppression. Intersectionality and the matrix of domination (Collins, 2017) help us understand how privilege and oppression are interconnected. A privileged view will also likely inform beliefs, assumptions, and norms that shape many design decisions made throughout design projects. If designers become more aware of and sensitive to how privilege and oppression (including their own) function in their designing contexts, they can make decisions to challenge status quo inequities and patterns of oppression produced (Goodwill *et*

Note 1.
Intersectionality coined by Kimberlé Crenshaw in 1989 for understanding how groups and individuals' social and political identities result in unique combinations of discrimination and privilege. These factors include gender, caste, sex, race, ethnicity, class, sexuality, religion, disability, height, age, weight, and physical appearance.
These intersecting and overlapping social identities may be both empowering and oppressing.

EVOLVING INCLUSIVE DESIGN (Dong, 2020)	APPROACH / FRAMEWORK	DESCRIPTION	FOCUS ON PROCESS	FOCUS ON OUTPUT
				✱ **ACCESSIBILITY**
1994 **Inclusive Design 1.0** focus on Product	**1994** **Inclusive Design** (Coleman, 1994)	The inclusive approach expands user reach while ensuring profitability and satisfaction, following "**Solve for one, extend to many**"	✅	❌
	1999 **Universal Design** Kyoyo Design (Guffey and Williamson, 2020)	Based on barrier-free and accessible design, it promotes a universal solution: "**one-size-fits-all**"	❌	✅
2004 **Inclusive Design 2.0** focus on Interface Interaction	**2004** **Design for All Europe** (EIDD Stockholm Declaration, 2004)	Design for **diversity**, **inclusion**, and **equality** presents a challenge for designers, entrepreneurs, administrators, and leaders.	✅	✅
	2009 **Design meets Disability** (Pullin, 2009)	Design and disability inspire each other by pairing six attributes of medical rehabilitation engineering with six attributes of commercial design.	✅	✅
	2011 **Designing for More (DfM)** (Hendersen, 2011)	Emphasises a **continuous iterative process** involving people with disabilities as research experts, fostering a cultural approach.	❌	✅
2014 **Inclusive Design 3.0** focus on Experience Service	**2016** (1st) - **2021** (reviewed) **Liberatory Design** (Anaissie, et al. 2021)	Encourage **self-awareness** to reshape designers' habits and **power dynamics** in design processes.	✅	✅
	2016 **EquityXDesign Framework** (Hill, et al. 2016)	Promoting equitable innovation through inclusive design, **acknowledging history**, and shaping the future, fostering **anti-racist processes**.	✅	❌
	2020 **Design Justice** Fair by Design, Just Design	**Reimagines design, prioritising marginalised communities,** and employs collaborative practices to tackle community challenges.	✅	❌
	2021 **Design for Belonging** (Wise, 2022)	Fosters greater **community belonging and reduces othering** by promoting diversity-driven design choices.	✅	❌
2024 **Inclusive Design 4.0** focus on System				✱ **INTERSECTIONALITY**

✱ Accessibility: 1) The qualities that make an experience open to all. 2) A professional discipline aimed at achieving No. 1. An important distinction is that accessibility is an attribute, while...

✱ Intersectionality coined by Kimberlé Crenshaw in 1989 for understanding how groups' and individuals' social and political identities result in unique combinations of discrimination and privilege. These factors include gender, caste, sex, race, ethnicity, class, sexuality, religion, disability, height, age, weight, and physical appearance. These intersecting and overlapping social identities may be both empowering and oppressing (Goodwill et al., 2021).

Figure 3.
Inclusive design approaches inserted into the evolving inclusive design framework developed by Dong (2020). The approaches considered come from the timeline proposed by Kille-Speckter and Nickpour (2022). In addition, other emerging approaches have been included that go beyond accessibility as a condition of inclusion.

al., 2021).

Figure 3 frames inclusive design's milestones about the evolution (Dong, 2020), highlighting how approaches initially emerged to address accessibility but have now evolved to consider diversity across multiple axes of identity, known as intersectionality. Furthermore, the analysis categorises approaches based on their emphasis on either process or output, with the latter being more focused on describing the qualities of a final project. Conversely, process-focused approaches delve into how designers reach their final designs.

This initial analysis suggests that inclusive design processes increasingly emphasise carefully examining the design process. However, it also critiques that snapshots of the theoretical landscape often need to align better with real-world practice (Luck, 2018; Kille-Speckter, 2022). Thus, there is a need for a balanced consideration of both practice and theory to fully appreciate the real-world impact.

9.5 Emerging approaches in inclusive design: practice awareness as a foundational phase

When comparing the previous analysis of design processes with emerging approaches in the literature on inclusive design, such as Design Justice and Liberatory Design, we observe the introduction of an additional phase not present or omitted in other approaches. This phase involves raising awareness before taking any action (Figure 4). This aligns with three essential concepts:

1. Reflection on Positionality: Stressing the importance of questioning one's perspective, without which design efforts may reinforce existing power structures (Buckley, 2020).
2. Embracing Diverse Perspectives: Considering diverse viewpoints addressing power imbalances (Bianchin and Heylighen, 2018; Noel, 2022)
3. Revisiting the Role of the *Design Hero*: Shifting from a saviour design mentality to a community-driven approach (Place, 2022).

	0. PRACTICE AWARENESS	1. OBSERVE	2. INTERPRET	3. IDEATE / EXPLORE	4. IMPLEMENT	5. TEST / IMPROVE	6. SHARE
Double Diamond Design Council		DISCOVER	DEFINE		DEVELOP		DELIVER
D.SCHOOL Stanford University		UNDERSTAND OBSERVE	POINT OF VIEW		IDEATE	PROTOTYPE TEST	
Human-Centered Design Interaction Design Foundation		INSPIRATION			IDEATION	IMPLEMENTATION	
Service design process This is Service Design Doing		RESEARCH			IDEATION	PROTOTYPING	
Design Thinking IDEO		EMPATHISE	DEFINE	IDEATE	PROTOTYPE	TEST	
Co-Design Beyond Sticky notes		IMMERSE AND ALIGN	DISCOVER		DESIGN	TEST REFINE	IMPLEMENT AND LEARN / BUILD THE CONDITIONS
META-DESIGN		Context People Market / OBSERVE	OPPORTUNITY DEFINITION	SCENARIO	DESIGN	PROTOTYPE TEST	ENGINEERING / PRODUCT SERVICE SYSTEM
Liberatory Design National Equity	NOTICE REFLECT / Biases Power Privilege	EMPATHISE / Human Values	DEFINE	INQUIRE	IMAGINE	PROTOTYPE	TRY
Design Justice Design Justice Network	POSITIONALITY	HOW WAS INVOLVED / HOW BENEFITED / HOW WAS HARMED	LOOK WHAT IS ALREADY WORKING		SUSTAIN, HEAL, EMPOWER	TOWARDS NON-EXPLOITATIVE SOLUTIONS	SHARE KNOWLEDGE / TOOLS

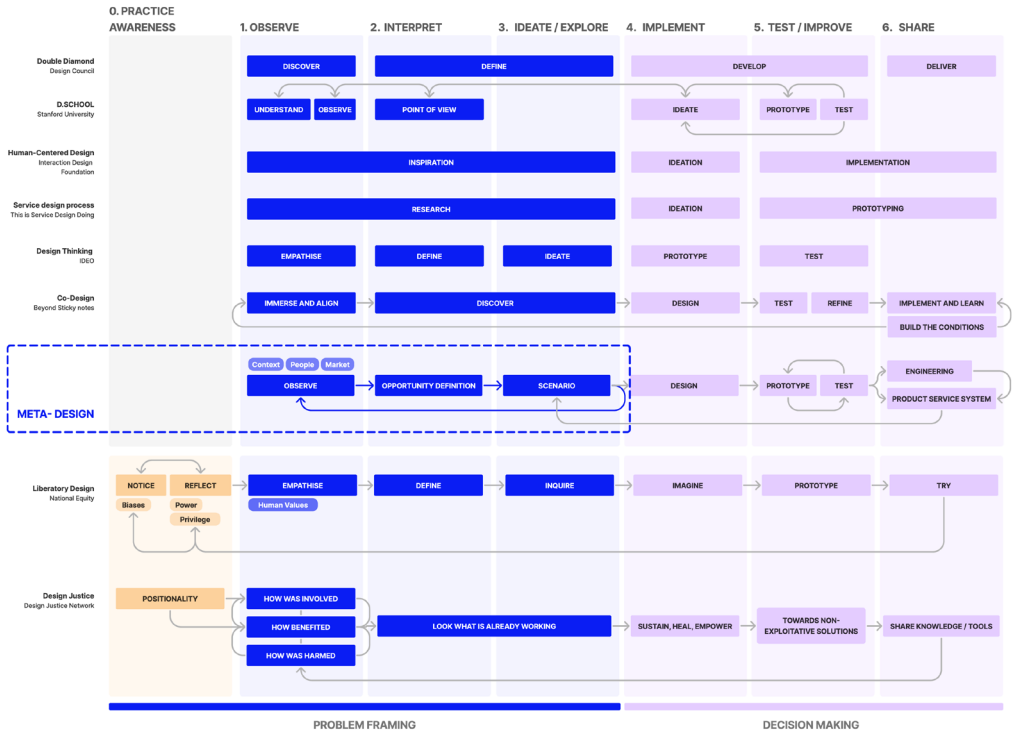PROBLEM FRAMING | DECISION MAKING

Figure 4. Builds upon the previously discussed design process, two additional design processes, Design Justice and Liberatory Design, have been included to demonstrate how they introduce a preliminary stage called *practice awareness* facilitates reflection on privilege and power dynamics, awareness of biases, and acknowledgement of one's positionality. The design process is iterative, with practice awareness emphasized initially to anticipate and address these issues.

Reflecting on privilege and oppression, including their own, is essential for individuals to create a solid foundation to build on (Goodwill *et al*., 2021). This involves recognising that before seeking new design solutions, it is crucial to understand what is already working within communities (principle 10 of design justice). Additionally, embracing the principle that everyone is an expert based on their lived experiences (principle 6 of design justice) highlights the importance of valuing diverse perspectives and contributions in the design process. By fostering awareness, designers can improve the effectiveness and relevance of their design work (Costanza-Chock, 2020).

9.6 Opportunity to integrate inclusive design within meta-design

The literature review highlights six key concepts of meta-design, which could be opportunities for a broader discourse on renewal.

These concepts succinctly capture the essence of meta-design and offer insights into integrating it with an inclusive approach, thus prioritising inclusive design.

Figure 5 below summarises these six key concepts and demonstrates their alignment with inclusive design principles. Hence, reimagining problem-framing through an inclusive lens and actualising meta-design to promote inclusivity appears feasible and relevant. Nowadays, inclusive design is usually at the end of the process (Donahue and Gheerawo, 2021). Early engagement with awareness during the design phase presents a chance to steer clear of tokenism[2] solutions (Costanza-Chock, 2020; Holmes, 2020).

Thinking about inclusive design at the level of meta-design is an opportunity to prioritise it within design education through its integration into meta-design. Research on problem-framing, which influences decision-making, can be significantly biased, leading to token efforts to promote inclusivity (Holmes, 2020). Early in the design process, addressing awareness, power dynamics and biases is crucial so that prejudice does not influence proposed solutions (Costanza-Chock, 2020). Due to poor prioritisation, inclusive design often needs to be revised to expand its principles and incorporate additional attributes that extend the exclusion criteria (Donahue and Gheerawo, 2021). Moreover, although intersectionality is gaining momentum, a gap in design education is emerging. More research is needed into how students handle intersectional biases (Berry *et al*., 2022), and educators need more practical guidelines to teach these concepts beyond theory (Costanza-Chock, 2020). Incorporating an inclusive approach in meta-design could bridge this gap, thereby promoting the training of designers to prioritise inclusive design while considering intersectionality (Figure 6).

In conclusion, recognizing the essential role of design is crucial in tackling today's dynamic challenges. Emphasizing the importance of research, the meta-design dimension underscores the imperative for an inclusive cultural perspective integrated right from the onset of the design process. This approach aims to address biases, promote coherence in future initiatives, and encourage critical evaluation of current cultural and economic limitations. With products increasingly intertwined with services, there is a pressing need to assert their

Note 2.
Tokenism is the practice of making only a perfunctory or symbolic effort to be inclusive to members of minority groups (Kahneman, 2017).

KEY CONCEPTS	DESCRIPTION	REFERENCES	
1 **Reflective Thinking**	The prefix meta usually refers to something beyond something else. Meta-design goes to the roots of design; **Meta-design represents a critical and creative investigation into the possibilities of transformation of human beings and culture** rather than a mode of praxis, wondering why we should design new things, new objects or environments, services and so on.	(Busbea, 2009) (Fischer & Scharff, 2000) (Ciuccarelli, 2022) (Knuth, 1982) (Maturana,1997) (Youngblood,1986)	
2 **Open approach**	Meta-Design provides a way to design **open, collaborative, and distributed processes** (including those in the professional design domain). Meta-design opens up new relational dimensions. It can be seen as a dynamic work of art which produces an aesthetic experience intertwined with our social and technological present, which has the potential to become a grounding reality in human history.	(Ciuccarelli et al., 2022) (Giaccardi & Fischer, 2008) (Giaccardi, 2005) (Wood, 2022)	
3 **Collaborative process**	Meta-design is a collaborative method to build common ground **and foster shared action**. "Meta" as "With" Designing Together, or Design by and for Participation.	(Ciuccarelli et al., 2022) (Fischer & Scharff, 2000) (Fischer et al., 2004) (Giaccardi & Fischer, 2008)	→ (Giaccardi, 2005) (Nold, 2021) (Van Onck, 1965) (Vassão, 2017) (Wood, 2022)
4 **Contextual Research**	Meta-design starts with the **analysis of local resources, both tangible and intangible**, the listening to the communities and the empathic exploration of the territory.	(Bertola & Manzini, 2004) (Celi, 2012) (Colombi, 2013) (Magnaghi, 1967)	
5 **Spotting issues**	The meta-design process aims to **raise new kinds of issues that can trigger innovative projects**. It is a pre-design research or problem analysis. This leads to the structuring and redefinition of the project brief, representing the real project goal.	(Busbea, 2009) (Fischer & Scharff, 2000) (Fischer et al., 2004) (Fisher, 2006)	→ (Maturana, 1997) (Peña, 2020) (Youngblood, 1986)
6 **Project-learning approach**	Meta-design is a project-based learning approach that aims to define or frame the problem to be solved, which does not consist in recognising a pre-existing model in the data, but in creating a model that **reformulates the problem and suggests directions towards a solution**. Project-based learning integrates knowing and doing by engaging students in investigating the real problem.	(Celaschi & Deserti, 2007) (Collina,2005) (Magnaghi, 1967) (Mendini, 1969)	

Figure 5.
Overview of Meta-design Definitions: this figure presents a compilation
of literature-related definitions. These concepts offer a foundation
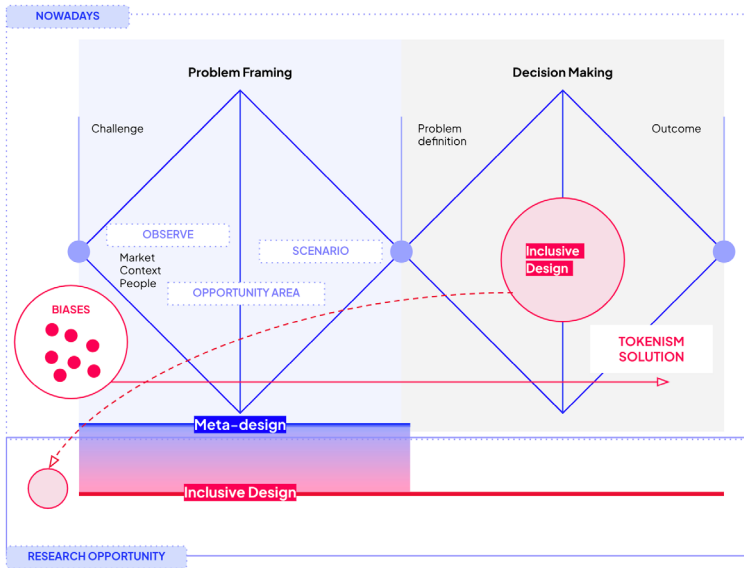for contemplating the reformulation and modernization of the approach.

Figure 6.
Representation of Research Phenomena and Opportunity.
The evidence from the literature suggests that biases highly influence problem-framing; moreover, nowadays, inclusive design is usually at the end of the process. Ideally, every new project should consider inclusive design from the very beginning (Holmes, 2020).
For this reason, working on awareness early in the design process is an opportunity to reduce bias.

value consciously and to redefine norms. Integrating these insights shapes foundational principles for the next generation of designers, which is essential for navigating our evolving world's complexities.

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