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Dilemmas and Conflicts in Systemic Design: Towards a theoretical framework for individual-system dialectic

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Towards a theoretical framework for individual-system dialectic

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The productive potential of conflicts, dilemmas, and tensions have attracted scholarly attention, which is also implied by the conference theme: Playing with Tensions. This paper proposes that interconnections in a complex system can be examined using dialectic thinking (i.e. thesis-antithesis-synthesis), which can be facilitated through the micro-meso-macro system architecture. Borrowing insights from a project on bike-security systems, individual dilemmas at the micro-level, interstakeholder conflicts at the meso-level, and conceptual conflicts at the macro-level are examined. Although conflicts are traceable at each level, their structure changes from experiential conflicts (i.e. dilemmas) to interpersonal and conceptual conflicts, respectively. In systemic design, dilemmas help maintain the richness and nuance of individuals' lived experiences when shifting the focus from individuals to systems. In addition, interstakeholder conflicts help address conflicting values and perspectives among stakeholders through revealing their interconnections; and conceptual conflicts help expose the moral and political dimensions of design decisions. Finally, dialectic thinking helps 'probe' the system to reveal the reciprocal and emergent relationships among the interconnected elements of a system. Future research is needed to further deepen the theoretical grounding of this framework and to reveal its implications for systemic design practices.

Keywords: conflict, dilemma-driven design, systemic design, dialectics, micro-meso-macro

Introduction

The concept of conflict and related concepts, such as dilemmas or tensions, have gained considerable traction in design research and practice. For instance, dilemma-driven design utilizes intra-personal (i.e. within-person) conflicts as promising starting points for conceptual design (e.g. contextual research, idea generation) (Ozkaramanli, Desmet, & Özcan, 2020). Moreover, value sensitive design (Friedman & Hendry, 2019) focuses on tensions among stakeholder values (e.g. safety, autonomy) to highlight ethical questions in technology development. In addition, vision in product design (ViP) (Hekkert & van Dijk, 2011) emphasizes that conflicts, which surface when analysing contextual data, signal valuable starting points for formulating a vision that drives design innovation. Building on ViP, Tromp and Hekkert (2014) conceptualizes conflicts between individual and societal goals as social dilemmas and employ these dilemmas as a lens to study the social implications of designing for behaviour change. The productive potential of conflicts is also evident in systemic design, since systems are characterized by complexity, ambiguity and value conflicts (e.g. Dorst, 2019; van der Bijl-Brouwer & Malcolm, 2020). This is also implied by this year's conference theme: *Playing with Tensions*.

Borrowing from Meadows (2008), a system can be defined as an interconnected set of elements (human and non-human) that is coherently organized to achieve a purpose. In this paper, I argue that these interconnections can be examined using dialectic thinking, and this examination can be facilitated through a focus on conflicts across micro-meso-macro levels of a system. Dialectics is a theory of thought development, which is characterized by the dialectic triad: thesis, anti-thesis, and synthesis (e.g. Basseches, 2005; Samson, 2019). In dialectics, the perceived conflict between a thesis and an antithesis sparks a synthesis. A dialectic approach to systemic design can help pinpoint the reciprocal and emergent relationships that exist between the interconnected elements in a system.

To facilitate dialectic thinking, I suggest examining conflicts using the micro–meso–macro system architecture (e.g. Li, 2012). At the micro-level, dilemma-driven design can guide design decisions (Ozkaramanli, Desmet, & Özcan, 2020). However, systemic design shifts the focus of analysis from individuals (micro-level) to organizations (meso-level) and society (macro-level). This creates a more complex design space, in which managing 'messes' replaces solving problems (Ackoff, 1994). For instance, at the meso-level, various stakeholders can have conflicting perspectives or requirements from the system (e.g. Castano et al., 2017). Moreover, one can possibly trace the sources of intra- or interstakeholder conflicts to macro-level structures (e.g. laws, legal regulations, policies). Consequently, dilemma analysis needs to be expanded to examine conflicts across the micro-meso-macro levels.

As a result, the main goal of this paper is to set the stage for an individual-system dialectic through examining conflicts using the micro–meso–macro system architecture. This theoretical framework aims to help maintain the richness and nuance of individuals' lived experiences when shifting the focus from individuals to complex systems; and to create a shared relational vocabulary for mapping reciprocal relationships in a complex system.

Dilemmas, conflicts and systemic design

This section elaborates on the theoretical framework underlying the individual-system dialectic by borrowing insights from a design project completed as part of a ten-week, bachelor-level research internship at the University of Twente (supervised by the author). This project focused on using dilemma-driven design (DDD) (Ozkaramanli, Desmet, & Ozcan, 2020) to design a bicycle security system for large cities in the United Kingdom (Hepburn, 2020). DDD is supported by a set of methods and tools that generate empathy for people's deeply-held goals and values in contextual research and stimulate associative thinking in idea generation (Ozkaramanli, Desmet, & Ozcan, 2016). DDD has so far mainly focused on identifying and addressing end-user dilemmas that prevail in daily life (micro-level conflicts). The bicycle-security project was a step towards using DDD methods to identify and address interstakeholder conflicts (meso-level conflicts).

Micro-level conflicts

One of the challenges of owning a sophisticated bicycle is to prevent it from getting stolen. Imagine having purchased such a bicycle after saving up for it for months. You decide to store it in your apartment overnight to keep it secure. But after a long evening out with friends, you feel too tired to carry it indoors. You hesitate: Lifting a bicycle is quite a chore when you are exhausted. But, isn't it better to be safe than sorry? This moment of hesitation characterizes an everyday dilemma, and it can potentially be resolved through design. In DDD, the design team identifies end-user dilemmas relevant for a specific project through analysing contextual research data with a focus on dilemmas. In the bicycle-security project, the dilemma analysis yielded five dilemmas (Figure 1a), which were further analysed using the framework of dilemmas (Figure 1b).

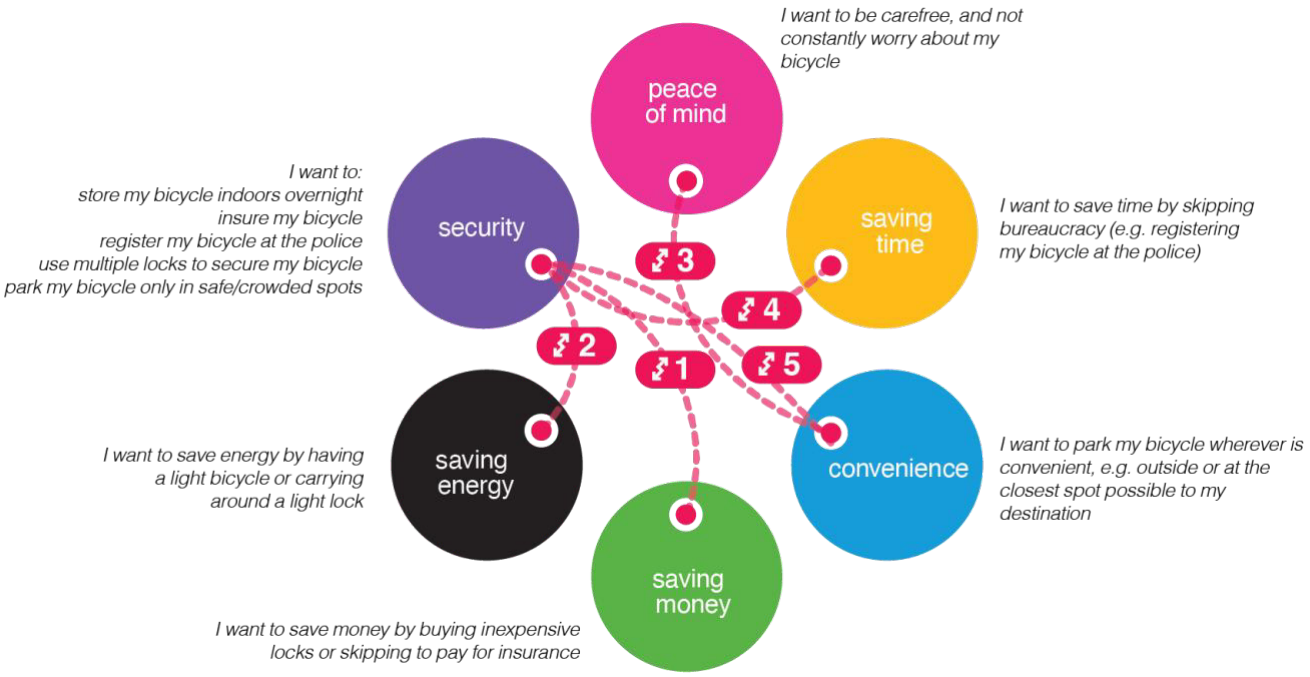

Figure 1a. The conflicting relationships among cyclists' goals at the micro-level

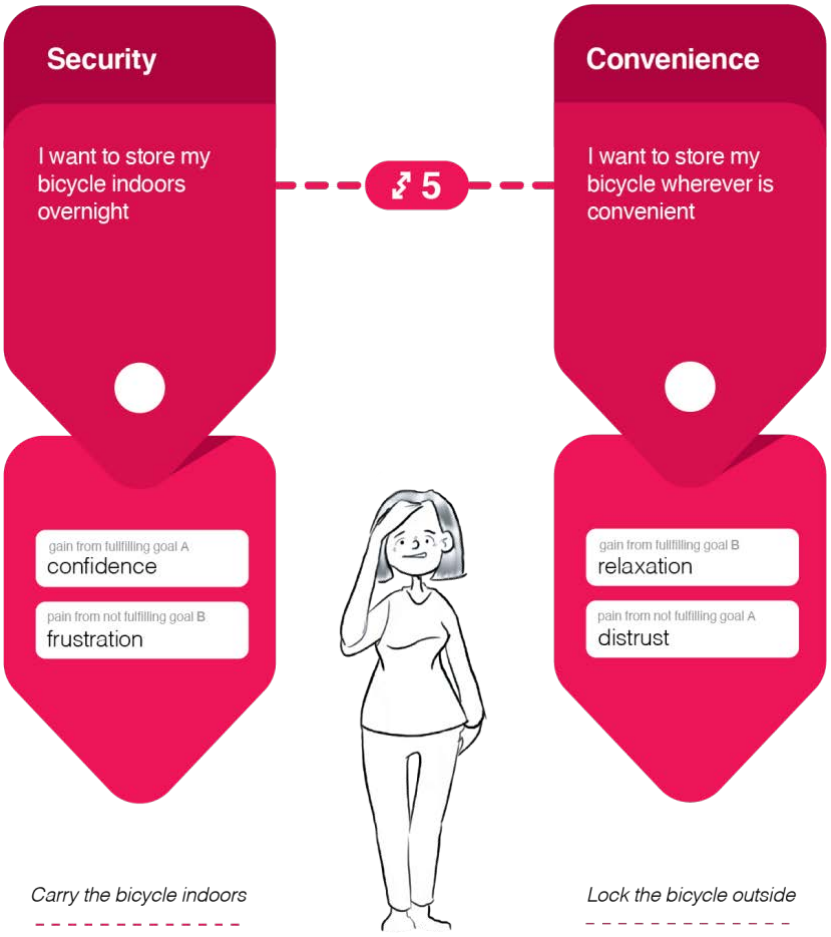

Figure 1b. Framework of dilemmas for designers illustrating the security-convenience dilemma (#5 on Figure 1a)

The framework of dilemmas acts as an analytical tool to unpack the experiential components of a dilemma, which are conflicting goals, mixed emotions, and mutually exclusive choices (Ozkaramanli, Desmet, & Ozcan, 2016). The process of filling out this framework facilitates a shared, in-depth understanding of dilemmas and stimulates empathy with the end-user. Simultaneously, juxtaposing the two choices as an 'either-or' scenario strengthens the perceived conflict among these choices and fuels creativity in idea generation. This productive function of conflicts is a tenet of dialectical thinking (Basseches, 2005), which evaluates a thesis (choice A), an antithesis (choice B) to form a synthesis (design solution). Figure 2 shows a bicycle-frame handle which can potentially resolve this dilemma by helping to lift one's bicycle comfortably (i.e. design solution as synthesis).

Figure 2. Bicycle frame handle by Walnut Studio[1]

In summary, DDD conceives human psyche as a web of relations and emphasizes conflicting relationships among goals as promising entry points for design. On the one hand, this micro-level analysis can be framed as systemic design: it considers human psychology as a complex system of interrelated goals in a particular context and synthesizes design opportunities through playing with the tension between two mutually exclusive choices. On the other hand, micro-level interventions may risk addressing the symptoms of a challenge (e.g. the difficulty of carrying a bicycle) rather than its root causes (e.g. the high rate of petty crime in a city). This understanding calls for expanding the dilemma analysis to interstakeholder conflicts at the meso-level.

Meso-level conflicts

To identify interstakeholder conflicts, Hepburn (2020) interviewed a police officer, a bicycle shop owner, an employee of an insurance company, and a former bicycle thief. An overview of interstakeholder conflicts is shown in Figure 3, where each number corresponds to a conflict.

[1] https://www.kickstarter.com/projects/walnutstudiolo/bicycle-frame-handle

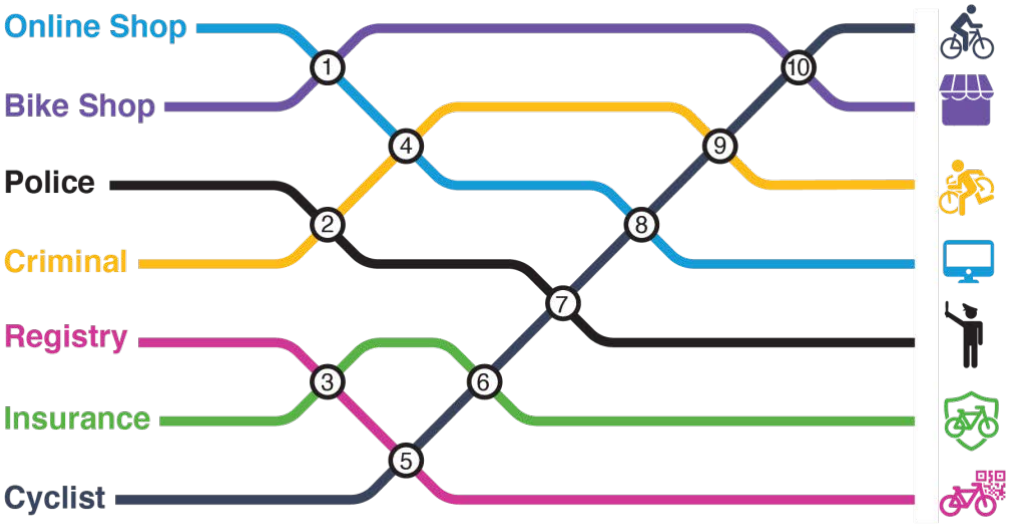

Figure 3. The overview of ten different interstakeholder conflicts

Arguably, any conflict presents a design opportunity that can improve the bike-security system. However, the dialectical thinking approach suggests that the reciprocal relationships between interconnected elements should be examined through multiple thesis-antithesis-synthesis cycles before (if at all) settling on a design intervention. For instance, the police needs solid evidence to catch a bicycle thief, which takes time (thesis-1). Yet, the cyclist expects the police to retrieve a stolen bicycle before it is sold (antithesis-1). This conflict between the police and the cyclist (intersection #7 in Figure 3) inspired Buckle-Up. Buckle-Up (synthesis-1, see Figure 4) is a product-service system that combines a smartphone application and a GPS-enabled bicycle-lock. The lock enables tracking the location of the bicycle, and the app facilitates communicating with the police department.

Figure 4. Buckle-Up, a product-service system

Buckle-Up is based on sharing the responsibility between the cyclist and the police. Although this may be a satisfactory end-result from a user-centred design perspective, dialectic thinking suggests that the project could continue to better understand the emergent properties of the system. For this, the initial synthesis (Buckle-Up) can be transformed to a new thesis. For instance, knowing the location of a stolen bicycle does not necessarily mean that the police will act on it. This leaves the cyclist with the dilemma of wanting to retrieve a stolen bicycle without informing the police (thesis-2), yet fearing the potentially harmful consequences of this action (antithesis-2). This dilemma could be addressed through a new synthesis, such as using social media to slow down selling a stolen bicycle (synthesis-2). In summary, continuing to probe the system in this way will not only lead to new ideas, but it will also reveal reciprocal and emergent relationships among the stakeholders.

Macro-level conflicts

Any system is part of a larger social, cultural, political structure (e.g. an organization, a nation). Therefore, it seems important to set system boundaries in a way that this larger structures can be examined and challenged. This requires a critical perspective for which the ethics of technology and critical theory can form the basis for exposing and challenging the ways in which oppressive social and political structures have come to be normalized (e.g. Ogbonnaya-Ogburu et al., 2021).

For instance, in a 2014 Dutch documentary by Sunny Bergman[2], a social, field experiment was carried out in which three men of the same age and wearing identical clothes try to cut the lock of a bicycle in a public space. The only difference between the men is their ethnicity. Passers-by, who are later interviewed, assume that the white man had forgotten his key, whereas they question the other men (with different ethnicities) whether the bicycle belonged to them. What can be learned from this field experiment is the following: While designing products to resolve conflicts is tempting, it is a relatively naïve stance when not accompanied by moral engagement with the topic (Ozkaramanli & Nagenborg, 2020). Although it is not possible (nor desirable) to reduce insights from the ethics of technology and critical theory to a set of critical questions, I will offer some illustrative questions for the sake of clarity. For instance, any dilemma at the micro-level can be critically examined by asking: why is this dilemma experienced? Who benefits from provoking/resolving this dilemma, and who gets harmed? A conflict often has a premise (e.g. a person of colour is more likely to be a criminal, x is an unsafe neighbourhood). And it is arguably through unlearning and relearning these premises that systemic design can drive social innovation.

Early conclusions and future research

In this paper, I argued that interconnections in a complex system can be examined using dialectic thinking, and this examination can be facilitated through a focus on conflicts across micro-meso-macro levels of a system. Borrowing insights from a design project on a bike-security system, end-user dilemmas at the micro-level, interstakeholder conflicts at the meso-level, and conceptual conflicts at the macro-level were examined. Moreover, this paper contributes to capturing the emergent properties of a complex system by positioning the dialectic triad (thesis-antithesis-synthesis) as a thinking tool to probe the system. This can be compared to the co-evolution model of the problem and its solution (e.g. Dorst & Cross, 2001; Dorst, 2019b), with the difference being that conflicts (vs. problems) form the unit of analysis and dialectic thinking serves as mechanism to probe the system through these conflicts (cf. Dorst, 2019a).

Although the concept of conflict forms the main unit of analysis at each level, the structure of these conflicts changes from *experiential conflicts* (i.e. dilemmas) at the micro-level, to *interpersonal conflicts* at the meso-level, and *conceptual conflicts* distilled from critical analysis of the system at the macro-level. Out of these three different 'flavours' of conflicts, dilemmas are perhaps the most accessible and easily relatable due to their experiential qualities. In systemic design, this may help to maintain the richness and nuance of individuals' lived experiences when shifting the focus from individuals to complex systems. At the same time, focusing strictly on dilemmas may risk overlooking conflicts among stakeholders, as well as the ethical and political dimensions of design decisions. Therefore, handling conceptual conflicts at the macro-level calls for bridging ethical reflection and systemic design. Guidance ethics (Verbeek & Tijink, 2020) is a promising approach for making this bridge, as it facilitates asking critical-ethical questions throughout the design process, enabling stakeholders to collaboratively expose and challenge values, biases, and assumptions underlying their design moves (cf. Schön, 1984).

The proposed individual-system dialectic framework is promising yet not complete. Insights from organizational and moral psychology can help deepen the understanding of meso-level conflicts. Moreover, critical theory (e.g. Ogbonnaya-Ogburu et al., 2021) and guidance ethics (Verbeek & Tijink, 2020) can help get a grip on macro-level, conceptual conflicts. Here, critical systems theory can also form a suitable interdisciplinary bridge (e.g. Eelderink, Vervoort, & Laerhoven, 2020). To further unpack the reciprocal relationships between dilemmas,

[2] https://www.vpro.nl/programmas/2doc/kijk/2doc-overzicht/2016/zwart-als-roet.html

interstakeholder conflicts, and conceptual conflicts, the dialectic method will be implemented in a large-scale social innovation project in the future.

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