Conceptual Infrastructure and Conceptual Engineering

Jochen Briesen and Steffen Koch

> "Concepts are the tracks our minds prefer to travel on […] Unfortunately, sometimes concepts lead us astray."[1]

Section 1. Introduction

This paper introduces and analyses the method of conceptual engineering as a particular infrastructural practice. Although conceptual engineering is applied in various philosophical traditions, in this text the method is discussed primarily within the so-called analytic tradition of philosophy. It is this tradition that coined the term "conceptual engineering," and it is within this tradition that the structure as well as the problems of the method are explicitly investigated. The emphasized infrastructural perspective on conceptual engineering serves two purposes. First, the infrastructural perspective highlights the relevance and urgency of the method. Second, the infrastructural perspective allows us to understand why the method is of central importance not only to philosophy and science, but also with respect to the social and political domain.

In section 2, we introduce the infrastructural perspective on conceptual engineering. In section 3, we give various examples of conceptual engineering and emphasize its importance as a form of infrastructural maintenance. In section 4, we will give a (simplified) systematic analysis of the options within projects of conceptual engineering and highlight some of its main problems as well as topics for future research.

1 Edouard Machery, *Philosophy Within its Proper Bounds* (Oxford: Oxford University Press, 2017), 222.

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Section 2. An Infrastructural Perspective on Conceptual Engineering

An infrastructure is a set of organizational units, rules, or facilities that are accidentally or deliberately designed and arranged to enable or facilitate the achievement of certain societal goals. An example of such a goal is the need to transport goods and people over long distances. A necessary means to achieve this goal is a certain *physical infrastructure* consisting of roads, bridges, tunnels, harbours, railways, etc., as well as an *institutional infrastructure* consisting of traffic regulations, engineering offices, freight forwarding companies, driving schools, etc. Other needs and goals such as safety, health, knowledge, or education require different infrastructures consisting (in part) of different units, rules, and facilities.

Infrastructures often face various challenges. For example, the aforementioned physical infrastructure directed at transporting goods and people is confronted with time-related deterioration, impairment due to more frequent weather extremes, the duty to be more responsive to the needs of underrepresented groups, and central ecological demands. In general terms, infrastructures of all kinds face a variety of functional, social, political, economic, and ecological challenges.

Faced with those challenges, the following questions are of central importance: What changes and improvements to a specific infrastructure are needed to adequately respond to the challenges in question? How can the necessary changes be implemented as effectively as possible? Is it possible to respond to all challenges simultaneously, or do we need to prioritize when responding to one challenge makes responding to another impossible or at least somewhat difficult?

Although these questions are of central importance, often they are raised too late. A central feature of infrastructure is that it is usually removed from our conscious attention. Only when the functioning of infrastructure is massively impaired does it attract our attention. However, by this point it is often too late to adequately respond to the multiple challenges—such as responding to the ecological challenges with regard to the physical infrastructures mentioned above. This is one of the reasons why it is so important to address and study in detail different variants of infrastructures and the various challenges they face.

Everything said so far not only applies to physical and institutional infrastructures, but also to infrastructure of a more abstract nature. One such abstract infrastructure is language (i.e., the words available to us; the syntactic, semantic, and pragmatic rules governing the use of those words; and the conceptual system related to them). The system of our representational devices (words and concepts) can be understood as the basic infrastructure that enables us to communicate and think—i.e., to classify things and thereby draw inductive, deductive, and abductive inferences which in turn enables us to act in coordinated, planned, and goal-oriented ways. Specifying the system of words and concepts as a conceptual infrastructure has the advantage of highlighting how our system of representational

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devices, just like any infrastructure, faces various challenges—challenges that are easily overlooked. Thus, the suggested perspective emphasizes that the system of words and concepts can (or even should) be changed and improved to fulfil its various functions in the face of multiple challenges.

The project of assessing and, when necessary, improving our system of representational devices has always been a central part of philosophy. Today, this method is known as *conceptual engineering*. What is conceptual engineering? What exactly is assessed and improved in such a project, and what kind of improvements are suggested? What are the main issues and problems of conceptual engineering, and what is its role in our scientific, social, political, and personal lives?

Section 3. Variants of Conceptual Engineering: What are the Goals? Why is it Important?

The view that our thinking and perception of reality are shaped by our language as well as the corresponding conceptual system can be found in various philosophical traditions. Immanuel Kant's transcendental idealism, for example, is in large part devoted to the analysis of conceptual conditions of our mental representation of reality.[2] Kant accepted certain conceptual preconditions of our cognitive life as fixed and considered it a central task of philosophy to discover and analyse them. In contrast, Friedrich Nietzsche declared that the central task of philosophy is not *analysis* but a profound *critique* of our conceptual repertoire. This critique resulted in the demand that philosophers "must no longer accept concepts as a gift, nor merely purify and polish them, but first make and create them."[3] This is a demand for a form of conceptual engineering in which philosophers improve or even create concepts so that they meet certain particularly important requirements. Traces of this Nietzschean attitude can be found in phenomenological (e.g., Heidegger) as well as (post-)structuralist traditions (e.g., Foucault).[4]

2 Immanuel Kant, *Kritik der reinen Vernunft* (Hamburg: Meiner, 1954).

3 Friedrich Nietzsche, *The Will to Power*, trans. by W. Kaufmann (New York: Random House, 1968), 221.

4 See, for example: Martin Heidegger, "Die onto-theo-logische Verfassung der Metaphysik," in *Identität und Differenz* (1955–1957), ed. Friedrich-Wilhelm von Herrmann (Frankfurt a. M.: Klostermann, 2006), 51–79; Martin Heidegger, "Zeit und Sein," in *Zur Sache des Denkens* (1962–1964), ed. Friedrich-Wilhelm von Herrmann (Frankfurt a. M.: Klostermann, 2007), 3–30; Michel Foucault, *Les mots et lex choses* (Paris: Gallimard, 1966); Michel Foucault, *L'archéology du savoir* (Paris: Gallimard, 1969).

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Likely the most explicit examples of conceptual engineering, however, can be found in the analytic tradition of philosophy.[5] Within this tradition, the method of assessing and improving representational devices is closely linked to the seminal work of Rudolf Carnap and his method of *explication*.[6] This method is best introduced in comparison to the widely used philosophical method of *conceptual analysis*.

In applying conceptual analysis, philosophers seek to formulate application conditions of a term (for example, "knowledge," "truth," or "freedom"). The guiding question within such a project is the following: What are the conditions that actually govern the correct use of the term in question, and under which conditions is the term correctly applied? The aim is to reconstruct the meaning of a term by providing a definition that specifies conditions that are individually necessary and jointly sufficient for its correct application. As these definitions are considered ways of specifying the meaning of a term, and the meaning of a term is often taken to be the concept associated with it, this method is called "conceptual analysis."

In contrast to conceptual analysis, Carnap's method of *explication* is not an attempt to analyse the meaning of a term but to improve and reengineer it. The goal is not to formulate the conditions that govern the actual use of a term but to establish conditions of application that make the reengineered term stand out favourably with respect to certain scientific goals. Thus, the guiding question is not what are the conditions that actually govern the correct use of the term but how can the application conditions of a term be improved so that the term becomes more conducive to scientific aims? Within this project, deviations from the pre-theoretic use of a term are explicitly allowed.

Carnap illustrates the details of his account by considering the examples "warm" (understood roughly as "property that causes a certain sensation in subjects") and "fish" (understood roughly as "animals that live in water"). In his view, in relevant contexts the first term has been substituted by the quantitative term "temperature," and the second has been replaced by the biologically defined term "piscis" (understood roughly as "cold-blooded aquatic vertebrate").[7]

According to Carnap, these substitutions can be considered successful acts of explication because the new and reengineered terms meet the following conditions of adequacy. First, the reengineered terms are *similar* to the pre-theoretic ones in the

5 It is this tradition that coined the term "conceptual engineering." For early usages of the term, see Simon Blackburn, *Think: A Compelling Introduction to Philosophy* (Oxford: Oxford University Press, 1999); Robert Brandom, "Modality, Normativity, and Intentionality," *Philosophy and Phenomenological Research* 63 (2001): 611–623.

6 Rudolf Carnap, *Logical Foundations of Probability* (Chicago: University of Chicago Press, 1962). For an interesting and detailed discussion of Carnap's method of explication, see: Georg Brun, "Explication as a Method of Conceptual Re-Engineering," *Erkenntnis* 81, no. 6 (2016): 1211–1241.

7 Carnap, *Logical Foundations*, §§ 3–5.

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sense that they can be used in many contexts in which the old terms are used. Despite their similarity, however, they also exhibit differences and even call for acts of reclassification; for example, in contrast to the pre-theoretic term "fish," "piscis" excludes whales. Second, the new terms are more *exact* in the sense that their application conditions are clearer and less vague than the application conditions of the pre-theoretic terms. Third, they are more *fruitful* in the sense that in contrast to the pre-theoretic terms, they are systematically embedded in established scientific theories, allowing for the formulation of more general laws as well as finer discriminations. Fourth, they are *relatively simple* and easy to grasp.[8] The second and third conditions of adequacy, exactness, and fruitfulness, are of central importance to Carnap. Only if these conditions are satisfied can a reengineered term or concept be considered an improvement with respect to scientific aims such as clarity, verifiability, systematicity, and explanatory power.

Carnap's method of explication can be applied to a wide range of terms and concepts, but the corresponding revisions are always concerned with improvements regarding scientific aims. Other analytic philosophers, however, have suggested projects of conceptual engineering that are supposed to be conducive to other aims, most importantly social and political ones. For example, for more than twenty years, Sally Haslanger has proposed a project of conceptual engineering (in her terminology, an "ameliorative project") for gender and race terms.[9] In line with critical theory, she proposes definitions of gender and race terms that clearly identify them as socially constructed and highlight certain power structures as constituents of their meaning.[10] The definitions are revisionary because they involve a change in the terms' meanings and call for acts of reclassification.

Haslanger argues that these revisions are an improvement because they force us to acknowledge (tacit) beliefs and inference patterns that are widespread in our society and that reinforce certain forms of social injustice. Why, for example, do we (tacitly) believe it more likely that a person has a certain profession once we know whether the person is a man or woman? By building oppressive structures into the meaning of "woman," we can answer this question in a way that helps us acknowledge and understand the flaws in our social practice. Understanding these flaws and acknowledging the force of oppressive systems is the first step in overcoming them

8 Carnap, *Logical Foundations*, 5–13.

9 Sally Haslanger, "Gender and Race: (What) Are They? (What) Do We Want Them to Be?" *Nous* 34, no. 1 (2000): 31–55; Sally Haslanger, "Language, Politics, and 'The Folk': Looking for the Meaning of 'Race,'" *The Monist* 93, no. 2 (2010): 169–87; Sally Haslanger, *Resisting Reality: Social Construction and Social Critique* (Oxford: Oxford University Press 2012); Sally Haslanger, "Going On, Not in the Same Way," in *Conceptual Engineering and Conceptual Analysis*, eds. Alexis Burgess, Hermann Cappelen, and David Plunkett (Oxford: Oxford University Press, 2020), 230–260.

10 Haslanger, "Gender and Race," 38–39.

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and has, according to Haslanger, the additional positive consequence of reframing "our personal and political identities."[11]

Sarah-Jane Leslie proposed another form of conceptual engineering that also aims at being conducive to social justice.[12] Consider the generic use of the nouns "tiger" and "tick" in "Tigers are striped" and "Ticks carry Lyme disease." These generic expressions are correct even though not all tigers are striped and not all ticks (not even most of them) carry Lyme disease.[13] Sometimes we refer to social groups with a generic use of a noun (e.g., "Muslim," "African American," "refugee," "European"). Leslie points to empirical data showing that hearing a member of a social group being described with a noun rather than an adjective increases the extent to which people expect the person to conform to a stereotype. Thus, empirical data seem to suggest the generic use of nouns leads to something that Leslie calls acts of "essentializing." We form the false (tacit) belief that there is some hidden property or underlying essence shared by members of that group, which causally grounds common properties and dispositions.[14] Leslie suggests the risk of falling prey to the mistake of essentializing, which can reinforce social injustice, would be reduced by avoiding the use of social-kind nouns. Instead of describing someone as a Muslim, we could describe them as a person who practices the religion of Islam. This way of speaking would emphasize that "person" is the relevant sortal and that *practicing Islam* is a particular property they happen to possess. Given the aforementioned empirical data, it is reasonable to assume that as a result of avoiding social-kind nouns, the amount of essentializing is reduced, which in turn is conducive to overcoming certain forms of social injustice.[15]

The examples of conceptual engineering introduced so far have all been examples from philosophy.[16] It is important to note, however, that philosophy is not the only discipline in which conceptual engineering takes place. In law, for example, the meanings (extensions) of "murder," "intention," and "war" are matters of widespread

11 Haslanger, "Gender and Race," 47. See also: Haslanger "Going On," 237.

12 Sarah-Jane Leslie, "The Original Sin of Cognition: Fear, Prejudice, and Generalization," *Journal of Philosophy* 114, no. 8 (2017): 393–421.

13 For a useful introduction to generics, see Sarah-Jane Leslie and Adam Lerner, "Generic Generalization," in *The Stanford Encyclopedia of Philosophy* (Winter 2016 edition), ed. Edward Zalta, available at: https://plato.stanford.edu/archives/win2016/entries/generics/.

14 Sarah-Jane Leslie, "Carving up the Social World with Generics," *Oxford Studies in Experimental Philosophy* (forthcoming).

15 Sarah-Jane Leslie, "Carving."

16 For more examples, see: Herman Cappelen, *Fixing Language: An Essay on Conceptual Engineering* (Oxford: Oxford University Press, 2018), 9–27. For a more detailed discussion of the role of conceptual engineering in philosophy, see: Herman Cappelen and David Plunkett, "Introduction: A Guided Tour of Conceptual Engineering and Conceptual Ethics," in *Conceptual Engineering and Conceptual Analysis*, ed. Alexis Burgess, Hermann Cappelen, David Plunkett (Oxford: Oxford University Press, 2020), 18–23.

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controversy, and in psychiatry, the question of how mental disorders should be classified is intensely discussed. Moreover, various public controversies are also related to conceptual engineering. Clear examples are the debates over whether we should use gender-neutral expressions and whether we should erase racial slurs from novels written in the past. Furthermore, the public debates over whether same-sex couples should be able to marry and whether a family can be constituted differently from a husband, wife, and their biological offspring. These debates can also be understood as projects of conceptual engineering in that they seem to involve proposals to reengineer the meanings of "marriage" and "family."[17]

At least with regards to these examples, the following general thought as well as the infrastructural perspective plausibly establishes the importance of conceptual engineering: If it is true that our social reality is at least in part constituted by the words we use to describe social categories,[18] then debates over what those words mean and how we should use them are of central importance. Revising and improving these terms and their use may help improve our social reality.[19] But even if we do not want to subscribe to the ontological thesis that our social reality is constituted by our use of words, the suggested infrastructural perspective still emphasizes the importance of conceptual engineering in various domains. Since the system of our representational devices (words and concepts) can be considered as the infrastructure that enables us to classify things and thereby draw inductive, deductive, and abductive inferences—which in turn enables us to act in coordinated, planned, and goal-oriented ways—considering possible challenges and improvements of that infrastructure becomes mandatory. This is true not only with respect to the achievement of our scientific goals, but with regard to our social and political interactions as well.

Section 4. Systematic Options and Open Questions

The examples of conceptual engineering introduced in the previous section illustrated how important this form of maintenance of our conceptual infrastructure is—not only for our scientific endeavours but also for our social, political, and personal lives. In this section, we will give a (simplified) systematic analysis of the options within projects of conceptual engineering and highlight some of its main problems as well as topics for future research. The goal is thus to illustrate the kinds of

17 For a defence of the view that such controversies can be construed as debates about the meaning of words, see: Peter Ludlow, *Living Words: Meaning Underdetermination and the Dynamic Lexicon* (Oxford: Oxford University Press, 2014).

18 Cf. John Searle, *The Construction of Social Reality* (New York: Free Press, 1995).

19 Cappelen, *Fixing Language*, 44.

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questions and problems that arise for those who aim to maintain conceptual infrastructures. We leave an assessment of the similarity and differences of conceptual engineering and other types of infrastructural practices for future work.

The first and most fundamental pair of questions that any conceptual engineer will have to answer is this: What exactly do they strive to engineer, and how can it be done? Note that answering these questions is more difficult than it may seem at first. For while it is (perhaps trivially) true that conceptual engineering does, in some sense, target *concepts*, the very term "concept" belongs to the most unclear and contested terms in theoretical philosophy and psychology.[20] Whereas many analytic philosophers construe concepts as abstract entities such as Fregean senses or modes of presentations,[21] philosophers of psychology typically construe them as bodies of information or mental representations that underwrite cognitive capacities such as categorization and inference-making.[22] These different approaches to the ontology of concepts yield radically different views of how they can be engineered. In a Fregean view, to engineer a concept is, roughly, to propose a set of necessary and jointly sufficient application conditions (see Carnap's method of explication introduced in section 3); in a psychological view, it is to change our (typically subconscious) ways of categorizing and making inferences.[23]

Some philosophers argue that unless one makes an explicit choice as to how one understands concepts, one does not really have an account of the nature and practice of conceptual engineering.[24] By now, various proposals about the target entities of conceptual engineering projects have been made, and there is a vibrant discussion about how such target entities can be engineered. A position that we deem particularly promising is pluralism: the view that conceptual engineering can potentially have many different targets, ranging from purely linguistic to more mental ones, that can be engineered by a great variety of different implementation strategies.[25]

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20 Cf. Edouard Machery, *Doing Without Concepts* (Oxford: Oxford University Press, 2009).

21 Cf. Gottlob Frege, "Über Sinn und Bedeutung," *Zeitschrift für Philosophie und philosophische Kritik*, 100 (1892): 25–50; Christopher Peacocke, "Rationale and Maxims in the Study of Concepts," *Nous* 39, no. 1 (2005): 167–178.

22 Cf. Edouard Machery, *Philosophy Within its Proper Bounds* (Oxford, Oxford University Press, 2017); Guido Löhr, "Concepts and Categorization: Do Philosophers and Psychologists Theorize about Different Things?" *Synthese* 197, no. 5 (2020): 2171–2191.

23 See for more details: Steffen Koch, "Engineering What? On Concepts in Conceptual Engineering," *Synthese* 199, no. 1–2 (2021): 1955–1975.

24 Cappelen, *Fixing Language*, 141.

25 Cf. Manuel Gustavo Isaac, Steffen Koch, and Ryan Neftd, "Conceptual Engineering: A Roadmap to Practice," *Philosophy Compass* (2022), doi 10.1111/phc3.12879; Steffen Koch, Guido Löhr, and Mark Pinder, "Recent Work in the Theory of Conceptual Engineering," *Analysis* (forthcoming).

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But how exactly to flesh out this sort of pluralism and the corresponding variety of implementation strategies remains a question for future research.

A related issue concerns the interplay between linguistic and more cognitive dimensions of concept application. Assume, as many other philosophers do, that conceptual engineering targets language: Does the relevant change conceptual engineers envisage concern the *meaning properties* of linguistic items such as words or how we go about *using them in practice*?[26] Both options give rise to tricky questions. If it concerns *use* rather than meaning, then what, if anything, distinguishes conceptual engineering from other forms of theorizing? For example, paleontologists' discovery and public declaration that birds are dinosaurs has normative linguistic consequences: people should no longer say that dinosaurs are extinct or that birds are not dinosaurs, for example. But did these paleontologists thereby *engineer* the concept of a dinosaur (or a bird)? It would seem that this is a case of a scientific discovery rather than a case of conceptual engineering. But then what exactly is it that sets the two apart? Or is "conceptual engineering" just a fancy new label for ordinary theorizing?[27]

On the other hand, if conceptual engineering primarily targets *linguistic meaning*, it is unclear how it could have the effects that advocates of conceptual engineering typically suggest it does. For example, conceptual engineers often claim that engineering concepts can be a means to increase social justice.[28] But how exactly can changes at the level of what certain words mean have such worldly consequences? Does this idea not rely, at least implicitly, on the truth of a controversial form of linguistic determinism, of which Steven Pinker famously said, "it is wrong, all wrong?"[29] Developing an empirically plausible rationale for how exactly language-centred versions of conceptual engineering may yield improvements in our reasoning patterns that translate into worldly consequences such as social justice remains an important desideratum for future research that ought to be approached from an interdisciplinary perspective.

A further set of questions concerns the normativity involved in conceptual engineering. As shown in section 3, conceptual engineering is not about the actual ap-

26 Cf. Cappelen, *Fixing Language*; Mark Pinder, "Conceptual Engineering, Metasemantic Externalism, and Speaker Meaning," *Mind* 130, no. 517 (2021): 141–163.

27 Something similar can be asked with respect to Carnap's examples of supposedly successful explications mentioned above: Should we take it as a scientific discovery or as a consequence of an act of conceptual reengineering that whales are not fish? What exactly is the difference between these two options?

28 Haslanger, "Gender and Race," 31–55. Leslie, "The Original Sin," 393–421. Paul-Mikhail C. Podosky, "Can Conceptual Engineering Actually Promote Social Justice?" *Synthese* 200, no. 160: //doi.org/10.1007/ s11229-022-03469-5

29 Steven Pinker, *The Language Instinct: How the Mind Creates Language* (New York: Harper Perennial, 1995), 57.

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plication conditions of concepts but about what application conditions they should have. But what kind of normativity does "should" refer to here?[30] There is a plethora of views one could take, ranging from epistemic to moral or prudential normativity to what is *all-things-considered* best. The Carnapian tradition introduced in section 3 puts the greatest emphasis on epistemic considerations, such as furthering exactness or scientific fruitfulness. Contemporary approaches to conceptual engineering, by contrast, typically emphasize its utility for the attainment of nonscientific goals, including moral or political ones.

Broadening the normative basis on which concepts may legitimately be engineered from purely epistemic to moral and political considerations raises important questions about how to handle conflicting cases. For example, can it be legitimate to sacrifice exactness or scientific fruitfulness in the attainment of a political good? Can it be justified to render our concepts less morally good for the sake of increasing their purely epistemic qualities? These questions are hotly debated in current discussions of conceptual engineering. Mona Simion argues that a concept's primary function is epistemic, and that conceptual engineering should thus be bound by what she calls the "epistemic limiting procedure." A concept should be engineered if and only if there is an all-things-considered reason to do so and when doing so does not translate into epistemic loss.[31]

Contra Simion, Paul-Mikhail Podosky, and Robin McKenna argue it is sometimes legitimate to engineer a concept even when this results in temporary epistemic disadvantages. As we already indicated at the end of section 3, this is particularly plausible for so-called social-kind concepts such as "family," "husband," "wife," "parent," or, according to many philosophers, "woman" and "man." McKenna explicitly claims social-kind concepts are special in that they "serve to shape the world, not (merely) to represent it."[32] In other words, "[i]f we decided to apply these terms in different ways, then—perhaps over a long period of time—the social roles themselves might change."[33]

Plausibly, then, epistemic considerations do not always have the last word in decisions to reengineer concepts. But how epistemic and non-epistemic considerations can be weighed against each other is a difficult issue. What complicates things further is that even epistemic constraints can pull us in different directions. The

30 Note that a similar question arises also for practices that are concerned with other types of infrastructures, such as physical or institutional ones.

31 Mona Simion, "The 'Should' in Conceptual Engineering," *Inquiry: An Interdisciplinary Journal of Philosophy* 61, no. 8 (2018): 924.

32 Robin McKenna, "No Epistemic Trouble for Engineering 'Woman,'" *Logos and Episteme* 9, no. 3 (2018): 336.

33 McKenna, "No Epistemic Trouble," 340. See also Paul-Mikhail C. Podosky, "Ideology and Normativity: Constraints on Conceptual Engineering," *Inquiry: An Interdisciplinary Journal of Philosophy* (2018), //doi.org/10.1080/0020174X.2018.1562374.

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ideal version of a concept for one scientific project might not be ideal for another one; more generally, the demand to have maximally specific concepts often contrasts with the demand to have concepts that can be used in general explanations of coarse-grained types of phenomena. All in all, it seems clear that resolving these various tensions and conflicts requires a comprehensive, multi-perspective approach that must be developed through intensive interdisciplinary collaborations among a wide variety of scientific disciplines and sociopolitical stakeholders.

We hope to have shown how theoretically fruitful it is to conceive of conceptual systems and languages as a kind of abstract infrastructure. Just as our transport system predetermines our travelling options, so do conceptual systems and languages predetermine our thought and speech patterns. Infrastructures are artifact kinds that serve the changing needs of their users. For this reason, infrastructures must be maintained. The philosophical project of conceptual maintenance work is conceptual engineering. We have also shown that the project of conceptual engineering faces numerous challenges, some of which can only be met through interdisciplinary collaborations.

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