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# Understanding Critical Design Tensions With Progression Through Historical Practices

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## Abstract

This article engages with the claimed limitation that critical design fails to address the problems it condemns, such as capitalism, and suggests looking at the different ways critical design practices have related to production in the past. Three examples from different historical moments are discussed through the theoretical lens of *tension with progression*. The discussion brings to light four areas of reflection which concern the way we understand progression, time, socio-technical contexts, and use. These — all suggesting that critical design is frictional yet can also be progressional — are presented as perspectives relevant to better position critical design in relation to production and to assess its potential contributions.

## Keywords

Critical design

Design history

Tension

Production

Critical design practices — or more precisely forms of *critique that unfold through design*<sup>1</sup> — have become popular within the field of human-computer interaction as well as related fields, such as human-robot interaction (Lupetti et al., 2021).

The growing attention towards critical practices is mostly motivated by the interest of these communities to diverge from the disciplinary norms of designing interactive systems, and more specifically from the user-centred design paradigm (Pierce et al., 2015) and usability concerns (Bardzell & Bardzell, 2013). In these practices, artefacts can be crafted to serve a rhetorical rather than a utilitarian function (Malpass, 2016): the designed object is used to question dominant beliefs surrounding a product or a technology, and to stimulate debate (Ferri et al., 2014).

These practices, however, are also often criticised for being unable to address the underlying structural problems they condemn (Ward, 2021). They focus on exploring future projections or alternative realities (presumably) leaving unattended the issues of our current conditions, such as the need to reimagine alternatives to capitalism and material consumption (Ward, 2021). As a consequence, there seems to be an expanding rift between the ones that explore this “alternative” space and the ones that approach design more conventionally, as a problem-solving and production-oriented practice (Pierce, 2021). Boundaries are being drawn to set the design thinkers apart from the design doers (Ward, 2021), who are increasingly seen as opposite ends of a design continuum (Forlizzi et al., 2017). Yet, such clear-cut separations only work in abstraction. As even advocates of such a divorce illustrate (Forlizzi et al., 2017) “design research efforts can encompass varying combinations of these two approaches”. In response to this, recent literature has been focusing on positioning and discussing these different design research practices in relation to their shared history, rather than in opposition to each other without any context (Bardzell, 2019). Revised conceptual tools have been proposed to better understand the connections between critique and design (Pierce, 2021). Yet, most of these works either adopt a highly theoretical perspective (e.g., discussed through the lens of critical theory (Bardzell & Bardzell, 2013)) or focus on recent practices. A critical tradition in design is often acknowledged (Pierce, 2015; Malpass, 2017) but rarely accounted for when engaging with methodological and ontological reflections. Example projects used to support arguments regarding critical practices hardly ever date back before the 2000’s (Pierce, 2021; Bardzell & Bardzell, 2013).

Accounting for concrete historical examples, however, could help to better understand the relationship between critique and design and, more specifically, could help address the claimed limitation that these practices fail to address the issues that they condemn, i.e., the problems of production and capitalism (Ward, 2021). Thereafter, the remainder of this article illustrates three examples of critical design practices belonging to three different historical moments and discusses them through the theoretical lens of *tension with progression* (Pierce, 2021). The aim is to further expand the disciplinary understanding of critical practices and their relationship to production.

The term critical design has proven to be controversial, because it is often associated only with the specific experiences of Dunne and Raby and their courses at the Royal College of Art (Pierce et al., 2015). Within the scope of this article, however, it is useful as it makes it possible to specifically address forms of critique that unfold through design, a broad set of practices that include Dunne and Raby’s work, among many other practices.

The following sections illustrate and discuss three examples of critical design practices: Maria Montessori materials; the radical furniture of Archizoom Associati; and Automato Farm para-products. The three examples, which differ in terms of historical connotation and areas of application, were selected to provide a broad picture of critical design, and to illustrate how critique that unfolds through design can relate to production and be “constructive” in different ways. The examples are illustrated and discussed through the lens of *tension with progression*, suggested by Pierce (2021). According to the author, conventional design is *progressional*, which means that it tends to progressively converge towards production. Conversely, critical design has a *frictional* tendency<sup>2</sup>: it is somewhat resistant to progress towards production. Both types of design, however, are *prefigural*: in both cases developed artefacts represent provisional actualizations of possible futures. The framework does not provide a complete answer to the argument that critical design fails to address the structural problems it condemns (especially in relation to production), yet it represents a useful theoretical instrument to reflect on existing critical design practices in search of answers.

2  
Pierce further distinguishes six types of frictional tendencies: divergent friction; oppositional friction; accelerational friction; counterfactual friction; and analogical friction.

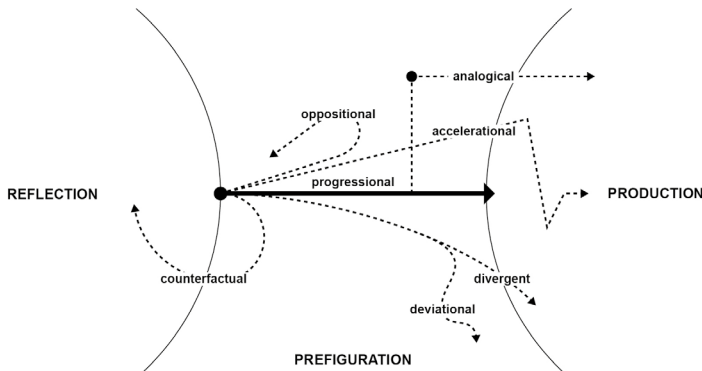


Fig. 1  
Frictional tendencies of critical design as prefigural activities that populate a virtual space in between reflection and production. The figure represents an extension of the “progression, friction, prefiguration” framework by Pierce (2021).

### Maria Montessori Materials

The Montessori materials, e.g., *Movable Alphabet* Fig. 2, are a popular series of manipulatives designed to let children learn independently, through experience and exploration. Consisting of both practical life utensils adapted to children and abstract objects designed ex-novo, they are aimed at fostering gross and fine motor skills, developing cognitive abilities and introducing children to the cycles of selection, initiation, completion and tidying up of an activity, crucial for building independent living skills as well (Marshall, 2017). Shape, materials and modalities of interactions are used as enablers of experience, but are also vehicles of a storytelling about educational theories that were being developed by Maria Montessori, an educator who lived and worked across Europe between 1870 and 1952. Through her work, which is also today acknowledged as a design practice (Martino, 2018), Maria Montessori levelled a critique at the educational approaches and narratives

of learning dominant at her times. She contested the relevance of assessing the child's development by physical measurement alone, and ideas of learning as knowledge transfer. Her manipulatives and related activities introduced an *oppositional friction*<sup>3</sup> to the norm (dominant at that time) of producing materials

3  
Pierce (2021) defines as *oppositional friction* design that exhibits a critical stance toward current practices, technologies, situations, trends, values.

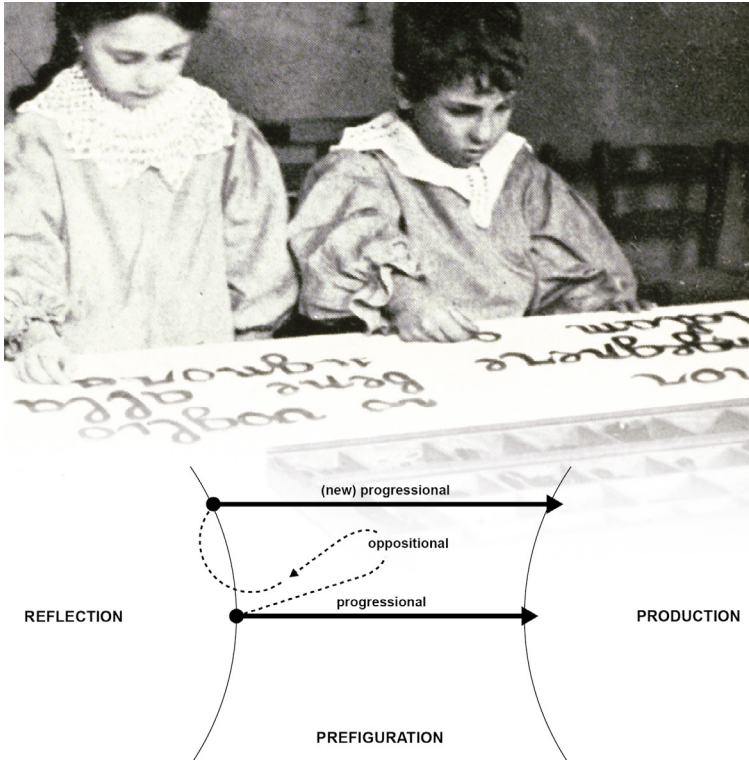


Fig. 2  
Montessori materials, i.e., *Movable Alphabet*, introduce an *oppositional friction* towards progression. Photographic part of the image © montessoricentenary.org

based on a logic of containing children's behaviour and on the idea that knowledge is something that can be transferred (Montessori, 2015). Maria Montessori opposed dominant practices by personally developing numerous manipulatives that were used daily, by children to learn and by teachers to observe (Montessori, 2015). As such, her work can be seen as a form of critical design with an *oppositional tendency that opens up an alternative form of progression*.

### Archizoom Associati Radical Furniture

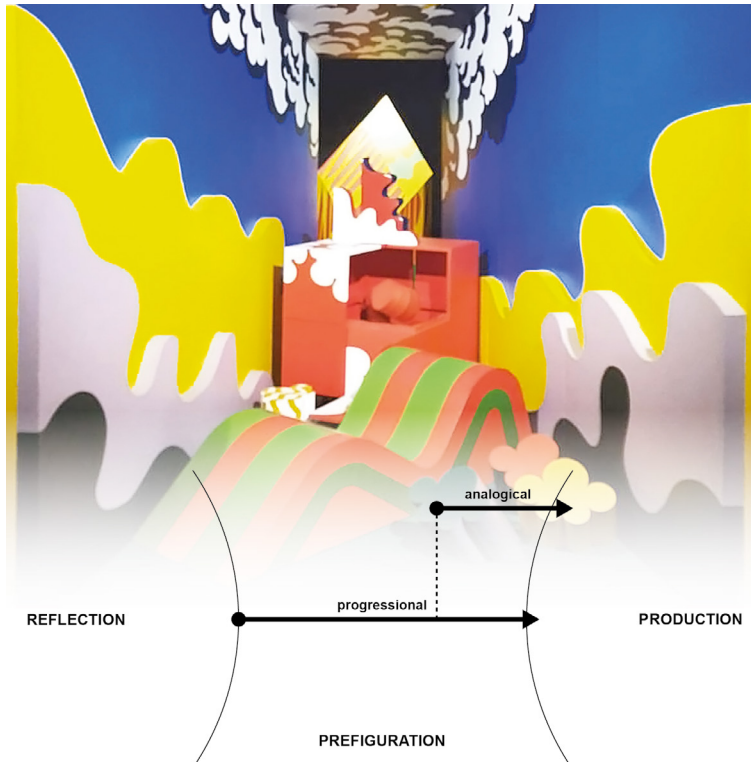
The furniture by Archizoom Associati, an architects' group founded in Florence in 1966 and one of the most representative members of the Italian Radical Design movement, represents a materialisation of philosophical ideas about living. They challenged the hegemony of architecture by designing objects and furniture as vessels of iconographic values and protagonists of the city (Capdevila, 2013). The *Superonda* sofa (Poltronova, 2019), for example, is an artefact that adapts to the modern dynamism of living by constantly redefining space and uses. The furniture is a manifestation of the open critique

levelled by Archizoom, as well as other contemporary Radical Design collectives, against the dominant rationalist rigour and technological utopia (Pettena, 2004).

At the time, technological innovation was mostly approached as a force for improving life through a rational use of new materials and

4  
Pierce (2021) defines as analogical friction design that resists the literal and direct, and instead promotes associative and metaphorical interpretations.

Fig. 3  
Archizoom Associati radical furniture, *Superonda*, introduces an analogical friction towards progression. Photographic part of the image © Mirko Burberi.



new production processes, to which form and modes of utilisation needed to adapt (Pettena, 2004). In this sense, Archizoom furniture appears as an *analogical friction*<sup>4</sup>. The group still engages with the conventional act of designing furniture and collaborates with industry for that purpose, but the language they use is a revolutionary one: metaphorical associations and symbolism replace rigour and control

Fig. 3. Artefacts become tangible representations of thoughts and desires (Pettena, 2004).

### Automato Farm Counterfactual Artefacts

Automato Farm is an international design collective founded in Shanghai in 2015. Their artefacts are developed in detail all the way down to code and electronics (SpeculativeEdu, 2019), but used to explore near futures and alternative realities. As such, they are better described as *counterfactual artefacts* (Wakkary et al., 2015): “working” artefacts crafted in detail that “falsely” exist in the actual world but are “true” in a possible world.

These *counterfactual artefacts* are crafted to reflect on the role of mundane things and on the compromises that people make every



day with technology. The project *Believe-it-Yourself* Fig. 4, for instance, is a series of three custom computing kits that allow people to tinker with a camera that can see luck, a microphone that can interpret destiny, and a compass that can point towards harmony and balance (Visnjic, 2019).

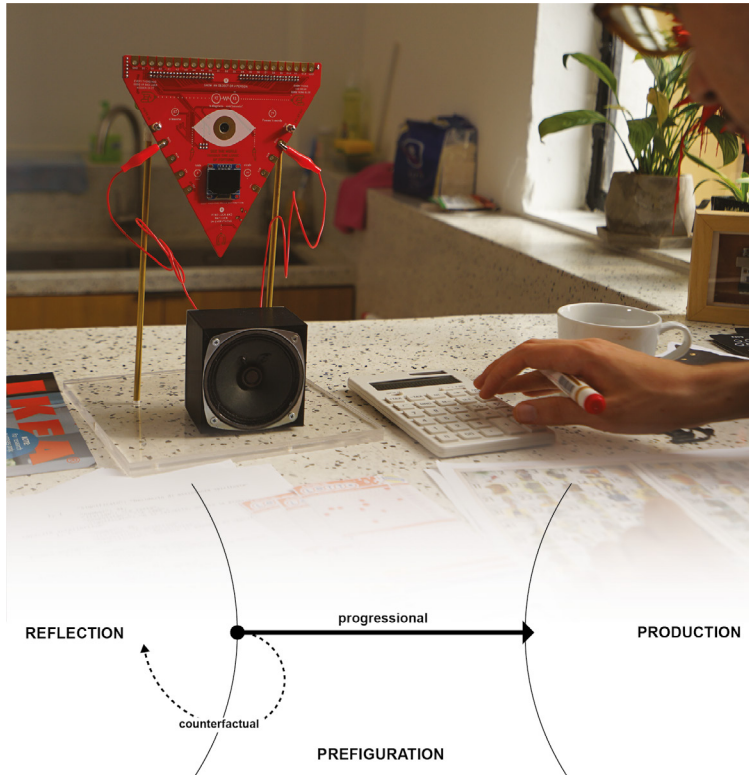
Through the artefacts, the collective engages the audience in a conversation about the hidden rules, structures and decisions behind

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Pierce (2021) defines as counterfactual friction design that fabricates alternative histories or worlds that might have transpired, but historically did not or presently have not.

Fig. 4

Automato Farm artefacts, *Believe it Yourself*, introduces a counterfactual friction towards progression. Photographic part of the image © Automato Farm.



technological products that may be considered as neutral, but in fact are always influenced by the thoughts and beliefs of the designers, engineers and corporations who produce them (Miller, 2016). By enabling non-conventional experiences of technology, these artefacts introduce a *counterfactual friction*<sup>5</sup> aimed at subverting the dominant polarised opinions, the extreme values, either positive or negative, that society attributes to technology (Milički & Paliska, 2017). Through exaggeration and unlikely scenarios, the group invites the public to join a satiric conversation about how subjective judgments, beliefs, and biased datasets can easily be turned into objective measures and potential truths to embed in the devices around us (Visnjic, 2019).

## Rethinking Tensions Towards Progression

A discussion of these three examples through the theoretical lens of *tension with progression* brings out four aspects to reflect upon. They concern the way we understand progression, time, socio-technical contexts, and use.

### *Transproductional uses and production are not mutually exclusive*

Pierce (2021) defines transproductional use as the ability of frictional design practices to enable purposes, uses, functions, effects and values other than the production they prefigure. To better grasp this concept, the author discusses the example of the *Tilting Bowl* (Wakkary et al., 2015): a ceramic bowl that tilts gently at random moments multiple times throughout a day. Even though tested in real households for a relatively long time (about three months (Wakkary et al., 2018)), the scope of the artefact is not to predict the future of technologically enhanced fruit bowls, but rather to explore how increasingly autonomous things and people could mutually shape each other in the future. The design function, then, is not to inform better product development, but rather to enable philosophical inquiries (Wakkary et al., 2018). Like the *Tilting Bowl*, the project *Believe it Yourself* has a clear transproductional use: the explicit absurdity of the artefacts declares the impossibility that they might ever become actual products, but triggers a reflection on the values designers embed into AI systems. In the work by Archizoom Associati and Maria Montessori, however, traditional and transproductional uses coexist. Montessori materials are both products as well as tools for investigating how children learn. Archizoom radical furniture are products as well as provocations, landmarks that break with the dominant tradition of architecture. The dual scope of these artefacts, both usable and debatable, is further testified by the writings of the same authors who, because they were also involved in academia, often discussed their work to advance knowledge in their discipline. Traditional and transproductional uses, then, are not necessarily mutually exclusive. The emphasis on one over the other, however, has direct implications on the potentially provocative nature of the artefacts as well as their capacity to open conversations about future or alternative realities. Hence, Montessori's work is mostly concerned with the "here and now" of children learning, while Archizoom's furniture speculates on how pop culture and youth movements might change the way we will understand everyday living in the future.

### *Critical design can be in tension with one form of progression, but not necessarily with progression and production per se*

Capitalism and production, in fact, are only some of the problems that critical design can condemn and create tension with (Encinas et al., 2021). Through her materials, for instance, Maria Montessori condemns the limits of dominant philosophies of learning and



related educational approaches. Archizoom Associati use furniture to condemn the misalignment between modernist rigour and the “frivolousness” of younger generations. Only the work of Automato Farm may seem a critique towards techno-solutionism (i.e., the idea that technology provides solutions to complex social problems (Lindtner et al., 2016)) and, relatedly, to capitalism. A broader look at the groups’ practice, however, discloses the designers’ intricate relationship with the technologies under critique: the problem they condemn, then, is not the technology itself or its wider application, rather the values and assumptions underlying their implementation. The three examples, then, all somehow frictionally engage with dominant production practices, yet, the focus of their critique is not the fact of producing. Montessori’s critique of learning theories generated new educational tools, which are still produced and used across the world today. Archizoom’s provocations opened up a space for playfulness and symbolism that still characterise contemporary Italian design. And what the impact of the work of Automato Farm is and will be, may be better understood with time.

*Artefacts can be critical today, yet become a norm in the future*

The examples discussed above clearly manifest how a design practice can have critical value at a specific moment in time, but also evolve towards progression, to the point of becoming a new norm. This is the case with both Maria Montessori and Archizoom Associati, whose artefacts embodied a strong critique towards the dominant practices of their time, yet were embedded into mainstream production over time, to the point of being criticised as norms (see critiques to Montessori education (Marshall, 2017)). This opens up the question of whether our understanding of critical design and its relations with production might be limited by short-term thinking and focus on single exemplars rather than whole practices. As a matter of fact, the critique that critical design leaves unattended the issues that it condemns is grounded on a narrow understanding of these practices. For instance, avant-garde design practices such as the work by Archizoom Associati, are being criticised for ultimately being appropriated by the dominant capitalistic system (Auger, 2019). Getting back to our first point, however, the focus of their critique was on something other than capitalism. They engaged with capitalism and its related consumer culture to actually claim a space for a changing lifestyle, in opposition to the modernist rigour. While it is true that their work was appropriated by industry (the system they were criticising), it is also true that they radically changed it in the process. As a matter of fact, what we know today as Italian design, a highly iconic design landscape where metaphors and pop references are deeply intertwined with functional solutions, owes a great deal to the Radical Design experiences (Bovo, 2017), which shocked the field with a previously unthinkable use of colours, patterns and shapes. Looking at how critical design unfolds and evolves across longer timeframes can thus help to address—or even resolve—some of its claimed limitations.

Critical design artefacts are often considered “improbable to become mass-market consumer products” (Pierce, 2021), as in the case of the *Tilting Bowl* (Wakkary et al., 2015) whose quirkiness is considered a clear contradiction of the logical norms of design and production. But, could such an improbability of production be determined by the geographical and socio-technical context of the researcher/designer developing the project? What if the *Tilting Bowl* was developed in an Asian country where most electronic industries operate? Within the field of human-robot interaction research, for instance, a rather particular case is the work of Sonya Kwak, a prolific robot designer whose research artefacts often become actual products, but at the same time challenge the field to rethink what a robot is and what purposes it can serve<sup>7</sup>. The work of Maria Montessori and Archizoom Associati, whose critical stance coexists with product development, somehow presents socio-technical conditions analogous to those of Sonya Kwak. They are all designers and researchers operating in a country with a strong craft tradition and a lively manufacturing environment (later). These examples suggest that contextual factors such as the country's industrial strength and vitality can play a crucial role in the way critical design practices can unfold. Yet, the example of Automato Farm is contradictory. The design collective, in fact, originated and operated mostly in China where production possibilities are extensive and the cultural scene is lively. Nevertheless, their projects remain within the sphere of provocation and usually “live” in exhibitions. Even more so, their projects are often inspired by the uniquely hectic technological life of the country (see the *Teacher of Algorithms* project). This suggests that a contextual condition, such as vicinity to production, is only one of the factors determining the critical design positioning towards progression. These, in fact, come to terms with the nature of the tension that the designers aim to generate (e.g., analogical or counterfactual (Pierce, 2021)).

## Conclusions

By engaging with the — claimed — limitation that critical design leaves unattended the issues it condemns, i.e., the problems of production and capitalism, this article provides insights into four aspects that characterise the relationship between these practices and progress towards production. Specifically, by discussing three examples of critical design practices belonging to three different historical moments, the article offers opportunities to reflect on four main aspects. First, it highlights how the disciplinary account of *production is often univocal*, leaving unattended the differences that might exist across alternative ways of production and the related underlying values. This implies that critical design practices can be in tension with one idea of progression, but not necessarily with progression and production per se. Relatedly, the examples manifest how critical design practices that are frictional and resist production in the present, can *converge towards production over time*, and even

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The here indicate the Western context. The author acknowledges that, like many of the scholars investigating the nature and role of critical design, the perspective of this work is influenced by the belonging to the Global North of the world. As such, we make assumptions and reflect on the role of these artefacts from the specific perspective of western cultures.

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In a recent talk Sonya Kwak discusses her design work through which she explicitly challenges robot stereotypes. The talk is available at: <https://www.youtube.com/watch?v=Ft-p5KVq-z5w&t=1s>

become a norm. Similar but distinct is also the role of the socio-technical context: if situated in a context with a *lively cultural and manufacturing scene*, a practice might progress towards production while preserving its critical stance or, conversely, take its distance from production precisely because of the technological frantiness of a context. The type of tension that the designer chooses to use might determine the convergence towards or opposition to production, yet the different practices can still be equally valuable as critiques that unfold through design. Finally, *critical design can support transproductional uses*, such as investigating philosophical aspects of human-technology relations, *without necessarily excluding traditional use*.

By shedding light on these aspects, this work aims to contribute to the disciplinary understanding of critical design practices and their potential value. Looking at historical practices and framing their relationship to production through the lens of time and context, in fact, might help the field answer some of the more common criticisms surrounding these practices. Yet, the presented arguments need not be approached as definitive answers, rather as openings and alternative perspectives into the ongoing making of critical design theory.

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This work owes a great deal to the work of James Pierce, who also kindly and thoughtfully engaged in this conversation about what we can learn from design history, providing precious insights and comments.

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