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Concepts as artefacts. Three insights that conceptual engineering can draw from the philosophy of technology

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ABSTRACT

In conceptual engineering, concepts are often likened to artefacts, yet engagement with the extensive theorisation of artefacts in the philosophy of technology literature remains rare. After advancing an account of concepts as akin to *socio-technical* artefacts that sets itself apart from Thomasson's work on concepts as *abstract cultural* artefacts (Thomasson 1999, 2007, 2021), this paper draws on the philosophy of technology scholarship on socio-technical artefacts to develop three insights for conceptual engineering. First, alongside functions, concepts, like artefacts, bear affordances and produce side effects, enabling uses beyond their intended purpose. Second, (re-)engineered concepts are inherently value-laden, reflecting the priorities and biases of their designers and the socio-technical contexts in which they operate. Third, conceptual engineering would benefit from greater methodological systematicity, drawing on the structured approaches employed in the philosophy of technology for the evaluation, design, and implementation of artefacts. Together, these insights suggest that exploring a closer alignment with the philosophy of technology scholarship on socio-technical artefacts can refine the theoretical understanding of concepts as artefact-like, enrich the conceptual engineering toolkit, and open new and promising directions for research and practice.

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1. Introduction

The conceptual engineering scholarship commonly discusses concepts in terms of something akin to artefacts. Concepts have been—seemingly uncontroversially—compared to tools, objects, artefacts, instruments,

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building blocks of thought (Margolis and Laurence 2023). While many of these parallels remain tacit, numerous scholars explicitly draw similarities between concepts and artefacts, broadly understood.¹

Most notably, when discussing the practice of conceptual engineering, Thomasson (1999, 2007, 2021) argues that there are good reasons to '[think] first and foremost of [engineering *concepts* in terms of] engineering words, considering words as a certain kind of *abstract cultural artifact*' (Thomasson 2021, 1, italics mine).² Moreover, while investigating conceptual functions and criteria for determining the adequacy of (existing) concepts, Haslanger (2000) wonders if '[such *concepts* are] effective *tools* to accomplish our (legitimate) purposes' (Haslanger 2000, 33, italics mine). Similarly, while discussing the importance and desirability of philosophers engaging in conceptual engineering, Eklund (2014) argues that 'philosophers should also be asking themselves whether [our actual *concepts* or the properties of relations they stand for] really are the best *tools* for understanding the relevant aspects of reality' (Eklund 2014, 295, italics mine).

Furthermore, Miracchi (2021) states that '*concepts* are the *tools* with which we reason' (Miracchi 2021, 12028, italics mine), Klenk (2024) discusses the Concepts-As-Tools hypothesis, arguing that '*concepts* are *like tools*' (Klenk 2024, 2884, italics mine), Kocurek (2022) writes that '[c]oncepts are *like tools* that we can employ for various purposes' (Kocurek 2022, 4, italics mine), and Hopster and Löhr (2023) write that '*concepts* frequently serve as *tools*' (Hopster and Löhr 2023, 12, italics mine). Again, when discussing the adoption of a process of reverse engineering of concepts to determine their functions, Veluwenkamp and van den Hoven (2023) state that '[t]he idea behind reverse engineering [of *concepts*] is that we discover the function of an *object* by disassembly and observation of its behavior in different contexts. This is *not unlike* what archaeologists do when they find puzzling *objects* or *artefacts*' (Veluwenkamp and van den Hoven 2023, 6, italics mine).

Although several scholars have gestured at parallels between concepts and artefacts, there remains little sustained engagement with the extensive theorisation of artefacts in the philosophy of technology literature. With few exceptions (e.g. Vermaas, 2016; Veluwenkamp and van den Hoven

¹This extends even beyond the 'core' conceptual engineering literature, provided that any such thing exists. Indeed, broadening the picture to include conceptual engineering-adjacent literature, Gallie (1956) talks of '[understanding] a *concept* or theory or *other tool of thought*' (Gallie 1956, 197, italics mine). Similarly, when talking about concepts in law, Ginsburg and Stephanopoulos (2017) write that '[c]oncepts are the *building blocks* of legal doctrine' (Ginsburg and Stephanopoulos 2017, 147, italics mine).

²Thomasson's account will be addressed in the following section. For now, it suffices to know that, while Thomasson focuses on *abstract cultural artefacts*, the focus on this paper is on *socio-technical artefacts*. In this paper, I do not wish to argue that concepts are themselves socio-technical artefacts. Rather, I intend to highlight the similarity between concepts and socio-technical artefacts and how merely establishing such an analogy between the two can lead to fruitful insights for conceptual engineers.

2023; Köhler and Veluwenkamp 2024; Marchiori 2025),³ references to concepts as artefacts remain often metaphorical in nature, rather than attempting to draw from, or contribute to, the philosophy of technology literature.⁴ As such, little to no explicit connection has been established between the conceptual engineering literature on concepts and the philosophy of technology literature on (socio-technical) artefacts. Consequently, the relation between concepts and artefacts—as understood in the philosophy of technology—remains broadly unexplored terrain.

This is a missed opportunity, as much is to be gained from a deeper exploration of the convergence of the two bodies of scholarship. My starting point is the intuition, stemming from the conceptual engineering literature, that concepts resemble artefacts in some salient respects. That is, that, at a minimum, there are good reasons to believe that concepts are *like* artefacts. Here, I explore this intuition further and zoom in to consider the relation between concepts and socio-technical artefacts specifically. In so doing, I begin by advancing an account of concepts as akin to socio-technical artefacts. I ultimately argue that the Western philosophy of technology literature on socio-technical artefacts is not only extremely relevant for conceptual engineering, but can spotlight insights and approaches that are un(der)explored in conceptual engineering and would greatly benefit from further investigation. In short, I present three ways in which conceptual engineers should tap into the philosophy of technology literature.

To make this case, I start by clarifying in Section 2 how this paper relates to existing work in conceptual engineering on the relation between concepts and artefacts. Here, I introduce an account of concepts as akin to socio-technical artefacts and illustrate salient differences and commonalities between Thomasson's work on concepts as *abstract cultural* artefacts (1999, 2021) and this paper's focus on concepts as (abstract) *socio-technical* artefacts. In Section 3, I argue that much is to be learnt from insights and approaches developed in the philosophy of technology on socio-technical artefacts, and present three pointers for future research in conceptual engineering. First, in Section 3.1, I argue that conceptual engineering should not only focus on conceptual functions, but integrate such an approach with the investigation of conceptual affordances and side effects. Second, in Section 3.2, I claim that engineered concepts are value-laden, and that this insight should guide approaches to the evaluation, design, and implementation of concepts. Third and last, in Section 3.3, I argue that conceptual engineering

³Köhler and Veluwenkamp (2024) draw analogies between concepts and artefacts, insofar as their (normative) functions are concerned, while Marchiori (2025) draws from the philosophy of technology scholarship in on conceptual functions and affordances to align conceptual functions (and affordances) with artefactual functions (and affordances).

⁴While Chalmers (2020) also invokes the artefact analogy in framing normative conceptual work through the engineering metaphor, the parallel between concepts and artefacts is illustrative rather than systematic, and does not engage with the philosophy of technology literature.

would benefit considerably from a greater focus on methodological work. Section 4 contains the conclusion.

2. Concepts as (socio-technical) artefacts

Perhaps the most notable example of concepts being compared to artefacts in the conceptual engineering literature is the one offered by Thomasson (1999, 2007, 2021), who has explored at length the connection between concepts and artefacts, ultimately arguing that there are good reasons to '[think] first and foremost of [engineering concepts in terms of] engineering words, considering words as a certain kind of *abstract cultural artifact*' (Thomasson 2021, 1, italics mine). Given the focus of this paper on artefacts from a philosophy of technology perspective, it is not immediately clear that Thomasson's work on concepts as artefacts will be a relevant starting point for this investigation. Therefore, two clarifications are in order with regard to what one takes concepts and artefacts to be, respectively. This will illuminate the commonalities and differences between the approach of concepts as *abstract cultural* artefacts proposed by Thomasson and the one of concepts as *socio-technical artefacts* advanced in this paper, which I argue better suits conceptual engineering in the philosophy of technology, while also being broadly applicable to conceptual engineering at large.

2.1. Concepts: broad and narrow accounts

To contextualise Thomasson's account of concepts as (abstract) cultural artefacts, it is important to note that her approach to conceptual engineering heavily draws from, and is grounded in, the scholarship on the ontology of words (e.g. Irmak 2019; Kaplan 1990; Thomasson 1999, 2021). Specifically, Thomasson proposes that the object of conceptual engineering should be words. Indeed, she argues that 'if we think first and foremost of [conceptual engineering as the practice of] engineering words, and think of words as a certain kind of cultural artifact, governed (like other artifacts) by norms of use, then we can begin to understand better how words do change naturally, and use that as a way into seeing how they (like other cultural artifacts and normative practices) can also be changed artificially' (Thomasson 2021, 2). In so arguing, Thomasson employs a narrow notion of concept which, if not completely, substantially overlaps with that of word, at least for the purpose of conceptual engineering.

While on Thomasson's account concepts are words and words are abstract cultural artefacts, the move from concepts to artefacts is not a straightforward one outside of Thomasson's paradigm. To follow this line of reasoning, one would first need to subscribe to Thomasson's account of concepts as words, at least within the confines and for the purposes of conceptual

engineering. This is not an uncontroversial position in the conceptual engineering literature (e.g. Lalumera 2009; Machery 2009). Furthermore, and perhaps most crucially, Thomasson's account of concepts as words may be overly restrictive, and there may be good reasons to explore how concepts are artefact-like regardless of whether they are equated with words.

In contrast to Thomasson, in this paper, I do not commit to a narrow understanding of concepts as words, but rather employ a broader account of concepts, which I understand as a functional kind (i.e., what makes something a concept is its role in the cognitive system; as in Lalumera 2009). In doing so, I remain uncommitted as to which structure, if any in particular, concepts (do or should) have. Therefore, I am not bound to the assumption of uniformity, and admit a plurality of conceptual structures. This makes the notion of concept I will employ in this paper significantly broader than Thomasson's.⁵

2.2. Artefacts: broad and narrow accounts

Second, it should be noted that, when Thomasson establishes a parallel between concepts (read: words) and artefacts, she primarily focuses on artefacts understood as *abstract cultural* artefacts. Instead, the focus on this paper is on artefacts as understood from a philosophy of technology perspective, hence as *socio-technical* artefacts. This is relevant in that, as will become clearer in the following sections, it is not straightforward that either abstract or cultural artefacts qualify as socio-technical artefacts as understood in the philosophy of technology. Once again, one can identify two main conceptualisations of *artefact*, distinguishing between a narrow and a broad account.

On the one hand, a longstanding tradition in the philosophy of technology maintains that technology is anything human-made (Hickman 2001). Correspondingly, based on this rather broad view of technology, anything human-made is a socio-technical artefact.⁶ Moreover, a well-established

⁵The notion of concepts as a functional kind adopted in this paper is intentionally broad. The analogy between concepts and artefacts is often articulated at the functional level: what makes the comparison productive is precisely that both concepts and artefacts serve specific purposes. Investigating concepts as a functional kind keeps this shared dimension in focus without foreclosing questions about the extent to which concepts and artefacts may differ. Moreover, understanding concepts as a functional kind does not commit one to any particular view of their structure and is compatible with diverse positions currently defended in the literature, among which word-focused, definitional and prototypical views of concepts (Margolis and Laurence 2023). Remaining uncommitted on conceptual structure allows this investigation to proceed at a level of generality that is appropriate for an analogy-based argument, while remaining open to further specifications that any particular conceptual engineering project may require.

⁶For the purpose of this paper, the distinction between *technology* and *artefact* is not salient. However, it should be noted that the philosophy of technology literature—in particular the portion of the scholarship subscribing to a narrow understanding of both technology and artefact—has investigated the relation between these two notions at length and formulated numerous hypotheses and frameworks to understand how they relate to each other (e.g. Brey 2012; Soltanzadeh 2021).

tradition in the philosophy of language and linguistics specifically considers language to be a technology or artefact (Mufwene 2013). That is, language is a tool that we have created to think and to communicate. Therefore, to the extent that concepts can be understood as (at least partially) overlapping with language, as they are in Thomasson's account, it seems intuitively reasonable to think of (at least some) concepts as socio-technical artefacts.

On the other hand, the broad conceptualisation of *artefact* is not uncontroversial. Indeed, a considerable strand within the philosophy of technology literature prefers a narrower account of both *technology* and *artefact*, often motivated by practical considerations. The intuition here is that, if it is the case that anything human-made is an artefact, then being able to classify something as an artefact would cease to be helpful in any meaningful way.⁷ This intuition can be substantiated by approaching the study of artefacts departing from a narrower understanding of technology as engineering. According to this view, artefacts are generally understood as intentionally modified material objects (Houkes and Vermaas 2010).⁸ Such a narrow understanding of *artefact* is often investigated by dual theories of artefacts, which focus on artefacts as a blend of structure and function.

Two points are of particular interest here. First, it seems to be the case that, when conceptual engineers establish a connection between concepts and artefacts, they are adopting a broad characterisation of artefacts. Hence, Thomasson's account of concepts as abstract cultural artefacts, which employs a similarly broad view of artefacts, seems to be *prima facie* consistent with, and representative of, the way in which artefacts are conceptualised by conceptual engineers when they are compared to concepts. Second, if the previous

⁷Consider the concept 'planet'. Advances in observational technologies between the 1990s and 2000s revealed a proliferation of entities that satisfied the prevailing criteria for planethood, thereby threatening to expand the category beyond practical or theoretical utility by rendering the concept insufficiently selective. As a result, the International Astronomical Union (IAU) redefined 'planet' by introducing a new constitutive condition aimed at restoring the concept's discriminatory usefulness (IAU General Assembly 2006). This example illustrates that, at least in some contexts, the adequacy of a concept turns on its capacity to meaningfully classify phenomena, which may be compromised when the extension of the category becomes too broad. A similar concern may arise in the philosophy of technology: one may argue that, if the category of socio-technical artefact is expanded to include all human-made entities, its classificatory and explanatory utility risks being diluted to the point of vacuity.

⁸It should be noted that substantive objections could be, and have been, moved to the intentionality, modification and physicality requirements. First, the intentionality requirement could be undermined when understood in terms of intentional design, either by highlighting how, historically, not all artefacts are the result of a design process, or by noting how, if artefacts are indeed intentionally designed, this would make their existence mind-dependent. Second, one could put pressure on the modification requirement from an ontological or mereological perspective, e.g. by questioning whether the process of modification of already existing objects can indeed lead to the creation of a new (material) entity or being. Third and last, the physicality requirement can be undermined by the advent of digital artefacts, such as computer programs and databases, which are rather uncontroversially understood in artefactual terms, but can also be considered immaterial. In this case, emphasis is being placed on the fact that, despite requiring a physical medium to exist, such artefacts are not understood in traditionally material terms (e.g. see Shep 2015, about digital materiality).

point holds, it is not immediately clear that such a broad account of artefacts would be compatible with the understanding of artefacts that is prevalent in the philosophy of technology literature. Indeed, from a philosophy of technology perspective, the relation between cultural and socio-technical artefacts is not a neat one: based on different accounts of both concepts and artefacts, abstract cultural artefacts can be considered as partially or fully overlapping with socio-technical artefacts, as a subcategory of socio-technical artefacts, or as distinctly separate entities from socio-technical artefacts, with no salient points of commonality.

In brief, while conceptual engineers often compare concepts to artefacts, few scholars have so far expanded on the relation between the two, among which, perhaps most notably, Thomasson (1999, 2007, 2021). However, Thomasson's account of concepts as artefacts is not uncontroversial, as it employs too narrow a notion of concepts from a conceptual engineering perspective and potentially too broad a notion of artefacts from a philosophy of technology perspective. As such, Thomasson's account may not be satisfactorily moved across disciplinary boundaries without losing (at least) part of its cogency, and its impact on the investigation at hand is limited. Therefore, the account of concepts advanced here is not a refinement or extension of Thomasson's, but a distinct account of concepts as artefacts. Ultimately, in this paper, I adopt a broad notion of concepts as functional kinds, individuated by their function(s), and a narrower account of artefacts as socio-technical artefacts, i.e. objects that have been created or modified by humans and fulfil a function. For reasons of conciseness, I will proceed to use 'artefact' to mean socio-technical artefact for the remainder of the paper, unless otherwise specified.

3. Conceptual engineering meets the philosophy of technology. Two approaches, three insights

In the following sections, I discuss three main ways in which the philosophy of technology scholarship can provide helpful insights for conceptual engineering, particularly in relation to the evaluation and (re-)design of concepts. I refer to such perspectives in terms of a *function-first* approach—focusing on what concepts and artefacts *can* do and on what they *should* do—and a *design-first* approach—focusing on how to decide what concepts and artefacts should do, and how to (re-)design them in such a way that they are more likely to do what we wish them to do.⁹ To clarify the distinction, consider a hammer. A function-first approach would analyse what the hammer allows us to do (e.g. driving nails) and what it should allow us to do (e.g. driving nails efficiently and safely). Meanwhile, a design-first approach would focus

⁹The function-first approach and design-first approach are not mutually exclusive.

on how to design a hammer to achieve these goals (e.g. decisions about materials, handle ergonomics, and head weight distribution).

3.1. Insight I. Concepts bear affordances and have side effects

The first parallel between concepts and technical artefacts that warrants further examination concerns the centrality of the role of functions in the respective bodies of literature. Building on functionalism as an entry point for the exploration of the similarities between the study of concepts and that of artefacts, this section illustrates how concepts, like artefacts, do not merely possess functions, but also give rise to affordances and side effects.

Functionalism, i.e. the view that something (in this case, a concept or an artefact) is at least partially determined by its function(s), is discussed at length both in conceptual engineering and in the philosophy of technology. Both bodies of scholarship present a broad spectrum of positions with regard to functionalism, ranging from functionalism opponents, to functionalism supporters, to functionalism advocates. Some scholars deny the benefits of a functional account of concepts and artefacts, mostly on the basis of its triviality, i.e. it is trivially true that concepts and artefacts have functions, and functionalism adds nothing meaningful to their conceptualisation or study (e.g. Cappelen 2018). The opposite view is also present, with both literatures featuring a version of functional essentialism, according to which concepts and artefacts are identified based *solely* on their function (e.g. Lalumera 2009).

However, many (perhaps, most) scholars fall in a middle position between such extremes. This is true for both conceptual engineers and philosophers of technology. In conceptual engineering, this means subscribing to the view that concepts have functions, without necessarily committing to functions being the essential or constitutive feature of concepts. Numerous conceptual engineers are aligned with this view (e.g. Cappelen and Plunkett 2020; Chalmers 2020; Haslanger 2020; Plunkett and Sandell 2013; Prinzing 2018; Queloz 2019; Simion, 2018b; Simion and Kelp 2020; Sundell 2020; Thomasson 2020; to a lesser extent: Jorem 2022; Riggs 2021). Similarly, numerous approaches within the philosophy of technology widely endorse moderate forms of functionalism, which typically take the form of hybrid accounts, wherein artefacts are individuated through a combination of their functional roles and additional criteria (e.g. structure, intention). One of such accounts, the dual nature theory of technical artefacts, illustrates the intuition that artefacts combine structure and function: they are described ‘structurally, in terms of their physicochemical capacities; [and] teleologically in terms of goals and actions’ (Houkes and Vermass 2010, 138). Both bodies of scholarship also draw on the (philosophy of) biology literature, most notably Millikan’s work on biological, teleological, and proper functions (Millikan 1984, 2000). This

lends further credence to the intuition that both literatures share remarkably similar intuitions, reinforcing the parallel between concepts and artefacts.

In short, the functional perspective offers a salient and productive lens through which to examine both concepts and artefacts, and has been the subject of extensive investigation in their respective domains. This suggests that an adequate understanding of concepts and artefacts benefits from attending to the roles or functions they are designed or expected to fulfil —i.e. what concepts and artefacts *should* do. This intuition has been further explored by the philosophy of technology scholarship through two main moves: the first move, from functions to (inter)actions; the second move, from functions, through (inter)actions, to affordances. Let us consider both in turn.

The intuition that artefacts are, at least in part, identified based on their functions has been investigated in depth within the philosophy of technology literature (e.g. Hansson 2006; Houkes and Vermaas 2009; Vermaas and Houkes 2003, 2006). The starting point of such investigations is the following intuition: if artefacts (are meant to) serve specific functions, studying artefacts in isolation would be limiting, in that it would keep considerations which should be relevant at arm's length. Consequently, the study of artefacts should not adopt an *entity*-first perspective, but an (*inter*)*action*-first perspective. That is, artefacts should be studied as part of the (inter)actions in which they are (expected to be) used, where their functions are put to use. Here, I will sketch two ways in which this approach has been developed in the philosophy of technology scholarship: mediation theory and activity realism.

Mediation theory (also known as the theory of technological mediation) is an approach in the philosophy of technology that emphasises the interconnectedness between humans and technology. It draws from post-phenomenology, i.e. an approach exploring the ways in which artefacts mediate our actions, perceptions, and experiences of the world (Ihde 1990), and research in science and technology studies such as actor-network theory (Latour 1987, 2007) and the social construction of technology (Pinch and Bijker 1984), arguing that artefacts are not passive tools, but active agents that contribute to shaping social relations. Mediation theory highlights how society and technology influence and (co-)shape each other, and provides a framework for understanding the complex relationships between humans and artefacts, shedding light on the active roles that artefacts play in mediating our understanding of, and relationships with, the world (e.g. how artefacts mediate our perceptions, interactions, and experiences), as well as their ethical implications (Verbeek 2005, 2015).

Alongside mediation theory, the shift towards relational analyses of artefacts has been advanced through activity theoretical approaches, which share the intuition that the conceptualisation and study of artefacts should be practically significant. According to such approaches, when artefacts are

studied from a metaphysical standpoint that is divorced from practical considerations, the artefact/non-artefact distinction is rendered inert. Consequently, the question of whether something qualifies as an artefact becomes practically useless (Houkes and Vermaas 2009). First introduced by Soltanzadeh (2015, 2016, 2019, 2021), activity realism exemplifies the broader family of activity theoretical approaches.¹⁰

Activity realism classifies entities as artefacts in relational terms, i.e. based on the relation between such entities and ‘purposeful activities of reflective beings’ (Soltanzadeh 2021, 33). This can be contrasted with *entity realist* accounts, which classify entities as artefacts based on features that they possess in isolation.¹¹ According to the activity realist perspective, artefacts ‘do not become practically significant because they are artefacts; rather, because they play roles as means to achieve ends’ (Soltanzadeh 2021, 28). Thus, activity realism suggests that a material object is an artefact when it is used in problem-solving activities (Soltanzadeh 2021). In this sense, the categorisation of an object as an artefact is not static, but dynamic, and objects can acquire and lose their status of artefacts over time, depending on whether they are being used in problem-solving activities.

While similar intuitions have only been explored to a limited extent within conceptual engineering), the conceptual engineering literature does feature positions compatible with, or at least adjacent to, the (inter)action-first approach. For example, one may argue that the case has been made in conceptual engineering in favour of individuation criteria for concepts that are not primarily based on the properties of concepts as entities taken in isolation, but are rather attributed on the basis of the conditions associated with the actor who interacts with the concept. Based on such accounts, to be a concept is to be grasped and used for specific purposes, e.g. to think, to draw inferences, to judge (e.g. as in Peacocke’s possession conditions; Lalumera 2009; Peacocke 2005).

The intuition that artefacts have functions has been further explored in a second move, one that synthesises functional and (inter)activity-based perspectives. Whereas the first move reframes artefacts as elements within a

¹⁰In the words of Soltanzadeh (2021): ‘This is not to say that artefacts are not useful – we use artefacts on a daily basis. Rather, *the metaphysical distinction between artefacts and non-artefacts is not useful*. To repeat, a categorisation is useful if our practical decisions are sensitive to whether we are dealing with objects that belong to the category or those which do not. The artefact/non-artefact distinction does not require us to use different decision-making or evaluators frameworks, and is thus not impactful. It is of little to no use in guiding practical actions’ (Soltanzadeh 2021, 28, emphasis added).

¹¹A parallel can be drawn here with debates regarding the ontological status of concepts as natural kinds versus functional kinds. Machery (2009) argues for an eliminativist stance, owing to the absence of a uniform set of intrinsic properties shared across all concepts. Analogously, entity realist approaches classify artefacts based on internal, self-standing traits. In contrast, activity realist perspectives ground the status of artefacts in relational terms—namely, their embeddedness within purposeful human (or cognitive) activities and contexts of use. This is reminiscent of functional kind theories of concepts (Lalumera 2009).

process of interaction, the second expands this lens to consider the broader context of use. In other words, the focus shifts from what artefacts (should) do to what they enable to do within a given context and with respect to given users. Therefore, attention should not be placed on artefactual functions alone (i.e. what artefacts do or should do), but should also extend to their affordances (i.e. what artefacts enable and constrain).

The notion of affordances describes the possibilities for action that an object or environment offers to an individual (Gibson 1977). In the context of artefacts, affordances refer to the potential actions that are available to users when interacting with a device or system. This includes both intended and unintended uses of technology, as well as the constraints that may limit certain actions. Consider an e-reader. Its buttons suggest specific possibilities for interaction, such as switching the device on or off, turning pages, and adjusting font size. These affordances guide user behaviour and facilitate intuitive navigation. Additionally, the physical characteristics of e-readers enable uses that extend beyond their intended functions. For example, they can serve as paperweights, trays, and even light sources. Conversely, what e-readers do not (currently) enable are activities such as watering plants, making coffee, or flying. In short, affordances shape how users approach, interpret, and engage with technology in everyday life.

The scholarship on artefactual affordances emphasises the relational properties of artefacts: what an artefact enables does not emerge solely from the artefact itself, but from its interaction with specific users in a specific context. Supplementing functionalism by incorporating the notion of affordances thus yields a more nuanced understanding of how artefacts shape human behaviour and vice versa (Bærentsen and Trettvik 2002). From a design standpoint, mapping the affordances of a given artefact allows designers to anticipate patterns of interaction and to design for intuitive and effective user experiences (Gaver 1991; Tollon 2022; Vyas, Chisalita, and Van Der Veer 2006).

Within the (moral) philosophy of technology, affordances have been investigated primarily through two interrelated lenses. The first concerns the ethical implications of artefacts (e.g. Swierstra and Waelbers 2012). In both constraining and enabling particular actions, artefacts can give rise to (unintended) consequences (and side effects) affecting individuals, the environment, or society at large. By attending to both the intended and unintended affordances of artefacts, philosophers are better equipped to assess their ethical implications, as well as to contribute to their responsible design, development, and deployment.

The second lens through which affordances have been examined concerns the values embedded in artefacts (Klenk 2020). Indeed, affordances can reflect and reinforce specific values (such as efficiency, transparency, and control), influencing how users perceive and interact with an artefact. Therefore, analysing the affordances of artefacts can reveal the underlying

assumptions, values, normative priorities, and goals which are inscribed into artefacts' design and which inform their functions. Such analysis, in turn, can shed light on the evaluation of the ethical implications of artefacts, providing a starting point for the evaluation of value alignment, and offering guidance for value-sensitive design practices.

This leads to a first key insight for conceptual engineering. Having acknowledged the analogy between concepts and artefacts, it becomes reasonable to expect that, similarly to artefacts, concepts themselves may also bear affordances and have side effects. That is, even when designed to fulfil specific functions, concepts will invariably enable additional (foreseen or unforeseen) usages and have a broader range of impacts beyond those intended by their designers. This points to a source of largely untapped potential for conceptual engineering, in that it suggests that conceptual engineering should attend to both the functions and the affordances of concepts (Marchiori 2025). This extends the current functional debate in conceptual engineering (e.g. Cappelen 2018; Jorem 2022; Nado 2021; Riggs 2021) in several directions.

Attending to the affordances and side effects of concepts yields a more comprehensive picture of the full impact of both existing concepts and conceptual proposals prior to their deployment and adoption. This enhances conceptual evaluation and broadens the diagnostic toolkit of conceptual engineering, improving the identification of inadequacies warranting a conceptual engineering intervention. Moreover, by mapping the functional and affordances profile of a given concept, conceptual engineers may more aptly identify risks and impacts before they materialise, and extend conceptual engineering approaches from (predominantly) reactive to proactive interventions (e.g. Brey 2012; Floridi and Strait 2021; Lundgren 2024; Marchiori and Sta. Maria 2026). This invites anticipatory approaches to conceptual engineering, which may be particularly valuable whenever post-hoc conceptual revisions may be costly or face implementation issues. Ultimately, while functionalism has its place in conceptual engineering, and it is fruitful to investigate whether and to what extent concepts fulfil the functions we wish them to fulfil, more attention should be placed on investigating what concepts enable and constrain.

3.2. Insight II. Concepts are value-laden

A second salient similarity between conceptual engineering and the philosophy of technology lies in their shared focus on design. This section adopts a design-first lens to explore how the philosophy of technology treats artefacts as value-laden, and to argue that recognising the value-ladenness of concepts should be central to their evaluation, design and implementation. In both literatures, design is a central object of analysis. In conceptual

engineering, which is often described in terms of the evaluation, design, and implementation of concepts, design encompasses both *de novo engineering*—i.e. creating new concepts from scratch—and *re-engineering*—i.e. the modification of existing concepts (Chalmers 2020). Likewise, in the philosophy of technology, artefacts are examined through the lenses of the interconnected processes of design, development, and use—where design is understood as the purposeful (re)structuring of a material object towards an end.¹²

This shared concern with design also invites reflection in both literatures concerning what should qualify as design. For example, in conceptual engineering, some concepts (such as scientific and expert concepts) may be more intuitively recognised as the outcome of a design process, whereas others (like many lay concepts) may rather seem to emerge organically and be adopted through a function-driven selection process. Comparable debates arise in the philosophy of technology with regard to artefacts. Indeed, it may be the case that, even when an entity rather uncontroversially qualifies as an artefact, it may not be clear whether it was the product of a design process. For example, naturally modified branches used for fishing are often considered artefacts, even when left entirely unaltered by humans.¹³

From here, both literatures extend their analysis to broader meta-theoretical questions about design (e.g. Feng and Feenberg 2008; Grant & Fox 1992; Potter 1980): Who should qualify as a designer? Is design a specialised activity, or can laypeople also be designers? The philosophy of technology scholarship further addresses in great depth questions that seem directly relevant for conceptual engineering, such as: Should design be open to a wide audience because, at least in part, of the wider impact of the implementation of an artefact on society at large? Should design be a participatory activity bringing together experts and laypeople? Such questions have helped foreground one assumption that has greatly shaped the contemporary Western philosophy of technology scholarship on artefacts, and which offers fertile ground for further exploration within conceptual engineering: artefacts are value-laden rather than value-neutral.

The intuition that artefacts are inherently value-laden underpins much of contemporary Western philosophy of technology. The value-ladenness thesis rests on the understanding of artefacts as inevitably carrying the imprint of

¹²While such an understanding of what the design of concepts and artefacts amounts to is sufficient for the purpose of the discussion at hand, it should be noted that this greatly simplifies the debates surrounding the notion and process of design, which are the object of rich debates in the respective bodies of scholarship.

¹³This complexity deepens when considering how design unfolds across domains. For example, architectural design, software engineering design, and the design of everyday products, each follow markedly different processes. Such diversity may suggest that a broad notion of what design entails might be preferable to account for all such variations under the umbrella term of design (Archer 1979; Ralph and Wand 2009; Suh 2021; Visser et al. 2016).

their designers. That is, designers hold preconceptions, biases, and values that inevitably make their way into the artefacts that they design, whether intentionally or unintentionally. This parallels the intuition that concepts have affordances and enable actions beyond designer intent. The value-ladenness position emerged as a corrective to the neutrality thesis, according to which artefacts are value-neutral. By recognising that technology is not neutral, but actively shapes and reflects societal values and power dynamics, philosophers of technology transitioned towards a value-laden view of artefacts as imbued with social, cultural, and moral values (Winner 1980).

Acknowledging the value-laden nature of artefacts has prompted philosophers of technology to place greater emphasis on the investigation of the ethical implications of technological innovation and the role of values in the design of artefacts. Indeed, recognising the values embedded in artefacts allows for a more critical analysis of technology and promotes a more responsible approach to technological development. This also led to discussions on the role that society at large should play in the creation of artefacts, leading to participatory and value-sensitive design approaches aimed at ensuring that artefacts reflect diverse values and stakeholder perspectives. Moreover, the recognition of artefacts as value-laden sheds light on the reason why philosophers of technology overwhelmingly refer to artefacts in terms of *socio-technical* artefacts, to underscore the interconnectedness of technology and society (Mumford 1987; Verbeek 2005).

This leads us to the second source of untapped potential that conceptual engineering can derive from the philosophy of technology: concepts, like artefacts, are not value-neutral, but value-laden. (Re-)designed concepts are shaped by, and in turn reflect, the values of their designers, as well as those embedded in the broader socio-technical landscape in which conceptual engineering takes place. This carries significant implications for conceptual engineering.

On an abstract level, recognising that all (re-)engineered concepts are value-laden can seem, at first glance, to blur the familiar distinction between normative and descriptive concepts—the former distinguished by the presence of evaluative content, the latter by its absence. Intuitively, a concept cannot be purposely designed without normative considerations playing a role in its creation. The worry is that if every act of conceptual design is informed by values, then no (re-)engineered concept is truly value-neutral. Indeed, considerations such as accuracy, efficiency, safety, and usefulness are values no less than fairness, responsibility, freedom, or sustainability. From this perspective, it might appear that all (re-)engineered concepts retain an evaluative component in virtue of their value-laden genesis. Yet this inference risks conflating two different senses in which a concept can be value-laden, and thereby misclassifying concepts whose content is not itself evaluative as ‘normative’ in the technical sense. First, a concept

can be *intrinsically evaluative* in its content, such that grasping and competently applying it requires making a normative judgment. Such concepts qualify as normative concepts. Second, a concept can be *extrinsically value-laden*, even if its content is purely descriptive, by virtue of its place within a value-laden framework, practice, or institutional setting.

Recognising this distinction is crucial for conceptual engineering. Without it, there is a risk of conflating all (re-)engineered concepts with normative concepts, simply because all are, in some sense, value-laden. Yet this would obscure important differences in how concepts should be evaluated, designed, and implemented. Concepts that are normatively evaluative in content require scrutiny of their evaluative dimensions and their justificatory grounds as well as of their broader impact on the socio-technical landscape; descriptive concepts embedded in value-laden frameworks require scrutiny of their socio-technical embedding, anticipated impacts, and alignment with broader value commitments, even if their content remains non-evaluative. Ultimately, the implication is not that the distinction between normative and descriptive concepts collapses following the recognition of value-ladenness, but rather that it must be supplemented by a second dimension: the source and mode of that value-ladenness. A solution may be to distinguish between content-level evaluativity and context-level evaluativity, and adopt different evaluation and design strategies for each.

A further implication of the value-ladenness of (re-)engineered concepts concerns its implications for the evaluation, design, and implementation of concepts. That is, if (re-)engineered concepts are the bearers of values, more (and more systematic) attention should be paid to investigating the anticipation, identification, evaluation, and (if necessary) mitigation of the satisfaction of such values, especially during the evaluation and design stage of the conceptual engineering process. This has been the object of recent work in conceptual engineering aiming to develop substantive accounts of the (problematic) mismatch between the values portrayed and perpetuated by our concepts and societal values (i.e. conceptual misalignment, Hopster and Löhr 2023; Marchiori and Scharp 2024).

One last observation is in order. Here, we have focused primarily on the design process, arguing that value-ladenness is inescapable since the purposes a concept is intended to serve and the affordances it is meant to enable are shaped by explicit or implicit values. It is reasonable to expect the value-ladenness of concepts to pervade any conceptual engineering project, beyond those focusing specifically on conceptual (re-)design. Indeed, assessing whether a concept is adequate, defective, or in need of revision is itself an evaluative act: the criteria employed, the weight assigned to different functions or affordances, and the context in which the assessment is conducted all reflect particular value commitments. Similarly, deploying a concept assumes that it has been judged fit for purpose, which entails a

prior evaluative decision about its adequacy and desirability relative to alternatives. In this sense, any concept that has undergone conceptual engineering will bear the imprint of the values of the conceptual engineers and of the broader socio-technical landscape in which conceptual engineers operate. This underscores how value-ladenness is not an incidental feature of (re-)engineered concepts, but a structural property of the conceptual engineering process itself.

3.3. Insight III. Conceptual engineering would benefit from greater systematicity

The third area of untapped potential for conceptual engineering is methodologically grounded: both function-first and design-first approaches in the philosophy of technology are frequently operationalised through structured methodologies. This section argues that more attention should be placed on developing systematic frameworks in conceptual engineering, akin to those emerging in the philosophy of technology. Indeed, one notable feature of much of the philosophy of technology scholarship is its commitment to developing structured methodologies for analysing, assessing, and guiding the evaluation, design, development, and deployment of artefacts. The philosophy of technology literature offers a sustained body of work demonstrating how systematic approaches can be fruitfully integrated into philosophical inquiry and used to support decision-making in contexts where technological change has significant practical and societal consequences. In short, philosophers of technology have been, and continue to be, prolific in their methodological output.

These methodologies are not monolithic: they differ in their theoretical commitments, intended scope, and level of prescriptiveness. Some methodological frameworks are diagnostic, such as models for identifying ethical risks or mapping stakeholder perspectives. For example, consider approaches to ethical foresight analysis, which are pursued to forecast and investigate ethical concerns at all stages of technology development through anticipatory techniques (Boenink, Swierstra, and Stemmering 2010; Brey 2012; Grunwald 2000; Johnson 2007; Lucivero 2016; Turoff and Linstone 1975). Such approaches, which abound in the philosophy of technology literature, are useful in at least two respects: '(1) to analyse the ethical, political, or societal effects of a current or emerging technological artefact; and (2) to identify actionable ways to mitigate any risks of harm an artefact poses (e.g. through changes to product features, research design, or the cancellation of a project altogether)' (Floridi and Strait 2021, 80).

Other methodologies are prospective and incorporate value considerations early in the design process to better align artefacts with societal priorities. Examples of such approaches are value-sensitive design (Friedman 1996;

Friedman and Kahn Jr 2007)—which focuses on incorporating ethical values and considerations into the design and development of artefacts, emphasising the need to engage stakeholders in the design process to identify and address ethical concerns—and anticipatory technology ethics (Brey 2012; Johnson 2007), which uses ‘the design phase to reflect upon how a system or technology’s affordances will impact their use and potential consequences’ (Shilton 2015, 1).

Still other approaches are reflexive, encouraging iterative reassessment of assumptions, design choices, and contextual fit over time. Examples include approaches in post-phenomenology such as technological mediation (Ihde 1990; Verbeek 2006; Tromp, Hekkert, and Verbeek 2011), as well as actor-network theory (Latour 1987, 2007) and the social construction of technology (Pinch and Bijker 1984), which examine the dynamic interplay between artefacts, users, and the socio-technical landscape, encouraging ongoing study and (re-)assessment of choices related to the design, development, and deployment of artefacts. While different, all such approaches are united in their effort to make the design, development, and deployment of artefacts more transparent and attentive to multiple dimensions of evaluation.

The relevance of this for conceptual engineering is straightforward. Much of the work in conceptual engineering is conducted either at the foundational level, i.e. clarifying the aims, scope, or feasibility of conceptual engineering (Belleri 2023; Isaac 2020, 2023; Koch 2021; Prinzing 2018), or at the level of individual projects focussed on specific concepts (Haslanger 2000; Jenkins 2016; Scharp 2013; Simion 2018a). What is less common is the development of meso-level, systematic tools that can guide practitioners, e.g. in identifying when a concept might be in need of intervention, diagnosing the type of intervention required, or evaluating the adequacy of proposed revisions (Queloz 2019; Thomasson 2020). Drawing on the philosophy of technology’s emphasis on systematicity could help fill this gap, not by importing any one methodology wholesale, but by adapting the underlying commitment to structured approaches to the evaluation, design, and implementation of concepts.

Some promising moves in this direction already exist. For example, Veluwenkamp and van den Hoven (2023) make the connection explicit between philosophy of technology methodologies and conceptual engineering, and propose to mutually integrate insights from responsible innovation frameworks and conceptual engineering. Moreover, there seems to be a tendency in the scholarship at the intersection of philosophy of technology and conceptual engineering to engage in research that is more systematic in nature.¹⁴ The literature on conceptual disruption exemplifies how greater

¹⁴Here, it should be noted that conceptual engineering in the philosophy of technology is a nascent niche at the intersection of the two disciplines and, as such, any trends and generalisations inferred from such a limited sample are to be taken as highly speculative.

systematicity can be embedded in conceptual engineering.¹⁵ The notion and phenomenon of conceptual disruption, first introduced by Löhr (2022), has been investigated and developed through a combination of case studies and frameworks aimed at articulating typologies of conceptual disruption—distinguishing, for example, between conceptual gaps, conflicts, overlaps, misalignments and appropriations (Hopster and Löhr 2023; Hopster et al. 2023; Löhr 2022, 2023a, 2023b, 2023c; Marchiori and Scharp 2024)—and then connecting such types to suitable conceptual engineering responses (Hopster and Löhr 2023; Hopster et al. 2023; Marchiori and Scharp 2024).

With regard to conceptual disruption, a further promising export from the philosophy of technology scholarship to conceptual engineering has been the move from reactive to proactive approaches to conceptual engineering. This can take on two dimensions. On the one hand, as discussed in the previous sections, concepts are best understood as embedded in their context of application rather than in a vacuum. The shift from reactive to anticipatory approaches is well-documented in the philosophy of technology. The key insight is that, by the time an artefact is deployed and becomes increasingly more entrenched, the window for meaningful revision often reduces substantially. A similar logic applies to concepts. Concepts, like artefacts, can become entrenched. Consequently, it is reasonable to expect that, the more a concept is entrenched in a given context—e.g. policy, scientific and academic practice or everyday discourse—the more the costs and efficacy of revising it or abandoning it might progressively increase. On the other hand, approaches are increasingly being developed to anticipate and (if deemed desirable) mitigate or prevent conceptual disruptions with conceptual engineering, e.g. by focusing on how different concepts may be more or less prone to disruption (Marchiori and Sta. Maria 2026) and designing concepts to resist disruption (Lundgren 2024).

Taken together, the three insights developed in this paper point towards the need for the development of a comprehensive approach to responsible conceptual engineering (an *ethics of conceptual engineering*) modelled on analogous approaches in technology ethics and responsible innovation.¹⁶ Furthermore, they suggest that comprehensive mapping of concepts' functional and affordance profile, the specification of the context of use as well as of the users and other stakeholders involved, and the mapping of the values embedded in concepts, should feature among the dimensions that should guide responsible conceptual engineering projects. Such intuitions may be productively

¹⁵ Conceptual disruption refers to the phenomenon of concepts no longer being able to adequately fulfil their functions, often (but not limited to) in response to technological innovation.

¹⁶ An ethics of conceptual engineering could draw on approaches including ethical technology assessment (Palm and Hansson 2006), responsible research and innovation (von Schomberg 2013), value-sensitive design (Friedman 1996; Friedman et al. 2002), design ethics (Verbeek 2006, 2008, 2011) and ethics by design (Dignum et al. 2018).

operationalised into a structured approach guiding conceptual engineering practitioners from the suspicion of a conceptual disruption through to evaluation and, if needed, design, implementation, and maintenance.¹⁷

These examples illustrate the potential benefits of more systematic approaches: they help practitioners see patterns across cases, identify recurring challenges, and more easily operationalise theoretical insights. Importantly, embracing systematicity need not mean imposing rigid procedures or narrowing the scope of conceptual engineering to fit a single model. Rather, it recognises that it is advantageous to have common reference points, diagnostic tools, and evaluative criteria to perform conceptual work, perhaps especially when embedded in value-laden socio-technical contexts.

4. Conclusion

In conceptual engineering, concepts are often de facto considered artefact-like. However, few scholars have explored this intuition further by engaging directly with the philosophy of technology literature on (socio-technical) artefacts. In this paper, I argued that this is a missed opportunity. Indeed, by establishing a closer connection between its study of concepts and the study of socio-technical artefacts in the philosophy of technology, conceptual engineering can be enriched by integrating valuable insights from the philosophy of technology scholarship. After introducing an account of concepts as akin to socio-technical artefacts and clarifying how such an approach sets itself apart from Thomasson's work on concepts as abstract cultural artefacts (Thomasson 1999, 2007, 2021), I illustrated three insights from the philosophy of technology that merit further investigation within conceptual engineering.

First, conceptual engineering should not limit itself to the study of the functions of concepts (i.e. what concepts do or should do), but would benefit greatly from the investigation of the affordances and side effects of concepts (i.e. what concepts enable or constrain), which would enhance conceptual evaluation and foster anticipatory conceptual engineering approaches. Second, conceptual engineering should consider (re-)engineered concepts as value-laden. That is, concepts reflect (some of) the values of their designers and of the broader socio-techno-cultural landscape in which the conceptual engineering process takes place. Third, acknowledging that the investigation of artefacts in the philosophy of technology is often operationalised through structured methodologies, I argued that conceptual engineering would benefit from exploring similar systematic approaches to the evaluation, design, and implementation of concepts.

¹⁷Developing and operationalising such an approach will be the object of future work. Such an approach could draw on methodological resources developed in ethical foresight analysis and anticipatory technology ethics (Brey 2012; Floridi and Strait 2021), stakeholder analysis and constructive technology assessment (Schot and Rip 1997), and value-sensitive design (Friedman and Kahn Jr 2007).

In doing so, the paper moved from an initial analogy between concepts and socio-technical artefacts to an illustration of what that analogy yields for conceptual engineering. Together, these three insights suggest that exploring a closer alignment with the philosophy of technology scholarship on socio-technical artefacts can both refine our theoretical understanding of concepts as artefact-like and offer practical directions for future conceptual engineering work, by broadening and enriching the toolkit of conceptual engineering and illuminating new and promising directions for research and practice. Ultimately, they contribute to fostering a responsible approach to conceptual engineering. Here, I make no claim to exhaustiveness. It is reasonable to expect that additional sources of untapped potential will arise from the further exploration of the connection between the conceptual engineering and the philosophy of technology literatures.

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