

The Critical Catalyst: A Critical Approach to Design Futures Literacy

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Abstract

Design and Future Studies are intrinsically related fields. Both fields pursue the goal to introduce potential visions of the future to achieve a sustainable future for humanity. However, future challenges are becoming more evident with the increasing ubiquity of socio-technological advancements. Over the past three decades, several movements have emerged with the shared objective of being critical of design (Mazé, 2019); these movements are attempting to operate outside the external borders of market-driven enquiry (Malpass, 2017). These practices require a critical examination of the possibilities to achieve change that mitigate unfavourable consequences. This paper reflects on the way that the Research through Design approach can affect these practices through the activities and devices we have developed and refer to as the Critical Catalyst (CC). We applied this approach to MSc students in Integrated Product Design at the Design School at the Politecnico di Milano. The results of this experience are condensed into nine pro-vo-types (provocative prototypes) presented at the end of the course. This paper examines the CC design future process and reflects upon the experience and tools by analysing the critical choices.

Keywords

Critical design
Futures studies
Futures literacy
Speculative design
Design fiction

Context

In an attempt to challenge future uncertainties, several movements have emerged over the past three decades that share the concept of being critical towards design (Mazé, 2019); these movements are attempting to operate outside of the external borders of market-driven enquiry (Malpass, 2017). Representative examples of these movements are Speculative Design (Dunne & Raby, 2013), Design Fiction (Sterling, 2005), and Experiential Futures (Candy, 2010). In this paper, we focus on the futures-oriented critical design movements and define them as “Critical Design Futures” (CDF), a notion developed to identify the set of design practices that are meant to address the uncertainty of the future by examining possibilities critically, and effecting change to mitigate unfavourable consequences. CDF emerged from Critical Design, which is described as a practice that uses design tools and processes not to solve a problem, but to rethink its boundaries and parameters from a critical perspective (Mazé, 2014). CDF was developed in response to the adverse effects over the past decades that are attributable to design. In their influential book, *Design in Crisis*, Fry and Nocek (2021) argued that while there have been many attempts to transform design to be socially and environmentally responsible, “[...] the modern meta-physics of design remains unchanged” (p. 2). The design discipline has faced these challenges for decades, and to date, they are still evident. The authors acknowledge the discussion among scholars about critical and alternative design practices and the complexity of proposing new terminology to address or describe this set of practices. However, the goal of proposing CDF is not to broaden or create new territories, but rather to further clarify the specific practices that focus on critiquing aspects related to the future rather than alternative practices that focus on political activism or other types of criticism in design.

Critical Design Futures: Bridging the Gap

Although CDF sounds very profound, and examples are abundant, the theoretical academic literature on CDF practices is still not fully comprehensive with respect to theory and the relation with other design practices; further, enquiries about method, performance, and development remain unresolved (Bardzell et al., 2012; Mazé & Redström, 2007; Ozkaramanli & Desmet, 2016; Pierce, 2021). This type of design futures practice is not intended to produce market products, but to analyse the factors and enact change in what could be proposed to the market. CDF refers to a type of design and object typology intended to communicate ideas, as well as raise awareness of controversial, psychological, ideological, or sociological issues (Tharp & Tharp, 2013). In addition to being a vehicle for communication, CDF are tools to problematize and investigate design problems. Thus, the design language used to make ideas tangible is not intended to solve problems, but to “[...] critically rethink the parameters of the problem itself” (Mazé & Redström, 2007, p. 11). The goal is to encourage discussion about an issue. It is not the discussion’s result or solution, but its initiator and trigger (Bardzell et al., 2012).

Researching Futures Through Design

Building on the discussion above, it is noteworthy that there are few established conceptual models to study futures through design in general, and in CDF in particular, other than Ollenburg (2019), Lindley & Coulton (2014) and Candy and Dunagan (2017). However, CDF can be considered constructive design research (Krogh & Koskinen, 2020) and be read with a Research through Design (RtD) approach (Frayling, 1993; Friedman, 2003). Nevertheless, the question remains: What constitutes RtD in the design futures practice, and how could CDF operate within the boundaries of design research paradigms?

There are evident parallels between RtD as action research and CDF with respect to their common ground. As Pierce (2021) noted: "Alternative design approaches implicitly if not explicitly align with a research through design (RtD) approach, another recent expansionary specialisation wherein methods and outcomes of design are used to conduct research inquiry and to generate and communicate knowledge" (p. 1). The parallels are evident in the following three aspects: 1) Both use either a design artefact or design output as the central point of the research (Ollenburg, 2019; Bardzell et al., 2012); 2) CDF is a reflexive practice, and RtD's core value is to generate knowledge by reflecting on practice (Kelliher & Byrne, 2015); and 3) participation is a key element in both, as they engage the audience in action and the research is an active part of the process.

The model we propose, the CC, is built on RtD as an iterative framework, as CDF's ultimate purpose is not to design a future product but to research futures through design.

The Critical Catalyst

We view design as a "critical agent or catalyst", a concept to steer the process of designing for the future context. It helps young designers problematize a future challenge and examine its hidden and intangible sides. The Critical Catalyst (CC) is a set of reflexive design activities and devices developed to fill the gap in the methodological approach of CDF. The CC serves to initiate critical debates in design futures and as a catalyst to facilitate designers' reflections on future challenges. Its objective is to 1) help trigger critical enactments in design futures practices, 2) work as a self-reflexive tool for practitioners and researchers, and 3) facilitate critical design decisions during the process. The CC serves to support the methodological flexibility needed for CDF by offering the critical triggers throughout the process, without imposing a particular sequential or linear process. It is a means to offer wide and flexible choices of critical triggers for a practitioner to select from. It is not prescriptive; it does support and suggest certain guidelines, such as identifying the researcher's positionality and analysing the future issue, yet without a limiting sequential emphasis. The process builds on Voros's generic futures framework (2005), Ollenburg's participatory futures model (2019), and Jonas's RtD generic design process (2007). The model has four macro phases (Analysis, Projection, Synthesis, and Communication

& Reflection). Generally, the first three phases are nearly agreed upon in future studies, and the fourth is added as an essential phase in critical practices, as it is the main phase in which the interaction with the audience takes place.

The model is placed in the action research format of iterative cycles, in which the research process progresses from Analysis to Projection, to Synthesis, and finally, Communication & Reflection Fig. 1.

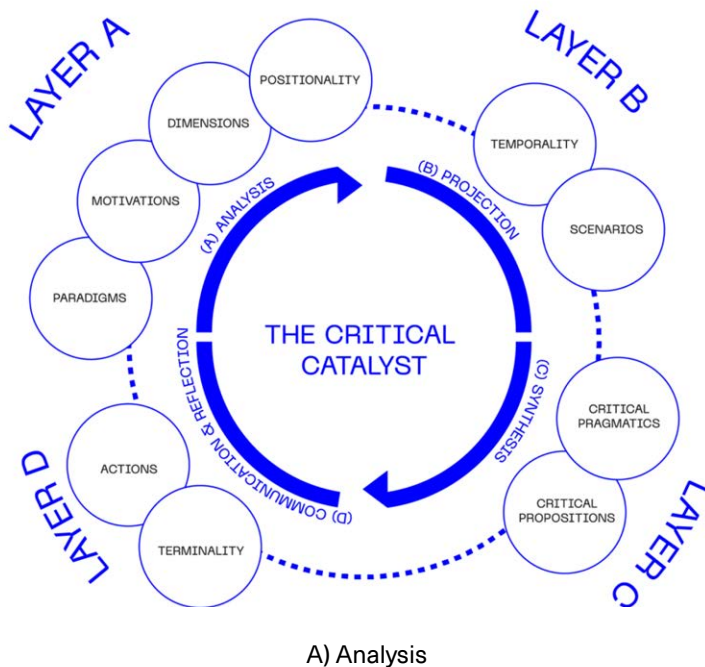


Fig. 1
The Critical Catalyst
model by Harb, 2022.



The Analysis is the primary stage in which design researchers explore the issue under investigation; this may include a vast number of tools and techniques that range from Horizon scanning and reviewing the literature to analysing emerging issues (Inayatullah, 2013). With respect to the critical catalyst, there are three main layers that must be considered.

- Paradigms. Ramos (2002), and Voros (2005) raise the issue of the need for a “paradigmatic dimension”, as models may help designers and researchers situate the CDF project within the scope of inquiry. The paradigms in CC refer to the inquirer’s worldview and offer different project perspectives through specific lenses. For instance, an interrogative paradigm is designed to question future states and debate their implications and consequences. In contrast, a propositional paradigm builds an alternative worldview of the future and opens a space for inspiration and imagination about plural futures.
- Dimensions. Dimensions — driven by Inayatullah’s (2007) Causal Layered Analysis — refer to the issue’s complexity, such as defining what is clearly visible (litany), what is hidden (myth or metaphor), and what factors constitute the real issue. Dimensions help the inquirer investigate the future issue in

greater depth and gain insights from deep and abandoned factors that are usually overlooked or misused (Inayatullah, 2007).

- Motivations. Motivations refer to a designer or design team's internal or personal objectives. Perspectives, ethos, and direction embedded in one's personal qualities become the agency that allows designers to take up the project and embrace new challenges. A designer may be sceptical about particular social, technological, or political issues. Scepticism encourages an interrogative stance wherein the inquirer poses questions about the issue and attempts to identify and expose its roots and implications (Tharp & Tharp, 2019).

B) Projection

There are three main important elements in the projection phase:

- Temporality. This is a core element of the CDF project. Temporality is related to how far into the future the project strays and how the timeline of the future might be constructed. Here we identify two main pillars used to create the timeline — projection (the extrapolation of events over a period of time determined by the designer) — and tracing (looking at the roots of the problem) (DiSalvo, 2012). Temporality refers to the development of a timeline of counterfactual or hypothetical events. The timeline can go back in history to create a counterfactual (leading to an alternative present) but can also form a future hypothetical (that leads to alternative futures) (Dator, 2019; Inayatullah, 2013).
- Critical Diegetic Scenarios. A fundamental cornerstone in CDF is scenarios in “world-building” and “diegesis” (story world). In CDF, we argue that scenarios are not the same as conventional futures scenarios such as DOS (Manzini & Jegou, 2003; Evans, 2010; Dator, 2019). Critical diegetic scenarios have a different purpose, to create a space of problematization in which the project should be situated. It follows the paradigms, motivations, and temporality, and shares their purposes, but shows them in terms of a story world. This world includes characters, as well as social, political, and economic values of the future state. We argue that this world should have a balanced level of defamiliarisation (uncanny) (Auger, 2014; Dunne & Raby, 2013), ambiguity (Gaver, Beaver & Benford, 2003), and plausibility (Tharp & Tharp, 2019).
- Positionality. Critical and speculative design is often interpreted as a position (Dunne & Raby, 2013). A position defines where the designer stands within the modes of the critical landscape, whether s/he is critical of a design or socio-political issue or is acting as a participant who works with the audience to identify issues for debate. It thus indicates where the designer stands within these interrelated aspects.

The third layer is the synthesis concerned with CDF's making aspects, which are the 1) Critical pragmatics and 2) Critical propositions: briefly, both aspects work together to inform the way that aesthetics and form can be achieved in the CDF project. They build on techniques of unconventional design, such as Chindogu (Kamino & Stolterman, 2021), Para-functional prototypes (Dunne, 1999), and critical Jugaad (Butoliya, 2018). The intent of these critical propositions is to problematize the project's focal issue and inspire provocative diegetic prototypes that represent the diegesis that the scenario creates both tangibly and viscerally.

Communication and Reflection

Communication and reflection are the fourth pillar of the CDF project, which amalgamates all the previous activities. This is a fundamental part of the CDF project in which the audience experiences the prototype and obtains insights. In it, the inquirer documents, digests, and observes the process. This stage closes the research through the design cycle, where designers reflect upon the experience overall, infer and map consequences, and if necessary, restructure the critical object for another cycle of iterations.

PoliMi Futures' Fictions: Testing the Critical Catalyst in Context

The researchers conducted a test in an educational context to determine how the CC could be used and identify how it might affect the participants.

The course is *PoliMi Futures Fictions* (POFF), the first module of the Concept Design Studio of the Master of Science program in Integrated Product Design at the Politecnico di Milano. The course is designed to expand the students' knowledge about the future and enhance their envisioning capabilities. It is intended to empower students with future literacy and improve their critical thinking skills when they encounter future challenges. Ten sessions that focused on the course objectives were conducted over the course of five weeks. The course was delivered to 58 international students who worked in 9 groups. The course's pedagogical approach focuses primarily on practice and the RtD approach by building on the results from both the CC and FUEL4Design projects (Future Education and Literacy for Designers), funded by the Erasmus+ program. The course is intensive, and each week is based upon a challenge related to specific objectives and activities, as well as a daily plan with lectures, seminars, and milestones to achieve.

The projects in the course were focused on researching futures. The intention was not to produce a product design of the future, but to research, investigate, and question the context and parameters of design in a future context. The investigation was conducted by creating objects that tend to push the boundaries and limits of conventional design practice to seek alternative paths and potential directions of the futures, as well as the implications and consequences of particular technologies.

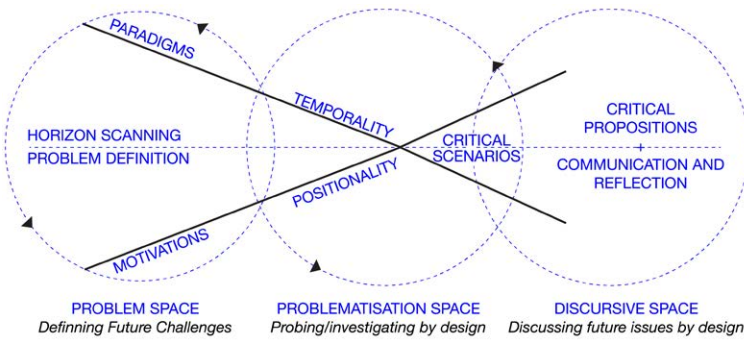


Fig. 2
The course process
read through the Critical
Catalyst lens.



The activities revolved around using the elements in the CC and applying them to the course structure that we developed Fig. 2 as follows:

Problem Space. For the first stage of the course, the students identified the topic and delved deeper into understanding the real issue and challenges. We asked the students to work with the Future Forces Canvas (FUEL4DESIGN, 2021), which we developed as an analytical tool for the horizon scanning stage, in which designers are asked to map emerging trends in 11 sections that drive the future. In addition to defining the topic and mapping trends, the first layer of the CC — the Paradigms — was introduced, along with the Motivations, in which the designers are asked to identify the purpose of engaging in the project and the perspective from which they want to approach it. Fig. 3.

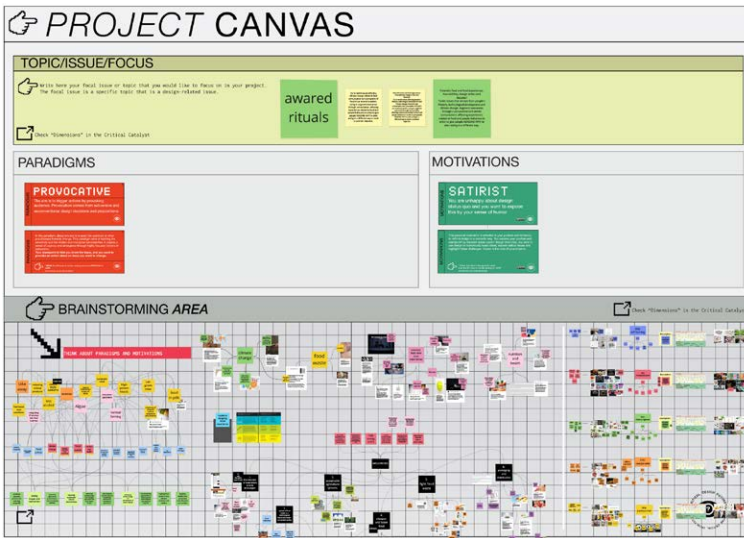


Fig. 3
Students' Paradigms,
Motivations, and horizon
scanning exercises
(screenshot from the
course Miro-board).

Problematization Space. The second stage is to analyse the findings of the first stage by building the future timeline. The future timeline is the projection of the potential implications and consequences of particular events or influential points in their futures timeline. Following the timeline is the Critical diegetic scenario. In this exercise, the critical diegetic scenarios cards were introduced, and the explanation of how they work with the timeline was supported with examples from projects.

Discursive Space. The third stage we proposed is the critical propositions cards, which is the stage in which designers can create concepts and provocative prototypes to debate the issue under investigation. The propositions are complemented with critical pragmatics, another layer that facilitates understanding and the design of a critical object's aesthetics Fig. 4.



Fig. 4
The CC cards of Critical Propositions by Harb, 2022.

Outcome

The participating students presented nine design fiction projects, all of which were in the form of physical prototypes accompanied by a video. All the groups were able to offer some sense of the outcome of the project. Here we present some examples.

The first is *BOW* Fig. 5, which discusses the future of senses, in particular the perception of time with respect to work/life balance. The second is *Pissing Pants* Fig. 6, which discusses the future of food and how we may need alternative ways to produce non-synthetic food. The third is the *Embryo: fireflies food can*, which discusses extreme migration in the post-Anthropocene Fig. 7.



Fig. 5
Bow by Helen Berhanu Tekle, Filippo Bugni, Matteo Corradini, Sabrina Gadotti, Elena Scarpelli, and Zixin Zheng.



Fig. 6
Pissing Pants by Zachary Edwards, Jisoo Kim, Lars Lampani, Alberto Milano, Alexandra Spassov, Davide Stefani, and Chaoyi Zhang.



Fig. 7
Embryo by Ka Chun Chow, Anna Dondini, Nuño González Rebaque, Elisa Melodia, Niccolò Maria Oliva, Elena Valle, and Zane Xie.

Reflections on the Critical Catalyst and Testing Experience

The discussion and analysis depended upon the results of a survey that was completed by 45 of 58 students at the end of the course. The most important insight into the experience of the CC is that the participants were able to grasp the meaning and purpose of being critical in design futures. The survey results showed no disagreement with the understanding of the purpose and the concept of CDF, as was also evident in the projects.

The first part of the framework was the analysis, which often conflicted with the participants' previous understanding of the typical research phase. The conflict derived from the fact that researching future trends, weak signals, or "the yet to be" is not always an easy task to conceive, segment, and put in order. Investigators require a significant amount of expertise, as the future itself is a very diverse topic, so that researchers who work in this area need to be aware of the many other factors that affect our futures. During this phase, the participants typically became confused until they understood the purpose of analysing the present and projected their understanding in a potential futures timeline.

The CC conceptual layers (e.g. paradigms and motivations) were more difficult to digest and reflect upon as they relate primarily to the users' perception of design itself, as well as their approach to it. Paradigms are positioned in the early stages of the process; however, some of the CC users found it difficult to identify the paradigm in the early stages, particularly when they did not have a clear position or direction from the beginning. However, the participants who had a definitive direction (either their own position or because they were able to define a clear project statement) found it easier to define their path through the CDF project. The users' paradigms were also affected by their cultural backgrounds. Different groups of CC users reflected upon the same paradigm in different ways. Western designers' decolonialism paradigm is not the same as that of users from the global South, and the same is true for different genders, ages, and professions. Another insight into motivations is that they are more reflective questions themselves, and as a result the CC's users found them difficult to implement, particularly in short-term projects where the design output needs to be very quick and produced in a timely manner.

With respect to the Critical Diegetic Scenarios, Critical Propositions, and Critical Pragmatics, the CC's users found them very insightful and supportive in the creative process. However, some of the participants may have found them to be a constraint, as if they presented a set of options or choices that could limit the user's creative uptake. However, they are not intended to be prescriptive (e.g., a methods menu); they are rather a suggestive choice that opens up a space for discussion and likely makes it easier to ideate or create concepts. Pragmatics is the most difficult part to digest in the CC because it relies heavily on personal experience, artistic knowledge, and cultural background (which always prevails). Even the pragmatics in the CC cards are quite difficult to perceive, as they are presented as a very short note on the cards themselves, making it difficult to grasp their complex meanings. They also need elaborate visual references or examples to give them some sense.

While on the one hand, the CC may help young professionals and design students understand these entangled factors, on the other hand, it may not be easy for them to grasp its complexity, as it requires more experience and understanding of the world in terms of economics, politics, technology, and the environment.

Conclusion

This paper proposed and described the Critical Catalyst, which is a new set of devices, design activities, and prompts as an RtD approach to studying CDF. The CC is not a prescriptive process; instead, it tends to support, facilitate, and help designers throughout the design process. This process leads to a research outcome, not a design outcome, although it uses design as a means of enquiry. Nonetheless, the designed objects are a byproduct of a CDF project, not its main output.

Authors' Notes

This work is a partial result of the combination of Prof. Celi's interests in Design Futures and her role as a supervisor of Ammer Harb's Ph.D. research on Critical Design Futures. The work was supported by the Design Ph.D. of the Politecnico di Milano, as well as a grant from the Erasmus+ project (FUEL4Design - Future Education and Literacy for Designers). Roles: Manuela Celi wrote sections 1, 2, and 6, and Ammer Harb wrote sections 3, 4, and 5.

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