

Kristin Flugel, Alexander Lang,
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Tatjana Scheffler, Joachim Scholz,
Estrid Sørensen (eds.)

Infrastructures of (Non-)Knowledge

Virtuality and Epistemic Transformations



[transcript] VIRTUAL
Lifeworlds

Kristin Flugel, Alexander Lang, Christina Lechtermann, Norbert Ricken,
Tatjana Scheffler, Joachim Scholz, Estrid Sørensen (eds.)
Infrastructures of (Non-)Knowledge

Editorial

Virtual Lifeworlds is a book series emerging from the DFG Collaborative Research Center 1567. It brings together interdisciplinary perspectives on how virtuality has become normalized. By tracing knowledge production, practices, negotiation processes, and network dynamics, the series shows how virtual lifeworlds have taken shape and how diverse forms of virtuality have become drivers of social and cultural change. It examines the functions and consequences of the virtual for the constitution of subjects, lifeworlds, and aesthetic practices; for social organization and processes; and for the scientific disciplines themselves.

The Collaborative Research Center unites education, history, art history, linguistics, literary studies, media studies, and the social sciences. Across these fields, research converges on the media and technological conditions under which virtual worlds are produced and perceived – worlds that can be narrated, calculated, experienced immersively, modeled, or imagined. The series foregrounds the concept of virtuality, the uses of virtual spaces, modes of interaction with them, and forms of participation in them. It maps the infrastructures and imaginaries that sustain virtual environments, reflects on their historical trajectories, and illuminates the ways virtuality reshapes everyday life, institutions, and knowledge.

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Editorial

*Kristin Flugel, Alexander Lang, Christina Lechtermann, Norbert Ricken,
Tatjana Scheffler, Joachim Scholz, Estrid Sørensen*

It has been widely acknowledged that scientific knowledge in all its facets is shaped by social and material infrastructures as well as by the practices that unfold within these arrangements. Several decades ago, laboratory studies by Karin Knorr Cetina, Bruno Latour and Steve Woolgar, Hans-Jörg Rheinberger and others demonstrated in a compelling manner that the production of knowledge cannot be separated from the practices, sites and technologies of scientific work.¹ In contrast to a positivist aspiration to universal knowledge and to purely mentalist conceptions of knowledge, insights into the social and material constitution and the contextual character of (scientific) knowledge have brought new questions to the forefront in the theory, sociology, anthropology and history of knowledge, and indeed founded the field of Science and Technology Studies (STS).² These new questions address not only the reception, but also the production, circulation and distribution of knowledge, including practices of conservation and storage. The concept of »epistemic cultures« (Knorr Cetina) has served as a central heuristic to investigate the entanglement of knowledge, media, institutions, practices and material arrangements, and to differentiate them in relation to their specific historical situations.

In view of the ongoing infrastructural transformation and digitization of epistemic cultures, these questions are being posed anew and in revised form. For quite some time, the digital infrastructures of knowledge practices were interpreted in a rather reductive way, namely as the straightforward transfer of existing analogue practices into the electronic domain of computers.³ At least since the rapid estab-

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- 1 Knorr Cetina, Karin (1999): *Epistemic Cultures. How the Sciences Make Knowledge*, Cambridge, MA: Harvard University Press; Latour, Bruno/Woolgar, Steve (1979): *Laboratory life. The social construction of scientific facts*, Beverly Hills: Sage; Rheinberger, Hans-Jörg (1997): *Toward a History of Epistemic Things. Synthesizing Proteins in the Test Tube*, Stanford: Stanford University Press.
 - 2 Cf. Beck, Stefan/Niewöhner, Jörg/Sørensen, Estrid (2012): *Science and Technology Studies. Eine sozialanthropologische Einführung*, Bielefeld: transcript.
 - 3 Rehbein, Malte (2017): »Digitalisierung«, in: Fotis Jannidis/Hubertus Kohle/Malte Rehbein (eds.): *Digital Humanities. Eine Einführung*, Stuttgart: Metzler, pp. 179–198; Holischka, Tobi-

lishment of AI infrastructures, including chatbots based on large language models (LLMs) from 2022 onwards, it has become evident that new modes of interaction are transforming multiple dimensions of knowledge—from production to circulation and distribution, conservation and reception. Referring to practices and forms of (non-)knowledge not as merely ›digitized‹ but as ›virtualized‹ emphasizes not only their technical articulation but also their specific features and affordances: their existence beyond physical locations; their relation to the imaginary, the real, the hypostasized, the material and the immaterial; their interoperability; their ability to generate doubles and immersive effects; their efficacy; their capacity to bring about new realities; and, above all, their power to constitute new objects of knowledge. Thus, focusing on virtuality rather than digitality not only allows for a more fine-grained description of contemporary forms and practices of knowledge, but it also opens up a renewed perspective on historical knowledge practices which, although not digitally mediated, nonetheless share features associated with the ›virtual‹.⁴

The contributions assembled in this volume share this perspective on the production, circulation and reception of knowledge. Drawing on examples from different periods in the history of knowledge and the sciences, they explore how knowledge depends on material arrangements, practices, communities, resources and locations which themselves change together with the status, logic, validity and function of knowledge. The contributions analyze how (non-)knowledge, infrastructures and technologies are intertwined. By focusing on the relation between knowledge and non-knowledge, they propose an approach that does not simply juxtapose knowledge and ignorance—almost in the sense of two complementary sets—but understands them as structurally linked and intertwined. Knowing is not only structurally and practically permeated by not-knowing, because it is perspectival, provisional, partial and fallible; knowing is also constituted through not-knowing. This also clarifies the specific significance of virtuality for forms and practices of knowledge, insofar as conceptions of reality always imply horizons of possibility and anticipatory structures (›as ifs‹) and can only be adequately understood in these structural terms. In this volume, the aim is not only to address questions concerning the structural constitution of knowledge, but also to examine its various constitutive conditions through infrastructures and associated technologies, as well as the relevance of digital platforms and archives. Some of the texts collected here are transcriptions or elaborations of lectures presented at the Second Annual Conference of the Collaborative Research Center 1567 *Virtual Lifeworlds* at Ruhr University Bochum, Germany, in October 2024.

as/Viertbauer, Klaus/Preidel, Christian (eds.) (2022): Digitalisierung als Transformation? Perspektiven aus Ethik, Philosophie und Theologie, Berlin: Metzler.

4 Lévy, Pierre (1998): *Becoming Virtual. Reality in the Digital Age*, New York/London: Plenum Trade.

Following this editorial, an extended introduction outlines the thematic focus of the book in two articles. The first one sketches two complementary moves. Firstly, it addresses the question of how knowledge (and the ontology of knowledge) can be, or has historically been, understood within different epistemological regimes. The paper therefore takes as its point of departure the (representational) understanding of knowledge, repeatedly marked as classical, in Plato's conception of knowledge as ›true justified belief‹, and traces the subsequent transformations of this conception toward a praxeological understanding of knowledge.⁵ In doing so, it shows that the relation between knowledge and non-knowledge is constitutive for knowledge and destabilizes the classical problem configuration of progressive truth. Secondly, the paper proceeds from infrastructures of knowledge and asks, in a complementary movement, how knowledge practices—and understandings of knowledge themselves—are changing in virtual worlds. The second introductory article shows that knowledge is inseparably linked to infrastructural prerequisites that are often overlooked or only noticed when they fail. Following considerations of the history of knowledge and discourse theory, the chosen examples, such as wax tablets, codices, hypertext and LLMs, illustrate how closely knowledge systems are linked to their respective forms of storage, transmission and representation, and how they simultaneously produce forms of non-knowledge. This leads to a plea for a reflexive observation of knowledge practices that systematically considers their own infrastructural conditionality.

Against this broad backdrop, the following chapters of this volume are divided into two main sections. In the first section, questions concerning the practices of (non-)knowledge are addressed and discussed with regard to their forms and structures, their logics, their histories and their functions. The focus is not only on what changes when knowledge is conceptualized and analyzed in praxeological terms. It also concerns how knowledge practices can be observed, methodologically investigated and described, on the one hand, and how they can be reconstructed in their historical genesis, on the other. The contributions illuminate various fields, such as sports, university contexts and small talk, and demonstrate that knowledge practices are an essential dimension of any social activity. They show that analyses of society and culture gain depth when attention is directed toward these practices. By examining (non-)knowledge, praxeological approaches yield valuable insights into the workings of social order and the multiple contexts on which it rests, particularly when implicit and embodied forms of (non-)knowledge and material infrastructures acting as co-actors are taken into account. Practices embedded in

5 Cf. Pulte, Helmut (2023): »Klassisch – Modern – Digital? Eine kleine Geschichte und Systematik des Wissensbegriffs, mit einer Note zur digitalen Bildung«, in: Sandra Aßmann/Norbert Ricken (eds.): *Bildung und Digitalität. Analysen – Diskurse – Perspektiven*, Wiesbaden: Springer VS, pp. 275–312.

contexts of (non-)knowledge generate and stabilize order while at the same time transforming it, sometimes even remaking entire epistemic cultures. Assuming that objects of knowledge are not simply given, but are constituted in the first place through heterogeneous practices and infrastructures, we can ask about both the deliberate, intentional or accepted and the unintended effects of such constitution processes—e.g.: To what extent and in what ways are multiple practices involved in creating objects of knowledge and engaging with them? What role is played by the concepts, assumptions, and ethical frameworks embedded within these practices, as well as by the latent possibilities inherent in their materials, instruments, apparatuses, and sites?

The second section turns to the significance of technical and non-technical infrastructures for the constitution of (non-)knowledge. Knowledge is produced and reproduced within, and through, certain infrastructural conditions. The fact that infrastructures themselves typically remain implicit, contained, or even invisible can be observed in numerous cases—for instance, in the spatial and logistical organization of universities, libraries or data centers, as well as in the logics of discrimination that accompany them. Yet the invisibility of infrastructures is historically and materially conditioned. Through catalogues, signatures, shelving systems and the physical involvement of researchers, the infrastructure of a library is often more readily perceptible than the algorithms of a database. At the same time, digital infrastructures are also perceptible—for example, when users help shape digital platforms through rating and evaluation tools. If the visibility of infrastructures is mutable, how can knowledge of the infrastructures of knowledge reflect its own contingency? How can virtualization be conceptualized as a tension between dematerialization, materialization and informatization? How does the relationship between visibility and invisibility, knowledge and non-knowledge change historically, materially, technically, economically and ecologically? And how is the increasing consumption of resources to be taken into account?

If we follow the trajectory outlined so far, it becomes necessary to ask how collections, repositories, platforms and digital or non-digital archives model, characterize and classify the objects of their knowledge. This concerns the methods of cataloguing, the data structures and document formats, the forms of metadata and indexing, the modes of linking, listing and description, as well as the specific spatial locations of the objects of knowledge. Not least, the issue of infrastructure helps to draw attention to the cooperative practices involved in the production of knowledge. Hence, in addition to technical and non-technical infrastructures and platforms, cognitive intrapersonal infrastructures are also taken into account—that is, the constitution and analysis of (non-)knowledge of human and artificial actors in virtual spaces of interaction.

The volume concludes with an outlook on the Virtual University. The university has always been an institution of virtuality in the sense of potentials, of the ›as if‹, of

experimentation. Since its inception, the university has been designed to scrutinize, imagine and shape existing, other, emergent, fantastic and utopian worlds, societies, forms of knowledge, natures and technologies. This infrastructure of speculation is fundamental to the university's mission. The humanities and social sciences, in particular, are trained in dealing with ambiguity, imagining the impossible, and engaging with speculation, multiplicity, tension, complexity, and ambivalence. But what might the virtual university of the future be? What will its infrastructures and architectures look like? How will we study, research and administer in and through virtual universities? The discussions at the conference resulted in a jointly authored contribution in which all discussants articulate their respective visions for the future of the Virtual University.

Taken together, the contributions collected in this volume provide a broad and nuanced insight into the interrelations between knowledge practices and their infrastructures. An overall picture emerges of complex practices and infrastructures of (non-)knowledge that, so we hope, will enable readers to sharpen their own view of these entanglements.

The editors would like to thank all authors for their contributions to the conference and to the preparation of this volume, without whose efforts its realization would not have been possible. We would also like to thank the German Research Foundation for funding the Collaborative Research Center 1567 *Virtual Lifeworlds*, in the context of which this volume was produced, and last but not least the editors of the series *Virtual Lifeworlds* for including this book in the series. In recognition of the considerable amount of work involved, we express our gratitude to Mirko Wittwar for language editing and to Benjamin Braamt and Laura Mazzoli for proofreading and formal editing. Finally, our appreciation goes to the publisher for the consistently reliable and smooth printing process.

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Introduction

On Knowledge

Remarks from an Epistemological Perspective

Norbert Ricken

»One is often bewitched by a word«, Ludwig Wittgenstein noted in ›On Certainty‹—and added: »For example, by the word ›know‹.«¹ To be ›bewitched‹ here means to be as much confused as captivated, even to be estranged within one's own domain: »I don't know my way about«, which Wittgenstein himself identified as »the form« of »a philosophical problem«.² This peculiar process of bewilderment and estrangement—of being seemingly familiar with something, yet faltering when being asked about it—may apply to many concepts, but it is of particular significance in the case of ›knowledge‹. For scarcely any other concept occupies such a central position not only in epistemological or philosophy of science discourses, but also in everyday and societal contexts, marking a fundamental dimension of human relations to the world. ›Knowledge‹—one might say—signifies the attempt to secure one's own understanding of and relation to the world, and in doing so it inevitably reawakens the very doubts it seeks to dispel.

It is thus not surprising that definitions and interpretations of ›knowledge‹ vary significantly, ranging from ›justified true belief‹ to what someone personally believes to be true, with numerous variations between these poles. These contrasting conceptions do not stand in equal opposition; rather, they form a gradient—one in which, depending on discourse and era, sometimes the strict conception of ›knowledge‹ as ›justified true belief‹ and at other times the more relativistic notion of ›individual truth‹ has been predominant. It is not unjustified to characterize the former as a traditional, sometimes even outdated, understanding of ›knowledge‹³ and, in contrast, to emphasize the (late) modernity status of the milder, because

1 Wittgenstein, Ludwig (1969): *On Certainty* [1949–1951], Oxford: Blackwell, § 435. Unless otherwise stated, the titles of the German-language publications mentioned in the text have been translated into English. Translated quotations from German-language publications are marked as own translations; all other quotations are in the original language.

2 Wittgenstein, Ludwig (1953): *Philosophical Investigations* [1945–1949], Oxford: Blackwell, § 123.

3 Cf. Pulte, Helmut (2023): »Klassisch – Modern – Digital? Eine kleine Geschichte und Systematik des Wissensbegriffs, mit einer Note zur digitalen Bildung«, in: Sandra Aßmann/Norbert

less demanding, version of knowledge. ›Knowledge‹, as we might add from this perspective, does also imply ›truth‹, since »one may [and must] assume that knowledge is true knowledge«. ⁴ Yet, as Luhmann argues, its value is not measured by its correspondence to the world, but—being a symbolically generalized medium of communication—exclusively by its capacity to facilitate further communication. Whereas for many years, indeed decades, the constructivist perspective has dominated the understanding of ›knowledge‹, in recent years—both with so-called ›new realism‹ ⁵ and especially in debates about ›post-truths‹ ⁶—representationalist or positivist conceptions of ›knowledge‹ have re-emerged, emphasizing the factuality of ›knowledge‹, albeit without addressing the well-founded objections that, since the 1980s at the latest, have caused a shift in our understanding of knowledge. ⁷

However, to avoid getting caught in such pendular movements, it seems to be advisable to recall some of the fundamental elements of the epistemological discourse, in order to develop a robust understanding of knowledge. After a brief survey of concepts and key distinctions of ›knowledge‹ (1), I will thus discuss central issues of a more traditional understanding of knowledge and describe thus connected shifts (2). This may then be followed by a praxeological view on knowledge which is also indebted to the history of knowledge (3), before concluding with a short outlook at current debates on ›knowledge in virtual worlds‹ (4). Overall, this text thus rather aims at shedding light on the background of current ›knowledge discourses‹ instead of attempting to discuss current challenges.

1.

Even the attempt to gain an initial understanding of ›knowledge‹ in the etymological sense reveals different conceptual traditions. ⁸ While the German language distinguishes between two conceptualizations—›wissen‹ and ›(er-)kennen‹—by

Ricken (eds.): *Bildung und Digitalität. Analysen – Diskurse – Perspektiven*, Wiesbaden: Springer VS, pp. 275–312.

- 4 Luhmann, Niklas (1990): *Die Wissenschaft der Gesellschaft*, Frankfurt a.M.: Suhrkamp, p. 134. Translation by the author.
- 5 Cf. Ferraris, Maurizio (2014): *Manifest des neuen Realismus*, Frankfurt a.M.: Klostermann/Vittorio.
- 6 Cf. Krasmann, Susanne (2024): »Postfaktisch«, in: Ulrich Bröckling/id./Thomas Lemke (eds.): *Glossar der Gegenwart 2.0*, Berlin: Suhrkamp, pp. 313–323.
- 7 Cf. Glaserfeld, Ernst von (1981): »Einführung in den radikalen Konstruktivismus«, in: Paul Watzlawik (ed.): *Die erfundene Wirklichkeit. Wie wissen wir, was wir zu wissen glauben? Beiträge zum Konstruktivismus*, pp. 16–38.
- 8 Cf. Hardy, Jörg et al. (2005): »Wissen«, in: Joachim Ritter/Karlfried Gründer/Gottfried Gabriel (eds.): *Historisches Wörterbuch der Philosophie*, Darmstadt: Wissenschaftliche Buchgesellschaft, Volume 12, pp. 855–902.

English ›to know‹, derived from Old English ›cnawan‹, through Latin ›(co-)gnoscere‹ and Greek ›gnosis‹ referring to Proto-Indo-European ›gno‹, a tradition has pushed through that is still present in German ›kennen‹ and ›erkennen‹. This tradition encompasses both ›to be acquainted with‹ and ›to recognize something as being true‹ or ›to distinguish something or someone‹. German ›wissen‹, by contrast—via Middle High German ›wizzen‹ and Old High German ›wizzan‹, meaning ›to have seen‹—derives from Proto-Indo-European ›vid‹, which, like Latin ›videre‹ (German: ›to see‹), is associated with ›seeing‹ and ›light‹ and has a (now obsolete) counterpart in Old English ›wit‹. Compared to the broader meaning of ›know‹ and ›kennen‹, ›wissen‹ conveys the narrower meaning of ›having knowledge of something or someone so as to be able to make reliable statements‹.⁹

Also, the numerous distinctions by which ›knowledge‹ is both delimited and differentiated further illustrate the enormous difficulty of developing a clear, unified, and universally applicable concept of knowledge. On the one hand, whereas the triad ›opinion—belief—knowledge‹ not only marks different degrees of certainty but also of (practical) bindingness, so that ›knowledge‹ refers to both tested or certain and to normatively orienting convictions, and must be distinguished from mere opinions and strong beliefs, the sequence ›signs—data—information—knowledge‹, on the other hand, focuses on the incremental attribution of meaning through contextual embedding and interpretation. Neither signs as arbitrary markers nor data as collections of measurements or observations are meaningful by themselves; they only become meaningful information within structured contexts which can then be used to answer questions or solve problems. Although the distinction between ›information‹ and ›knowledge‹ is not always drawn,¹⁰ there are good reasons to mark this difference and to interpret ›knowledge‹ as ›interpreted information‹.¹¹ Interpretation here refers both to the relation to ›somebody‹ and to the evaluation and classification of information for the purpose of orientation or shaping of (that individual's) life practices. This also raises the question of whether machine knowledge can be qualified as ›knowledge‹ or must at first be regarded as information. However, if one follows this line of reasoning, it becomes clear that the designation of claims, beliefs, and attitudes as ›knowledge‹ does not simply mean a linear representation of objects or the world as a whole, for which ›b repr a‹ would be true;¹²

9 Dudenredaktion (ed.) (2019): Duden. Deutsches Universalwörterbuch, Berlin: Dudenverlag. Translation by the author.

10 Exemplarily cf. Spinner, Helmut F. (1994): Die Wissensordnung. Ein Leitkonzept für die dritte Grundordnung des Informationszeitalters, Opladen: Leske + Budrich, pp. 24–26., part. p. 27.

11 Breidbach, Olaf (2008): Neue Wissensordnungen. Wie aus Informationen und Nachrichten kulturelles Wissen entsteht, Frankfurt a.M.: Suhrkamp, p.12. Translation by the author.

12 Sandkühler, Hans Jörg (2014): ›Wissenskulturen. Zum Status und zur Funktion eines epistemologischen Konzepts‹, in: id. (ed.): Wissen. Wissenskulturen und die Kontextualität des Wissens, Frankfurt a.M.: Peter Lang, pp. 59–72, here p. 61.

rather, this perspective on knowledge implies a fundamental perspectivity, categoriality, and contextuality, which disrupts the simple form of linear representation and dissolves it into the relational configuration of a ›world-self-other relation‹.¹³ ›Knowledge‹ can thus only be explained reflexively—by its categoriality, perspectivity, and contextuality—so that every kind of knowledge must give expression both to the ›what‹ and the ›how‹ of knowing. This, however, results in ›knowledge‹ again and too easily being interpreted just as scientific or ›propositional knowledge‹.

Now, to counter such a reduction, numerous distinctions of the concept of knowledge itself have been mentioned and introduced into the epistemological discourse. As early as 1945 Gilbert Ryle pointed out to the difference between ›knowing that‹ and ›knowing how‹,¹⁴ each associated with different logics: ›knowing that‹ refers to truth conditions, while ›knowing how‹ depends on conditions of fulfillment; in psychology, this distinction is sometimes labelled as ›declarative‹ and ›procedural knowledge‹.¹⁵ This can then be linked to Michael Polanyi's distinction between ›explicit‹ and ›implicit‹ or ›tacit knowledge‹¹⁶ which, however, does not only point out to the often underestimated significance of an implicit knowledge—typically possessed in practice, in the sense of what was formerly ›knowing how‹—but it also raises the clearly broader question of whether and to what extent ›knowledge‹ can ever be fully explicated, so that also ›dark knowledge‹ or the ›ununderstood‹ may indeed be part of (supposedly ›positive‹) knowledge. These adjustments have led to further distinctions: meanwhile, following ›knowing how‹, there is talk not only of ›technical‹ and ›behavioral knowledge‹¹⁷ but also of ›bodily knowledge‹¹⁸ which brings into focus not only (self-)perception and knowledge of movement, but also the ›corporeality‹ of all interaction and the ›doing‹ of something moves into focus. Both corporeality and the materiality of things¹⁹ are thus crucial

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- 13 Cf. Koller, Hans-Christoph (2023): *Bildung anders denken. Einführung in die Theorie transformativischer Bildungsprozesse*, Stuttgart: W. Kohlhammer, p. 16.
- 14 For the first time: Ryle, Gilbert (1945): »Knowing How and Knowing That«, in: *Proceedings of the Aristotelian Society* 46, pp. 1–16. Then in more detail: Ryle, Gilbert (1949): *The Concept of Mind*, Chicago: University of Chicago Press, pp. 25–61.
- 15 Roelle, Julian et al. (2023): *Lernen. Theorien und Techniken*, Paderborn: Brill/Schöningh, pp. 15–17.
- 16 Cf. Polanyi, Michael (2009): *The Tacit Dimension* [1966], Chicago/London: University of Chicago Press.
- 17 Tietgens, Hans (2000): »Arten des Wissens und ihre Relevanz für die Erwachsenenbildung«, in: *Report/Literatur- und Forschungsreport Weiterbildung* 45, pp. 109–115.
- 18 Keller, Reiner/Meuser, Michael (eds.) (2011): *Körperwissen*, Wiesbaden: VS Verlag für Sozialwissenschaften.
- 19 See Latour, Bruno (2007): »Eine neue Soziologie für eine neue Gesellschaft. Einführung in die Akteur-Netzwerk-Theorie, Frankfurt a.M.: Suhrkamp, and the related debate in Herbert Kalthoff et al. (2016): *Materialität. Herausforderungen für die Sozial- und Kulturwissenschaften*, Paderborn: Wilhelm Fink.

structural moments of (not only) sociological praxeology. However, the significance of ›non-knowledge‹ or ›negative knowledge‹²⁰ has also been moved into focus, insofar as ›knowledge‹ and ›non-knowledge‹ can precisely not be understood as being just complementary; rather, any kind of ›knowledge‹—simply for reasons of the fundamental revisability of all knowledge—is structurally permeated with ›non-knowledge‹ and itself contains much that is understood or is not fully explicable. To this—also significant for this volume—reformulation of knowledge one can finally add one last distinction, developed by Gottfried Gabriel in his initially rather traditional epistemological reflections.²¹ His distinction between ›propositional‹ and ›non-propositional knowledge‹ at first takes up the direction of both Gilbert Ryle and Michael Polanyi who also consider kinds of knowledge that cannot simply be reduced to factual statements and propositions; if this distinction is also related to the categoriality of all knowledge, it becomes clear that even propositional knowledge by itself refers to and depends on non-propositional knowledge.²² This coupling of the ›what‹ and ›how‹ of knowledge can, with Werner Heisenberg, be described as a kind of ›uncertainty relation‹, in that one cannot bring structural moments into sharp focus and a positive form at the same time, so that both structural obscurities of knowledge and a permanent reversibility of knowledge (through categorial shifts) are the inevitable result.

Even this—admittedly cursory—survey of the various concepts and theories of knowledge makes clear the difficulty, indeed the impossibility, of developing a somewhat consistent and coherent concept of knowledge. One might understand and accept this as a late-modern awareness of complexity, but conceptually one is constantly confronted with the intuition that the aspects of ›knowledge‹ described are not and cannot merely separate phenomena. Also the observation that ›knowledge‹ denotes both an epistemic content, an epistemic ability, and a thus resulting epistemic state²³ reinforces this perspective. Now, in his ›Philosophical Investigations‹, Ludwig Wittgenstein sketched a conceptual figure that may be helpful also here: »I can think of no better expression to characterize these similarities than ›family resemblances‹.«²⁴ These »family resemblances« are indeed not based on »common properties« but on their structural connections: »And I shall say: ›games‹ form a family.«²⁵ By ›knowledge‹, one might say, a structural aspect of human relations to the world might be marked by which ›propositional knowledge‹ only

20 Cf. Wehling, Peter (2006): *Im Schatten des Wissens? Perspektiven der Soziologie des Nichtwissens*, Konstanz: UVK.

21 Gabriel, Gottfried (2015): *Erkenntnis*, Berlin/Boston: de Gruyter.

22 Cf. *Ibid.*, pp. 57–69.

23 Hardy et al.: *Wissen*, p. 855.

24 Wittgenstein: *Philosophical Investigations*, § 67.

25 *Ibid.*

represents the tip of the iceberg. Against the tendency to regard the distinctions of knowledge sketched here as sometimes separate aspects of the same phenomenon and thus to render them inert, their (albeit non-substantial) interconnectedness should thus be emphasized.

2.

Like hardly any other formulation, Plato's definition of knowledge—namely, ›justified true belief‹, particularly developed in the Theaetetus dialogue—has been continuously transmitted and is until now the vanishing point of all definition attempts. In many respects, this definition is not only regarded as the philosophical epitome of ›knowledge‹ but also marks the core of a lifeworld understanding of knowledge. In Plato's argument, three elements—subjective conviction or opinion (»δόξα«), objective truth or correctness (»ἀλήθεια«), and logical justification or explanation (»λόγος«)—are connected in such a way that only their interplay can be considered an ›episteme‹ (»ἐπιστήμη«): »Now when a man gets a true judgment about something without an account, his soul is in a state of truth as regards that thing, but he does not know it; for someone who cannot give and take an account of a thing is ignorant about it. But when he has also got an account of it, he is capable of all this and is made perfect in knowledge«. ²⁶ Even though in the course of the dialogue also this conception of knowledge proves to be aporetic—since no clear distinction between presumably and demonstrably correct conceptions is possible (as Socrates concludes by the end of Theaetetus: »And so, Theaetetus, knowledge is neither perception nor true judgment, nor an account added to true judgment« ²⁷)—, this definition is frequently invoked and as vehemently defended as it is contested whenever ›knowledge‹ is an issue. ²⁸ At the heart of these debates there is the question of how, after all, the ›truth‹ of a statement can be adequately grasped and justified.

However, the intensity of these debates can be understood only when one considers the ›crisis of truth‹ ²⁹—and often this crisis concerns a traditional, representationalist notion of truth. ³⁰ Without being able here to consider the complex history of conceptions of truth, ³¹ ›truth‹ was for a long time understood as the ›correspon-

26 Plato (1997): Complete Work. Edited, with Introduction and Notes, by Thomas M. Cooper, Indianapolis/Cambridge, MA: Hackett Publishing, p. 224/202c.

27 Ibid., p. 233/210b-c.

28 Cf. Pulte: Klassisch – Modern – Digital?, pp. 275–312.

29 Trawny, Peter (2021): Krise der Wahrheit, Frankfurt a.M.: S. Fischer.

30 Cf. Sandkühler, Hans Jörg (2009): Kritik der Repräsentation. Einführung in die Theorie der Überzeugungen, der Wissenskulturen und des Wissens, Frankfurt a.M.: Suhrkamp.

31 See e.g. Enders, Markus/Szaif, Jan (eds.) (2006): Die Geschichte des philosophischen Begriffs der Wahrheit, Berlin/New York: de Gruyter.

dence of a statement with the object« or—as in the classical formulation by Thomas Aquinas—as »adaequatio rei et intellectus«. ³² But what still appears plausible in everyday life—that a statement is true if it »fits«, i.e. if it corresponds to the facts—has, especially in twentieth-century philosophical discourses, become highly problematic. ³³ Two arguments are repeatedly raised against this »realist« conception: on the one hand, the limitation and, particularly, the conditionality of human perception, thus introducing the relevant Kantian distinction between the »object in itself« and »object as appearance«, ³⁴ sometimes translated as »thing in itself« and »thing as appearance«: ³⁵ »What the things may be in themselves I do not know, and also do not need to know, since a thing can never come before me except in appearance«. ³⁶ This emphasis on experience (as far as it depends on the senses), on the other hand, provokes the question of who could ever verify that any statement corresponds with a matter if each person can only know the thing according to their own perception, ³⁷ so that at best agreement is possible on the perspectival statements about something. Since the early 1980s at the latest it has thus become common to speak not of »representation« but of the »construction of reality«, ³⁸ thereby emphasizing both the impossibility of a realistic depiction and the constructivity and perception-dependence of every perspective—even down to the logic of neurological processes. These insights have long since become a matter of course in both scientific and everyday self-understandings and rarely provoke outrage—despite repeated attempts to rehabilitate some philosophical realism. ³⁹ For the concept of truth this means that the traditional, correspondence-theoretical version is now widely regarded as

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- 32 Thomas von Aquin (1986): *Von der Wahrheit [De veritate (Quaestio I)]*. Lateinisch-deutscher Text, ausgewählt, übersetzt und herausgegeben von Albert Zimmermann, Hamburg: Meiner, p. 8; see in more detail Kobusch, Theo (2006): »Adaequatio rei et intellectus. Die Erläuterung der Korrespondenztheorie der Wahrheit in der Zeit nach Thomas von Aquin«, in: Markus Enders/Jan Szaif (eds.): *Die Geschichte des philosophischen Begriffs der Wahrheit*, Berlin/New York: de Gruyter, pp. 149–166.
- 33 Cf. Skirbekk, Gunnar (ed.) (1977): *Wahrheitstheorien. Eine Auswahl aus den Diskussionen über Wahrheit im 20. Jahrhundert*, Frankfurt a.M.: Suhrkamp.
- 34 Kant, Immanuel (1781–1787/1998): *Critique of Pure Reason*. Translated and edited by Paul Guyer and Allen W. Wood, Cambridge: Cambridge University Press, p. 190/B69.
- 35 Cf. *ibid.*, p. 536/B567.
- 36 *Ibid.*, p. 375/A276–277.
- 37 Cf. Foerster, Heinz von (1990): »Wahrnehmen wahrnehmen«, in: Karlheinz Barck/Peter Gente/Heidi Paris (eds.): *Aisthesis. Wahrnehmung heute oder Perspektiven einer anderen Ästhetik*, Leipzig: Reclam, pp. 434–443.
- 38 Glasersfeld, Ernst von (1995): »Konstruktion der Wirklichkeit und des Begriffs der Objektivität«, in: Heinz Gumin/Armin Mohler (eds.): *Einführung in den Konstruktivismus*, München: Piper, pp. 9–40.
- 39 Cf. Ferraris: *Manifest des neuen Realismus*; Gabriel, Markus (2013): *Warum es die Welt nicht gibt*, Berlin: Ullstein.

being outdated or unfounded, even unfoundable, and has long since given way to other—especially coherence- and consensus-theoretical—notions of truth.⁴⁰ In addition to the (coherence and consistency) relations of knowledge to other kinds of knowledge and to the overall architecture of knowledge—which can be negotiated under the heading of ›knowledge order‹—precisely the social dimension of ›truth‹ as the capacity for assent and social validation has gained (perhaps excessive) weight.

For the concept of knowledge, this fundamental shift in the tectonics of truth at first results in a bracketing of (traditional) claims to truth and certainty in knowledge, so that ›knowledge‹ is understood as that which, at a given time and in a given society, can be »recognized as being true«.⁴¹ This basic attitude—to behave basically agnostically towards possible claims to truth« and not to examine whether and to what extent the arguments presented »were already one step closer to today's truth than others«⁴²—shapes the epistemological and, in particular, knowledge-historical discourses. This not only opens up the space for ›situated truths‹ but also—following Michel Foucault—draws attention to the interrelations of ›savoir‹ and ›pouvoir‹,⁴³ which then allows for focusing the question of the »fabrication of truth«—that is, the question of »how what counts as true and thus guides our speaking, thinking, acting, and deciding is made acceptable and enforced«, as described by the Research Training Group 2945 »Knowledge—Belief—Assertion« at Ruhr University Bochum.⁴⁴ This fundamental bracketing of knowledge claims thus also entails a plea for an understanding of ›knowledge‹ as »situated knowledges«,⁴⁵ which arises from an unrelenting critique of a merely asserted and impossible »objectivity«;⁴⁶ the (specifically male) epistemic posture of ›objectivity‹, it says, is only possible because—starting out from an »unmarked position«⁴⁷—it denies its own perspectivity, contingency, and social constructedness, establishing a kind of »god trick of seeing everything from nowhere«.⁴⁸ However, the reception of this understanding of »situated knowledges« often overlooks that not even the relativistic reversal of

40 Cf. Habermas, Jürgen (1973): »Wahrheitstheorien«, in: Helmut Fahrenbach (ed.): *Wirklichkeit und Reflexion. Walter Schulz zum 60. Geburtstag*, Pfullingen: Neske, pp. 211–266.

41 Sarasin, Philipp (2011): »Was ist Wissensgeschichte?«, in: *Internationales Archiv für Sozialgeschichte der deutschen Literatur (IASL)* 36:1, pp. 159–172, here p. 167. Translation by the author.

42 Ibid., p. 172. Translation by the author.

43 Cf. Foucault, Michel (1975): *Surveiller et punir. Naissance de la prison*, Paris: Gallimard.

44 Cf. online: <https://grk2945.blogs.ruhr-uni-bochum.de> (last access: 13.11.2025). Translation by the author.

45 Haraway, Donna (1988): »Situated Knowledges. The Science Question in Feminism and the Privilege of Partial Perspective«, in: *Feminist Studies* 14:3, pp. 575–599.

46 Ibid., p. 575.

47 Ibid., p. 581.

48 Ibid.

›objectivity‹, based on a ›very strong social constructionist argument for all forms of knowledge claims‹,⁴⁹ offers a way out but is itself merely a variant of this ›god trick‹: ›Relativism is a way of being nowhere while claiming to be everywhere equally. [...] Relativism is the perfect mirror twin of totalization in the ideologies of objectivity‹.⁵⁰ Even in epistemological debates this has resulted in not only marking one's own situatedness within processes of recognition and knowledge but also in understanding it as a possible indicator of the validity of one's own perspective⁵¹—even if, as Florian Sprenger impressively demonstrates in his recent ›Genealogy of Situatedness‹,⁵² the positive determination of this situatedness does not and cannot succeed but itself produces fundamental distortions.

Against this background now, a proposal by Albrecht Koschorke, developed in his narratological reflections on ›Truth and Invention‹,⁵³ is of particular interest. There Koschorke at first distinguishes ›object reference‹, ›inference‹, and ›social reference‹ as ›three referential dimensions of cultural sign systems‹⁵⁴ which, at a second glance, can then be read as partial aspects of a narratologically conceived theory of truth and offer a possible way out of previous oppositions between correspondence, coherence, and consensus theories of truth. While social reference points out to how statements are ›embedded in communicative events and are attuned to the cognitive conditions of their human users‹,⁵⁵ so that social assent or assentability is foregrounded here, object reference marks the way in which, to which, and how one refers to extra-linguistic phenomena; in this context, the formulation of ›referring‹ to extra-linguistic realities, events, or phenomena does precisely not aim at any (im)possible ›correspondence‹ with them but seeks to uncover the mode of this reference: for instance, as an eyewitness and based on experience, but also on observation and experiment, I can refer to ›something‹, without any possibility and necessity to pass off this reference as an image or representation of this ›something‹; rather, it is a matter of marking the respective mode—that is the ›how‹—of reference and of specifying its relevance for the ›what‹. ›Both dimensions are necessary for the production of knowledge but cannot be reduced to or subsumed under one another‹.⁵⁶ Finally by inference Koschorke takes up the structuralist insight that the meaning of signs arises from their relation to one another—from their reference not to states

49 Ibid., p. 576.

50 Ibid., p. 584.

51 Cf. Sprenger, Florian (2024): ›Situiertheit‹, in: Ulrich Bröckling/Susanne Krasmann/Thomas Lemke (eds.): *Glossar der Gegenwart 2.0*, Berlin: Suhrkamp, pp. 346–358.

52 Sprenger, Florian (2025): *Ich-Sagen. Eine Genealogie der Situiertheit*, Berlin: August.

53 Koschorke, Albrecht (2017): *Wahrheit und Erfindung. Grundzüge einer Allgemeinen Erzähltheorie*, Frankfurt a.M.: Fischer.

54 Ibid., p. 343. Translation by the author.

55 Ibid. Translation by the author.

56 Ibid. Translation by the author.

of world affairs or ego states but to other, preceding or succeeding, signs⁵⁷—thus marking their mutual relations and (linguistic-)logical correlations.

Backed by this threefold reference, it becomes possible to do justice not only to the different aspects of knowledge—declarative and procedural knowledge, theoretical and practical knowledge, explicit and implicit knowledge—by their respective modalities, without giving a (misunderstood) priority to propositional knowledge. Rather, these dimensions of knowledge can also be understood as different modes of referring to something, each of which (must) satisfy different inferential logics of consistency and coherence—eyewitness accounts cannot be refuted by experimental measurements; theoretical insight does not invalidate practical experience—and (may) also be met with different forms of social assent. In my opinion, what is productive here is that ›object reference‹ is (again) recognized at all as a relevant dimension of statements, so that not only social assentability (social reference) and logical or semantic correlation (inference, especially consistency) are considered criteria for evaluating statements; to have it pointedly: it must be possible for one's own understandings of reality to fail in relation to the ›world‹, even if one has been subjectively convinced and has consensually agreed with others. Social reference and inference do not replace the aspect of referring to ›something‹, as some conceptions sometimes suggest; only the interweaving of all three dimensions allows for a specification of the respective degrees of certainty and may also help to moderate the pendular movements between ›objectivism‹ or ›realism‹ on the one hand and responding ›relativism‹ on the other.

While there is wide agreement on the significance of (linguistic-)logical inference and social reference for the understanding of knowledge, it remains at least open, if not contested, how the modally dimensioned object or factual reference can be conceptualized more precisely. Both ›representation‹ and ›construction‹ seem to carry associations that can be misleading; above all, it is the always assumed duality of ›world‹ and ›self‹ or ›object‹ and ›subject‹ that proves to be problematic and provokes oppositional figures of ›projection‹ and ›introjection‹. Whereas, realistically, the world is conceived as an ›external counterpart‹, in a constructivist sense the ›internal‹ and (multi-)perspectival construction of this world is emphasized; in both cases, however, the question of the adequacy of world apprehension comes to the fore. Even the (often cognitive-psychological) intertwining of both aspects—we represent ›world‹ internally and must then ›externally‹, i.e., symbolically, represent these ›internal representations‹⁵⁸—only reinforces this oppositional configuration. If, however, one focuses on ›involvement‹ (›Involviertsein‹) in each case,⁵⁹ as Agnes

57 Ibid., p. 332. Translation by the author.

58 Cf. Renn, Jürgen (2020): *The Evolution of Knowledge. Rethinking Science for the Anthropocene*, Princeton: Princeton University Press, pp. 60ff.

59 Heller, Agnes (1981): *Theorie der Gefühle*, Hamburg: VSA Verlag, pp.19-32.

Heller suggested decades ago (albeit with regard to emotions), then ›reality‹ arises first of all from the relational engagements of humans in the world. »Instead of saying what reality is like«, as Hans Jörg Sandkühler formulates in his ›Critique of Representation‹, »we should say of reality that it *comes into being* from open intentional (directed), engaged acts by knowing subjects«. ⁶⁰ Sandkühler continues: »By cognition, phenomenal reality is constituted insofar as it confers meaning to ›in itself‹ amodal reality by way of signs and symbols«⁶¹—which Sandkühler then terms »(re-)presentation«, meaning »to represent something as something«. ⁶² This way, representation as a »pictorial reproduction«⁶³ is rejected, without, conversely, giving too much space to the »burdens of subjectivity and relativity«⁶⁴ of the constructivist principle. Rather, within the framework of the concept of the ›embodied mind‹—developed, among others, by Francisco J. Varela in the wake of phenomenological traditions⁶⁵—it is now widely emphasized⁶⁶ that ›reality‹ arises in and from concrete, (inter-)corporeal and socially situated engagement with and within the world. ⁶⁷ What is thus gained is not only a perspective that leaves behind the duality of ›inside‹ and ›outside‹; rather, object reference—especially in its fundamental categoriality, i.e. the question of ›how‹ I refer to ›what‹—becomes understandable as the result of (always also) practical engagement with this ›what‹. For the concept of knowledge, precisely this doubling seems to be of great significance, so that ›knowledge‹ is always also reflexively constituted—as knowledge of the ›how‹.

Now these considerations, which can only be sketched here, allow for the formulation of an initial concept of knowledge:⁶⁸ knowledge in each case can now be understood as those conceptions and understandings that, at a given time, culture, and social community, (a) are regarded as being true (in the sense of a proven object or

60 Sandkühler: Kritik der Repräsentation, pp. 23f. Translation by the author.

61 Ibid., pp. 56ff. Translation by the author.

62 Ibid., p. 62. Translation by the author.

63 Ibid. Translation by the author.

64 Ibid., p. 24. Translation by the author.

65 Varela, Francisco J. et al. (2018): The Embodied Mind. Cognitive Science and Human Experience, Cambridge, MA: MIT Press.

66 Cf. Fingerhut, Joerg et al. (2017): Philosophie der Verkörperung. Grundlagentexte zu einer aktuellen Debatte, Berlin: Suhrkamp; Etzelmüller, Gregor et al. (eds.) (2017): Verkörperung. Eine neue interdisziplinäre Anthropologie, Berlin/Boston: de Gruyter.

67 See, with regard to ›knowledge‹: Fuchs, Thomas (2017): »Verkörperter Wissen – verkörperter Gedächtnis«, in: Gregor Etzelmüller/id./Christian Tewes (eds.): Verkörperung. Eine neue interdisziplinäre Anthropologie, Berlin/Boston: de Gruyter, pp. 57–78.

68 Cf. Ricken, Norbert et al. (2023): »Transformationen des Bildungswissens. Eine wissenstheoretische und -geschichtliche Perspektive auf digitale Wissenskulturen«, in: Sandra Aßmann/Norbert Ricken (eds.): Bildung und Digitalität. Analysen – Diskurse – Perspektiven, Wiesbaden: Springer VS, pp. 313–347, here pp. 319–326.

factual reference), (b) are socially shared (social reference), (c) can be plausibly justified and integrated into existing bodies of knowledge (inference), and thus (d) can be discussed or reflected upon in terms of their epistemic status (e.g. methodically or methodologically), and (e) are action-orienting or even action-guiding. From a historical point of view, this referential understanding of knowledge includes the fact that earlier—however also contemporary—cultures may maintain conceptions of ›something‹ as knowledge which they can justify and utilize within their own knowledge orders but which, in other—later, but sometimes also earlier—cultures must be regarded as unjustified or not well founded. Furthermore, the embedding of all knowledge in (encompassing) knowledge orders and architectures also makes clear that the ways of producing, storing, using, and socially sharing knowledge cannot be separated from each existing knowledge, and points out to concrete knowledge practices (and their materialities, locations, and infrastructures)—more precisely: the production and reception, storage or preservation as well as distribution and circulation—on the one hand and to encompassing knowledge cultures on the other (see chapter 3). At the same time, what is marked in each culture, time, and region as non-knowledge or even as ›precarious knowledge‹⁶⁹ is also an elementary component of these knowledge orders—and this is less (though also) because non-knowledge marks the field of which actors (as yet) have no knowledge (in the sense of a clearly delimited domain) but rather as a structural moment of every (however positive) knowledge, since every knowledge—at least in the modern understanding—is considered revisable due to its perspectivity and categoriality and thus always contains an element of non-knowledge (e.g. in the form of different knowledge).

3.

Against the background of a referential conception of knowledge it is understandable that also practices of knowledge have been attracting growing attention for a couple of years now. In this context, practices refer to routinized ways of doing things, thereby not only transcending the dual logic of action and structure and moving the interplay of embodied agents, material objects, and structuring frameworks such as places and infrastructures into focus.⁷⁰ With regard to knowledge, the focus is thus at first on the ways in which knowledge is produced and received, stored, and

69 Mulsow, Martin (2012): *Prekäres Wissen. Eine andere Ideengeschichte der Frühen Neuzeit*, Berlin: Suhrkamp.

70 Cf. Schatzki, Theodore R. (2002): *The Site of the Social. A Philosophical Account of the Constitution of Social Life and Change*, The University Park: The Pennsylvania University Press; Schäfer, Hilmar (ed.) (2016): *Praxistheorie. Ein soziologisches Forschungsprogramm*, Bielefeld: transcript; Alkemeyer, Thomas (2026): »The (Non-)Knowledge of Practice. Praxeological Reflections on the Concerted Formation of Knowledge in Practice«, in this volume.

circulated; even this dimensioning demonstrates that knowledge cannot at all be limited to ›propositional knowledge‹ and its discussion or verification but that even its validity depends on a much broader bundle of practices. If furthermore the scope is expanded, practices of observing, measuring, and experimenting, of publishing and discussing, as well as practices of reading, annotating, excerpting, and note-taking can be distinguished. Finally the various practices of collecting and ordering as well as the practices of transmission and tradition, teaching, and examination are of particular significance.⁷¹

Meanwhile the sheer volume of praxeological studies has become almost unmanageable:⁷² Early on, Bruno Latour and Steve Woolgar⁷³ as well as particularly Karin Knorr Cetina⁷⁴ independently addressed issues of natural-scientific knowledge production and, in their ethnographic studies of natural-scientific laboratory work, highlighted the fabricated nature of knowledge. What could initially be read as a critique of the traditional self-understanding of science—Latour and Woolgar wrote: »scientists [...] also systematically conceal the nature of activity which typically gives rise to their research reports«⁷⁵—has increasingly transformed into a new focus »on the architecture—and the diversity—of the manufacturing systems from which truth effects arise [...], on the empirical strategies of these systems, on their configuration of objects, technologies, and epistemic subjects, on the role of the laboratory etc.«.⁷⁶ The insight into the constitutive significance of scientifically established practices has changed the perspective on knowledge and enabled a critique of representation without at the same time lapsing into constructivist relativism. Rather, (natural-scientific) knowledge production becomes understandable as a way of generating knowledge in both socially and institutionally and materially structured ways; the constructedness of knowledge does precisely not correspond to subjective arbitrariness. Knowledge arises from knowledge-cultural contexts and owes its validity indeed to these contexts.⁷⁷

71 Cf. Füßel, Marian (2021): *Wissen. Konzepte – Praktiken – Prozesse*, Frankfurt a.M.: Campus.

72 See Rheinberger, Hans-Jörg (2017): »Historische Epistemologie«, in: Marianne Sommer/Staffan Müller-Wille/Carsten Reinhardt (eds.): *Handbuch Wissenschaftsgeschichte*, Stuttgart: J.B. Metzler, pp. 32–45 for an introduction.

73 Cf. Latour, Bruno/Woolgar, Steve (eds.) (1979): *Laboratory Life. The Social Construction of Scientific Facts*, London: Sage.

74 Cf. Knorr Cetina, Karin (1980): »Die Fabrikation von Wissen. Versuch zu einem gesellschaftlich relativierten Wissensbegriff«, in: *Kölner Zeitschrift für Soziologie und Sozialpsychologie (KZfSS)* (Sonderheft 22: Wissenssoziologie, Edited by Nico Stehr und Volker Meja), pp. 226–245.

75 Latour/Woolgar: *Laboratory Life*, p. 28.

76 Knorr Cetina, Karin (1999): *Epistemic Cultures. How the Sciences Make Knowledge*, Cambridge, MA: Harvard University Press, p. 12.

77 See Sandkühler: *Wissenskulturen* for a more detailed discussion.

Analogous to these thus far natural science-oriented studies, Steffen Martus and Carlos Spoerhase have recently presented a ›praxeology of the humanities‹,⁷⁸ by which they seek to reconstruct the practices of scholarly work in the humanities—often with reference to the works by Peter Szondi and Friedrich Sengle—and drew a long line from ›preparatory work‹⁷⁹ via ›coordinating reading practices‹⁸⁰ and ›problematizing‹⁸¹ to ›theorizing and publishing‹.⁸² Unlike the studies on scientific knowledge cultures, however, this praxeology is less concerned with highlighting the ›constructedness‹ of knowledge in the humanities and with countering objectivity claims—which, after all, have never been asserted in the humanities—rather, the authors intend to but break up the image of ›intellectual work‹ as a ›solitary desk activity‹.⁸³ Also within sociology the question of specifically sociological knowledge practices and cultures is now being addressed.⁸⁴

In terms of knowledge, however, the above sketched shift towards the question of the constitution and internal logic of knowledge cultures is eminently stimulating. ›Knowledge cultures‹ are initially defined as ›those amalgams of arrangements and mechanisms—bonded through affinity, necessity, and historical coincidence—which, in a given field, make up *how we know what we know*. Epistemic cultures are cultures that create and warrant knowledge‹.⁸⁵ Knowledge cultures do thus not only determine the genesis of knowledge but also its validity, by regulating ›questions posed, epistemic aims, possible solutions, claims to validity and standards of justification, as well as culture-specific practices and techniques and, in this context, recognized norms, values, and rules‹.⁸⁶ As specific cultures, however, they only become apparent by their difference, by their shifts in the course of historical change—and are only rarely as visibly staged as in Umberto Eco's novel ›The Name of the Rose‹,⁸⁷ where the monastic culture of merely passed on religious knowledge clashes with the modern ideal of hypothesis-driven and progressive in-

78 Martus, Steffen/Spoerhase, Carlos (2023): *Geistesarbeit. Eine Praxeologie der Geisteswissenschaften*, Berlin: Suhrkamp.

79 Ibid., p. 71. Translation by the author.

80 Ibid., p. 292. Translation by the author.

81 Ibid., p. 264. Translation by the author.

82 Ibid., p. 186. Translation by the author.

83 Ibid., p. 11. Translation by the author.

84 Cf. Schmidt, Robert (2016): ›Theoretisieren. Fragen und Überlegungen zu einem konzeptionellen und empirischen Desiderat der Soziologie der Praktiken‹, in: Hilmar Schäfer (ed.): *Praxistheorie. Ein soziologisches Forschungsprogramm*, Bielefeld: transcript, pp. 245–263; Keller, Reiner/Poferl, Angelika (eds.) (2018): *Wissenskulturen der Soziologie*, Weinheim/Basel: Beltz Juventa.

85 Knorr Cetina: *Epistemic Cultures*, p. 1.

86 Sandkühler: *Wissenskulturen*, p. 60. Translation by the author.

87 Eco, Umberto (1982): *Der Name der Rose*, München: Hanser.

quiry—and ultimately collapses.⁸⁸ Even though the sharp opposition of paradigms of scientific forms of knowledge, as early on advocated by Thomas Kuhn as the »structure of scientific revolutions«,⁸⁹ was sharply criticized and has meanwhile been modified,⁹⁰ since the change of scientific knowledge happens rather slowly and, through engagement with previous knowledge, often only step by step and peaceably—that is, rather evolutionarily instead of revolutionarily⁹¹—it is nevertheless possible, albeit only in retrospect, to distinguish knowledge cultures which differ from each other because of their respective internal logics. In their book ›Objectivity‹,⁹² Lorraine Daston and Peter Galison have impressively reconstructed such a transformation within the sciences—at first by the example of scientific atlases, but then, among others, with regard to historiography⁹³—and doing so, not coincidentally they deconstructed ›objectivity‹ as a supposedly universal epistemic ideal. One may certainly question the empirical basis of this study when it comes to the possibility to reconstruct a specific manifestation of an entire knowledge culture based on the example of scientific atlases and their transformation under the keyword of ›objectivity‹; one may also argue over the chronological classifications and localizations of this epistemic ideal between 1850 and 1950⁹⁴—but the central distinctions and figures of scientific cognition can hardly be fundamentally rejected. Precisely contrasting ›objectivity‹ to the earlier orientation towards ›impartiality‹ and ›disinterestedness‹ which, as epistemic virtues, demanded work on oneself—following the maxim ›sine ira et studio‹⁹⁵—as well as contrasting to the later figure of ›trained judgement‹ or ›expertise‹, demonstrate eminently vividly that ›objectivity‹ was only a specific, spatially and temporally bound guiding ideal of scientific cognition, which is due to its—albeit illusory—proximity to the object and its differentiated representation.

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- 88 Cf. Eco, Umberto (1986): *Nachschrift zum »Namen der Rose«*, München: Deutscher Taschenbuch-Verlag.
- 89 Kuhn, Thomas S. (1970): *The Structure of Scientific Revolutions*, Chicago: University of Chicago Press.
- 90 Cf. Hoyningen-Huene, Paul (1989): *Die Wissenschaftsphilosophie Thomas S. Kuhns. Rekonstruktion und Grundlagenprobleme*, Wiesbaden: Springer.
- 91 Cf. Renn: *The Evolution of Knowledge*.
- 92 Daston, Lorraine/Galison, Peter (2007): *Objectivity*, Brooklyn, NY: Zone.
- 93 Daston, Lorraine (2019): ›Objektivität und Unparteilichkeit. Epistemische Tugenden in den Geisteswissenschaften‹, in: Andreas Gelhard/Ruben Hackler/Sandro Zanetti (eds.): *Epistemische Tugenden. Zur Geschichte und Gegenwart eines Konzepts*, Tübingen: Mohr Siebeck, pp. 201–216.
- 94 Cf. Daston, Lorraine/Galison, Peter (2008): ›Objectivity and its Critics‹, in: *Victorian Studies* 50:4, pp. 666–677; Dear, Peter/Hacking, Ian/Jones, Matthew L./Daston, Lorraine/Galison, Peter (2012): ›Objectivity in Historical Perspective‹, in: *Metascience* 21:1, pp. 11–39.
- 95 Daston: *Objektivität und Unparteilichkeit*, p. 203.

Within the framework of knowledge-cultural research, finally two angles of inquiry would be of interest: On the one hand, it would be worthwhile, in addition to the procedures of knowledge production and legitimation, to also trace the history of the procedures by which respective ›untruths‹ are identified or constructed and delimited from legitimate knowledge. Here, too, a change in practices would likely become visible, which may tell more about the logic of each respective knowledge culture; only exemplarily one may refer to practices of distinguishing between orthodoxy and heresy,⁹⁶ between knowledge and ideology,⁹⁷ and, more recently, between so-called facts and ›post-factual truths‹ or ›fakes‹,⁹⁸ whose differences can only be explained in the context of different knowledge cultures. On the other hand, however, also within the framework of a history of ›Bildungswissen‹ (engl.: ›educational knowledge‹) different practices of passing on—and thereby also regulating—knowledge to the next generation⁹⁹ could be reconstructed. Here, ›Bildungswissen‹ (engl.: ›educational knowledge‹) refers not only to the knowledge that elders seek to bindingly pass on to the younger generation but, as ›knowledge of knowledge‹,¹⁰⁰ also to all ways of dealing with knowledge—from the acquisition of knowledge to its organization and classification as far as to the handling of non-knowledge.

4.

Given the current, digitally induced transformations permeating all areas of knowledge production and circulation, the here sketched systematic view on knowledge may appear almost traditional. Yet, perhaps precisely this understanding may provide perspectives which go beyond some, sometimes indeed fashionable, assessments, since the concept of knowledge is not simply adapted to changing technologies. For, interestingly, some (also pedagogical) debates on the use of digital technologies for working with and on knowledge often do without addressing the ques-

96 Cf. Pieper, Irene/Schimmelpfennig, Michael/Soosten, Joachim von (eds.) (2003): *Häresien. Religionshermeneutische Studien zur Konstruktion von Norm und Abweichung*, München: Fink.

97 E.g. Jaeggi, Rahel (2009): ›Was ist Ideologiekritik?‹, in: id./Tilo Wesche (eds.): *Was ist Kritik? Philosophische Positionen*, Frankfurt a.M.: Suhrkamp, pp. 266–298.

98 Cf. Klimczak, Peter/Zoglauer, Thomas (eds.) (2021): *Wahrheit und Fake im postfaktisch-digitalen Zeitalter. Distinktionen in den Geistes- und IT-Wissenschaften*, Wiesbaden: Springer Vieweg.

99 Cf. Detel, Wolfgang (2003): ›Wissenskulturen und epistemische Praktiken‹, in: Johannes Fried/Thomas Kailer (eds.): *Wissenskulturen. Beiträge zu einem forschungsstrategischen Konzept*, Berlin: Akademie, pp. 119–132, here p. 120.

100 Ricken et al.: *Transformationen des Bildungswissens*, p. 324. Translation by the author.

tion of how, as a result, knowledge itself changes its status, logic, and function, or whether—and to what extent—it is still appropriate to speak of knowledge at all. Often enough, calls not to close one's mind to these new technologies but rather to use them—albeit critically—confront rather traditionalist assessments which then fear the possible loss of established orientations and routines.

If at first one asks about the transformation of knowledge in *virtual (life-)worlds*, certainly several—albeit only roughly outlined—phases can be distinguished.¹⁰¹ Accordingly, initially digital technologies in the (here primarily considered) human sciences could be understood as improved substitutes for previous analog knowledge practices; for example, word processing programs were treated as improved typewriters, search engines increasingly replaced laborious research in libraries, and digital encyclopedias such as Wikipedia, despite ostentatious disparagement, were increasingly utilized.¹⁰² Moreover, digital communication tools—from e-mail to Zoom—revolutionized all forms of communication and interaction, making traditional forms almost disappear. Even the exponentially growing possibilities of digital data processing, the thus possible (now automated) handling of up to then unmanageable amounts of data, the management of complexity and differentiation, however also new ways of preserving, circulating, and distributing knowledge or texts (as far as to the completely reversed publishing policies of an ›open access‹ culture) have made clear that digital technologies in knowledge work cannot at all be understood as the ›digitization‹ and optimization of previous practices but have themselves by and by fundamentally transformed knowledge work. Once again, just to give some examples: vast and otherwise unmanageable amounts of data and text can now be made accessible and usable in the shortest span of time, full-text search allows for accessing individual texts and entire works without laborious full-text reading, and virtually all information is available on the World Wide Web at any time, accessible through any query. However, changed ways of dealing with these technologies also depend on (not always already) changed conceptions, that is they depend on what one believes to be dealing with (in the respective digitally generated mode of appearance).¹⁰³ In this context, and in order to conceptually grasp the thus connected qualitatively altered internal logic of digital media (also in knowledge

101 See the overview in Baecker, Dirk (2017): »Wie verändert die Digitalisierung unser Denken und unseren Umgang mit der Welt?«, in: Rainer Gläß/Bernd Leukert (eds.): *Handel 4.0. Die Digitalisierung des Handels – Strategien, Technologien, Transformation*, Berlin/Heidelberg: Springer Gabler, pp. 3–24.

102 Cf. Pscheida, Daniela (2010): *Das Wikipedia-Universum. Wie das Internet unsere Wissenskultur verändert*, Bielefeld: transcript.

103 See for the early distinction between conception and technology Esposito, Elena (1998): »Virtualität und Fiktion«, in: Sybille Krämer (ed.): *Medien, Computer, Realität. Wirklichkeitsvorstellungen und Neue Medien*, Frankfurt a.M.: Suhrkamp, pp. 269–296.

work), particularly Stefan Rieger proposed¹⁰⁴ using the concept of the ›virtual« or of ›virtuality«, to mark the (since long common) ways of dealing with digital technologies (and the modes of appearance and conception implied therein) and to distinguish them from ›digitization«. For, with the use of generative technologies based on large language models at the latest—such as ChatGPT, Claude, Gemini, or Mistral Large—it has become obvious how profoundly these technologies have qualitatively transformed what we call ›knowledge« in all its dimensions.¹⁰⁵ Apart from the technologically induced problem of structurally embedded ›epistemological conformism«,¹⁰⁶ also the question of whether and to what extent machine-generated knowledge can be considered knowledge at all—in the sense of both legitimate and verifiable knowledge¹⁰⁷—may also mark this radical transformation.

Now, if one follows these conceptual changes of course, in these debates on the (in)appropriate use of these technologies¹⁰⁸ frequently the necessity is pointed out to that dealing with automatically generated knowledge requires critical reflection. At the same time, however, it often remains unclear how this can be achieved and also learned—precisely if reflexivity also arises from contradictions and also relates to the difference between propositional content and categorial structures; both, however, are largely smoothed out in the smart formulations of a generative language model. At the same time, however, this aspect of (critical) reflexivity as a (necessary) aspect of knowledge can also be specified by the vocabulary of the virtual. This, however, requires that the ›virtual« is not merely be reserved as a designation for virtual objects in the sense of ›virtual reality« but must instead be connected to the long and rich, albeit confusing, conceptual tradition of ›virtuality«¹⁰⁹ and, beyond often habitual dualisms—such as factuality and fictionality, reality and possibility, reality and

104 Cf. Kasprowicz, Dawid/Rieger, Stefan (2020): »Einleitung«, in: id. (eds.): *Handbuch Virtualität*, Wiesbaden: Springer VS, pp. 1–22.

105 Cf. Fiedler, Mariana (2022): »Wissenstheorie. Michael Polanyi und Künstliche Intelligenz (KI)«, in: Katharina Block et al. (eds.): *10 Minuten Soziologie. Digitalisierung*, Bielefeld: transcript, pp. 17–30; Bajohr, Hannes/Hiller, Moritz (eds.) (2024): *Das Subjekt des Schreibens. Über Große Sprachmodelle*, München: edition text + kritik.

106 Richter, Christoph/Allert, Heidrun (2025): »Generative Sprachmodelle als Herausforderung für erziehungswissenschaftliche Vorstellungen von Lernen und Sozialisation?«, in: *Erziehungswissenschaft* 36:1, pp. 19–25, here p. 21. Translation by the author.

107 Cf. Susnjak, Teo (2022): »ChatGPT. The End of Online Exam Integrity?«. Online: <http://arxiv.org/pdf/2212.09292v1> (last access: 13.11.2025).

108 See for an example de Witt, Claudia/Gloerfeld, Christina/Wrede, Silke Elisabeth (eds.) (2023): *Künstliche Intelligenz in der Bildung*, Wiesbaden: Springer VS.

109 Cf. Knebel, Sven K./Grötter, Ralf (2001): »Virtualität«, in: Joachim Ritter/Karlfried Gründer/Gottfried Gabriel (eds.): *Historisches Wörterbuch der Philosophie*, Darmstadt: Wissenschaftliche Buchgesellschaft, pp. 1062–1068; Weber, Julia (2024): *Dynameis. Bausteine einer Geschichte der Virtualität*, Berlin/Boston: de Gruyter.

simulation, being and appearance, or clarity and ambiguity¹¹⁰—must be interpreted as a specific and processual difference, namely as ›virtualization‹.¹¹¹ Accordingly, following the work of Gilles Deleuze, it was above all Pierre Lévy who—as early as in 1995—interpreted ›virtuality‹ as ›virtualization‹ and thus marked a specific form of problematization:

»But what is virtualization? No longer the virtual as a way of being but virtualization as a dynamic. Virtualization can be defined as the movement of actualization in reverse. It consists in the transition from the actual to the virtual, an exponentiation of the entity under consideration. Virtualization is not a derealization (the transformation of a reality into a collection of possibles) but a change of identity, a displacement of the center of ontological gravity of the object considered. Rather than being defined principally through its actuality (a solution), the entity now finds its essential consistency within a problematic field. The virtualization of a given entity consists in determining the general question to which it responds, in mutating the entity in the direction of this question and redefining the initial actuality as the response to a specific question«.¹¹²

If one applies this operation—embedding ›something‹ back into its problem constellation—and thus, in the really classically hermeneutic sense, asking what, after all, the question is to which this ›something‹ is supposed to be the answer—then it becomes possible to reasonably speak both of knowledge *as a (form of) virtualization* and also of virtualization as a way of generating knowledge.¹¹³ Yet, often enough it is precisely this moment of relationing (and implicit reflection) what is made disappear by the machine production of virtual knowledge—and which must thus explicitly be made visible and conceivable again. Reflexivity is strictly bound to the contradictoriness of perspectives, to working out and processing the respective categoriality of statements, and to the thus resulting relationing of categories to one another.

Both aspects—*knowledge in virtual (life-)worlds* and *knowledge as virtualization*—however, provoke the question of the *virtuality of knowledge* itself. Perhaps it

110 Cf. Rieger, Stefan/Schäfer, Armin/Tuschling, Anna (2021): »Virtuelle Lebenswelten: Zur Einführung«, in: id. (eds.): *Virtuelle Lebenswelten. Körper – Räume – Affekte*, Berlin/Boston: de Gruyter, pp. 1–12, here 3–6.

111 See for a more detailed discussion Ricken, Norbert/Röhr, Henning (2026): »Virtualität als Differenz. Erkundungen«, in: Armin Schäfer/Stefan Rieger (eds.): *Die unruhige Differenz der Virtualität*. Bielefeld: transcript (in press).

112 Lévy, Pierre (1998): *Becoming Virtual. Reality in the Digital Age*, New York/London: Plenum Trade, p. 26.

113 See also, with regard to ›learning‹, Ricken, Norbert/Flügel, Kristin/Röhr, Henning (2026): »Lernen«, in: Patrizia Breil/Florian Sprenger (eds.): *Virtuelle Universität. Geistes- und gesellschaftswissenschaftliche Zugänge*, Bielefeld: transcript, pp. 73–85.

is precisely a classical understanding of virtuality, different from mere ›potentiality‹—namely: »a virtual X is ... not an X, [but] has the efficiency of an X«¹¹⁴—that attempts to describe the internal logic of knowledge and allows us to think beyond the dichotomy of representation and construction. From this vantage point, if one looks back at the distinctions and inescapable problem constellations presented—particularly regarding the concept of truth—as well as to the recent praxeological shifts, it becomes clear that and why the dispute on ›knowledge‹ must be started again and again: as an ongoing attempt to reflexively bring one's own relation to and understanding of the world reflexively into view and to test its viability.

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114 Peirce, Charles Sanders (1920): »Virtual«, in: James Mark Baldwin (ed.): *Dictionary of Philosophy and Psychology*, New York: Macmillan, pp. 763–764, here p. 763.

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From Memo to AI

On Observing Infrastructures

Matthias Bickenbach

»On the one hand, we had the impression that the humanities and the institutions associated with them tend to overlook their own practice.«¹

The fact that knowledge does not arise out of nothing but presupposes infrastructures is a perspective that becomes productive precisely where this condition of possibility is lost sight of. Even in the Aristotelian distinction between *doxa* and *episteme*, mere opinion and knowledge, it is easy to overlook the fact that knowledge presupposes the comparison of doctrinal opinions of expert authorities. In *Nicomachean Ethics* Aristotle differentiates *episteme* as specific theoretical knowledge and distinguishes it, for example, from *techne* as a practical skill,² while his *Analytics* prioritises logical conclusions and syllogisms. Nevertheless, knowledge is always based on prior knowledge, as is inconspicuously stated at the beginning of *Second Analytics*.³ Aristotle himself compiled collections of the doctrines of earlier philosophers and scientific collections on nature or important political constitutions of Greek cities

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- 1 I would like to thank Jessika Hammers for her help and work on the translation from German. For the sake of readability, all quotations are translated. The original text is given in the footnotes: »Zum einen hatten wir den Eindruck, dass die Geisteswissenschaften und die mit ihnen verbundenen Institutionen dazu neigen, die eigene Praxis zu übersehen.«; Martus, Steffen/Spoerhase, Carlos (2024): »Praxeologie der Geisteswissenschaften – revisited«, in: IASL 49:2, pp. 323–340, here p. 326. Online: <https://doi.org/10.1515/iasl-2024-0016>.
 - 2 Aristotle: *Nicomachean Ethics*, 1139b. *Episteme* and *techne* are distinguished from *nous* (intuitive understanding), *sophia* (wisdom) and *phronesis* (moral, practical understanding); Cf. Parry, Richard (2020): »Episteme and Techne«, in: Edward N. Zalta (ed.): *Stanford Encyclopedia of Philosophy*. Online: <https://plato.stanford.edu/entries/episteme-techne/#Aris> (last access: 15.04.2025).
 - 3 Aristoteles: *Zweite Analytik*. Ch. 1, in: Wolfram Detel (ed.): *Aristoteles: Zweite Analytik*. Hamburg 2011, p. 1.

and the performance dates of tragedies.⁴ This prerequisite of an infrastructure of knowledge, which also plays a fundamental role for *topic*, is pushed so much into the background by the focus on syllogisms and deduction in *Second Analytic* that it must be emphasized separately.

For Aristotle, knowledge and science are on the one hand specific mental states of a rational being, but on the other hand also a set of scientific assertions and theories we have established according to appropriate criteria and methods.⁵

Even in Aristotle's time, knowledge of already established principles therefore presupposes written fixation as the infrastructure of knowledge. Aristotle thus turns away from the priority of oral instruction and introduces a new infrastructure of knowledge. In other words: a library is needed.⁶ The reference to his own library then became almost topical; early modern chronicles and encyclopedias from *Schedelsche Weltchronik* to *Zedler's Universallexikon* continually refer to it. »Let us go to the home of the bookworm«, Plato is believed to have once said.⁷ However, the library itself presupposes the production and dissemination, collection and maintenance of writings. It requires order and classification according to genre as well as concrete practices in dealing with texts, infrastructures which book culture has developed further since then. In today's zones of contact between book printing and digital texts it is easy to study how these infrastructures must be replaced by new ones in order to ensure the transposition of functionality and practices in media change, such as accessibility and sustainability.

Sciences therefore not only need (heated) spaces in which they can take place as well as devices, but they are also based on a variety of social, medial and praxeological prerequisites that can be understood as infrastructures of knowledge. The perspective is very connectable, think of the work of Bruno Latour and Actor-Network-Theory or of praxeology as an approach to social practices. Last but not least, Michel Foucault's concept of discourse and dispositif should also be considered. According to the understanding developed by Foucault, the *episteme* is always already inherent in the discourse. As we know, he is concerned with the

4 Detel, Wolfram: »Einleitung«, in: Aristoteles: Zweite Analytik, p. XI.

5 Ibid., p. XIV. »Wissen und Wissenschaft sind für Aristoteles im übrigen einerseits spezifische mentale Zustände eines vernünftigen Lebewesens, andererseits aber auch eine Menge von wissenschaftlichen Behauptungen und Theorien, die wir nach angemessenen Kriterien und Methoden etabliert haben«.

6 Wilker, Julia (2002): »Irrwege einer antiken Büchersammlung. Die Bibliothek des Aristoteles«, in: Wolfram Hoepfner (ed.): *Antike Bibliotheken*. Mainz: Philipp von Zabern Verlag, pp. 24–29.

7 Cf. Schwarz, Franz Ferdinand: »Einleitung«, in: Aristoteles: *Politik*. Stuttgart 1989, p. 11–12.

fundamental codes of a culture which govern its language, its patterns of perception, its exchange, its techniques, its values, the hierarchies of its practices, which right from the start determine for each person the empirical orders they will have to deal with and within which they will find themselves.⁸

Foucault thus indicates that infrastructures are not only to be thought of as the material structure of the condition of possibility (such as electricity or gas pipelines) but that immaterial prerequisites for communication, social affairs or knowledge must also be taken into account.⁹ Simon Ganahl gives a broader definition of the term in this sense, following Brian Larkin: »Infrastructures are built networks, systems of objects that enable a continuous flow of things, living beings or signs.«¹⁰ Foucault himself developed the concept of episteme further in this sense by also understanding it as a dispositive. He could

define the episteme as a strategic dispositive that makes it possible to filter out from all possible statements those that can be acceptable within, I am not saying: a scientific theory, but a field of scientificity, and of which one can say: This one is true or false. The episteme is the dispositive that makes it possible to separate not only the true from the false but also the scientifically qualifiable from the non-qualifiable.¹¹

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- 8 »[Die] fundamentalen Codes einer Kultur, die ihre Sprache, ihre Wahrnehmungsschemata, ihren Austausch, ihre Techniken, ihre Werte, die Hierarchien ihrer Praktiken beherrschen, fixieren gleich zu Anfang für jeden Menschen die empirischen Ordnungen, mit denen er zu tun haben und in denen er sich wiederfinden wird.« Foucault, Michel (1974): *Die Ordnung der Dinge*, Frankfurt a.M.: Suhrkamp, p. 22.
 - 9 Cf. Laak, Dirk van (1999): »Der Begriff ›Infrastruktur‹ und was er vor seiner Erfindung besagte«, in: *Archiv für Begriffsgeschichte* 41, pp. 280–299. It was first used in France in 1875 to describe the substructure of railroad constructions, later for the military, then as an economic term, which became more common after 1950.
 - 10 »Infrastrukturen sind gebaute Netzwerke, Systeme von Objekten, die einen kontinuierlichen Fluss von Dingen, Lebewesen oder Zeichen erlauben.«; Ganahl, Simon (2015): »Poetiken der Infrastruktur oder Foucault und Materialität«, in: *Le foucauldien* 1:1. Online: <https://doi.org/10.16995/lefou.6>. Cf. Larkin, Brian (2013): »The Politics and Poetics of Infrastructure«, in: *Annual Review of Anthropology* 42, pp. 327–343.
 - 11 Foucault, Michel (1978): *Dispositive der Macht. Über Sexualität, Wissen und Wahrheit*. Frankfurt a.M.: Suhrkamp, p. 124. He could »die Episteme als strategisches Dispositiv definieren, das es erlaubt, unter allen möglichen Aussagen diejenigen herauszufiltern, die innerhalb, ich sage nicht: einer wissenschaftlichen Theorie, aber eines Feldes von Wissenschaftlichkeit akzeptabel sein können und von denen man wird sagen können: Diese hier ist wahr oder falsch. Die Episteme ist das Dispositiv, das es erlaubt, nicht schon das Wahre vom Falschen, sondern das wissenschaftlich Qualifizierbare vom Nicht-Qualifizierbaren zu scheiden.«

Episteme, however, is thus no longer conceived as the foundation of knowledge but is itself recognized as an infrastructure of knowledge, as it is based on historical traditions, habits and norms.

Nevertheless, both the material and immaterial conditions of knowledge are easily overlooked. However, they are taken for granted. Even the transport, water and electricity networks usually only are made aware of when disruptions and crises remind us how important they are. In 2021, for example, the »gas crisis« in Germany together with the sudden increase in prices (or the condition of the railways, bridges and roads in Germany) has recently brought the importance of infrastructure to the public's attention. The ensuing uncertainty results from the realization of the limitations of our prosperity. Imagine a few days without electricity, without light or Internet, a scenario that immediately evokes catastrophic and almost apocalyptic conditions.

With its 2nd Annual Conference 2024 on *Infrastructures of (Non-)Knowledge*, the CRC 1567 *Virtual Lifeworlds* has set a highly interdisciplinary topic and was able to provide a multitude of concrete insights into the complexity of the interplay of knowledge, technology and infrastructure, whether from a sociological and praxeological or a media-technical perspective of the computer sciences, or from a literary, art or educational historical perspective. From the conversation about the digital text constitution of a medieval codex to the question of virtual archives and the functioning of large language models, the focus on infrastructures encompasses a fascinating range of research. What they have in common is marking and reflecting on the conditions of functioning and their infrastructural prerequisites in material, medial and practical terms as a condition of the possibility of knowledge. Restructuring or deviant practices play a particular role here, by questioning, shifting and reshaping known knowledge.

A small example may illustrate this. As part of the *Vocabulary of the Virtual* exhibition on the CRC's projects a doctoral student (Ann-Carolyn Hartwig) presented a three-dimensional graphic together with a 3D print. Both digitally implement a map of the island from Johann Gottfried Schnabel's novel *Insel Felsenburg* (1731). The fact that this imaginary place is visualized even in the first edition by an inserted map is a special feature of the book that opens up a play between fiction and authenticity. Such real maps of fictitious places have their own literary history which, however, only dates later in history.¹² Stevenson's *Treasure Island* and Tolkien's map of Middle-earth are famous examples. Both novels are the result of the maps that precede them. In the case of *Insel Felsenburg*, the digital 3D modelling of the map does something that is hardly noticeable but visible this way. Only in the three-dimensionality of the island landscape surrounded by mountains with its villages does the central castle

12 Cf. Bushell, Sally (2020): *Reading and mapping fiction. Spatialising the literary text*, Cambridge: Cambridge University Press.

of patriarch Albert Julius rise above everything else. This central position marks the entire symbolic structure of the utopia, as this state is strictly patriarchal. What is broadly explained in terms of content (which sons of Albert preside over which villages and what they produce for the common good) is shown in detail on the map. Yet, it is only in the three-dimensional realization that the centralist system becomes visible. This example shows that even the visualization of infrastructures leads to new insights. Before the contributions in this volume speak for themselves, I would like to take up three examples highlighting the interplay of infrastructure, form and meaning from the perspective of literary and media studies.

1. Waxboard—The infrastructure of memory as non-knowledge

If knowledge presupposes the knowledge of scholars, then this presupposes the existence of locally comprehensive media, in short: writing and the change from oral to literal culture. In addition to the text medium of antiquity, the scroll (*volumen*), notes on wax tablets (*tabulae*), were already common very early on, for example in Socrates' time. The muses and their acoustic whisperings, which were regarded as *inspiration*, and the daimon of Socrates were replaced by material writing media.¹³ The wax tablet with a wooden frame and a surface made of wax, several of which could be bound together in book form, as it were, is characterized as an early Greek writing medium by its potentially infinite storage capacity. The corresponding stylus had a flat and wide end so that the engraved characters of what one wanted to remember (*hypomnemata*) could be erased by heating the wax. In this form of memory with an integrated erasing function, the ancient wax tablet is unique. In terms of media technology, it was not until the magnetic head of the tape recorder in 1935, even before the computer, that this permanent link between erasing and writing became possible. Books, on the other hand, whether in the form of the scroll or later in the form of our books as a codex, are ROM in terms of media technology: read only memory. They preserve written content permanently, while the wax tablet functions as a technically extended working memory: as RAM, i.e. random access memory. The wax tablet as a medium of memory is therefore ideally suited for illustrating this astonishing but invisible and intangible capacity. Plato explicitly uses it as a metaphor for the human memory.

13 Cf. Havelock, Eric A. (2007): *Als die Muse schreiben lernte. Eine Medientheorie*, Berlin: Wagenbach.

Assume, then, for the purpose of our investigation, that there is a waxen tablet in our soul [...]. This tablet shall now be called a gift from the Mother of the Muses, Mnemosyne; on this tablet [...] we imprint what we want to keep in our memory.¹⁴

This image may be considered successful, as it also allows, as Plato explains, that some people with coarser wax remember less accurately, while people with finer wax remember more accurately. Even today's German expression »sich etwas einprägen« (to memorize something, lit.: to imprint) uses this memory metaphor which has remained highly effective throughout the ages alongside the »storage« (»Speicher«), i.e. a room in which something is stored.¹⁵ From now on, memory will be oriented towards the state of the respective media technology in order to linguistically illustrate the performance and, so to speak, the infrastructure of the invisible and intangible ability to remember and have a memory. Memory can thus appear as a (weathered) grave inscription, as a book or library or even as photographic memory after photography was invented. Finally, since the advent of the Internet, it is now described as a network of synapses. However, the fact that these do not know any traces or inscriptions but that the network simply constitutes the current electrochemical readiness to react or not to react, is once again pushed into the background by the metaphor of »pathways« (»Bahnungen«) or even »circuits« (»Schaltkreise«). With their inscription paradigm, the metaphors of memory thus provide a vivid but ultimately false picture. This example of an effective metaphor shows that infrastructures of knowledge may simultaneously be infrastructures of non-knowledge.

2. The infrastructure of the book

There exists a media revolution in media history that is often overlooked. It does not appear in the classical triad of writing, printing and computers. The book tends to be identified with the printing culture. In this way the medium of the book in the form of the codex' has disappeared from view. However, the establishment of our book form in late antiquity must be seen as one of the most important changes in

14 »Nimm also zum Zweck unserer Untersuchung an, in unserer Seele befinde sich eine wächserne Tafel [...]. Diese Tafel soll uns nun ein Geschenk der Mutter der Musen, der Mnemosyne, heißen; auf diese Tafel [...] drücken wir ab, was wir im Gedächtnis behalten wollen.«; Platon: »Theätet (191c)«, in: Platon: Sämtliche Dialoge. Bd. IV. Ed. by Otto Apelt. Bd. 4. Reprint Hamburg 1988, p. 111.

15 According to Harald Weinrich, the entire Western metaphor of memory can be traced back to these two types: Memory and wax tablet. Cf. Weinrich, Harald (1964): »Typen der Gedächtnismetaphorik«, in: Archiv für Begriffsgeschichte 9, pp. 23–26. Cf. Assmann, Aleida (1991): »Zur Metaphorik der Erinnerung«, in: id./Dietrich Harth (ed.): Mnemosyne. Formen und Funktionen der kulturellen Erinnerung, Frankfurt a.M.: Fischer, pp. 13–53.

the infrastructures of knowledge. Yet, it took about three centuries before the codex was able to establish itself, as the culture of the book scroll was too much institutionalised.¹⁶ As a symbolic form, it continued to represent the authority of texts into the high Middle Ages, for example in the *Codex Manesse* (around 1300 to 1340), where we see Walther von der Vogelweide not with a book but with a scroll rising from his hands into the sky. The codex became established for the first time after the turn of the millennium, supported by the growing influence of the Bible. What makes this form of book a media revolution is its layering of sheets, which provides a completely different infrastructure for texts and their practical use. Scrolls already had pages (strung together), but in the codex the *pagina* becomes a structure that can be turned. The first literary mention of the book in this form was made by the Roman poet Martial in his *epigrams* in the 1st century AD.

You who want my books everywhere with you / and as companions on long journeys: / buy those that the parchment presses onto narrow pages. / Put the large ones in their covers. A hand grasps me.¹⁷

The self-advertisement for the »handy« book, as inconspicuous as it may seem, brings up a groundbreaking innovation. While scrolls were laborious to read and had to be removed from their rolls and rolled up with both hands, usually while standing up, the codex is literally handy. It is smaller, easier to transport and stores more text, such as Homer's *Illiad* and *Odyssey* in one volume, as Martial admiringly notes.¹⁸ Above all, you can hold it in one hand. What seems self-evident today is a revolution that has largely been forgotten. The codex liberates the other hand while reading. Therefore, it allows for the possibility to take a pen and write into the book or to copy out of it. In this respect, the tradition of (Bible) commentary and exegesis is based on the book, thus providing the infrastructure of Western scholarly culture.

Martial's praise of the handiness of the codex thus reminds us that the book is a highly technological medium, long before the printing press and even more so in the digital age. Its form also structures the access to the content in a non-linear way.

16 On the enforcement of the codex cf. Mazal, Otto (1999): *Geschichte der Buchkultur*. Bd. 1, Graz: Akademische Druck und Verlagsanstalt, pp. 128–130. On the book scroll culture in Rome cf. Cavallo, Guglielmo (1999): »Vom Volumen zum Kodex: Lesen in der römischen Welt«, in: Roger Chartier/Guglielmo Cavallo (eds.): *Die Welt des Lesens. Von der Schriftrolle zum Bildschirm*, Frankfurt a.M.: Campus, pp. 97–133.

17 »Du, der du meine Bücher überall bei dir / und als Begleiter wünschst auf weiten Wegen: / kauf jene, die das Pergament auf schmale Seiten drängt. / Die großen steck in ihre Hüllen. Mich faßt eine Hand.«; Martial (2013): *Epigramme*. Latin-german. Ed. by Paul Barié and Werner Schindler (Sammlung Tusculum), 3rd, revised edition, Berlin: Akademie Verlag, p. 37.

18 Ibid., p. 1084.

Pliny's *Historia Naturalis*, with its 37 volumes, is the first to introduce a table of contents that allows for the targeted selection of chapters and passages instead of successively reading through, as Pliny announces in the preface. From the perspective outlined here, indexes of terms, page numbers, headers and footers are therefore infrastructures of the book that enable non-linear use and navigation within the text.

This structure of the book results in a remarkable and momentous consequence: the codex sequentializes the fabric of the text independently of possible text-immanent structures such as paragraphs and chapters. It spatializes the text, turning it into a tangible object made up of individual layers that must be leafed through. If the book is a leading medium of our culture, then it is not only the history of the codex, then our cultural history also reveals itself as a culture and a history of turning pages.¹⁹

The book introduces new possibilities of access. The story told by St. Augustine in his *Confessiones* (about 397 AD) is famous. After years of struggling to find the right faith in God, one day he hears a voice: »tolle, lege, tolle lege«, take it and read.²⁰ He opens the Bible he is carrying at a random point and reads the sentence that first catches his eye.²¹ This is Augustine's famous conversion scene. This would simply not have been possible with a scroll. In view of the digital other of the book, be it e-books or Internet texts, the material *bookishness* of the book has been reflected upon since recent years and its quality of difference emphasized.²²

19 »Aus dieser Struktur des Buches ergibt sich eine bemerkenswerte und folgenreiche Konsequenz: Der Kodex sequentialisiert das Gewebe des Texts unabhängig von möglichen text-immanenten Gliederungen wie Absätzen und Kapiteln. Er verräumlicht den Text, macht aus ihm einen aus einzelnen Lagen geschichteten greifbaren Gegenstand, der geblättert werden muss. Wenn das Buch ein Leitmedium unserer Kultur ist, dann ist sie nicht nur die Geschichte des Kodex, dann zeigt sich auch unsere Kulturgeschichte als eine Kultur und eine Geschichte des Blätterns.«; Schulz, Christoph Benjamin (2015): *Poetiken des Blätterns*, Hildesheim/Zürich/New York: Olms, p. 26. Cf. Maye, Harun (2019): *Blättern/Zapping. Studien zur Kulturtechnik der Stellenlektüre seit dem 18. Jahrhundert*, Zürich: Diaphanes.

20 Augustinus, Aurelius (1987): *Bekenntnisse/Confessiones*. Latin-german. Translated by Joseph Bernhart, Frankfurt a.M.: Insel.

21 Ibid. p. 417.

22 Cf. Piper, Andrew (2012): *Book was there. Reading in Electronic Times*, Chicago/London: University of Chicago Press; Bickenbach, Matthias (2023): *Bildschirm und Buch. Versuch über die Zukunft des Lesens*, Berlin: Kadmos. See also Bickenbach, Matthias (2019): »Opening, Turning, Closing: The Cultural Technology of Browsing and the Differences between the Book as an Object and Digital Texts«, in: Nicolas Pethes/Gabor Kelemen (eds.): *Philology in the making in the digital Age*, Bielefeld: transcript, pp. 163–176 and Bickenbach, Matthias (2020): »Die Form des Buches. Oder warum das absolute Buch bei Novalis Seiten hat«, in: Torsten Hahn/Nicolas Pethes (eds.): *Formästhetiken und Formen der Literatur. Materialität – Ornament – Codierung*, Bielefeld: transcript, pp. 139–163.

3. The Internet as an empire and the ignorance of AI

The fact that the Internet makes other knowledge structures possible became clear at the latest with the hypertext euphoria of the 1990s. In contrast to the printed text, which was now often described by the metaphor of the *frozen text*, the digital is seen as a liquid space of plural possibilities for networking. Drawing on Marshall McLuhan's euphoric farewell to the Gutenberg galaxy through multisensory and multimedia technology, hypertext pioneers were able to contrast the supposed linearity and thus also the hierarchy of author and reader to the flexible digital data possibilities. Theodor Nelson's *Xanadu* project and his book *Literary Machines* (1981) as well as Jay David Bolter's *Writing Space* (1991) present writing by way of digital possibilities as a new creative form even in terms of thought and knowledge. George P. Landows, in his book *Hypertext* (1992), saw this as a revolution of all established positions of author and reader, teacher and student, teaching and knowledge.²³ However, the supposed freedom compared to the linearity of the book also proved to be a great challenge or overload for orientation when reading.²⁴ In retrospect, the initial euphoria of a revolutionary infrastructure of knowledge can certainly be traced back to *Californian Ideology*,²⁵ to the euphoria and unreserved belief in progress through technology that Silicon Valley once produced.

In the mid-1990s, as the Internet and the World Wide Web went public, a utopian nearconsensus about their likely social impact seemed to bubble up out of nowhere. The Net would level social hierarchies, distribute and personalize work, and dematerialize communication, exclaimed pundits and CEOs alike. The protocols of the Net were said to embody new, egalitarian forms of political organization.²⁶

An astonishing document of this time is the famous *Declaration of the Independence of Cyberspace* by John Perry Barlow in 1996. The governments of the nations are contrasted to an independent realm of digital data, as if this were an autonomous coun-

23 Cf. Landow, George P. (1992): *Hypertext. The Convergence of Contemporary Critical Theory and Technology*, Baltimore/London: Johns Hopkins University Press.

24 Cf. Winko, Simone (1999): »Lost in hypertext?«. *Autorkonzepte und neue Medien*, in: Fotis Jannidis et al. (eds.): *Rückkehr des Autors. Zur Erneuerung eines umstrittenen Begriffs*, Tübingen: Niemeyer, pp. 511–534.

25 Cf. Barbrook, Richard/Cameron, Andy (1996): »The Californian Ideology«, in: *Science as Culture* 6, pp. 44–72. Online: <https://doi.org/10.1080/09505439609526455>.

26 Turner, Fred (2006): »How Digital Technology Found Utopian Ideology«, in: David Silver/Adrienne Massanari (eds.): *Critical Cyberculture Studies*, New York/London: New York University Press, pp.255–269. Online: DOI 10.1007/s11569-017-0285-6.

try. The full-bodied tone of this manifesto, which alludes to the US Declaration of Independence, is what makes it so fascinating to this day. It begins with a contrast:

Governments of the Industrial World, you weary giants of flesh and steel, I come from Cyberspace, the new home of Mind. On behalf of the future, I ask you of the past to leave us alone. You are not welcome among us. You have no sovereignty where we gather.²⁷

New versus old, matter versus spirit, freedom versus rules—that is the basic structure of this text. A new realm is proclaimed, with its own rules beyond the old world and its institutions. »We are forming our own Social Contract. This governance will arise according to the conditions of our world, not yours. Our world is different.«²⁸ But it is precisely this new realm that appears to be threatened. Rhetorically, the text figures its self-aggrandizement through a paradox: the claimed sovereignty is, on closer inspection, quite questionable. »You claim there are problems among us that you need to solve. You use this claim as an excuse to invade our precincts.«²⁹ This is precisely what must be rejected. Don't regulate us, says the text, as it were, and this makes it relevant to this day. Autonomy is demanded: »Your legal concepts of property, expression, identity, movement, and context do not apply to us.«³⁰ The argument for this independence of all established infrastructures and laws of the real world is the incorporeality of cyberspace as the home of the supposedly pure mind, combined with the promise of freedom and equality for all.

Cyberspace consists of transactions, relationships, and thought itself, arrayed like a standing wave in the web of our communications. Ours is a world that is both everywhere and nowhere, but it is not where bodies live. We are creating a world that all may enter without privilege or prejudice accorded by race, economic power, military force, or station of birth.³¹

That is why this text is the declaration of hope for the utopia of the Internet par excellence. The new infrastructure of communication is to be one that transcends social hierarchies. Freedom and equality as high ethical and political values thus create a self-confidence that wants to take on the entire old world. But one must not be deceived by this rhetoric. Barlow pretends that the inhabitants of cyberspace do not have bodies and do not need social security numbers, employment contracts

27 Barlow, John Perry (1996): A Declaration of the Independence of Cyberspace. Online: <https://www.eff.org/cyberspace-independence> (last access: 18.04.2025).

28 Ibid.

29 Ibid.

30 Ibid.

31 Ibid.

or identity cards. He cleverly excludes economic dependence, for example, on chip manufacturers and power supplies, i.e. the material infrastructure of the Internet. Servers, cables, codes and protocols are being overlooked. Today the global power of corporations such as Alphabet, Apple, Meta, Microsoft and Nvidia or even Tesla is coming into focus, but also the ecological costs of server farms for the Internet. Every search query has an ecological footprint, streaming requires electricity. Google's European headquarters are not arbitrarily located in Finland, by the sea, to have enough cooling water. In Frankfurt am Main the enormous heat generated by the servers is being considered for heating apartments. The electricity consumption just for the current generative AIs has already reached about the size of the consumption of France in one year. Blockchain and digital currencies are no less energy-intensive. This infrastructural penetration of the real world was masked by the emphasis on freedom in the early days of the Internet. The emergence of global digital powers, which does not follow the utopia of decentralized, rather anti-capitalist breaking of monopolies, was also not reflected on as a possibility—and yet William Gibson's epoch-making cyberpunk novel *Newromancer* (1984) expresses precisely this:

Like an origami trick in liquid neon, his distanceless home unfolded [...], a transparent chessboard in 3-D, infinitely extended. The inner eye opened to the stepped, bright red pyramid of the Eastern Seaboard Fission Authority, rising luminously behind the green cubes of the Mitsubishi Bank of America. High above and very far away, he saw the spiral arms of military systems, forever out of his reach.³²

The utopia of the Internet has always been accompanied by dystopia. However, Barlow's rhetoric is particularly effective in hope. His manifesto ends with a wish: »We will create a civilization of the mind in cyberspace. May it be more humane and fair than the world your governments have made before.« However, this better world through the new infrastructure of communication cannot be guaranteed or promised but only hoped for.

From this last sentence, one reads this text differently. Its strong schematization (old/new spiritual/material) seems contrived and thus ignores the fact that even cyborgs and hackers are not mere ghosts but, as social beings, have always been part of the real world. As great as the hope was, the Internet does not exclude economic interests and power. Consequently, the digital infrastructure is also characterized by

32 »Wie ein Origami-Trick in flüssigem Neon entfaltete sich seinen distanzlose Heimat, [...] ein transparentes Schachbrett in 3-D, unendlich ausgedehnt. Das innere Auge öffnete sich zur abgestuften, knallroten Pyramide der Eastern Seaboard Fission Authority, die leuchtend hinter den grünen Würfeln der Mitsubishi Bank of America aufragte. Hoch oben und sehr weit weg sah er die Spiralarme militärischer Systeme, für immer unerreichbar für ihn.«; Gibson, William (1987): *Neuromancer*, München: Heyne, p. 77.

asymmetry and hierarchies. Although interactive participation is potentially possible for everyone, it is only possible under conditions that have already invented their own economy of sales and big data. Barlow's manifesto is therefore a good example of what Sascha Dickel and Jan-Felix Schrape highlighted as the »Logic of Digital Utopianism«.³³ The success of the media utopia is on the one hand due to the spread of technology but is also based on the ability to connect to ethical, economic and political discourses which are always addressed simultaneously. Utopias thus have a social function within the digital discourse—they are to a certain extent a rhetorical form of self-assurance, according to the two authors.

Beyond this discourse, numerous projects in the *digital humanities* have shown that recoding the infrastructures of book printing into digital editions and new knowledge possibilities require some rethinking on the basis of digital data, be it the creation of data collections or the recoding of printed texts into XML.³⁴ This change of practices and thought styles, but also of communication about scientific objects, requires not only interdisciplinary cooperation but also particularly complex coordination. Successful projects, beyond the digitization offensives of regional, state and university libraries, should be highlighted as *best practice*. In my field of German literary studies, for example, the online collection of Heine's works in the Heinrich Heine Portal of the University of Trier, which has existed for a long time and where the critical Düsseldorf edition can be compared with other editions as well as with original writings, is worth mentioning.³⁵ Heinrich von Kleist's works are now also available as a privately organized, exemplary critical edition.³⁶ Gabriele Radecke's digitization project of *Fontane's Notebooks* is also noteworthy, as she first had to find digital ways of representation for different types and colours of pen, for scribbles in the margins, scribbles in between and even for pages that had been torn out (and inserted elsewhere).³⁷ Another project will be briefly discussed in more detail, due to its special design.

As the head of the *Campus Medius* project, Simon Ganahl worked for years with programmers and graphic designers to create a multi-perspective depiction of the events of three days in Vienna in 1933. *Mapping Austrofascism* is about the visit of several German National Socialists to Vienna in May 1933 in the context of the »Türkenbefreiungsfeier« (Celebration of the Liberation from the Turks) and the counter-

33 Schrape, Jan-Felix/Dickel, Sascha (2017): »The Logic of Digital Utopianism«, in: NanoEthics. Studies of New and Emerging Technologies 11, pp. 47–58.

34 Cf. Jannis, Fotis/Kohle, Hubertus/Rehbein, Malte (eds.) (2017): Digital Humanities. Eine Einführung, Stuttgart: Niemeyer.

35 Cf. online: <http://www.hhp.uni-trier.de/Projekte/HHP/werke> (last access: 18.04.2025).

36 Cf. online: <https://kleist-digital.de> (last access: 18.04.2025).

37 Cf. online: <https://fontane-nb.dariah.eu/index.html> (last access: 18.04.2025).

reactions, for example from the communist side. Marches, headlines, radio broadcasts, propaganda films—all of this takes place simultaneously at various locations in Vienna over the course of three days. Ganahl's project, which is presented in detail in his habilitation thesis of 2022,³⁸ not only offers a topographical map of contemporary Vienna but also distinguishes between topology and topography as modes of access.³⁹ Drawing on actor-network theory and Foucault's concept of the *dispositif*, the project reflects on historical events as a network and includes not only people but also the cinema, film cameras and radio broadcasts as »agency« (Latour). The project emphasizes the dependence of representation from specific perspectives. It offers different modes of access and networking, for example the alternatives of bird's-eye view, street view and panoramic view, each with different links to text, image and sound material. Ganahl summarizes this by the term »Medienerfahrung« (media experience), by way of which we are supposed to become aware of what exactly the practices and their associated possibilities are and what advantages and disadvantages each of them has. This way, the representation itself is reflected upon as a filtering of perspective. The bird's-eye view of the map of Vienna with its marked locations is not evaluated as a supposedly neutral view but is distinguished by its suggestion as a supposedly objective overview of a quasi-divine perspective. Of course, such a project also provides the possibility of directly integrating archive material, such as historical radio broadcasts, thus contextualizing it anew. Ganahl does not see himself as the author but as the »curator« of the material. His project shows how today digital possibilities of mapping both digitize material collection while at the same time reflecting this digital form of presentation as an infrastructure of knowledge.

As we can learn from Ganahl's reflections, the representation of the infrastructure of knowledge is always accompanied by a withdrawal of knowledge. That not-knowing itself is a necessary reflective category has been in the world since Socrates' famous ironic epigraph that the only thing he knows is that he knows nothing. But while critical reflection has its place in the humanities, the digital infrastructure seems to think too little about not-knowing, despite all the fake news and data exploitation. This is necessary, for example, in the case of the latest media revolution through generative AIs since the public accessibility of ChatGPT. This is not an attempt to describe the history and background of this new emergence of knowledge but to conclude by highlighting the proximity of knowledge and non-knowledge based on personal experience.

For a seminar on Clemens Brentano's early Romantic novel *Godwi* (1801/02) I wanted to use the introductory session to point out to the dangers of using AI for students and to check for myself how far the new text machines have developed.

38 Ganahl, Simon (2022): *Campus Medius. Digitales Kartographieren in den Kultur- und Medienwissenschaften*, Bielefeld: transcript.

39 Cf. online: <https://mapping-austrofascism.campusmedius.net> (last access: 18.04.2025).

After experimenting with *Perplexity* and *ChatGPT4* I discovered *myjotbot*, an AI application that generates ad hoc suggestions for the continuation of the sentences while you are writing as well as possible next topics in a column to the right.⁴⁰ This writing experience was quite irritating, but there is no denying that there also appear useful (and sometimes surprising) suggestions (the Tab key immediately accepts the suggestion). What is astonishing is that this AI presents itself to be a master of the subject matter. The choice of the generally rather unknown, very complex novel by young Clemens Brentano in no way influenced the seemingly certain knowledge the AI proclaims. The machine formulates in a certain, at a first glance well-informed tone. Of course it cannot know that the older research consistently stated Brentano's dependence on Friedrich Schlegel's ideas on early Romantic universal poetry, while today's analyses recognize an independent aesthetic that deliberately distances itself from the early Romantic circle, even if it adopts and uses figures of thought and keywords.⁴¹ *Godwi*, for example, calls itself a »verwilderter Roman« (unkempt novel) in its subtitle, an allusion to the figure of the arabesque, which for Friedrich Schlegel stands both for the winding paths of the imagination and for the Romantic novel itself. *Godwi* is a very complex novel, the first part of which is structured as an epistolary novel, while the second, set many years later, is narrated by the editor of the letters and alleged author of *Godwi*. The fact that this author dies in the course of the narration and then continues to be narrated by his character Godwi is only a small part of many extravagances. In terms of content, it deals with topics that may be considered psychoanalytical today; all family and love relationships are disturbed and refer to traumata, not least those of absent or rejecting mothers. The AI formulates full-bodied statements in this regard, which could be quite exciting when being read as theses, but they are not formulated as such but as supposedly objective facts. The example I finally presented to the seminar is the following passage formulated by the AI:

Godwi's development is a journey through conflict and self-discovery which forms the heart of this novel. At first, Godwi seems to be a plaything of his circumstances—driven by passions and a seemingly aimless search for identity. But over time, he begins to confront the profound questions of his existence: Who am I? What drives me? It becomes clear that his outward crushes are reflections of inner conflicts.⁴²

40 Cf. online: <https://www.myjotbot.com> (last access: 20.04.2025).

41 Cf. Bickenbach, Matthias (2018): »Noch« nicht einmal Optik studiert«. Clemens Brentanos Medienästhetik und ihre Abweichung von der Frühromantik«, in: Volker C. Dörr/Rolf J. Goebel (eds.): *Literatur in der Medienkonkurrenz: Medientranspositionen 1800, 1900, 2000*, Bielefeld: transcript, pp. 49–66.

42 AI text generated with myjotbot.com, February 2024: »Die Entwicklung von Godwi ist eine Reise durch Konflikt und Selbstfindung, die das Herzstück dieses Romans bildet. Zunächst

This reads well, but the devil is in the details. The individual formulations sound *too good*, so to speak. The image of the »journey through conflict and self-discovery«, for example, is too good to be true. Godwi travels only in the first part of the novel. He sets out on an initially »aimless search« which is of course »driven by passions«. You can see it that way, but the AI reshapes it into a course that is not appropriate to the novel. In particular, the phrase »over the time, he begins« is grossly misleading. *Godwi* is not a novel of development. Between Part 1, in which little time passes, and Part 2, there is a leap in time of around 20 years. There is no progression but rather a stage A and a stage B of Godwi, who is a very different character in the second part than in the first one, as the fictitious letter editor named Maria also notes. In retrospect, the fact that he rearranged and partly mixed letters with his own ones destroys their fictitious authenticity. The novel virtually deconstructs the possibility of a biography. It rather dissolves the text into several perspectives and depictions, a mechanism that is presented as the definition of the Romantic in Chapter eight.

The now older Godwi, on the other hand, no longer asks himself who he is and what drives him. In short, the AI suggests a skewed, false image of the novel, and even if a sentence such as the one that the »outward crushes are reflections of inner conflicts« sounds nice, this does not represent knowledge of the novel. It is not only questionable which infatuations (»Schwärmereien«) are meant here, but also whether the term is appropriate here at all, since the figure of the *Schwärmer* (*dreamer*), especially in Christoph Martin Wieland's work much earlier, represents the immature youth who confuses fantasy with reality—a concept that was productive in 1764, but no longer in the Romantic period and certainly not with regard to the character of Godwi from the first line of his first letter. The supposed knowledge of the novel claimed by the AI thus leads to an undifferentiated knowledge of the novel. The AI text must rather be considered a knowledge of what is wanted to be heard, an elegant, not very differentiated overview that is rhetorically convincing in that it is linguistically consistent. But understood as non-knowledge of the novel, the AI text presents a fruitful task regarding the question of reading and understanding texts, precisely because the infrastructure of the large language models simulates plausible statements. They thus combine knowledge and non-knowledge in a specific way, and the differentiation between them will increasingly become a task for future research.

scheint Godwi ein Spielball seiner Umstände zu sein – getrieben von Leidenschaften und einer scheinbar ziellosen Suche nach Identität. Doch mit der Zeit beginnt er, sich den tiefgreifenden Fragen seines Daseins zu stellen: Wer bin ich? Was treibt mich an? Es wird deutlich, dass seine äußerlichen Schwärmereien Spiegelungen innerer Konflikte sind.«

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On Practices of (Non-)Knowledge

The (Non-)Knowledge of Practice

Praxeological Considerations on the Concerted Formation of Knowledge in Practices¹

Thomas Alkemeyer

Contrary to the common assumption that knowledge is stored in the minds—or bodies—of individuals, it is understood in the following as something that unfolds *between* the human and non-human participants—things, objects, artefacts—of social practices. I focus in particular on the questions of how something new comes into being by collective practice and what role different kinds of knowledge play in this process.

Since I am not an expert in digital infrastructures, I can address only a limited number of the questions raised in the invitation to this volume. I therefore largely confine myself to examples from the world of sports to illustrate my theoretical considerations. In these examples, digital technologies do not yet play a major role; their role is merely the subject of a tentative outlook at the end of the article. Nevertheless, I briefly address the aspect of virtuality in the sense of opening spaces of potentiality and imagining alternatives, as this dimension bears relevance for the question that interests me here: the emergence of the ›new‹ in social practice.

By addressing the practical formation of knowledge in the concert of human and non-human contributions, I enter a field that has been investigated, among others, by cognitive science, philosophy, and science and technology studies (STS) under headlines such as ›distributed cognition‹,² ›situated action‹,³ ›situated knowledge‹,⁴ and agential realism.⁵ This field also includes contributions from the his-

1 I would like to thank Kristina Brümmer for her important comments.

2 Hutchins, Edwin (1995): *Cognition in the Wild*, Cambridge, MA: MIT Press.

3 Suchman, Lucy (2006): *Human-Machine Reconfigurations. Plans and Situated Actions*, 2nd, ed., Cambridge: Cambridge University Press. Online: <https://doi.org/10.1017/CBO9780511808418> (last access: 20.02.2026).

4 Haraway, Donna (1988): »Situated Knowledges. The Science Question in Feminism and the Privilege of Partial Perspective«, in: *Feminist Studies* 14:3, pp. 575–599. Online: <https://doi.org/10.2307/3178066> (last access: 20.02.2026).

5 Barad, Karen (2012): *Agentieller Realismus*, Berlin: Suhrkamp.

tory and sociology of science, such as Hans-Jörg Rheinberger's study *Experimental Systems and Epistemic Things* or Karin Knorr Cetina's work on the ›fabrication of scientific knowledge‹ in experimental physics.⁶ These studies emphasize that scientific knowledge is not simply discovered but fabricated in the course of social interactions and negotiations, with the active involvement of laboratories, devices, and theoretical assumptions—that is, material and cognitive artefacts—which, once mobilized as participants in practice, acquire a relative objectivity⁷ and agency of their own.

Furthermore, power struggles and disputes over prestige, recognition, and funding, as well as prevailing ›styles of thought‹⁸ and the norms of scientific communities play a decisive role in determining what is recognized as ›valid‹ knowledge and what is, by contrast, devalued as non-knowledge. From the perspective proposed here, such distinctions are produced and stabilized through recurrent acts of attribution. Following Lammi,⁹ I refer to these acts as ›situated doings and sayings that mark entities (in this case, forms of knowledge, TA) [...] in relation to a concern‹ (for example, the secure handling of data in the context of research projects). This perspective also applies, among other things, to philosophical debates concerning whether there is only propositional knowledge or whether, for instance, the practical capacity to dodge a ball or to ride a bicycle may also be considered a form of knowledge in its own right.

Both the title of this paper and these preliminary remarks should make clear that I adopt a practice-theoretical perspective on the emergence, valorisation, and

6 Rheinberger, Hans Jörg (2001): *Experimentalsysteme und epistemische Dinge. Eine Geschichte der Proteinbiosynthese im Reagenzglas*, Göttingen: Wallstein; Knorr Cetina, Karin (1984): *Die Fabrikation von Erkenntnis. Zur Anthropologie der Naturwissenschaft*, Frankfurt a.M.: Suhrkamp.

7 I use ›objectivity‹ (›Gegenständlichkeit‹) in the sense of Leont'ev's activity theory; Leont'ev, Alekseï N. (1931/1981): *Problems of the Development of the Mind*, Moscow: Progress Publishers. Here it does not mean that an action is directed at or influenced by an object. Rather, human activity is always objective for Leont'ev insofar as it is directed at something in the world that lies outside the subject and is transformed by the activity. ›Analogous to phenomenological intentionality‹ (Schürmann, Volker (2022): ›Was ist eine kulturelle Praktik? Zur Materialität von Bedeutungsräumen‹, in: Tobias Kienlin/Richard Bußmann (eds.): *Sociality–Materiality–Practice. Sozialität–Materialität–Praxis*, Bonn: Habelt, pp. 71–90, here p. 77), objectivity orients individual doings and constitutes them as *meaningful* action by determining whether X (e.g. running after someone) or Y (e.g. running a race) is done. It is therefore nothing physical but ›the determinacy of action‹ (ibid.), its ›actual motive‹ (Leont'ev, Alekseï N. (1978): *Activity, Consciousness, and Personality*, Englewood Cliffs/London: Prentice-Hall, p. 122, cited in Schürmann: *Was ist eine kulturelle Praktik?*, p. 77).

8 Fleck, Ludwik (1935/1980): *Entstehung und Entwicklung einer wissenschaftlichen Tatsache. Einführung in die Lehre vom Denkstil und Denkkollektiv*, Frankfurt a.M.: Suhrkamp.

9 Lammi, I. (2025): *Making Security Large. Assigning-Acts and the Concept of Large Concerns*. Working Paper for the Practice Theory Gathering 2025.

role of different kinds of knowledge in and for social practice. This implies that I am not primarily interested in the fabrication of knowledge within specialized settings and practices of knowledge production such as laboratories, but rather in the emergence of knowledge—understood as what is situationally recognized as knowledge—across all kinds of practices. Knowledge, I argue, drawing on Louis Althusser's notion of a ›materialism of encounter‹,¹⁰ emerges from the contingent encounters of heterogeneous human and non-human ›co-players‹. At the same time, I attempt to show that such encounters, while not predetermined, are also not entirely arbitrary but subject to a variety of conditions and thus characterized by a form of conditioned contingency.

Against this background, I first sketch several basic features of my selective engagement with the vocabulary of recent practice theories and their conceptualizations of knowledge (I). By a second step, I elaborate the concerted formation of knowledge as a process of mutual enablement among people, bodies, and things in practice (II). Third, I turn to the problem of the emergence of the ›new‹ in collective socio-material and socio-imaginary constellations, which opens up spaces of imagination and meaning (III). Finally, I outline some tentative reflections on how, and with what transformative effects, digital data participate in the emergence of knowledge in practices (IV).

1. The Knowledge of Practices

The cluster of approaches commonly referred to as ›practice theories‹ has gained considerable inter- and transdisciplinary appeal over the past four decades. This cluster includes such diverse perspectives as Pierre Bourdieu's praxeology, Anthony Giddens's structuration theory, Harold Garfinkel's ethnomethodology, Theodore Schatzki's social ontology, Michel de Certeau's *Art of Practice*, and—often overlooked—Aleksēi Leont'ev's cultural-historical activity theory.¹¹ These approaches differ, among other things, by their ways of understanding practice, by the roles they attribute to human actors, and by whether they emphasize the reproduction or transformation of existing conditions. Nevertheless, a common orientation can be identified: practice theories oppose a mentalistic mode of thought that explains action either subjectivistically, by reference to hidden motives and intentions, or

10 Althusser, Louis (2010): *Materialismus der Begegnung. Späte Schriften*, Zürich: Diaphanes.

11 See, for example Schatzki, Theodore (2002): *The Site of the Social. A Philosophical Account of the Constitution of Social Life and Change*, University Park: Pennsylvania State University Press; Nicolini, Davide (2011): *Practice Theory, Work and Organization. An Introduction*, Oxford: Oxford University Press.

objectivistically, by invoking supra-subjective structures, rules, norms, and codes that operate behind the scenes.

Instead, praxeological inquiry is directed toward the phenomenal—and thus publicly accessible—richness of embodied, sensuous, and meaningful action within concrete material environments. Practice theories seek to render observable how social orders and their subjects are embodied, produced, maintained, and transformed through the interplay of humans, natural objects, and artefacts. While they do not deny the distinctive status of human actors, they relativize it: individuals no longer appear as autonomous centres of initiative but as specific participants among others, including infrastructures, buildings, tools, language, technologies, climatic conditions, and animals. From this perspective, things are not merely passive instruments of human action but appear as co-actors within the social. Accordingly, they are attributed a specific power¹² or agency¹³ that structures human behaviour, thinking, and action. As emphasized by Haraway and Actor-Network-Theory (ANT),¹⁴ such agency can combine with human agency to form hybrid agencies that transcend conventional boundaries between culture and nature, technology and biology.

Methodologically, two perspectives can be distinguished. From a performance perspective—what I refer to as *practice as performance*, following Shove et al. —the researcher attempts to understand how participants relate to one another in the flow of practice,¹⁵ what demands, expectations, and uncertainties they encounter, and what coping efforts they mobilize in the ›melee‹ of practice. When practices are instead observed *as entities*, attention shifts to the historically developed, typified, and recognizable structures and patterns of activity that prefigure practical performances and qualify individual actions as forms of playing along. Practices such as driving a car, teaching at school, or playing tennis can then be understood as settings within which bodily sayings and doings that are meaningless by themselves are regularly connected in ways that render them intelligible as contributions to a specific practice.¹⁶ Thus, hitting a ball with an appropriate object becomes intelligible as tennis only in the context of the practice of tennis, and a human body appears as a tennis-playing body whose movements can be evaluated by others as being elegant,

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- 12 Akrich, Madeleine (1992): »The De-scription of Technical Objects«, in: Wiebe Bijker/John Law (eds.): *Shaping Technology/Building Society. Studies in Sociotechnical Change*, Cambridge, MA/London: MIT Press, pp. 205–224; Burri, Regula V. (2008): *Doing Images. Zur Praxis medizinischer Bilder*, Bielefeld: transcript.
 - 13 Latour, Bruno (1988): »Mixing Humans and Non-humans together. The Sociology of a Door Closer«, in: *Social Problems* 35, pp. 298–310.
 - 14 Haraway: *Situated Knowledges*.
 - 15 Shove, Elizabeth/Pantzar, Mika/Watson, Matt (2012): *The Dynamics of Social Practice. Everyday Life and How It Changes*, London: Sage Publications.
 - 16 Schatzki: *The Site of the Social*.

awkward, successful, or unsuccessful according to the explicit and implicit norms of the game. In this sense, a practice provides individual doings with a frame and an objectivity in the above-mentioned sense (see footnote 2): it organizes their context and attunes the perceptions, motivations, moods, and affects of human co-players to its internal structure of meaning, goals, and purposes. Schatzki refers to this as the *teleoaffective structure* of practice.¹⁷

To play along in a practice in an acceptable manner and to cope with the ›turmoil‹ of its performance, a range of capacities is required. Human co-players must, for instance, know which game they are currently engaged in and must possess a »practical sense« not only of the explicit rules but,¹⁸ above all, of the implicit conventions governing the respective game. In the practice-theoretical discourse, a variety of terms are used to refer to this sense, including tacit knowledge, skills, bodily techniques, routines, or *habitus*.¹⁹ While these terms foreground different aspects, they converge in designating an embodied form of practical knowledge that is not captured by the hegemonic concept of propositional knowledge in Western modernity and is therefore de-thematized as knowledge within that framework. From this perspective, one of the specific achievements of the various cultural-studies turns of recent decades—the spatial turn, performative turn, practice turn, material turn, postcolonial turn, and others—has been to bring into view not only *knowing that* but also *knowing how*: forms of knowledge anchored in materiality, corporeality, locality, and situatedness, and transmitted primarily through non-written means, from body to body, orally or even magically.²⁰

As Pierre Bourdieu has already emphasized, such practical knowledge enables for appropriate action even under conditions of uncertainty and time pressure that are characteristic of most everyday practices. However, if this knowledge is located primarily in the bodies of humans, there is a risk of reproducing a conception of knowledge and subjectivity familiar from both cognitive science and classical action

17 Ibid. p. 80–82.

18 Bourdieu, Pierre (1987): Sozialer Sinn. Kritik der theoretischen Vernunft, Frankfurt a. M.: Suhrkamp.

19 See Hirschauer, Stefan (2008): »Körper macht Wissen. Für eine Somatisierung des Wissensbegriffs«, in: Angelika Wetterer (ed.): Geschlechterwissen und soziale Praxis. Theoretische Zugänge – empirische Erträge, Königstein/Taunus: Ulrike Helmer Verlag, pp. 82–95.

20 From a Foucault-inspired, governmentality-theoretical perspective, however, the discourse on »body knowledge,« which is booming primarily in (body- and sports-) sociology and post-materialist anthropology, is also subject to considerable criticism because bodies that have been instituted as knowing could be easily subjected to new practices of governing, optimizing, and monitoring (cf. Koch, Anne (2016): »KörperWissen – Körpermacht. Wie die Formierung des Körpers als Wissen ihn neuen Praktiken des Regierens unterwirft«, in: Paragrana. Internationale Zeitschrift für Historische Anthropologie 25:1, pp. 61–75). See also Schmidt, Robert (2008): »Stumme Weitergabe. Zur Praxeologie sozialisatorischer Vermittlungsprozesse«, in: Zeitschrift für Soziologie der Erziehung und Sozialisation 28, pp. 24–41.

theory, with the sole difference that knowledge is no longer discovered in minds but in bodies. In this context, the role of material objects in the constitution of a situated capacity for action tends to be neglected. More recent practice-theoretical approaches, influenced in particular by debates in the sociology of technology (STS), therefore also emphasize the resource character of things and the effects on practice they generate. From this perspective, things appear as carriers of »warranties of use« (*Gebrauchsgewährleistungen*) or as infrastructures that can be relied upon for support,²¹ such as a handrail.²² In this sense, they encourage certain forms of behaviour while inhibiting others, much like »tightly cut garments«.²³ This view is extended to symbolic infrastructures,²⁴ such as language, as well as to digital technologies like the World Wide Web, which can then be understood, for instance, as scaffolds for human speaking, thinking, and remembering.²⁵

To describe the role of such entities in human action, practice-theoretical approaches often draw on the concept of *affordance*, originally developed in perceptual psychology.²⁶ However, if affordances are interpreted merely as »latent offers of action«,²⁷ the relational character of the concept is lost. As Gibson writes:

»[...] an affordance is neither an objective property nor a subjective property; or it is both, if you like. An affordance cuts across the dichotomy of subjective-objective and helps us to understand its inadequacy. It is equally a fact of the environment and a fact of behavior. [...] An affordance points both ways, to the environment and to the observer.«²⁸

Understood relationally, affordances make it possible to observe how people and things mutually inspire and *in-form* one another in practice—that is, how they notify

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- 21 Schmidt, Robert/Volbers, Jörg (2011): »Öffentlichkeit als methodologisches Prinzip. Zur Tragweite einer praxistheoretischen Grundannahme«, in: Zeitschrift für Soziologie 40:1, pp. 24–41, here p. 11.
 - 22 Hirschauer, Stefan (2016): »Verhalten, Handeln, Interagieren. Zu den mikrosoziologischen Grundlagen der Praxistheorie«, in: Hilmar Schäfer (ed.): Praxistheorie. Ein soziologisches Forschungsprogramm, Bielefeld: transcript, pp. 45–68, here p. 51. Online: <https://doi.org/10.1515/9783839424049-003> (last access: 19.02.2026).
 - 23 Ibid., p. 52.
 - 24 Ibid.
 - 25 Heersmink, Richard/Sutton, John (2020): »Cognition and the Web. Extended, Transactive, or Scaffolded?«, in: Erkenntnis 85:1, pp. 139–164, here p. 140. Online: <https://doi.org/10.1007/s10670-018-0022-8> (last access: 20.02.2026).
 - 26 Gibson, James (1979): The Ecological Approach to Visual Perception, Boston: Psychological Press.
 - 27 Jörissen, Benjamin (2015): »Bildung der Dinge. Design und Subjektivation«, in: id./Torsten Meyer (eds): Subjekt Medium Bildung, Wiesbaden: Springer VS, pp. 215–233. Online: https://doi.org/10.1007/978-3-658-06171-5_11 (last access: 20.02.2026).
 - 28 Gibson: The Ecological Approach, p. 129.

and shape one another in such a way that neither remains unchanged.²⁹ From this perspective, things do not merely assume supportive functions or guarantee special uses; they also appear as media of thinking, designing, and imagining. The archaeologist Lambros Malafouris illustrates this in his ethnography of pottery-making,³⁰ aptly entitled »creative thinging«. His study shows that people do not simply think *about* things but think *with* and *through* them: by concrete engagement with materiality, potentials are explored and there emerge projects of what might be done with or out of things. Unlike a plan, a project is not a rationally conceived programme that can be implemented through technical action; rather, as Castoriadis explains,³¹ it is developed only under actual conditions and is shaped in practice until it eventually materializes by a realized object.

Malafouris's ethnography thus demonstrates that the materialities involved in a practice are not external to human thinking and acting but constitute an internal, quasi-organic moment of their formation. They are, so to speak, taken into thought (interiorised); they motivate and orient thinking and acting from within while at the same time acquiring concrete form and meaning for the actor only in practice. As noted above (see footnote 6), Leont'ev refers to this object-relatedness of practice as a constitutive feature of thinking and acting, describing it as their inescapable objectivity (*Gegenständlichkeit*). Such objectivity characterizes not only practices by way of which tangible objects are produced from raw materials, as in pottery, but also non-productive activities such as play or sport. Schürmann illustrates this point by the example of hurdle racing: from an activity-theoretical perspective,³² hurdles are not external environmental constraints that artificially hinder a subject's intention to cover a distance in the shortest possible time, as assumed in classical action theory. Rather, they define the intention and motivation themselves. Without hurdles, the intention and motivation to run hurdles would not arise in the first place; conversely, it is only through the athlete's practical engagement that the objects placed on the track become hurdles in the sporting sense.

29 Kalthoff, Herbert (2008): »Einleitung. Zur Dialektik von qualitativer Forschung und soziologischer Theoriebildung«, in: Id./Stefan Hirschauer/Gesa Lindemann (eds.): *Theoretische Empirie. Zur Relevanz qualitativer Forschung*, Frankfurt a.M.: Suhrkamp 2008, pp. 8–32, here p. 10.

30 Malafouris, Lambros (2014): »Creative thinking. The feeling of and for clay«, in: *Pragmatics & Cognition* 22:1, pp. 140–158.

31 Castoriadis, Cornelius (1990): *Gesellschaft als imaginäre Institution. Entwurf einer politischen Philosophie*, Frankfurt a.M.: Suhrkamp.

32 Schürmann, Volker (2014): »Bedeutungen im Vollzug. Zum spezifischen Gewicht der Praxisphilosophie«, in: *Sport und Gesellschaft* 11:3, pp. 218–231.

2. Reflective Enabling

To describe such co-constitutive relationships between human and non-human participants, my colleagues Nikolaus Buschmann, Kristina Brümmer, Matthias Michaeler, and I have developed the concept of *mutual enablement*.³³ By its threefold meaning—to *enable*, to *be enabled*, and to *be able to*—this concept emphasizes that enablement does not amount to the transfer of knowledge from one pole to another. Rather, it refers to processes in the course of which the entities participating in a practice mutually bring one another into play, engage one another, and attribute possibilities for action to one another.³⁴

This process is not a *creatio ex nihilo* but is marked by numerous preconditions. Co-players must already possess certain dispositions and must be disposed toward one another to be able to bring one another into play at all. We therefore distinguish conceptually between *disposition* and *ability*. Dispositions are diffuse, opaque, and indeterminate; they have the status of motor, cognitive, or affective potentialities which acquire the form of addressable competences only within the relational networks of practice. Being disposed toward one another does not necessarily mean that the dispositions of co-players must fit together seamlessly. Rather, it refers more modestly to the potential for establishing connections. Accordingly, the outcome of a coupling need not be smooth functioning; it may also take on the form of irritation or rupture, for example when a participant withdraws and decouples—out of listlessness, overload, shyness, or failure.³⁵

Enablement thus always has a flipside in the possibility of dis-enablement. An object may present itself as being resistant in each situation and elude use because its design, technology, or manageability finds no point of connection with an actor's dispositions. Or students may fail to gain access to the dispositifs of school teaching because the unfamiliar habitus of the social middle classes materializes by these dispositifs. These are examples of relations in which the embodied dispositions of certain groups are de-qualified and prevented from taking the form of recognized competence. They show that processes of recognition and de-recognition affect not only knowledge but also its carriers or media:³⁶ not everyone who potentially knows something can appear as a knowledgeable person. Individuals expe-

33 See for example Alkemeyer, Thomas/Buschmann, Nikolaus (2017): »Learning in and across Practices. Enablement as Subjectivation«, in: Allison Hui/Elizabeth Shove/Theodore Schatzki (eds.): *The Nexus of Practices. Connections, constellations, practitioners*, London: Routledge, pp. 8–23.

34 This is similar to what Kalthoff: *Einleitung*. means by mutual in-formation (see above).

35 Stäheli, Urs (2021): *Soziologie der Entnetzung*, Berlin: Suhrkamp.

36 I am using the vague term »medium« here in the sense of »mediator«. This is intended to emphasize that something—an object, a technology, a body—only becomes a medium of knowledge through social practice, that is, within the relationships of practice.

rience »epistemic injustice«³⁷ when material circumstances prevent their dispositional potentialities from entering the public sphere as knowledge.

From the perspective of a sociology of practices, mutual enablement is reflective in multiple ways. Co-players orient their activities toward one another, but they do so simultaneously with reference to the general understandings and teleoaffective structures that organize the practice currently being performed. When playing football, for instance, players observe and enable one another in different ways than when playing volleyball; when skateboarding in the public space, urban furniture is used in different ways than when shopping, and so on.

Affordances, through enactment of which participants inform and enable one another, therefore do not arise in a vacuum but within the meaningful context of the practice being performed. This also shapes the formation of practical knowledge. A key medium of such knowledge is the experience-based perception and sensing capacities of the body. By the performance of practice these capacities adjust to its teleoaffective structure, as do thinking and feeling. Through this adjustment, bodily doings and sayings are typically shaped in ways oriented toward the objectivity, the demands, expectations, goals, and norms of the respective practice. An action thus becomes recognizable as »playing volleyball«, »giving a lecture«, or »programming«.

Relevant artefacts—playing field, lectern, keyboard, screen, and so on—explicit knowledge (for example tactical knowledge of correct running and ball trajectories), and conscious reflection are always involved in this fundamentally bodily self-organization of action, as praxeographic studies of sports acrobatics or volleyball demonstrate.³⁸ Together, embodied sensory capacities, implicit practical knowledge, and explicit theoretical knowledge establish an *empractical co-knowledge* (*Mit-Wissen*, Leont'ev) oriented toward the respective activity in the form of multimodal reflection on one's own actions. This insight challenges the widespread assumption that reflection begins only when routine fails. Instead, reflection is always involved, with actors continuously shifting between routine and conscious reflection, pragmatic and meta-pragmatic registers.

37 Fricker, Miranda (2007): *Epistemic Injustice. Power and the Ethics of Knowing*, Oxford: Oxford University Press.

38 Brümmer, Kristina (2015): *Mitspielfähigkeit. Sportliches Training als formative Praxis*, Bielefeld: transcript; Michaeler, Matthias (2025): *Die Organisation von Zusammenarbeit als Frage der Praxistheorien. Zur konzertierten Ausgestaltung von Praxis am Beispiel des Volleyball-spielens*, Wiesbaden: Springer VS.

3. The Emergence of the New in Socio-Material and Socio-Imaginary Constellations

For a long time, practice-theoretical approaches were primarily concerned with how habits solidify by relations between bodies and things, thereby contributing to the reproduction of existing structures. More recently, praxeological interest has increasingly turned toward change and the emergence of novelty. Transformation is often explained in terms of shifts and re-constellations of materialities, competences, meanings, and practices that seem to arise from the continuous repetition of practice.³⁹ What is often overlooked, however, is what I call an imaginary power of transformation which manifests itself situationally by contingent encounters between human and non-human co-players.

This power can be illustrated by the ›invention‹ of the Fosbury Flop in high jump. At the 1968 Olympic Games in Mexico City the American high jumper Dick Fosbury was the first to clear the bar at a major international competition by using this technique.⁴⁰ Characterized by a fast arched approach, a turn of the torso during the final steps, and a backward clearance of the bar, the technique was initially regarded by experts as an idiosyncratic deviation. Renowned coaches such as the Soviet Yuriy Dyachkov were convinced it would have no lasting impact on the discipline. They were mistaken. By the late 1970s nearly all elite athletes had adopted this technique, which became the new standard.

The conditions for this ›revolution‹ were manifold. First, backward landings were made possible by the introduction of large foam safety mats, developed in response to serious accidents associated with new pole-vaulting materials. Second, Fosbury's social trajectory⁴¹ mattered: despite his height, he achieved only modest

39 Schäfer, Hilmar (2013): *Die Instabilität der Praxis. Reproduktion und Transformation des Sozialen in der Praxistheorie*, Weilerswist: Velbrück; Shove et al. *The Dynamics of Social Practice*; Schatzki, Theodore (2019): *Social change in a material world*, London/New York: Routledge.

40 In truth, Fosbury was not the first to use this technique. Back in 1958 the relatively unknown Austrian Fritz Pingl won the national championship by using this technique. Pingl's problem, however, was that despite his technique he only managed 1.96 m—not enough to compete with the big names. So it took a jumper who was able to win a major title by using the new style, such as Fosbury, to change this. Whether Fosbury copied the Austrian's jumping style or discovered the technique himself without knowing it already existed is unclear (see Heibel, Marco (2010): »Geh besser zum Zirkus«. *Der Fosbury-Flop im Hochsprung*«, in: *Netzathleten-Magazin*. Online: <https://www.netzathleten.de/lifestyle/sports-inside/geh-besser-zum-zirkus-der-fosbury-flop-im-hochsprung/> (last access: 20.02.2026)).

41 By this term Bourdieu refers to the connection between social structure and behaviour. The social conditions under which people grow up and perform their activities open up certain ›trajectories‹ in social space while closing off others. As soon as a person enters a social space, the trajectories of their possible careers are already prefigured and develop a certain force

success using the straddle technique and began to experiment. His training in physics enabled him to recognize that his new technique reduced the portion of the body passing over the bar at any given moment.⁴² Third, after years of being an outsider, Fosbury encountered a coach who believed in the technique and helped develop it systematically.

Fosbury's success immediately motivated imitation. In 1993, Javier Sotomayor cleared 2.45 m while using the flop, setting a world record that still stands. The diffusion of this technique was driven not only by performance gains but also by its symbolic appeal: Fosbury was perceived as being youthful, dynamic, and modern, resonating with the late-1960s zeitgeist of change: the media celebrated him as a »youthful pioneer [...] in encrusted structures«.⁴³

Translated into praxeological theoretical language, this means that Fosbury »inscribed« himself into the history of high jumping by »stubbornly« responding to the established routine of the discipline through experimentation with a new technique—a technique that was contingent upon infrastructural conditions, his personal trajectory, and the prevailing zeitgeist. More precisely, it was enabled by (a) his individual history of failure, (b) his marginal position within the field of high jumping—a position that, as Bourdieu shows for the literary field,⁴⁴ often favours an experimental disposition—(c) his *knowing how* acquired as a high jumper, for example in the form of a finely developed sense of distance and flight, and (d) his explicit theoretical knowledge (*knowing that*) acquired through his studies in physics outside the sporting context. Together, these conditions enabled Fosbury to grasp a historically emerging »situational potential« and to create and publicly perform a new technique.⁴⁵

At the same time this new technique remained anchored in the traditional practice of high jumping,⁴⁶ even though it was clearly distinct from it. The example thus illustrates the constitutive dependence of the invention of a new practice on

in interaction with other forces (cf. Staab, Philipp/Vogel, Berthold (2014): »Laufbahn (trajec-toire)«, in: Gerhard Fröhlich/Boike Rehbein (eds.): Bourdieu-Handbuch, Stuttgart: J.B. Metz-ler. Online: https://doi.org/10.1007/978-3-476-01379-8_34 (last access: 20.02.2026)).

42 Hartmann, Peter (2020): »Wendepunkte der Sportgeschichte«. Als Dick Fosbury den Hochsprung revolutionierte – und die Welt plötzlich auf dem Rücken lag«, in: Neue Zürcher Zeitung 14.04.2020. Online: <https://www.nzz.ch/sport/wendepunkte-der-sportgeschichte-a-ls-dick-fosbury-den-hochsprung-revolutionierte-und-die-welt-plotzlich-auf-dem-ruecken-lag-ld.1549753> (last access: 20.02.2026).

43 Ibid.

44 Bourdieu, Pierre (1999): Die Regeln der Kunst, Frankfurt a.M.: Suhrkamp.

45 Jullien, Francois (1999): Über die Wirksamkeit, Berlin: Merve.

46 Swidler, Ann (2001): »What anchors cultural practices?«, in: Theodore Schatzki/Karin Knorr Cetina/Eike von Savigny (eds.): The Practice Turn in Contemporary Theory, London: Psychology Press, pp. 83–101.

the dominant field-specific code—in this case, the outbidding code of competitive sport. The adoption of the new technique by other high jumpers, driven primarily by the prospect of enhanced performance but also by its relative ease of learning, qualified the new style as a significant innovation that permanently transformed the discipline of high jumping.

4. Tentative Considerations on the Participation of Digital Technologies in Social Practices

A practice-theoretical perspective shifts attention to the embedding of digital artefacts in the performance of social practices. This shift brings different dimensions of practice into view.

In a first dimension, attention is directed to how digital technologies are integrated into everyday routines, how they transform established practices—such as consumption, cooperative work, or sports—and which new practices of evaluation,⁴⁷ visualization, and comparison emerge through their participation.⁴⁸

A second dimension, which is of particular relevance for the purposes of this essay, focuses on interactions between humans and digital artefacts as well as on the forms of knowledge circulating within these interactions, drawing on Actor-Network-Theory (ANT) and Science and Technology Studies (STS). From this perspective, attention is paid, for example, to the role played by socio-technical arrangements composed of humans, interfaces, keyboards, mice, joysticks, data glasses, gaming chairs, and similar elements in organizing physical activities, actions, perceptions, affects, and (self-)experiences. At the same time this dimension raises the question of which kinds of knowledge must be developed and acquired to participate competently in such arrangements. Playing a computer game, for instance, requires practical knowledge appropriate to the use of the relevant artefacts as well as a practical sense of the specific objectivity (*Gegenständlichkeit*), spatiality, and temporality of the virtual game world represented on the screen. From this perspective, learning how to play a game means inhabiting its »microworld« »without a map«—as David Sudnow has shown it in his instructive phenomenological-praxeological contribution on game studies *avant la lettre*.⁴⁹ This involves becoming familiar with the mi-

47 E.g. Schatzki, Theodore (2025): »The Changing Form of Social Phenomena Today«, in: *Philosophy and Technology* 38:1, pp. 1–22.

48 E.g. Reckwitz, Andreas (2017): *Die Gesellschaft der Singularitäten. Zum Strukturwandel der Moderne*, Berlin: Suhrkamp, p.225–227; Beer, David (2016): *Metric Power*, London: Palgrave Macmillan; Schmidt, Robert/Kempff, David/Weigelin, Max (eds.) (2024): *Leistungsvergleiche und evaluative Praktiken. Sport als instruktiver Fall der Soziologie der Bewertung*, Bielefeld: transcript.

49 Sudnow, David (1983): *Pilgrim in the Microworld*, New York: Warner Books.

crowworld and adjusting concrete game activities, such as the minimal movements of an analogue joystick, to on-screen events through visual and auditory anticipation, timing, and a sense of rhythm, in such a way that movement and perception merge into a state of flow.

A precondition for this process is that the virtual game world maintains a reference to the analogue world and to skills acquired within it. Individual player characters in video football games, for example, can only be controlled appropriately by help of an analogue stick if practical knowledge incorporated through physical experience can be translated into the micro-movements required by the controller. From a phenomenological-praxeological perspective, the structure and practical logic of a virtual world thus becomes intelligible to actors in a manner analogous to that of the analogue world: by becoming accustomed to it in such a way that it turns into a medium for incorporated knowledge circulating between the socio-technical setting of concrete game activities and the events represented on the screen. Conversely, knowledge incorporated through virtual play can also feed back into analogue practice. In this sense, the virtual game functions as a training space for pre-reflective perceptual, decision-making, and affective knowledge which, once incorporated, also comes into play in analogue contexts. This enables, for example, for the recognition of situations that resemble the situational constellations of the game world, with the effect that situation-appropriate game knowledge is activated without conscious deliberation. The mimetic references between analogue and digital game worlds thus extend in both directions, in such a way that the screen does not constitute a boundary between digital and analogue worlds but rather functions as a »gate« through which practical knowledge circulates in continuous feedback loops.⁵⁰

The ways in which physical activities—such as playing a video game, participating in an online meeting, or programming—are formatted by socio-technical arrangements of digital practice are accessible to ethnographic observation and, in this sense, to the public.⁵¹ This also applies to the formatting of action through the design of software interfaces and online platforms. By contrast, the effects of algorithmic systems largely remain inaccessible to users and ethnographic observers *in situ*. These systems establish their own »grammaticality«,⁵² structuring action from offstage by filtering content, »deciding« what becomes visible and

50 Theweleit, Klaus (2004): *Tor zur Welt: Fußball als Realitätsmodell*, Köln: Kiepenheuer und Witsch.

51 Schmidt: *Stumme Weitergabe*; Schmidt/Volbers: *Öffentlichkeit als methodologisches Prinzip*; Schatzki: *The Changing Form of Social Phenomena Today*.

52 Fuhrmann, Jan (2024): *Die Zeit der Algorithmen. Zur Inklusion algorithmischer Systeme in die Zeitstrukturen des Ökonomischen und des Politischen*. Dissertation Carl von Ossietzky Universität Oldenburg.

what remains invisible, generating metrics that function as behavioural norms, or orienting attention and affect. In the case of autopoietic algorithmic systems such as artificial neural networks—which, unlike allopoietic systems, do not process communication based on predefined and pre-programmed universal rules but instead structure themselves through processes of ›learning‹—practice and algorithm mutually shape one another.⁵³ From this perspective, the algorithmic logic not only transforms established practices but also generates processes operating behind practices that guide it without being accessible to an actors' practical knowledge. Data logic operates behind users' backs, according to Martin Feige in his »Critique of Digitalization.«⁵⁴

This diagnosis also points out to a third dimension which addresses how digital practices structure and produce power relations, social hierarchies, and inequalities; how they (re)produce norms and evaluations; and how they ultimately affect the order of the analogue world by reshaping perceptions, attentions, activities, decisions, and affects, thereby contributing to new forms of subjectivity, such as the ›networked self‹.

From a praxeological perspective, however, digital artefacts do not determine practice. Rather, they acquire their meaning and value within practice itself. In this sense, they do not possess agency in and of themselves but are attributed agency through practice. Brümmer demonstrates this convincingly in her ethnographic studies on the use of digital game-analysis systems in professional football.⁵⁵ By generating new practices of visualization, measurement, and evaluation, these technologies help determine what may appear as a relevant fact for the concrete organization of training and match processes. They exert a profound influence on social interactions, team dynamics, and training and playing practices by reshaping how coaches and players perceive both the game and themselves. At the same time, which of the various forms of digitally generated information are recognized as relevant data for practical use remains subject to contested negotiation processes,

53 Ibid.

54 Feige, D. Martin (2025): *Kritik der Digitalisierung. Technik, Rationalität und Kunst*, Hamburg: Felix Meiner.

55 Brümmer, Kristina (2018): »Subjectivation by video. Ethnographic explorations on practices of video analysis in high-performance youth football«, in: *German Journal of Exercise and Sport Research* 48:3, pp. 358–365. Online: doi.org/10.1007/s12662-018-0504-5 (last access: 20.02.2026); Brümmer, Kristina (2019): *Spielsysteme, Matchpläne, Spielanalysen. Über Praktiken und Medien des Kontingenzmanagements im gegenwärtigen Fußball*. *Sport und Gesellschaft* 16:3, pp. 264–296. Online: <https://doi.org/10.1515/sug-2019-0017> (last access: 20.02.2026); Brümmer, Kristina (2019): »Coordination in Sports Teams. Ethnographic Insights into Practices of Video Analysis in Football«, in: *European Journal for Sport and Society* 16:1, pp. 27–43. Online: doi.org/10.1080/16138171.2019.1603682 (last access: 20.02.2026).

and the interpretation and evaluation of such data are equally contested. Experienced coaches have long insisted that digitally produced information is of limited relevance for organizing training and match processes when compared with their own practical experience and knowledge—their quasi-intuitive ›coaching eye‹. This assessment has been shaped, not least, by the fact that their position within the field depended on the recognition of this experience and knowledge and that its devaluation threatened their standing.

According to Brümmer, however, attitudes toward digital technologies have shifted in recent years. Digital data have increasingly gained recognition, partly because their quality has improved significantly in the eyes of relevant stakeholders. Contemporary digital analysis systems no longer merely record individual performance metrics—such as running distances, ball contacts, or shots on goal—which coaches and players often regard as offering limited insight into the players' ›ability to play along‹.⁵⁶ Instead, they also generate information on collective game dynamics, while practical insights derived from user experience are continuously incorporated into the technological development and the programming of analysis software.⁵⁷ This development enhances the value of digital data as a means of managing and constraining—rather than eliminating—the ignorance and uncertainty that are constitutive of competitive sports, for instance regarding player development and future success (or failure).

Nevertheless, even digitally generated information that is recognized as relevant data within the field does not exert any objective or direct influence. Rather, it becomes operative within meta-pragmatic negotiation practices in the course of which interpretations of and reflections on analogue training and playing practices are contested, for example between coaches and players. In other words, such data do not guide analogue practice directly but influence it indirectly through contested processes of interpretation and evaluation. Within these negotiation practices, data assume the status of ›boundary objects‹⁵⁸ to which all participants must refer from their respective positions to justify and legitimize their viewpoints. This way, they function as social factors which—despite lacking the materiality of a field marking or a goal—resemble them in one decisive respect: once established as recognized data, they cannot be ignored. All participants are compelled to engage with them to assert their positions, an engagement that in turn requires a practical sense of

56 Brümmer: Mitspielfähigkeit.

57 Schmidt, Robert/Kempf, David/Weigelin, Max (2024): ›Leistungsvergleiche und evaluative Praktiken. Sport als instruktiver Fall für eine Soziologie der Bewertung‹, in: id. (eds.): ›Leistungsvergleiche und evaluative Praktiken. Sport als instruktiver Fall der Soziologie der Bewertung, Bielefeld: transcript, pp. 13–42, here p. 30.

58 Star, Susan L./Griesemer, James R. (1989): ›Institutional Ecology, ›Translations‹ and Boundary Objects. Amateurs, Professionals in Berkeley's Museum of Vertebrate Zoology, 1907–39‹, in: Social Studies of Science 19:3, pp. 387–420.

the strategically effective, for example well-timed, use of data in practice. Contrary to technology-deterministic assumptions, digital artefacts thus do not determine practice in a linear, top-down manner; rather, they exert their influence indirectly by becoming shared reference points in social conflicts and negotiation processes. Their power is precisely due to this mediated, contested status.

5. Conclusion

To summarize, this contribution advances five core claims: First, knowledge is not a substance contained in individuals' minds and/or bodies nor in infrastructures or objects. Rather, it unfolds in practice through the contingent encounters of heterogeneous co-players. Secondly, an encounter is not merely a contact but a relational process that arises only if the entities involved are disposed toward one another. A lack of connectivity, by contrast, results in dis-enablement and exclusion. Thirdly, the abilities that become relevant as knowledge in an encounter are always reflectively tied to the teleoaffective structure and the guiding code of the practice currently being performed—for example, in sports to the code of outbidding, and in laboratory practice to the code of truth production. Fourthly, in encounters involving human and non-human participants, existing structures are not merely reproduced; they also open up »situational potentials« for the unfolding of a power of imagination from which novelty can emerge.⁵⁹ Finally, with the rise of new co-players in practice such as digital technologies, new forms of knowledge, self-knowledge, and non-knowledge are taking shape that not only transform practices and their subjects but also give rise to new practices and social contexts—for example, »synthetic situations«,⁶⁰ new modes of algorithmic formatting in practice, as well as debates on the evaluation and significance of digital data which themselves become established as powerful social factors in the context of these debates.

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59 Jullien: Über die Wirksamkeit.

60 Knorr Cetina, Karin (2009): »The Synthetic Situation. Interactionism for a Global World« in: *Symbolic Interaction* 32:1, pp. 61–87.

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›Bildungswissen‹ and its Transformation in a Historical Perspective

Joachim Scholz

1. Introduction

By knowledge, the research in cultural history focuses on an aspect which is crucial for the constitution of society. Societies shape knowledge cultures which find expression by epistemic practices, media, and materialities and which can furthermore be reconstructed. In a much quoted, concise definition, Karin Knorr Cetina calls knowledge cultures »those practices, mechanisms, and principles [...] of one field of knowledge« which »decide about how we know what we know«.¹ The focus of education-scientific or education-historical research is, more specifically, on that section of a knowledge culture which determines which knowledge is supposed to be obligatorily and bindingly transferred from the older to the younger generation. In modern historical constellations this section of cultural practice—we may call it ›educational knowledge‹ (›Bildungswissen‹)—is programmatically formulated, fixed by curricula, and communicated as well as appropriated by way of specific practices.² The following contribution starts out from the historical finding that by the end of the 18th and in the early 19th centuries the educational system was subject to processes of fundamental change which shaped the organisation of school as well as the profession in a way which is typical for modern society. Although reforms were also initiated at the level of lower schooling and the neo-humanist concept of general education (›Allgemeinbildung‹) showed some egalitarian features, it was the grammar school, which decided about access to university and was the decisive arena of the transformation and expansion of the educational system. Higher educational

1 Knorr Cetina, Karin (2002): *Wissenskulturen. Ein Vergleich naturwissenschaftlicher Wissensformen*, Frankfurt a. M.: Suhrkamp, p. 11.

2 The German term ›Bildung‹ has a broad meaning in the German-speaking tradition, only approximated by the English term ›education‹. It refers not merely to training or instruction but to a transformative process of personality shaped through self-activity. For this reason, in the following the term ›educational knowledge‹ (›Bildungswissen‹) is used.

careers, among which then there also counted university studies, frequently led towards the civil service, however also among the clergy, in literature, and in publicism the scholars met as a group most of all after 1800, which in a way epitomised the increased significance of ›Bildung‹.³ They were the first to make visible this new function of education, of no longer being a ›derived feature of status or some private particularity but a relevant criterion for a social position connected to claims to power‹. For them the slogan was true: ›Man creates his social status by way of his Bildung‹.⁴ Fritz Ringer in his monograph on the scholars points out to a passage in Goethe's *Wilhelm Meister*, where the personality ideal clearly reveals itself. Confronted with the wordly nobleman, the bourgeois protagonist does feel inferiority and the pressure to prove his worth, but most of all he is characterised by his ›deep longing for fully developing his personality‹.⁵ In Goethe's novel, the path of self-development by way of education takes the young man to the theatre and not to university. However, after a period of crisis during the transformation phase at around 1800 also and precisely the university developed a new knowledge culture which was to most closely combine with the idea of Bildung. In the following contribution this shall be outlined and, more specifically, the question shall be asked in which ways knowledge occurred as ›educational knowledge‹ (›Bildungswissen‹) in this context. Apart from the reform papers on the occasion of newly founding the University of Berlin, also descriptions of new seminar practices at around 1800 as well as the methodological literature of the time, which was supposed to pave the way of future students to university studies by viewing at the ideal and the reality of university and to make them familiar with academic teaching formats and manners, shall be taken into consideration.

2. The crisis and restructuring of German universities by the end of the 18th century

For Friedrich Paulsen, this early authority of the German research of the history of educational science, still at the beginning of the 20th century it was a fact that the changes which had happened at German universities since the age of Enlightenment meant the transition to their modern constellation. By moving away from ancient

3 Ringer, Fritz K. (1983): *Die Gelehrten. Der Niedergang der deutschen Mandarine 1890–1933*, Stuttgart: Ernst Klett, pp. 24–25.

4 Jeismann, Karl-Ernst (1987): ›Einleitung. Zur Bedeutung der ›Bildung‹ im 19. Jahrhundert‹, in: id./Peter Lundgreen (eds.): *Handbuch der deutschen Bildungsgeschichte*. Vol. III: 1800–1870. Von der Neuordnung Deutschlands bis zur Gründung des Deutschen Reiches. München: C. H. Beck, pp. 1–21, here p. 2.

5 Ringer: *Die Gelehrten*, p. 27.

scholasticism with its dogmas and petrified forms, by shifting the weight of the faculties, as a consequence of which theology lost its uncontested position towards the faculties of law and philosophy, by the German language being introduced as a »living and invigorating language« of instruction, and by the systematically structured lecture pushing through, not least also by the development of university seminars, he identified the constituting factors for the principle of free research and teaching which first and foremost characterised the university of his time.⁶ Today one is more careful when it comes to the nature of the 18th century as a turning point, and in view of university history one describes longer preliminary stages and lines of continuity. That many new developments connected to the idea of Enlightenment became apparent even since the Thirty Years War is emphasized e.g. in *Handbuch der deutschen Bildungsgeschichte* (*Handbook on the German History of Education*).⁷ As a matter of fact, as early as at the threshold to the Modern Age there started the trend towards the differentiation and dynamization of knowledge production and circulation which lasts still today. For example, even the Lutheran Reformation had marked the end of the previous static knowledge culture which had exclusively counted on passing on the tradition, and earlier as assumed by Paulsen we observe the beginnings of the restructuring of the university's teaching and research infrastructures as well as a differentiation of new knowledge fields at university (e.g. in the natural sciences or the technological fields of knowledge). Nevertheless, it cannot be overlooked that despite such already perceivable shifts many academic contemporaries considered the university to be stuck in traditional structures and strictly keeping up its function of communicating fixed and safe knowledge stocks. Under the influence of the Enlightened spirit of the times, one hoped for change to be initiated rather by other institutions. More than a few critics of the university favoured the training of experts at special schools which promised to spread useful insights from many fields of knowledge more effectively. New research practices were rather expected from the academies, whereas the university was downgraded as a dinosaur burdened with tradition. However, insofar as the Enlightenment generally strengthened educational institutions, also the universities benefitted, and notwithstanding widely spread criticism finally even they had come under the influence of Enlightened reform intentions. In the 18th century two prominent new foundations, Göttingen and Halle, were considered strongholds of the philosophy of Enlightenment, and at Königsberg—otherwise a rather modest university—the famous philosopher

6 Paulsen, Friedrich (1902): *Die deutschen Universitäten und das Universitätsstudium*, Berlin: Verlag von A. Asher & Co., pp. 52–60.

7 Hammerstein, Notker (2005): »Universitäten«, in: Notker Hammerstein/Ulrich Herrmann (eds.): *Handbuch der deutschen Bildungsgeschichte*. Vol. II: 18. Jahrhundert. Vom späten 17. Jahrhundert bis zur Neuordnung Deutschlands um 1800, München: C.H. Beck, pp. 369–400.

Immanuel Kant was teaching. This way the universities survived the crisis which recently, during the occupation of wide parts of Germany by Napoleon's troops, had caused a real extinction of universities. At the same time the neo-humanist reform activities became stronger. Most of all the planning and refoundation of the University of Berlin, realised in 1800, allows for studying an ambited reflection on the future of the university. The scientific ideal, formulated in the founding papers, carried with it new ideas of what should characterise scientific knowledge, however also of how it was to be created, appropriated and communicated.

3. Concepts of a new knowledge culture in the context of the Prussian university reform

Ideas of knowledge and science moving away from the model of knowledge being fixed and legitimated and stored by canonical texts had spread at European universities since the early Modern Age. Since the 18th century the search for knowledge and insight started to become the criterion, an aspiration which reinterpreted the proverbial ›academic freedom‹ and demanded a critical control of establishing knowledge.⁸ In the natural scientific disciplines these standards—early on initiated by Thomas Hobbes (1588–1679)—were established by practices of observation and the collection of data, in the humanities it was flexible methods of text criticism and new practices of interpreting and reading which indicated a shift. The relation of teaching and learning at university changed from an authoritarian way of communicating to cooperative ways for which there developed new institutional frames. The academic concept of knowledge was particularly accentuated under neo-humanist auspices. In their memoranda the reformers from the planning environment of refounding the University of Berlin criticised established university teaching formats, and for formulating a modern ideal of science they referred to new, participative and activating knowledge practices.

The reform concepts had the insight in common that in particular the lecture in its traditional form did no longer meet the requirements. The format of the lecture should either be transformed into other forms, or it should change markedly. For Johann Gottlieb Fichte the availability of books made the lecture lose its original purpose, that is the communication of knowledge. In his *Plan einer zu Berlin zu errichtenden höhern Lehranstalt* (*Plan for an institution of higher education to be established in Berlin*), written in 1807, he criticises professors who in their lectures just duplicate what is written in the books. Repetition, he says, is no activity in its own right but is the opposite of what universities are about and of what students are supposed to

8 See Rüegg, Walter (ed.): *Geschichte der Universität in Europa*. Vol. III: Vom 19. Jahrhundert zum Zweiten Weltkrieg 1800–1945, München: C. H. Beck, 2004, pp. 18–35.

learn there: »the art of making use of knowledge«. The university must become »a school of the art of making scientific use of reason«.⁹ While being aware of this kind of activity and while keeping its rules the elaborate use of knowledge, he says, can become habitual, in a way, and become »a unique element of our personalities, and our lives, which are to be developed freely and at will«.¹⁰

Also Wilhelm von Humboldt opposed the scholastic way of teaching which at his time was still common at universities, and sneeringly he joined the critics of the lecture format.¹¹ His essay *Über die innere und äußere Organisation der höheren wissenschaftlichen Anstalten in Berlin* (*On the inner and outer organisation of the higher scientific institutions in Berlin*) of 1810, published as late as in 1896 and 1900, contains condensed ideas of general educational teaching at university and thus counts among the most famous founding documents of the modern research university.¹² Humboldt's formula of »solitude and freedom« as the ideal of university activity was an open confrontation with a kind of science fixing and passing on knowledge by closed systems. It was supposed to be replaced by a kind of university which treats science »always as a still not really solved problem« and was supposed to make both teachers and students »cooperate in always reviving yet casual and purposeless ways«.¹³ By way of its inner organisation the university was supposed to stimulate and maintain permanent research and to make it an ›educational‹ institution (›Bildungsinstitution‹) in a double sense. On the one hand, it is an institution organising knowledge in different ways, that is more dynamically than it is the case with scholasticism or at school, where only fixed knowledge is taught and passed on. On the other hand, the demand to understand science as an uncommitted and unconstrained process of searching for and newly creating knowledge which never comes to an end is immediately connected to a way of developing personality which is typical for Humboldt's idea of education. The nature of a university obliged to science »is thus connecting [...] objective science with subjective education«.¹⁴

9 Fichte, Johann Gottlieb (1817): *Deducirter Plan einer zu Berlin zu errichtenden höheren Lehranstalt*. Geschrieben im Jahre 1807. Stuttgart [Stuttgart]/Tübingen: Cotta'sche Buchhandlung, p. 10. Online: <https://mdz-nbn-resolving.de/details:bsb10732168> (last access: 14.11.2025).

10 *Ibid.*, p. 9.

11 See Menze, Clemens (1975): *Die Bildungsreform Wilhelm von Humboldts*. Hannover, Dortmund, Darmstadt, Berlin: Hermann Schroedel Verlag KG, pp. 280–282.

12 Humboldt, Wilhelm von (1810/1969): »Über die innere und äußere Organisation der höheren wissenschaftlichen Anstalten in Berlin«, in Andreas Flitner/Klaus Giel (eds.): *Werke in fünf Bänden*. Vol. IV: *Schriften zur Politik und zum Bildungswesen*, Darmstadt: Wissenschaftliche Buchgesellschaft, pp. 255–266.

13 *Ibid.*, p. 256.

14 *Ibid.*, p. 255.

For this, the lecture was not sufficient. Rather—as again Fichte describes—university teaching must take on the »shape of a dialogue«. It is, he said, »mutual information of and by everybody and the melting together of the individuals to one learning organic whole as it can precisely develop only out of these learning individuals.«¹⁵ In terms of method, Fichte's ideas result in demands for variety: apart from delivering subject matter by way of lectures and books, he suggests exams where not only knowledge is requested but its skilful use is demonstrated. He suggests both *konservatoria* (conversations), »in the course of which the disciple asks questions and the teacher asks back about the question, which way there develops an expressive dialogue of the Socratic kind«,¹⁶ and written elaborations on certain tasks. In Fichte, at last the continuous exercise of making use of reason does not only concern the students. He also demands the establishment of a »Professor Seminarium (seminar of the Professors)«. ¹⁷ Friedrich Schleiermacher, on the other hand, does not go as far as to replace the lecture by conversations, as Fichte does. Also, he has an interest in the scientific attitude which must be exercised, however it must be based on an example, that is the skilful lecture by a professor, he says. To give reasons he explains: »Our education is much more individual than the old one, thus the conversation is at once by far more personal, so that no individual could be named as a conversation partner speaking in the name of all others and the conversation would become a form which is only confusing and annoying«. ¹⁸ Thus, particularly the kind of education which aims at individual characteristics and is thus individualising as well as the specialisation of knowledge Schleiermacher perceived indeed required centring and focussing. Accordingly, the communication of knowledge, he said, requires a representative, »the desk lecture at university« shall, by way of a kind of Socratic teaching conversation, »only create awareness of ideas«. ¹⁹ However, also Schleiermacher emphasizes that everything inflexible and schematic shall disappear from the lecture and that the professor must both incorporate and create a scientific attitude. The teacher must make everything he says develop in front of his listeners, he cannot just tell what he knows but must »reproduce« his own insight, »the act itself, so that they [the students; J.S.] constantly not only collect information but im-

15 Fichte: *Deducirter Plan*, p. 28.

16 *Ibid.*, p. 15.

17 *Ibid.*, p. 13.

18 Schleiermacher, Friedrich Daniel Ernst (1808/1998): »Gelegentliche Gedanken über Universitäten in deutschem Sinn. Nebst einem Anhang über eine neu zu errichtende«, in: Dirk Schmid (ed.): *Kritische Gesamtausgabe. Erste Abteilung. Schriften und Entwürfe*, Vol. 6: *Universitätsschriften*. Herakleitos. *Kurze Darstellung des theologischen Studiums*, Berlin/New York: De Gruyter, pp. 15–100, here p. 48.

19 *Ibid.*, p. 48

mediately watch the activity of reason while creating insight and recreate it while watching«. ²⁰

The structural considerations of the Prussian educational reformers have been extensively reconstructed and critically discussed by historical research. In this context, the tensed relationship between the drafts and the subsequent organisation of the German university in the 19th and 20th centuries has been pointed out to, and it has been demonstrated that e.g. referring to Humboldt was often rather a quotation than the normative guideline for the actual development. »The ideal Humboldtian university was never congruent with the actual German university of the 19th century«, as Rüdiger von Bruch takes stock. ²¹ The plausibility of the historical findings on the »Humboldt myth« (Ash) must instead be confronted with the fact that around 1800 the changed relation to knowledge did not only consist of ideal drafts but also of new ways of dealing actively and dynamically with academic practices, which shall be viewed at in more detail in the following.

4. Infrastructures of knowledge: the seminar and the practices of studying

The knowledge order pushing through at around 1800 was not limited to a new conception of the university and a new concept of knowledge and science but can be read from formats of university teaching and studying themselves. Thorsten Pohl even supports the thesis that the modern understanding of university teaching as developed in the memoranda lagged behind the contemporary practice which, by the seminar as a format, had already partly been implemented, ²² as will have to be demonstrated. However, historical praxeology offers even earlier indications for tracking constituting factors of more dynamic ways of making use of knowledge, for even the spread of the book as a teaching aid from the distance had, in the Early Modern Age, contributed to accelerating the communication among students and their teachers and to replacing the old culture of being present at university which was tied to reading manuscripts aloud. ²³ The increased production of paper coming

²⁰ Ibid., p. 49.

²¹ Bruch, Rüdiger vom (1999): »Langsamer Abschied von Humboldt? Etappen deutscher Universitäts-geschichte 1810–1945«, in: Mitchell G. Ash (ed.): *Mythos Humboldt. Vergangenheit und Zukunft der deutschen Universitäten*, Wien/Köln/Weimar, pp. 29–57, here p. 38.

²² Pohl, Thorsten (2013): »Die Seminararbeit. Eine Skizze ihrer institutionellen Rahmenbedingungen im 19. und beginnenden 20. Jahrhundert«, in: *Zeitschrift für Germanistik*, 2, pp. 293–310, here pp. 300–301.

²³ See Ricken, Norbert/Reh, Sabine/Scholz, Joachim (2023): »Transformationen des Bildungswissens. Eine wissenstheoretische und -geschichtliche Perspektive auf digitale Wissenskulturen«, in: Sandra Aßmann/Norbert Ricken (eds.): *Bildung und Digitalität. Analysen – Dis-*

along with the book is yet another example. Also, this made the autonomous-productive appropriation of knowledge easier: »The unprecedented availability of paper allowed students to produce a large number of documents and contents of them were a mirror of their study experience with notes of various kinds. Single words, phrases, quotations of various lengths, lecture notes, transcripts of works or parts of works on study subjects, or simply things of interest to the author«. ²⁴ And not least the expansion of the production of written material came along with changed reading practices. The Göttingen philologist Johann Matthias Gesner (1691–1761) successfully propagated a new way of cursory reading in the course of which reading was oriented at grasping the text as a whole, and the reader's attention was supposed to be directed on the overall context instead of individual phenomena. Gesner's disciple again, the classical scholar Friedrich August Wolf (1759–1824), took up these ideas in the preface to his first work, *Prolegomena ad Homerum* (1795), and introduced new ways of practicing university studies for his philological seminar founded at Halle in 1787. ²⁵ Wolf had his students interpret the classical works in a way as to practice a tactful, appropriate application of philological knowledge by way of intensive conversation among each other and with their teacher. Doing so, the reference to interpretation rules was rather loose, the way of dealing with each other was rather collegial. ²⁶ According to Lutz Danneberg in view of the history of his discipline, German studies, »abilities, skills and methods of one's own way of working were developed and scientific norms, but most of all philological tactfulness, were in a way habitually internalized.« ²⁷ Seminars such as Wolf's or his disciple August Boeckh's (1785–1867)

kurse – Perspektiven, Wiesbaden: Springer VS, pp. 313–347, p. 328. Online: https://doi.org/10.1007/978-3-658-30766-0_12.

- 24 Lepri, Valentina (2023): »Note-Taking with Method. Remarks on the Theories of Knowledge in Early Modern *De ratione studii* Manuals«, in: id. (ed.): knowledge shaping. Student note-taking practices in early modernity, Berlin/Boston: De Gruyter, pp. 9–28, here p. 9–11. Online: <https://doi.org/10.1515/978311072722-002>.
- 25 At that time he as well as the Berlin educationalist Friedrich Gedike had been tasked by the Prussian Minister of the Interior, von Zedlitz, with the founding of two institutions of teacher training. In this context Wolf is considered to have been the one who, by way of his programme aiming at the studying of ancient languages, established philology as the »professional science« of grammar school teachers.
- 26 Apart from interpretation and the writing of essays, Spoerhase and Dehrmann also count Wolf's personal conversations and walks with his students among these new practices. Wolf did not like to be paid for them: »The relations between professor and students at the seminar were collegial, not mercantile« (Spoerhase, Carlos/Dehrmann Mark-Georg (2011): »Die Idee der Universität. Friedrich August Wolf und die Praxis des Seminars«, in: Zeitschrift für Ideengeschichte 5:1, pp. 105–117, here p. 109).
- 27 Danneberg, Lutz (2013): »Altphilologie, Theologie und die Genealogie der Literaturwissenschaft«, in: Thomas Anz (ed.): Handbuch Literaturwissenschaft. Vol. 3: Institutionen und Praxisfelder, Weimar: Verlag J. B. Metzler, pp. 3–25, here p. 20.

contributed to creating at universities an understanding of knowledge as a complex of intertwined proceedings and skills which build on each other and to providing it with an institutional frame. The seminar was thus considered the ›nursery‹ of scientific research.²⁸

It is no coincidence that the epistemic practice Wolf developed—a kind of understanding which is oriented at grasping the overall context and the flexible application of interpretation rules—developed in the context of teacher training. It was at the seminar where future teachers practiced how to have a tactful teaching conversation about matters.²⁹ However, even Boeckh's seminar dissolved from the primacy of teacher training. It completely lacked educational instruction, its goal was exclusively the focus on the practicing of philological science. Sources from the seminar work show that apart from discussing and interpreting—e.g. during simulated teaching situations for future teachers—writing by students was highly appreciated. Via being asked to write down essays on tasks set by the teachers or by the student's themselves there established a student writing culture which was different from the records of lectures in notebooks by an even higher degree of autonomy, served for proving and examining one's own skills and, by its function of »confirming knowledge and representing it to the outside«,³⁰ gradually transferred the ancient format of the disputation into the written form. There is also evidence that the drafts by students served as preliminary works for dissertation theses and this way were in line with the universities' new target definition of extending the existing knowledge stock. The dissertation thesis as a format which, since the second half of the 18th century, combines examination and exercise, developed its current form and function at seminars.³¹

Initially, however, there can be no question of a new knowledge culture pushing through at German universities: in the first half of the 19th century seminars were to be found at less than a few university locations.³² The lecture remained the pre-

28 Pohl, Thorsten (2009): Die studentische Hausarbeit. Rekonstruktion ihrer ideen- und institutionsgeschichtlichen Entstehung. Heidelberg: Synchron, Wiss.-Verl. der Autoren, p. 35.

29 Reh, Sabine/Scholz, Joachim (2021) »Seminars. A Hybrid Form of Education (18th-19th Centuries)«, in: Monica Ferrari/Matteo Morandi/Rita Casale/Jeanette Windheuser (eds.): La formazione degli insegnanti della secondaria in Italia e in Germania. Una questione culturale, Milano: FrancoAngeli, pp. 189–202.

30 Seifert, Sabine (2021): Die Ursprünge der Berliner Forschungsuniversität. August Boeckhs philologisches Seminar in Konzeption und Praxis (1812–1826), Berlin: Berliner Wissenschaftsverlag, p. 328.

31 See Behrs, Jan/Klausnitzer, Ralf/Gittel, Benjamin (2013): Wissenstransfer. Konditionen, Praktiken, Verlaufsformen der Weitergabe von Erkenntnis, Frankfurt a.M./Bern/Wien: Peter Lang, pp. 230–231.

32 Seminars started booming only as late as in the 1870s. On their spread see Pohl: Die studentische Hausarbeit, pp. 35–37 and Pohl: Die Seminararbeit, pp. 305–306.

dominant way of instructing, and if additionally we consider the characteristics of the student culture, as Marian Füssel has recently done based on everyday sources, it becomes obvious that at many places university studies were a dull business between »everyday life of studying and excess«.³³

5. Hodegetic works

The mediation of the ideal and the actual situation was the purpose of the hodegetic works which were published in large numbers in the 18th and 19th centuries. This genre which, due to the increasing spread of literary productions, grew out of the necessity of bibliographic instruction, was essentially stimulated by the encyclopaedic conviction of the inner coherence of the sciences. The authors of this contemporary literature for those starting university studies—in most cases experienced, older university teachers—attempted to spread an Enlightened academic ethos.³⁴ Thus they warn against immorality of which, not without reason, studying at university had a reputation, just like confronting the novice with images of exemplary practice. Thus, university knowledge cultures and their change find expression by hodegetics, although in different ways—rather in view of practice than of theory—which in the following shall be demonstrated by the example of three titles.

The first one is the work *Über das akademische Studium und akademische Leben. Ein Lehrbuch für Jünglinge, so auf Universitäten gehen wollen und bereits daselbst sind* (On Academic Studies and Academic Life. A Textbook for Younglings as Wanting to Attend Universi-

33 See Füssel, Marian (2016): »Studentenkultur in der Frühen Neuzeit. Praktiken – Lebensstile – Konflikte«, in: Andreas Speer/Andreas Berger (eds.): Wissenschaft mit Zukunft. Die »alte« Kölner Universität im Kontext der europäischen Universitätsgeschichte, Köln/Weimar/Wien: Böhlau, pp. 173–204. Lectures and exercises frequently happened at the private homes of the professors, other activities such as the sorting of records or reading happened mostly at home. Flats shared by students were crowded, the student culture at home, in the street, and at the pub was connected to consuming alcohol, honour disputes resulting in duels, however also to prostitution as well as to minor and major offences. Yet still, Füssel identifies indications of a gradual change of the student culture, which found expression by changed habits of reading, writing, and listening, however also by other new practices such as changing the place of studying (see Füssel: Studentenkultur, p. 174). Hardtwig, Wolfgang (1985): »Krise der Universität, studentische Reformbewegung (1750–1819) und die Sozialisation der jugendlichen deutschen Bildungsschicht. Aufriß eines Forschungsproblems«, in: Geschichte und Gesellschaft 2, pp. 155–176.

34 Olbertz, Jan-Hendrik (1994): »Hodegetik. Hallesche Wurzeln einer universitätspädagogischen Denktradition im Licht der akademischen Freiheit«, in: Günter Jerouschek/Arno Sammes (eds.): Aufklärung und Erneuerung. Beiträge zur Geschichte der Universität Halle im ersten Jahrhundert ihres Bestehens (1694–1806). Zur Dreihundertjahrfeier, Hanau: Dausien, pp. 234–244, here p. 235.

ties and Are already there) by Christoph König (1754–1812). For a university professor of the 18th century like the jurispudent König the ideal of university studies consisted of emulating the ancient scholars and following their traditions. By extensive allegories he enters into a discussion of all the traps of university existence. If we read this hodegetics as a list of virtues, then the student seems to be obliged most of all to assess, prior to attending university, his own suitability for studies and to find out if he could count himself among those who could be recommended at all to be granted access to university. Only if, as favourable preconditions, quick-wittedness, a good memory, and also a degree of financial backing come together, König recommends university studies. This requires scrupulous self-awareness, which is why hodegetics communicate primarily knowledge of the various minds and the capabilities attributed to each of them. Introspection and self-selection *before* entering the world of the sciences are demanded and later become a »sensum commune«, ³⁵ a sense of the whole which indeed often cannot be investigated by way of special examinations and in situations of proving one's worth. Also, the second work from the end of the 18th century to be mentioned here grants much space to assessing one's own capability for studies before starting them. Moreover, the literary historian and philologist Erduin Julius Koch (1764–1834) in his *Hodegetik für das Universitätsstudium in allen Facultäten* (*Hodegetics for University Studies at all Faculties*) (1792) bases the self-awareness he demands on a taxonomy of fixed types. Both in the former and the latter the primary task is gaining knowledge of oneself. What is interesting with both hodegetics is that first of all they address a bourgeois clientele aspiring business careers and attending university for this purpose. Koch does without a section »supposed to deal with the education (Bildung) of man«, although nominally he emphasizes its significance. But given the addressees he decides: »Such general reasoning about what is supposed to happen is listened to and forgotten, because it does not enter the heart which is receptive only for the particular«. ³⁶

A third, quite well-known hodegetic work to be introduced here, by philosopher Johann Gottfried Kiesewetter (1766–1819), was published in 1811. Compared to the works from 20 resp. 30 years before, now a qualitative difference becomes obvious. At first Kiesewetter explains what university studies mean (»making efforts concerning a matter, dealing diligently with it«³⁷) and that it is the purpose of scholarly schools to communicate scientific knowledge. He does not bother much with the

35 König, Johann Christoph (1781): Ueber das akademische Studium und akademische Leben. Ein Lehrbuch für Jünglinge, so auf Universitäten gehen wollen und bereits daselbst sin, Nürnberg: Ernst Christoph Grattenauer, p. XIV.

36 Koch, Erduin Julius (1792): *Hodegetik für das Universitäts-Studium in allen Facultäten*, Berlin: Franckesche Buchhandlung, p. XI.

37 Kiesewetter, Johann Gottfried Karl Christian (1811): *Lehrbuch der Hodegetik oder kurze Anweisung zum Studiren*, Berlin: G. C. Nauck, p. 1.

question of who should study. Indeed, certain basic requirements are necessary, »a sane, experienced mind, a productive imagination which is not lazy, and a good, reliable memory«,³⁸ however soon it becomes clear that in the course of studying these qualities may even be further extended and increased. Who studies, cultivates the use of reason and acquires a »higher degree of civilisation«. ³⁹ What makes Kiesewetter's hodegetics special is the wealth of systematically organised, practically implementable rules for correct studying which hardly leave anything out. His suggestions for the »perfection of reasoning power«, ⁴⁰ for example, include very concrete knowledge practices of studying: How must the lecture be attended? How must attending be prepared, what must be considered while listening, for the follow-up, for taking notes? What belongs to purposeful reading, and which rules should be kept while reading? Again and again Kiesewetter comes back to »increasing and perfecting insight by way of thinking for oneself«⁴¹ being of utmost significance. He lectures about ideas being organised by intuition and thoughts, to the last detail he explains procedures to understand meaning, or he recommends contemplation exercises to control autonomous thinking. The purpose is the capability of learning how to study, of self-research and »training the mind«, to once be able to »oneself extend the field of this science«. ⁴² Also when it comes to the value of writing, Kiesewetter speaks out in favour of a culture of »educational knowledge« (»Bildungswissen«) we have already encountered by the ways of learning at the seminar: »Among the eminent matters of a student's private diligence there counts practicing the written essay. [...] Here we just consider the usefulness of these exercises in view of the perfection of insight and of training the power of cognition. They make us consider the subject we are going to write about from different sides and with much attention and thus train the capability of observation and reflection, they make us used to thought moving on quietly and make the structuring of thoughts easy, they train phrasing and help to a better oral presentation, they make us feel the existing faultiness of insight and drive us to remedy it, it is them by way of which we brand matters deeper on the memory etc.«. ⁴³

38 Ibid., p. 14.

39 Ibid., p. 40

40 Ibid., pp. 15–16.

41 Ibid., pp. 224–257.

42 Ibid., p. 240. In the quoted passages Kiesewetter praises the studying of mathematics.

43 Ibid., pp. 251–252.

6. Conclusion

The reformation of the university at the threshold between the 18th and the 19th century, which then found expression by establishing the exemplary model of the University of Berlin, is still discussed in the historiography on universities, however these days it is no longer considered a turning point and connected to clear attributions. Before and parallel to the history told by the emphatic founding papers and parallel to the structural parameters which then, in the course of the 19th century, made the German universities expand unprecedentedly, cultural history and the history of practices also create insights concerning the long run-up to and the complex structure of the preconditions for the new university knowledge order. For example, the culture of studying, which has been discussed in somewhat more detail in this contribution, may partly be traced back as far as to the socially privileged status of the university and to the liberties granted to its students since the Middle Ages.⁴⁴ Despite such long-term observations, the decades around the year 1800 may still be considered a transformation period of particular significance, in the course of which the university knowledge structure is reshaped and starts a constellation which is typical for the Modernity and its understanding of education. The here considered sources provide evidence that in those days, almost at the same time and to the same degree, a new concept of knowledge started having effect, based on new ideas and practices. If the literature on the history of knowledge emphasizes that since the 18th century a new concept of knowledge produced the effect of combining growing and differentiating knowledge stocks by way of epistemic procedures, thus making knowledge transferable and applicable,⁴⁵ at first the aspect of the personal appropriation of this knowledge in the sense of an individual education experience must be noticed. Knowing is more than just appropriating information for the purpose of its application. The ways in which students at university are supposed to be made familiar with scientific knowledge on the one hand makes obvious the intention to refer knowledge and insight to the shaping of one's own personality, to incorporate it and make it reflective in the form of »awareness of the ways of learning.«⁴⁶ The here outlined historical change, however, concerns even knowledge itself and,

44 Not only in the 18th century the relative freedom of the university and its members was the cause of observation by the non-university outside world and resulted in conflicts. Given the frequently perceived exaggerations and excesses which characterised most of all the students' everyday lives, the university had a reputation of living »a culture of deviance in the context of which studies became secondary« (Füssel: *Studentenkultur*, p. 202).

45 Behrs et al.: *Wissenstransfer*, p. 217.

46 Fichte: *Deducirter Plan*, p. 10. And he goes on: »One knows thoroughly and unforgettably only that of which one knows how one got it. Then, [at university; J.S.] not just that is learned and practiced what is given first of all, the capability is developed to learn everything else easily and safely in all eternity and as one likes it; and there develop artists of learning« (ibid.).

from this perspective, means more and different things than just its individual tailoring and the contribution of knowledge to personal development. If from this perspective we look at the seminar practice, most of all the *changed relation to knowledge* moves to the fore which is supposed to be established and cultivated at university. By the hodegetics which, in a way in virtualised forms, transport the understanding of university studies, by the formats of university events such as the discussion during the seminar, the reorganised lecture as Schleiermacher had it on his mind, or in the course of Fichte's walks with students, the exchange, change, correction, and the recreation of knowledge is of significance. After all, these ways of dealing dynamically and reflectively with knowledge devote knowledge to appropriation and consequent dedication, they provide the university with a particular nature for which the term ›educational knowledge‹ is adequate.

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Continuities and Discontinuities of Practices and Logics of (Non-)Knowledge

A Comparative Case Study of Student Practices in University Courses around 1900 and 2025

Alexander Lang, Kristin Flügel

1. Introduction: Student practices as practices of knowledge

University students in their daily work are occupied with many things—they read, listen, write, take notes while listening, repeat, organize, memorize, and discuss. Such student practices are complex and can be understood as ›knowledge practices‹ which are an inextricable part of the everyday university lifeworld of aspiring academics. Analyzing and investigating these practices can therefore make an important contribution to understanding students' learning processes and knowledge acquisition. Students obtain and acquire knowledge through such practices and within the specific educational context provided by the university's infrastructure. Within this framework in particular students absorb, structure, and secure knowledge. This process is fundamentally shaped by the asymmetrical relationship between lecturer and student, the former having essential authority over what is perceived as knowledge and non-knowledge at university in a specific academic discipline.¹ All of this takes place within the context of different types of university courses (e.g. lectures, exercises, seminars), and is in each case enacted performatively through practices.

Here practices are understood, in line with the theory of social practices, as repeatable forms of meaningful action.² They can be seen as establishing and consol-

1 Nevertheless, nowadays students—especially those in the humanities—are given the task to question the canon and critically examine established knowledge. However, it is possible that these discussions in university courses are mostly just about practicing the academic discourse, not about serious criticism. Cf. Kollmer, Imke/König, Hannes/Wenzl, Thomas (2023): »Wissen ohne Geltung oder: Das Seminar als Ort eines kritiklosen Diskurses«, in: Zeitschrift für Pädagogik 69:5, pp. 584–598.

2 Cf. Reckwitz, Andreas (2003): »Grundelemente einer Theorie der sozialen Praktiken. Eine sozialtheoretische Perspektive«, in: Zeitschrift für Soziologie 32:4, pp. 282–301; Haasis, Lucas/

idating social order and thus providing insight into the logic of their cultural environment. In this sense, this article will examine student practices and their logics as practices of knowledge, using the example of two university courses in Germany in comparison, one course from the beginning of the 20th century and one of today, around 2025.

This comparison protects from focusing solely on supposedly new or old and outdated aspects: The comparative perspective seeks to draw attention to the fact that current practices are historically constituted and that past practices are connected to larger and longer developments in the sense of the *longue durée*. For example, as such and detached from their analogue predecessors, so-called digital practices cannot be understood as being entirely new. Practices should be seen as continuations, transformations, and extensions of long-established practices.

As early as around 1900, Friedrich Paulsen in his (historical and contemporary) analysis of German universities and university studies provided a detailed account of »Universitätsunterricht«³—university instruction—and addressed issues related to students, their academic pursuits, and their examinations. He discusses student practices such as transcribing lectures⁴ and identifies the introduction to scientific methods as a key achievement of university seminars.⁵ Furthermore, he emphasizes that engaging with scholarly literature is central to academic studying,⁶ and he highlights, for instance, that it is necessary for students to purchase books themselves rather than merely borrowing them.⁷ Moreover, he describes the practice of reading as always being connected to the practice of writing, as »reading with the pen in hand«,⁸ in the sense of excerpting and annotating. Nevertheless, all these descriptions constitute ideal-typical representations of student practices.

There are already considerable research findings about how students study *these days* and which materialities, media, and technical infrastructures are involved, but not from a perspective that combines epistemological questions with a praxeological approach.⁹ The *historical* sciences have also addressed these topics. In *Geistesar-*

Rieske, Constantin (2015): »Historische Praxeologie. Zur Einführung«, in: id. (eds.): *Historische Praxeologie. Dimensionen vergangenen Handelns*, Paderborn: Ferdinand Schöningh, pp. 7–54.

3 Paulsen, Friedrich (1902): *Die deutschen Universitäten und das Universitätsstudium*, Berlin: Verlag von Asher & Co, p. 201.

4 Ibid., pp. 398–400.

5 Ibid., pp. 400–401.

6 Ibid., pp. 400–407.

7 Ibid., p. 404.

8 Ibid., p. 407. Translation by the authors.

9 Cf. for some insights into contemporary student practices: Hofhues, Sandra et al. (eds.) (2020): *Studierende – Medien – Universität. Einblicke in studentische Medienwelten*, Münster/New York: Waxmann; Meyer, Daniel/Reuter, Julia/Berli, Oliver (eds.) (2022): *Ethnografie der Hochschule. Zur Erforschung universitärer Praxis*, Bielefeld: transcript; Willatt, Car-

beit, Steffen Martus and Carlos Spoerhase have presented a recent and widely discussed praxeological study focusing on the practices of the humanities in their historical transformation.¹⁰ In general, studies combining the history of knowledge and praxeology have been published since the 1990s and continue to do so today.¹¹ In the course of this, the practices of students in the past have also been examined.¹² Going beyond these previous studies, this article explores the practices and logics of knowledge and non-knowledge, the underlying cultures of knowledge, and their transformation.

To do so, the empirical analysis addresses the following questions to examine how students' practices were and are enacted and how this is linked to students' production and acquisition of knowledge: Which practices of knowledge can be observed around 1900 and around 2025, and which underlying logics are present? How are both conditioned by specific infrastructures? What is regarded as knowledge, and what is identified as non-knowledge? How is non-knowledge dealt with—where and when does it occur, and how does it relate to knowledge? What do students and lecturers perceive as valuable knowledge? How do lecturers shape the relationship between knowledge and non-knowledge?

Student practices change significantly over time and are by no means timeless or universal. Examining these changes can contribute to an understanding of the development process of knowledge categories and scientific concepts. So, this article will compare two university courses in the field of history (one around 1900, one around 2025) and the thus applied knowledge practices. Both courses dealt, among

los/Buck, Marc Fabian (2023): »Studieren im Medium des Digitalen«, in: Marc Fabian Buck/Miguel Zulaica y Mugica (eds.): Digitalisierte Lebenswelten. Bildungstheoretische Reflexionen, Berlin: J.B. Metzler, pp. 347–369.

- 10 Martus, Steffen/Spoerhase, Carlos (2022): *Geistesarbeit. Eine Praxeologie der Geisteswissenschaften*, Berlin: Suhrkamp.
- 11 The focus of these studies was and is not solely on university history. For example see Lehner, Eva M. (2023): *Taufe – Ehe – Tod. Praktiken des Verzeichnens in frühneuzeitlichen Kirchenbüchern*, Göttingen: Wallstein.
- 12 Cf. for example Prinz, Michael (2021): »Historische Vorlesungen zwischen freyem Discours und Heftmanufactur. Praktiken des Vortragens und Nachschreibens akademischer Vorlesungstexte im 18. und frühen 19. Jahrhundert«, in: Wolf Peter Klein/Sven Staffeldt (eds.): *Zur Geschichte der Fach- und Wissenschaftssprachen. Identität, Differenz, Transfer*, Würzburg: Julius-Maximilians-Universität Würzburg, pp. 135–179; Füssel, Marian (2024): »Hörsaal-Leben. Zur Praxisgeschichte der Vorlesung im 18. Jahrhundert«, in: *Zeitschrift für Historische Forschung* 49, pp. 441–478; Reh, Sabine/Klinger, Kerrin (2020): »Perspektiven einer bildungshistorischen Praxeologie. Studieren als Praxis«, in: Andreas Hoffmann-Ocon/Andrea De Vincenti/Norbert Grube (eds.): *Praxeologie in der Historischen Bildungsforschung. Möglichkeiten und Grenzen eines Forschungsansatzes*, Bielefeld: transcript, pp. 207–242; Spoerhase, Carlos/Dehrmann, Mark-Georg (2011): »Die Idee der Universität. Friedrich August Wolf und die Praxis des Seminars«, in: *Zeitschrift für Ideengeschichte* 5:1, pp. 105–117.

other things, with the military conflicts between the Delian League and the Peloponnesian League, especially during the Peloponnesian War (431 BCE to 404 BCE). This thematic overlap is intended to enable for a comparison that is not distorted by shifts in content. The comparison can help to highlight the specificity of contemporary conditions. In addition, continuities and discontinuities of academic knowledge practices can be identified. At the same time, this requires a particularly careful comparison, so that no anachronistic conclusions arise. This can be ensured by not making comparisons in a judgmental sense but rather (in the spirit of historical research) by emphasizing the otherness of the past and the meaningfulness of individual actions.

To analyze student practices, this article will at first briefly outline the theoretical framework of the comparative case study. Subsequently, the approximately 120-year-old course and the current one will be analyzed separately regarding the questions outlined above. Finally, continuities and discontinuities will be identified in a conclusion, and further research perspectives will be pointed out to.

2. Theoretical framework: Cultures of knowledge and ›Bildungswissen‹¹³

The contexts shaping and conditioning students' practices and their underlying logics can be summarized under the term ›culture of knowledge‹.¹⁴ In this paper the term is used according to Hans Jörg Sandkühler and Karin Knorr Cetina. Sandkühler provides a contextualist definition by saying that ›cognitive performance and

13 This article uses the terms ›culture of knowledge‹ and ›knowledge culture‹ synonymous. In other publications, the term ›epistemic cultures‹ is used, too. The term ›Bildungswissen‹ could best be translated as ›educational knowledge‹. Since the German word ›Bildung‹ and the English word ›education‹ are not identical and the term ›educational knowledge‹ could be misleading, the term ›Bildungswissen‹ is used in this article. It was first described, but differently, as a form of knowledge by Max Scheler. Cf. Scheler, Max (1926): *Die Wissensformen und die Gesellschaft*, Leipzig: Neue Geist.

14 The concept of thought styles (›Denkstile‹) and thought collectives (›Denkkollektive‹) according to Ludwik Fleck could also be applied. According to Fleck's theory, knowledge is also conceived as a construct. Thought styles describe (similar to knowledge cultures) historically and socially influenced ways of thinking that prevail within a particular community and shape the way in which knowledge is handled. However, the concept of knowledge cultures has the advantage that it focuses more on framework conditions, allowing the present analysis to look at practices. About Fleck's thought styles cf. Fleck, Ludwik (1935): *Entstehung und Entwicklung einer wissenschaftlichen Tatsache. Einführung in die Lehre vom Denkstil und Denkkollektiv*, Basel: Schwabe; Sabisch, Katja (2017): ›Die Denkstilanalyse nach Ludwik Fleck als Methode der qualitativen Sozialforschung. Theorie und Anwendung‹, in: *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* 18:2. Online: <http://nbn-resolving.org/urn:nbn:de:0114-fqs170258> (last access: 11.09.2025).

knowledge [are] embedded in the contexts of complex cultural—epistemic and practical-social—networks». ¹⁵ The logics of practices are tied to the orders of knowledge within which they take place. Knorr Cetina defines the culture of knowledge as being constructed by practices and determining the emergence of knowledge. ¹⁶ Even though Knorr Cetina tends to view practices as the generating factor, it is the connection between practices and the knowledge culture that is particularly important for this article. By help of the analysis of student practices and their logics, the aim is to reconstruct historical and current cultures of knowledge which »are distinguishable, systemically constituted ensembles of epistemic and practical contexts of representations that can be reconstructed holistically«. ¹⁷

This article aims at looking at the context shaping the knowledge representation through student practices. Therefore, it is of interest to see how students are introduced to specific cultures of knowledge. Cultures of knowledge thus determine the scientific practices that are carried out within their context, and practices likewise shape and create the knowledge culture as a social construct. Cultures of knowledge and practices are therefore always in a mutually dependent relationship with each other. It must be noted at this point that knowledge cultures are not absolute. They are neither independent in time—nor are they spatially unlimited. Cultures of knowledge are not monolithic but are subject to constant change and a process of negotiation. The purpose of this article is to identify continuities and changes of knowledge practices and thus to be able to make initial observations about different knowledge cultures over time. It is neither possible nor desirable to present a comprehensive and definitive picture of the respective knowledge culture. As already pointed out to: First indications of the reconstruction of cultures of knowledge should be achieved by analyzing student practices and the logic behind them.

University courses are a particularly interesting object of research because lecturers are faced with a complex task here: They are supposed to impart specialized knowledge as well as propaedeutic techniques of academic research, especially with first-year students. In doing so, they are forced to convey the configuration of the relationship between knowledge and non-knowledge that is customary for their academic discipline. ¹⁸ This knowledge, transmitted from older to younger generations,

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- 15 Sandkühler, Hans Jörg (2014): »Wissenskulturen. Zum Status und zur Funktion eines epistemologischen Konzepts«, in: id. (ed.): Wissen. Wissenskulturen und die Kontextualität des Wissens. Frankfurt a.M.: Peter Lang, pp. 59–72, here p. 59. Translation by the authors.
 - 16 Knorr Cetina, Karin (2002): Wissenskulturen. Ein Vergleich naturwissenschaftlicher Wissensformen, Frankfurt a.M.: Suhrkamp, p. 11. See also the articles by Norbert Ricken and Joachim Scholz in this volume.
 - 17 Sandkühler: Wissenskulturen, p. 60.
 - 18 See also the considerations by Patrizia Breil, Anne Dippel, Christoph Engemann, Estrid Sørensen and Iris van der Tuin regarding the question of how virtual universities deal with truth in this volume.

is closely intertwined with the culture of knowledge it belongs to and to whose ongoing formation it actively contributes.

By the concept of ›Bildungswissen‹ as it was outlined by Norbert Ricken, Sabine Reh and Joachim Scholz, we adopt a theoretical perspective on this particular type of knowledge about knowledge that »can be analyzed as a special form of [...] reflection of knowledge from an *intergenerational* perspective«.¹⁹ It plays a crucial role for the process of subjectivation, constituting: »Who one is made to be through knowledge [...], what position [...] one is ascribed [...], what relationship to the world, but also to others and to yourself goes hand in hand with this, all this is at the core of the respective ›Bildungswissen‹«.²⁰

It may be, for instance, a kind of meta-knowledge of the organization of knowledge, or knowledge of the practices of knowledge production. It is knowledge of how to deal with non-knowledge, too. In doing so, ›Bildungswissen‹ must be conceptualized as being both processual and relational because it emerges from a process of cooperation and negotiation between lecturers and students, who rely on each other: The former set guidelines and are in the powerful position to authorize and evaluate knowledge and knowledge practices. On the other hand, students carry on and potentially transform traditional knowledge practices by developing new routines and idiosyncratic behavior.

3. Case Study Part I: Student practices in a university course around 1900

The first part of the case study will take a closer look at the course from 120 years ago. The basis of the reflections is a notebook written by a student from the summer semester 1903 to the winter semester 1903/04.²¹ The author was Adolf Hofmeister, a male history student in Berlin whose father held a doctorate in history and was director of the university library in Rostock. He is thus a representative of precisely that social group that was particularly common at German universities around 1900. At the end of the 19th century and around 1900 there were almost exclusively male

19 Ricken, Norbert/Reh, Sabine/Scholz, Joachim (2023): »Transformationen des Bildungswissens. Eine wissenstheoretische und -geschichtliche Perspektive auf digitale Wissenskulturen«, in: Sandra Afßmann/Norbert Ricken (eds.): *Bildung und Digitalität. Analysen – Diskurse – Perspektiven*, Wiesbaden: Springer VS, pp. 313–324. Translation by the authors. About ›Bildungswissen‹ see also the articles by Norbert Ricken and Joachim Scholz in this volume.

20 Ibid., p. 325. Translation by the authors.

21 University Archive Greifswald, Estate Hofmeister, B3-32: Prof Eduard Meyer: *Historische Übung – Peloponnesischer Krieg* (Berlin, SS 1903, WS 1903/04), unpaginated, [cover verso].

students at German universities. Moreover, these students often came from an upper social class.²² These two aspects applied to almost all students of the time.

The notebook being the only direct source of the course, it is of course no longer possible to observe the practices firsthand. Instead, attention must be paid to the material traces left behind by bodies and practices in the material.²³ This allows for indirect conclusions about practices. This case study investigates one single case. The praxeological method may—as in this article—start out from a single object²⁴ as well as search for and examine practices in serial sources.²⁵ With case studies starting out from one single object it is of course only possible to search for »repetitions and small deviations«²⁶ within this single object.

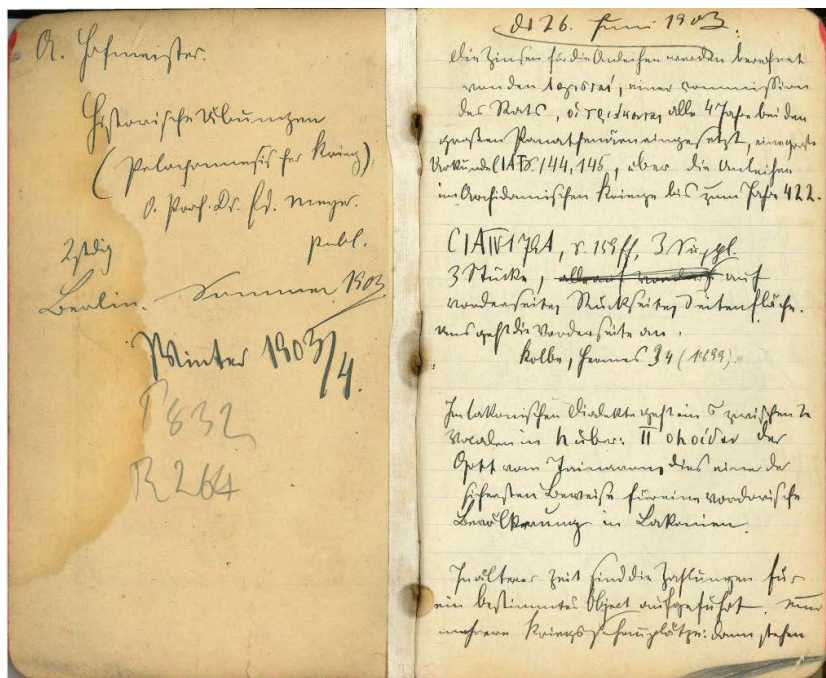
Hofmeister had been enrolled at Friedrich Wilhelm University in Berlin (now Humboldt University) since Easter 1903,²⁷ having studied in his hometown of Rostock²⁸ and in Halle since 1901.²⁹ So he was about halfway through his studies when he attended the course. Historical seminars and exercises were traditionally intended for advanced students. Exercises especially for new students in the field of historical science were not established at universities until the end of the 19th century.³⁰ Hofmeister himself had attended history seminars from his first semester onwards,

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- 22 Möller, Silke (2001): *Zwischen Wissenschaft und ›Burschenherrlichkeit‹. Studentische Sozialisation im Deutschen Kaiserreich, 1871–1914*, Stuttgart: Steiner, p. 65; Jaraus, Konrad H. (2012): »Frequenz und Struktur. Zur Sozialgeschichte der Studenten im Kaiserreich [1980]«, in: *Historische Sozialforschung*, Supplement 24, pp. 125–156, here p. 148.
- 23 Füssel, Marian (2022): »Praxeologie als Methode«, in: Stefan Haas (ed.): *Handbuch Methoden der Geschichtswissenschaft*, Wiesbaden: Springer VS, pp. 1–19, here p. 8. Online: https://doi.org/10.1007/978-3-658-27798-7_18-1 (last access: 06.10.2025).
- 24 Ibid., p. 12.
- 25 Reh, Sabine (2014): »Can we discover something new by looking at practices? Practice theory and the history of education«, in: *Encounters in Theory and History of Education* 15, pp. 183–207, here p. 189; Berdelmann, Kathrin et al. (2019): »Praxeologie in der Bildungsforschung. Ein Umriss historischer und gegenwartsbezogener Forschungsperspektiven«, in: id. (eds.): *Transformationen von Schule, Unterricht und Profession. Erträge praxistheoretischer Forschung*, Wiesbaden: Springer VS, pp. 1–28, here pp. 6–10.
- 26 Reh: Practices, p. 189.
- 27 Amtliches Verzeichnis des Personals und der Studierenden der Königlichen Friedrich-Wilhelms-Universität zu Berlin, Sommersemester 1903, p. 109. Online: <http://edoc.hu-berlin.de/18452/1440> (last access: 06.08.2025).
- 28 Immatrikulation von Adolph Hofmeister, Sommersemester 1901, in: Krüger, Kersten (ed.): *Matrikelportal Rostock*. Online: <http://purl.uni-rostock.de/matrikel/200007385> (last access: 06.08.2025).
- 29 Schmidt, Roderich (1972): Art. »Hofmeister, Adolf«, in: *Neue Deutsche Biographie* 9, p. 469–470. Online: <https://www.deutsche-biographie.de/pnd11695230X.html#ndbcontent> (last access: 06.08.2025).
- 30 Eskildsen, Kaspar (2015): »Private Übungen und verkörpertes Wissen. Zur Unterrichtspraxis der Geschichtswissenschaft im 19. Jahrhundert«, in: Steckel, Sita/Kintzinger, Martin (eds.): *Akademische Wissenskulturen. Praktiken des Lehrens und Forschens vom Mittelalter bis zur*

which is an indication of this period of transition.³¹ However, his sparse notes from the first courses suggest that his attendance was not particularly successful and productive. This may have been because the special differentiation of courses for different student groups had not yet been completed.

The student attended a historical exercise with Professor Eduard Meyer at the University of Berlin. The course was given every semester on Friday from 6 to 8 pm.³²

Fig. 1: First page of the notebook with notes inside the cover.



Moderne, Basel: Schwabe, pp. 143–161, here p. 154; Weber, Wolfgang (2002): *Geschichte der europäischen Universität*, Stuttgart: Kohlhammer, p. 228.

- 31 University Archive Greifswald, Estate Hofmeister, B3-15: Prof. Schirrmacher – Historisches Seminar (Rostock, SS 1901, WS 1901/02), Prof. Meyer – Historisches Seminar (Halle, SS 1902), Prof. Droysen – Historisches Seminar (Halle, WS 1902/03), Prof. Meyer – Historisches Seminar (Berlin, SS 1903).
- 32 Verzeichnis der Vorlesungen der Friedrich-Wilhelms-Universität zu Berlin, Sommersemester 1903, p. 31. Online: <https://nbn-resolving.org/urn:nbn:de:kobv:11-709232> (last access: 30.07.2025); Verzeichnis der Vorlesungen der Friedrich-Wilhelms-Universität zu Berlin, Wintersemester 1903/04, p. 32. Online: <https://nbn-resolving.org/urn:nbn:de:kobv:11-709233> (last access: 30.07.2025).

He notes down a kind of cover page in his notebook with his own name, the name of the professor, the title of the course, the semester and the place where it was held in, the length, and whether it was open to the public or private (Fig. 1).³³ This way the notes can be assigned quite easily. It is a notebook approximately 100 pages long, with pre-printed lines and a size of 19 by 12cm. It is very densely written and has hardly any paragraphs. It was written in both ink and pencil. The student uses different scripts and languages, all of which he is proficient in: Ancient Greek, Latin, and German—as well as German Kurrent script, Latin script, and shorthand.

First of all, it is important to consider how the notebook was handed down: it was among the estate of a professor who had attended this course himself as a student. Thus, Hofmeister was not only part of an educated upper class with a historian as his father, but he also became a history professor himself. The fact that the notebook is among the estate of the professor already speaks for the value that was attached to it. The author considered it necessary to keep it for many years after attending the course and also to keep it in his professorial library. This is certainly a very common practice among scholars of the time.³⁴ But it also reflects the understanding of knowledge. The author assumed that this knowledge would continue to be relevant decades after attending the course. There is no decay of knowledge but rather the idea and understanding that knowledge is timeless and objective.

This may certainly also be due to the materiality around 1900. This notebook is the only thing the student may be supposed to have physically taken away from this course. The notes are not supplemented by other materials. This notebook can and must therefore be understood firstly as a notebook and workbook but, secondly, also as a material learning outcome and knowledge repository. It can be seen as an actively used everyday object as well as a knowledge medium designed for a certain permanence.

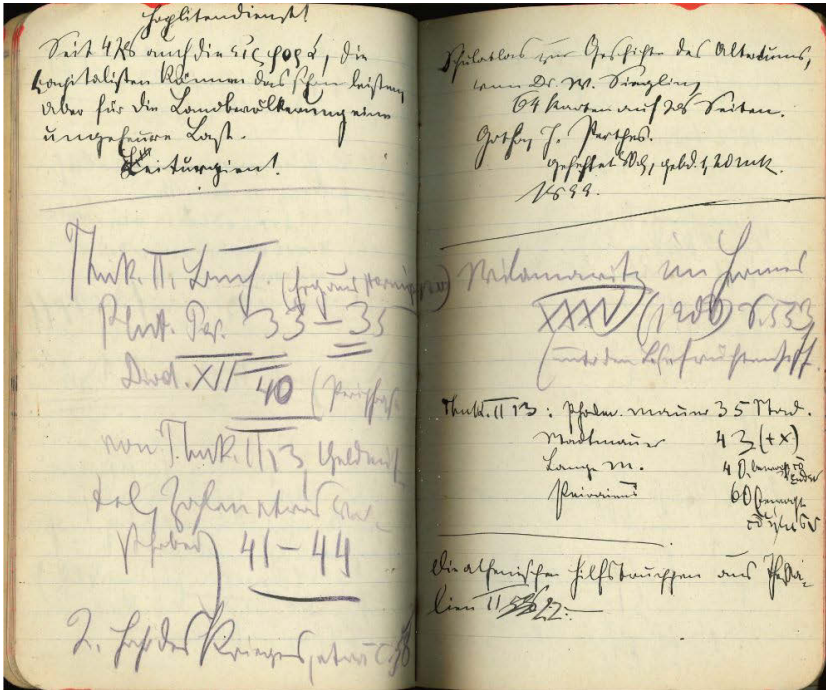
The notebook consists largely of standardized abbreviations of ancient authors and parts of their works, with subsequent text blocks which contain summaries or evaluations of these text passages.³⁵ These parts can be seen as material traces of practices of reading and transforming knowledge.

33 UA Greifswald, Hofmeister, B3-32, [cover verso].

34 Reh/Klinger: *Praxeologie*, pp. 224, 228; Weber: *Geschichte der europäischen Universität*, pp. 227–228.

35 For example: UA Greifswald, Hofmeister, B3-32, [fol. 7r].

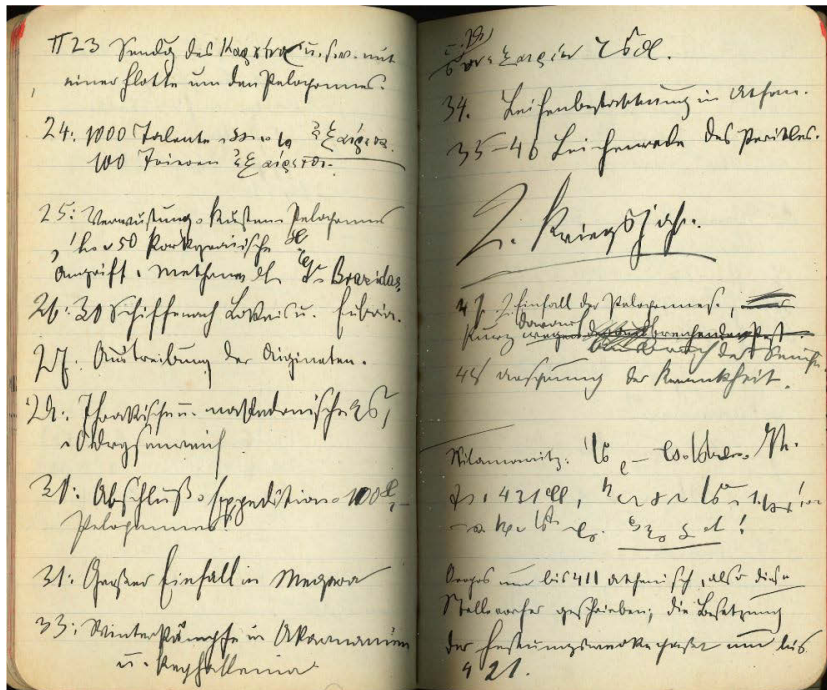
Fig. 2: Notebook page with abbreviations



These abbreviations are very common in the field of ancient history and stand for certain ancient sources. The author (if necessary, the work), book, and chapter are abbreviated—page numbers are not given. By help of these abbreviations, text passages can be clearly assigned in different prints and are independent of their (translated) language. Here (Fig. 2) we have an example of Thucydides' History of the Peloponnesian War. It shows that subject-specific terms and codes were familiar to the student and could be decoded by him. Therefore, when he attended the course, he was already provided with a certain amount of orientational knowledge, which made specialized knowledge accessible and allowed for its systematization, as well as with a subject-specific body of knowledge.

This orientational knowledge can also be found in lists created by the student as practices of knowledge structuring. Longer text passages in the ancient source are summarized by paragraph. Hofmeister compiled lists of entire passages from the ancient sources, for example by creating short summaries of only two lines for each paragraph. This is also a repository, a storage of orientational knowledge. It can be surmised that the later professor used these lists, for example, to be able to quickly find certain passages again.

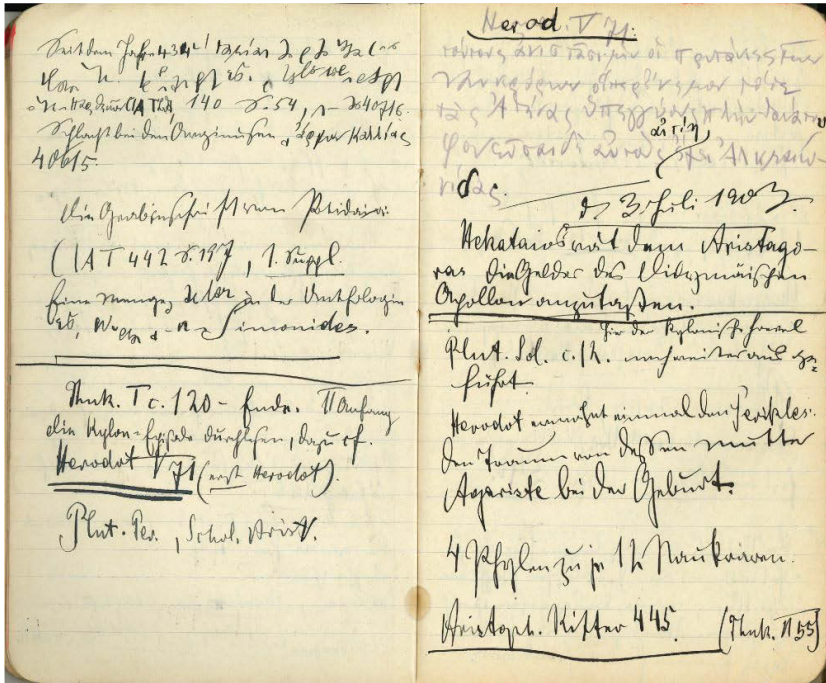
Fig. 3: Notebook page with listed contents of chapters.



For example, in one list Hofmeister summarized Thucydides' History of the Peloponnesian War, Book II, Chapters 23 to 48. For Chapter 31, he writes »Großer Einfall in Megara«³⁶—the invasion of Megara (Fig. 3). Thus, he knows that Thucydides talks about this event at this specific part in his text. This made the sources accessible, especially because the students could not otherwise provide themselves with orientation in source editions. This kind of overview is therefore not directly accessible to students but must firstly be actively created and secondly be saved.

These abbreviations can also be found in parts that may be understood as a kind of homework (Fig. 4).

Fig. 4: Notebook page with homework.

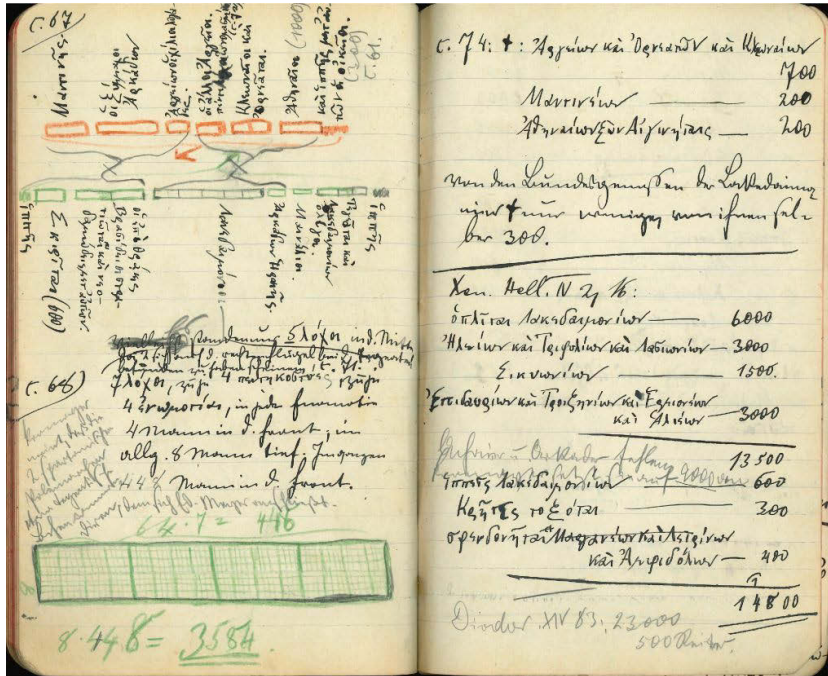


At this point, for example, the students are given the task of reading several sources, and precise instructions are also given: for example »erst Herodot«³⁷—Herodotus first. While working on the task, the student writes down the original ancient Greek text from the source edition into his notebook. This is certainly the practice intended by the professor. Students are supposed to go to the libraries of the seminars on their own and to look at the source editions. Usually this was the only place to look at them. The students practised working with the primary sources there. They were supposed to handle them on their own and to internalise the knowledge of dealing with sources. They practiced the reconstruction of events from the past.

The sources are attributed particular significance. The information provided by them was directly accepted as knowledge in the course and transferred to the notebook.

37 Ibid., [fol. 2v]. Highlighting in the original.

Fig. 5: Notebook page with calculation of troop strength.



Hofmeister, for example, transferred figures directly from Thucydides to his notes (Fig. 5).³⁸ The ancient author talks about the size and composition of an army, and the student transfers these figures and calculates an exact troop strength. This example shows that the information from the sources was simply copied. The knowledge conveyed by the sources is therefore regarded as truth. This was not only done by the students but was a standard academic practice of the time.³⁹ The practices taught and practiced in this course were therefore part of an introduction to the knowledge culture and conventions of contemporary historical scholarship.

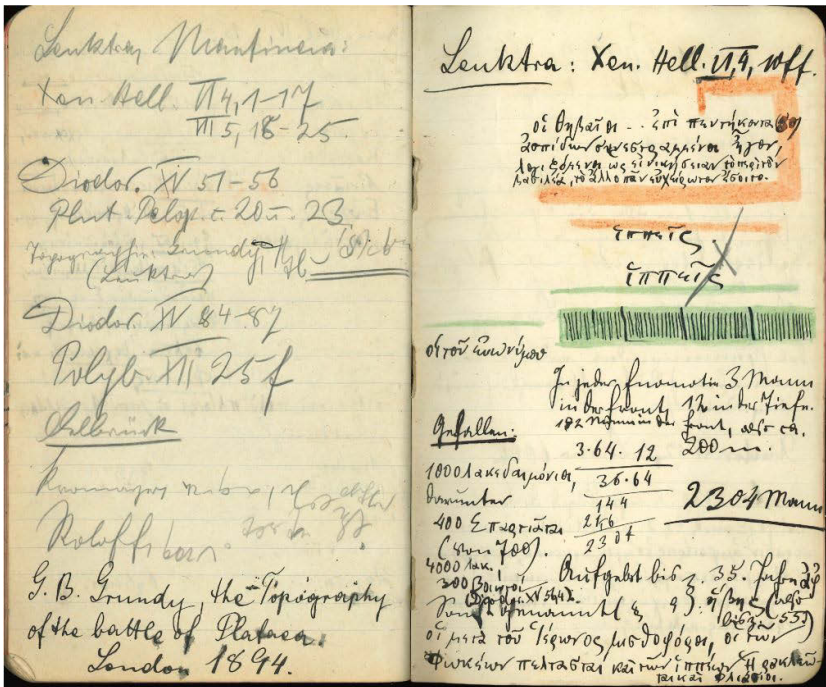
This assumption was very widespread and can also be found in the textbooks and introductory works on ancient history. Curt Wachsmuth in his 'Introduction to Ancient History' of 1895 wrote, for example: Thucydides could tell »the truth about

38 Ibid., [fol. 46v].

39 E.g. Busolt, Georg (1905): Spartas Heer und Leuktra, in: Hermes 40:3, pp. 387–449. Around 1900, troop strength was already being critically questioned, for example by Hans Delbrück. Delbrück, Hans (1900/2006): Geschichte der Kriegskunst. Vol. 1: Das Altertum. Von den Perserkriegen bis Caesar, Hamburg: Nikon.

important events«. ⁴⁰ The text of the ancient author is not regarded as a product of its time and circumstances: Thucydides was said to report with »scientific clarity«. ⁴¹ This conveys an understanding that past events are directly accessible to the trained eye through the sources. This means that the learned historians of the time around 1900 are able to extract the truth handed down to the readers by, for example, Thucydides. This assumption was passed on from the professor to the student and trained in and through the course.

Fig. 6: Notebook page with precise calculation of fatalities.



Knowledge of the past in the sources did not have to be worked out interpretatively or to be read from between the lines but could be extracted directly. Knowledge was always believed to be explicitly found in the sources—such was the prevailing conviction at the time. For example, the student also calculated exactly how many

40 Wachsmuth, Curt (1895): Einleitung in das Studium der Alten Geschichte, Leipzig: S. Hirzel, p. 519. Translation by the authors.

41 Ibid., p. 521. Translation by the authors.

people died in the Battle of Leuctra a few years after the Peloponnesian War (Fig. 6).⁴²

It naturally follows from this that non-knowledge is everything the sources do not explicitly reveal. A distinction between knowledge and non-knowledge could therefore be made quite clearly. Only what was written by ancient authors is considered knowledge. It is not related to the historian's interpretation. They therefore do not create knowledge. This sovereignty belongs to the sources alone. Wachsmuth, for example, also called Thucydides a »master«⁴³ and thus places him on the same level as contemporary scientific historians. Thus, the boundary between knowledge and non-knowledge is quite clearly defined. It is not subject to any variability conditioned by the historian's perspective. The historian has just the modest task of discovering true knowledge. The student in this example is taught to absorb the knowledge from the sources and accept it as being true. In a certain sense, the learning subject submits to knowledge that is valid independently of him.

4. Case Study Part II: Student practices in a university course around 2025

Considering the research questions formulated at the outset, several observations can now be made about the university course in the field of history in 2024, which forms the basis of the second case study. The seminar, held for four hours each week at a university in Western Germany, was ethnographically observed during five sessions over the course of a semester. Furthermore, conversations with students and the lecturer before and after the seminar were included, as well as the opportunity to access the corresponding course on the university's online learning platform, which to this day serves as a repository for various documents. The sessions were typically held in attendance in a seminar room at the university, equipped with digital technology, and were intended for around 30 first-semester students, both female and male, and from different social backgrounds. The course was accompanied by two tutorials led by senior students. Given the need for conciseness, the following considerations are directly linked to the analysis of the first case study and focus on selected aspects that allow for a comparison.

The first notable aspect concerns the data and its materialities. Unlike the historical notebook, which has been preserved, the ethnographer in this case is directly involved in the production of (partly digital) data: It is possible to observe students' »doing note-taking« in practice. Moreover, the researcher has access to the products or outcomes of student practices in various forms—for example, as

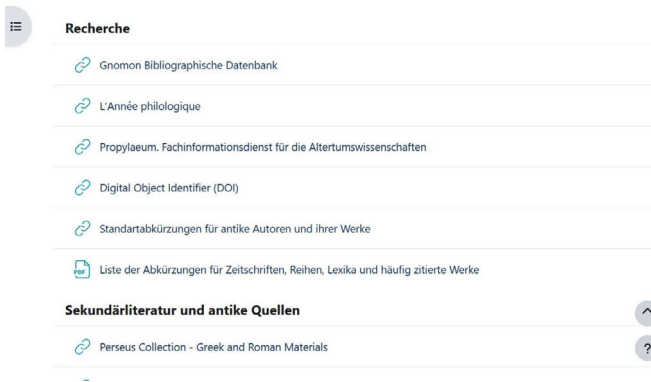
42 UA Greifswald, Hofmeister, B3-32, [fol. 49r].

43 Wachsmuth: Einleitung, p. 527. Translation by the authors.

a printed position paper or as a digital note file on an iPad which can be opened on any device for editing, taking screenshots, lossless duplication, uploading to a cloud, and so on. The research situation is therefore entirely different, and the ethnographer occupies a powerful position which must always be critically reflected upon—ethnographic fieldwork is a practice in its own right.⁴⁴ Ethnographic note-taking and writing must also be considered with regard to epistemological aims and principles of linguistic and stylistic composition.⁴⁵

Within the framework of what one could call digital ethnography—defined as »the practice of doing ethnographic fieldwork in digital environments«⁴⁶ or »ethnography of digital worlds«⁴⁷—the course on the online learning platform serves as a valuable resource: It contains, for example, around forty PDFs, thirty links to secondary literature, and ten homework assignments with corresponding texts (see screenshot of a section in Fig. 7).

Fig. 7



44 Cf. Breidenstein, Georg et al. (2020): *Ethnografie. Die Praxis der Feldforschung*, 3rd, revised edition, München: UVK Verlag.

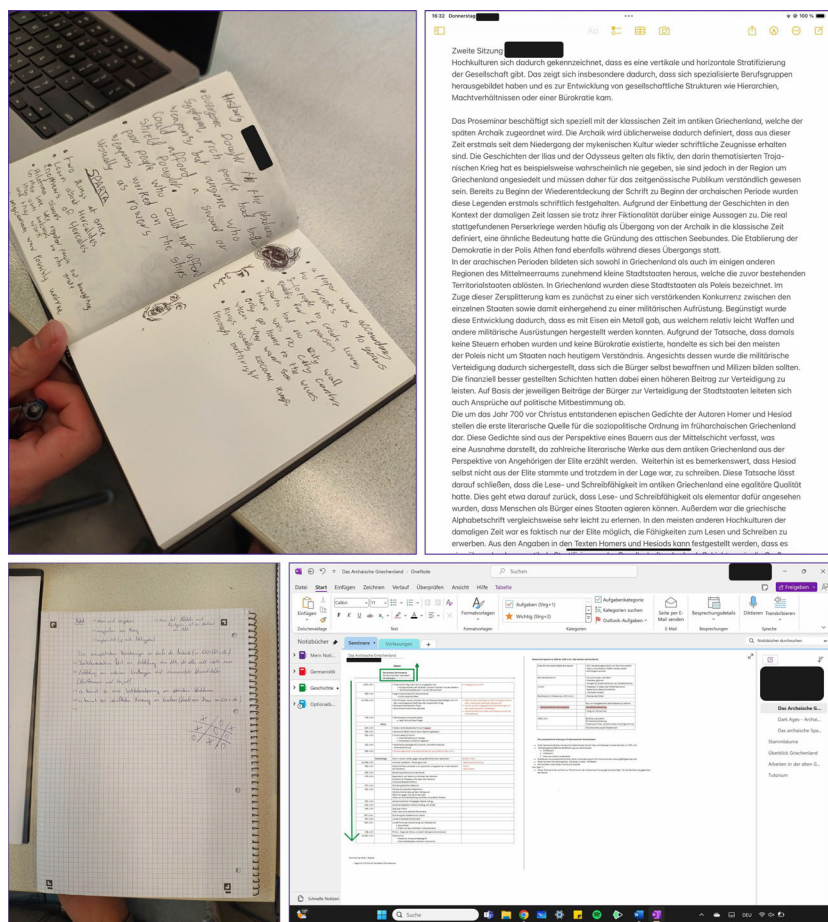
45 Cf. Bock, Katharina (2019): »Ethnografisches Protokollieren. Erkenntnisabsichten und sprachlich-stilistische Gestaltungsprinzipien«, in: *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* 20:1. Online: <http://dx.doi.org/10.17169/fqs-20.1.2933> (last access: 06.08.2025).

46 Underberg-Goode, Natalie M. (2016): »Digital Ethnography«, in: Heidrun Frieße/Marcus Nolden/Miriam Schreiter (eds.): *Handbuch Soziale Praktiken und Digitale Alltagswelten*, Wiesbaden: Springer VS, pp. 1–7, here p. 1. Online: https://doi.org/10.1007/978-3-658-08460-8_49-2 (last access: 06.08.2025).

47 Ibid., p. 2.

The information provided is structured but overwhelming because of its sheer volume. Behind every link there lies a new world of information with further links. It becomes evident that students must choose which information they engage with. Their implicit task is to get an overview and find the document that provides the answers to their questions or the texts they need to complete an assignment—and to decide what is (currently) not relevant for them and can be disregarded as irrelevant information and personal non-knowledge.

Fig. 8



The student practice of note-taking is carried out in different ways (see photos and screenshots in Fig. 8). These days it comprises of a multitude of materialities be-

cause students use tablets or laptops with different operating systems and software, or pen and paper. They combine various techniques for different purposes, while the tools structure the practice of note-taking.

Some students write down more or less accurately what the lecturer says about the historical events during plenary discussions. What he says is thus taken as validated specialized knowledge which can be used for graded assignments to pass the course. However, we cannot say whether the notes are kept or stored permanently. There are significant differences of the practices of storing and organizing knowledge: many students collect texts and material in a folder on their notebooks. However, some open files in their browsers and do not seem to save them. Few students use a physical file. One way or another, it is difficult to observe in detail how students structure or collect (their) knowledge in class—or it rarely happens. There is one exception: a student who is attending the seminar for the second time because he/she previously failed takes notes in a table in *OneNote*. The student tries to organize what he/she is writing down into a chronology, focusing on historical facts. However, no one records details about ancient sources or even uses standard abbreviations for ancient authors. It no longer seems to be a necessary skill to know them (from memory). Ancient sources are read less frequently, and they can be googled or summarized by help of generative AI such as *ChatGPT*—which does not say anything about the quality of the result of this approach to ancient sources. Learning the abbreviation system is no longer part of ›Bildungswissen‹.

Fig. 9

The figure consists of two side-by-side screenshots from the Perseus website. The left screenshot shows the 'Verzeichnis der Abkürzungen der antiken Autoren und Werktitel' (Index of abbreviations of ancient authors and titles) page. It contains a table with columns for the author's name in Latin, Greek, and German, and their corresponding abbreviations. The right screenshot shows the 'Thucydides, The Peloponnesian War' page. It features a search bar at the top, a table of contents, and a list of references. The page also includes a 'This text is part of' section and a 'Download' button.

However, links to it are to be found in the online course as well as the *Perseus Collection of Greek and Roman Materials*,⁴⁸ where one can find Thucydides's ›The Peloponnesian War‹ in Greek and English (see screenshots in Fig. 9). The homepages and texts are potentially accessible to anyone.

48 *Perseus Collection of Greek and Roman Materials*. Online: <https://www.perseus.tufts.edu/hoppe/r/collection?collection=Perseus:collection:Greco-Roman> (last access: 12.09.2025).

Fig. 10

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The students are obligated to give a presentation and submit a written version of it. Prior to the presentation they discuss it with the lecturer during an (online) office hour and submit their position paper via email shortly before or after their presentation. While presenting, they refer to ancient sources but rarely quote directly, instead referring to many authors of secondary literature. The presentations are an important practice of knowledge in the course of which students try to reproduce and reflect on the knowledge currently valid in historical science (see screenshots of sections in Fig. 10).

Fig. 11

Die Kleisthenischen Reformen

Fragestellung: Inwiefern sind die Anfänge der Demokratie bei den Kleisthenischen Reformen anzusetzen?

These: Die Quellenlage und die Handlungsprinzipien hinter und während der Reformen erlauben den Ansatz des Beginns einer weit isonomen athenischen Gesellschaft und damit einer Frühform der Demokratie.

Forschungsstand:

- ❖ Bleicken: Es gab keine Frühformen der Demokratie.
- ❖ Riklin: Die Demokratieentwicklung begann bereits bei dem Mehrheitsprinzip.
- ❖ Ober: Durch den Aufstand von 507 wurde die Demokratie durch die Menge geboren.
- ❖ Kienast: Die Inschriften aus dem 4. Jahrhundert sind als inakkurat zu betrachten.

Reformen des Kleisthenes:

- ❖ Einteilung des Staatsgebietes von Athen in Phylen

Some students still refer to historical events as facts, others indicate that they are presenting several research perspectives (see screenshot of section in Fig. 11). In any case, the lecturer urges students to specify exactly where each piece of information comes from. It is emphasized that they should read secondary literature on specific topics and be able to contextualize it.

Around 2025 students are also required to complete homework assignments, primarily involving the reading of secondary literature in German or English. Based

<https://doi.org/10.14361/9783839478462> <https://www.inlibra.com/de/page/sgb> - Open Access - 

on interview data and the absence of annotations or highlights in the relevant texts on students' devices, it appears that only a minority of students engage with these readings on a regular basis. Instead, they focus on those assignments that are subsequently graded—the students produce or generate knowledge that is relevant as a form of assessment. The lecturer ascribes achievement and knowledge to the students and, through specific examination practices—which can be understood as part of knowledge practices—positions them as subjects of the examination.⁴⁹ Alongside the presentation, two written papers must be submitted by specific deadlines and will be graded.

Fig. 12



Content-wise, the task is about an ancient source by Herodotus in its German translation (see screenshot of section in Fig. 12). The text excerpt is provided with the literature reference, available as a PDF in the online course. The questions that need to be answered examine Herodotus' status as a historian and are intended to train students in source criticism.⁵⁰

The intended critical attitude conflicts with the assumption that historical sources convey something that can still be correctly reconstructed these days. The lecturer repeatedly marks different limits of historical knowledge, for example

49 Cf. Ricken, Norbert/Reh, Sabine (2017): »Prüfungen – Systematische Aspekte der Geschichte einer pädagogischen Praxis. Einführung in den Thementeil«, in: Zeitschrift für Pädagogik 63:3, pp. 247–258.

50 About source criticism in historical science cf. Fachgebiete Wissenschafts- und Technikgeschichte, TU Berlin (2022): Leitfaden zur Quellenkritik. Online: https://www.static.tu.berlin/fileadmin/www/10002004/Material_Studium_Lehre_tg/Leitfaden-Quellenkritik-1.pdf (last access: 06.10.2025).

when he exclaims: »We know nothing, we know nothing! Welcome to ancient history«, or: »Those are very good questions, and I cannot answer any of them. The sources provide no information on that«. Accordingly, *something* could be known based on the sources. In the introductory literature on historical science it also says: »ad fontes«—»to the sources!«⁵¹ This means that the sources are subject to interpretation, not that they contain pure truth. It is also emphasized that historians must be able to engage directly with primary sources and should not rely exclusively on secondary literature. On the other hand, the lecturer emphasizes that we cannot know what happened in the past anyway. He invites the students to make reasoned assumptions and points out that historians also make well-reasoned distinctions which could also be made differently. Herbey, the lecturer, points out to the constructed nature and necessity of social validation of all historical knowledge, to the coexistence of different bodies of knowledge that may also be in conflict with one another, the fallibility of knowledge, and the necessity of contextualizing all knowledge objects.

5. Conclusion: Continuities, discontinuities, and the idea of knowledge

On the surface, the comparative analysis of the two case studies reveals continuities of student practices such as reading ancient sources, taking notes, or doing homework. Nevertheless, the underlying structure and meaning of quite similar practices have changed significantly. Some have become less important, others have been modified, new ones have been added, and others have faded. Transformed technical and digital infrastructures are transforming the logics of established practices. This is accompanied by changed ways of work as well as by changed value of individual practices. Nowadays, the skill of reading and writing ancient Greek is less important than the skill of creating a *PowerPoint* presentation, so we have to ask once again about subject-matter expertise and knowledge.⁵² Many of the changed, new, and often subversive student practices (or, less entrenched: routines) are not yet part of the kind of ›Bildungswissen‹ the lecturer wants to convey, for example, (academic) writing with generative AI or researching using online search engines.⁵³

51 Eckert, Georg/Beigel, Thorsten (2019): *Historisch Arbeiten. Handreichung zum Geschichtsstudium*, Göttingen: Vandenhoeck & Ruprecht, p. 11. Translation by the authors.

52 Cf. Reh, Sabine/Caruso, Marcelo (2020): »Entfachlichung? Transformationen der Fachlichkeit schulischen Wissens. Zur Einführung«, in: *Zeitschrift für Pädagogik* 66:5, pp. 611–626.

53 Cf. Macgilchrist, Felicitas et al. (2023): »»Google_Suche. Suche als soziale Praxis in Unterricht und Schule«, in: Matthias Proske et al. (eds.): *Schule und Unterricht im digitalen Wandel. Ansätze und Erträge rekonstruktiver Forschung*, Bad Heilbrunn: Verlag Julius Klinkhardt, pp. 67–89. They show that if ›searching‹ means ›googling‹ the »multiplication of knowledge made relevant and the shifting of sovereignty over knowledge« (p. 68) is central.

Around 1900, the professor seems to know the limits of what is worth knowing or at least the limits of what history scientists of his time are interested in: True historical knowledge lies in the sources that define the area of what must and could be known. The idea is that there is pure knowledge to which one could advance. It would then also be timelessly valid. So, around 1900 historical knowledge is governed by the logic of unambiguity. Therefore, it can be made canonical for students.⁵⁴ The students practice working through the relevant ancient sources in their original language, gaining detailed knowledge of battle formations and calculating casualty figures while becoming scholars. The students follow the professor's guidance in analysis at a measured pace. The library, where the primary sources are stored in the form of books, and the seminar, as an exclusive institution, serve as the most important infrastructure for the acquisition of knowledge. One could say that knowledge is tied to these physical locations.

Around 2025 it is important for the lecturer to always specify the reasoning behind why certain facts are assumed to be true or untrue and by whom. The boundaries of what is worth knowing in historical science are expanded: the ancient sources are placed under new horizons of inquiry. It is well known that knowledge of the past is uncertain. Therefore, the lecturer aims at presenting different representations of the past and highlights the conditions that shape these perspectives. He questions traditional distinctions and emphasizes their temporality, criticizes his own academic discipline, and tries to enter into discussions with the students. At the same time the idea is upheld that there is a core of tangible specialized knowledge that is still, as factual knowledge, tied to the sources. It must be acquired in order to enter the academic discipline. The same applies to mastering the strict formal rules of academic research. The university course, the tutorial, but also the online course and the Internet in general (especially *Wikipedia* and *Google*), as well as the students' *WhatsApp* group and their devices serve as the most important infrastructure for acquiring different kinds of knowledge in scattered locations. Knowledge has become elusive and is leaving the university as a physical place. So, around 2025 historical knowledge is governed by the logic of ambiguity. It encompasses both positive factual knowledge of historical events and dates, which students simply need to know (factual or event-based level), as well as a much broader knowledge that goes well beyond, enabling for the classification and

54 Nevertheless, it should be noted here that criticism as a knowledge practice emerged as early as in the 18th century, in opposition to the tradition of scholasticism. Contemporaries were therefore aware of its ambiguity and lack of clarity. However, this study shows that the idea of positive knowledge was quite widespread. Of course, this was not an abrupt change but rather a process that manifested itself at different speeds in different teaching formats. Joachim Scholz demonstrates this in this volume by examining changes of the seminar practice.

contextualization of these facts (interpretative level). The latter aims at facilitating the understanding of complex issues and also reflects on the limits of historical knowledge and the conditionality of all that can be known. Additionally, historical knowledge is characterized by the dispersion of knowledge infrastructures underlying the practices of knowledge.

This comparative case study has shown that the transformation of the culture of knowledge in the field of history could be described by a neologism: what can be observed is an ongoing process of the ›contingentization‹ of knowledge—that is, an increasing emphasis on the possibility that knowledge is not incontestable or eternally fixed. The result is an ambivalent situation that calls for a careful examination of what can be considered knowledge worth knowing. During their proceeding, university courses reflect both the idea that knowledge is something that can be discovered or found and the idea that knowledge is contingently constructed.⁵⁵ These described changes can also be understood as a result of changes of epistemology and the theory of science. Contingentization rises from epistemological and methodological considerations regarding the status of historical sources.

6. Further research prospects

Future research will need to determine whether the here presented findings can also be observed in other disciplines—particularly in the humanities, but in contrast also in science, law, or engineering—and among other groups of students. Different cultures of knowledge can be understood as products of a scientific paradigm within specific social milieus, and it might be that the findings reflect a special characteristic of the discipline of history—or even of ancient history in particular. On the other hand, it might also be that the shift in the knowledge culture within the discipline of history towards a contingentization of knowledge reflects a broader move towards late or postmodernity, one that affects the sciences as a whole and is very much in line with Lyotard's idea of the dissolution of universal truth claims.⁵⁶ Only further empirical research can determine in which situations in different university courses knowledge becomes contingent and in which it is stabilized, such as in the context of examination knowledge.

55 Anthony Grafton's remarks on the origins of footnotes in the early modern period up to Leopold von Ranke should not be forgotten here. In his book, published in 1997, he attributed a central role in the process of changing historical sciences to them. They would move between the poles of evidence of past reality and the production of realistic constructs. Footnotes would remind to the uncertainty of life. Cf. Grafton, Anthony (1997): *The Footnote. A Curious History*, London: Faber and Faber.

56 Lyotard, Jean-François (1982/1994): *Das postmoderne Wissen*, 3rd, unchanged edition, Wien: Passagen-Verlag.

To conclude with some thoughts on virtuality and knowledge as ›Bildungswissen‹, the findings and previous considerations can be linked to Pierre Lévy's views about the virtual⁵⁷ by stating: university teaching is an attempt to actualize and virtualize the world (or, more specifically, objects of knowledge in an academic discipline). »Knowledge is the product of apprenticeship, the result of a virtualization of immediate experience«.⁵⁸ For Lévy, the

»process of virtualization is a transition from the act—here and now—to the problem, to the knot of constraint and finality that inspires our acts. [...] [V]irtualization devises questions, problems, act-generating structures, lineages of processes, the machinery of becoming«.⁵⁹

In contrast,

»[a]ctualization creates a solution for the problem presented by the virtual. In doing so, it does not simply replenish its resources or provide a form for the mechanism of realization. Actualization *creates form*. It creates a radically new kind of information«.⁶⁰

In university courses, the proportion of virtualization and actualization—which must always be considered to be entangled—may have changed from 1900 to 2025. It might be that digitalization is an essential condition for shifting the relationship between virtualization and actualization, because teaching under conditions of digitality has changed insofar as the references appear more placeless and the contexts of reference more confusing. By around 2025, many objects of knowledge are frequently virtualized, leading to the blurring of existing distinctions and a focus on a (knowledge) vacuum.⁶¹ Only the primary sources, as the most relevant sources, are continuously updated and actualized in the field of history. The need to teach forces the scientific community to also convey solutions to complex problems, actualizations for the problems presented by the virtual, and not just to carry out virtualizations as problems. Digitalization does not change everything, but the significance of those infrastructures that ensure the (permanent) availability of knowledge can hardly be overstated. Not least, the boom in generative AI raises the

57 Lévy, Pierre (1998): *Becoming Virtual. Reality in the Digital Age*, New York/London: Plenum Trade.

58 Ibid., p. 75.

59 Ibid., p. 174.

60 Ibid. Italics in the original.

61 Ibid., p. 27.

question of where and what any kind of knowledge is and where it can be found.⁶² When knowledge needs to be tested at the latest, it must still be made accessible to and by students today.

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62 See the discussion by Patrizia Breil, Anne Dippel, Christoph Engemann, Estrid Sørensen and Iris van der Tuin in this volume regarding another form of knowledge: that shapes university co-working practices of researchers at virtual universities.

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The Ritual Infrastructure of Conversation

Sam Berstler

1. Introduction

The curmudgeonly Larry David—fictional television executive and primary source of cringe in HBO's cringe comedy *Curb Your Enthusiasm*—hates social niceties.¹ So when he finds himself at a formal dinner party, he just sits there in a huffy silence.

The man next to him ventures a remark:

Guest: I don't even know how to write in cursive anymore.

Larry says nothing. Then, he tries this:

Larry: How's your marriage?

Guest: What the hell? Why—why would you ask me that?

Larry: I'm trying to elevate small talk to medium talk.²

Even Larry David knows that in the United States, the question »How's your marriage?« is not appropriate for small talk.

Larry does not want to make small talk for the same reason that many of us dislike the genre. It can be repetitive, tedious, and emotionally stifling. It seems to lack the stakes that enliven »big talk«. By definition, small talkers are not pouring their hearts out to each other, negotiating a contract, or debating which governmental policies they support. While each of them makes banal observations about the

1 For their prescient comments, patience, and enthusiasm, I am grateful to audiences at the Iceland Genre and Communication Workshop (Summer 2024), a Works in Progress session at MIT (Spring 2025), a Works in Progress session at King's College London, arranged by Elise Woodard (Spring 2025), and especially the Infrastructures of (Non)-Knowledge Conference at Ruhr University Bochum (Fall 2024). I am especially grateful to Karen Lewis, whose unpublished work on small talk inspired this project.

2 The Hero (2011): *Curb Your Enthusiasm*, Season 8 Episode 6, 15:38-16:00. Created by Larry David. HBO.

weather, small talkers might wonder, »Are we just doing this because we're afraid of silence?«

Since Bronislaw Malinowski's groundbreaking anthropological work on what he called »phatic communication«, theorists have acknowledged that small talk is neither pointless nor cowardly.³ The genre of small talk has a critical social function. It is through small talk that we build trust, nurture relationships, and mutually prepare for »bigger« forms of talk. Even within the culture-at-large, small talk how-to manuals circulate, all of which espouse the same view: small talk is a form of social glue.⁴ Decline to do it at your own peril.

So the question that I want to raise here is not *what* small talk does. Instead, I want to ask: how does small talk *do it*? How is it that uninteresting chit-chat about the weather or the local sports teams can knit relationships closer together?

Malinowski originally suggested that »the give and take of utterances that make up« small talk generates an »atmosphere of sociability«, which »bind[s] hearer to speaker«.⁵ On this view, small talk is a feelings engine, a way to produce good vibes that endear us to each other.

The view that I will sketch rejects this affect-centric approach. I am going to argue that small talk is a kind of rational ritual.⁶ In making small talk, we indirectly

3 Malinowski (1923) argued that phatic communication is communication that functions to promote social solidarity. For an overview of Malinowski-inspired work on small talk, cf. Coupland (2014) and Zuckerman (2021). Note that while Roman Jakobson theorized about something he called »phatic communication«, he defined it differently (Jakobson 1960). For Jakobson, phatic communication is communication that primarily aims to establish and maintain channels of communication; it is one kind of meta-communicative communication. It is an open question how the two kinds of phatic communication relate to each other. Malinowski, Bronislaw (1923): »The Problem of Meaning in Primitive Languages«, in: C.K. Ogden/I.A. Richards (eds.): *The Meaning of Meaning*, London: K. Paul, Trend, Tubner, pp. 296–336; Coupland, Justine (ed.) (2014): *Small Talk*, New York: Routledge; Zuckerman, Charles H.P. (2021): »Phatic, then: Communication and Communion«, in: James Stanlaw (ed.): *The International Encyclopedia of Linguistic Anthropology*, Hoboken, NJ: Wiley-Blackwell. Jakobson, Roman (1960): »Closing Statement. Linguistics and Poetics«, in: Thomas A. Sebeok (ed.): *Style in Language*, Cambridge, MA: MIT Press, pp. 350–377.

4 Examples of such manuals include Fine, Debra (2005): *The Fine Art of Small Talk. How to Start a Conversation, Keep It Going, Build Networking Skills—and Leave a Positive Impression!*, New York: Hyperion; Wadsworth, Melissa (2012): *The Small Talk Handbook. Easy Instructions on How to Make Small Talk in Any Situation*, Avon, MA: Adams Media and Fleming, Carol A. (2018): *The Serious Business of Small Talk. Becoming Fluent, Comfortable, and Charming*, Oakland, CA: Berrett-Koehler Publications.

5 Malinowski: *The Problem of Meaning in Primitive Languages*, p. 315.

6 I've borrowed this term »rational ritual« from Michael Suk-Young Chwe. Chwe (2013) argued that ceremonies function to produce common knowledge and thereby rationalize certain forms of coordination. Chwe, Michael Suk-Young (2013): *Rational Ritual. Culture, Coordination, and Common knowledge*, Princeton: Princeton University Press.

generate evidence about the nature of our practical agency. We do this by showing each other the extent to which we can and will conform to social norms. We thereby make it rational for each of us to enter into further social interactions with the other.

Analytic philosophers of language often say that the aim of conversation is to exchange information.⁷ Does small talk undermine or vindicate this claim? After all, small talk has a social or »phatic« aim. But if I am right, small talkers primarily accomplish this aim *through* exchanging information about the kinds of agents that they each are.

What I think my analysis shows is something subtler. Philosophers need to distinguish between two kinds of conversational aims. Within any specific conversation, speakers themselves have joint aims that structure what they are doing. But small talk is a conversational *genre*. And in order to theorize about the structure of a conversational genre, we must identify not the speakers' but the genre's internal aim. Once we make this distinction, we can dispel a good deal of confusion within the analytic philosophy of conversation.

2. Some rules for small talk

Imagine that we were to replace small talk with some other kind of activity. Whenever we would normally make small talk, we instead play tic-tac-toe, recite song lyrics, or perform some elaborate handshake. What kind of society would this be? Would we lose anything—socially, interpersonally, morally?

Answering this question requires us to relate the *structure* of small talk to its *function*. In this section, I am going to attempt to loosely sketch small talk's structure. Using my own cultural context as a case study—middle class communities within the Greater Boston metropolitan area—I will specify a few of the genre's rules.

First, let's distinguish between two sets of rules for small talk. The first set of rules tells us when it is permissible or obligatory to initiate small talk. The second set of rules tells us what we may or must do when we are in the throes of making it.

Note that small talk is a kind of talk. So if some rule normally governs *all* conversations in a cultural milieu, that rule will govern small talk too. For example, it's normally rude to look at your phone while someone is talking to you. Therefore, it's

7 The claim originates with H.P. Grice's classic paper from 1967/1989. It has received its most developed treatment within Stalnaker's work on inquiry and the common ground. Grice, H.P. (1967/1989): *Studies in the Way of Words*, Cambridge, MA: Harvard University Press; Stalnaker, Robert (1984): *Inquiry*, Cambridge, MA: MIT Press; Stalnaker, Robert (1999): *Context and Content. Essays on Intention and Thought*, New York: Oxford University Press; Stalnaker, Robert (2002): »Common Ground«, in: *Linguistics and Philosophy* 25, pp. 701–721; Stalnaker, Robert (2014): *Context*, New York: Oxford University Press.

normally rude to look at your phone while someone is *small* talking with you. I am going to focus on rules that seem specific to small talk.⁸

When can or must we make small talk? The rules are sensitive to at least three parameters:

A1. **Physical proximity:** in many cases, it is permissible or mandatory to initiate small talk merely because we are in each other's physical presence.

For example, if we are acquainted and riding an elevator together or using a communal kitchen at the same time, we must make small talk for the duration of our time in the shared space. Otherwise, we risk »cold shouldering« our acquaintance. If we are not acquainted, then we may initiate small talk. But we needn't.

A2. **Conversational phase:** conversations tend to have a phase-like structure. Often, small talk is a required phase of a larger conversation. It tends to follow greetings or precede leave-takings. It thus serves as an extended gateway into or out of the interaction.

When a North American academic philosopher meets with a student to discuss the student's paper, the professor usually initiates small talk before or after the academic discussion. During consultations, a doctor tends to make small talk with her patient. She usually performs it after greetings or while she accomplishes some routine technical task, like filling out a prescription form.

In both cases, we say that small talk makes the encounter feel »warmer« or »more personal«. Someone who does not perform it is abrupt, »cold«, or »just wants to get down to business«.

A3. **Relationship status:** whether we can or must make small talk depends upon our relationship. If we want to socialize with each other but do not know each other well, we often revert to small talk. We may not trust each other enough to have a heavier conversation. Alternatively, social norms may not permit us to have one.

Sometimes, we each occupy a role that requires one or both of us to make small talk with the other. If we are both attending an intimate party, or if we are seated near each other at a wedding, it is polite to make at least cursory chit-chat. Otherwise, we risk seeming snobbish.

Conversely, intimate partners should generally not make small talk. Making it indicates severe relationship strain. One counseling service talks about it like a disease, warning of the »damage of chronic small talk« between partners.⁹

8 For example, I set aside Grice's Four Maxims, which (allegedly) govern all conversations. Grice: *Studies in the Way of Words*, pp. 26–27.

9 Smyth, Teyhou (2024): »The Damage of Small Talk in Relationships«, in: Connolly Counseling Center. Online: <https://www.counsellor.ie/small-talk-in-relationships/> (last access: 01.07.2025).

Once we are making small talk, what should we do? We can ask the question slightly differently. If we want to know *whether* our interlocutor is trying to make small talk with us, which features of her speech should we attend to?

Almost everyone understands that small talkers ought to select »small« topics for discussion. (Even Larry David recognizes that his question constitutes »medium« talk.) We say that appropriate small talk topics are »light« or »safe« ones. As a rule-of-thumb, middle class Greater Bostonians tend to talk about the weather (and how bad it is), the traffic (and how bad it is), public transportation (and how bad it is), and the doings of the local sports teams. Informants from other parts of the United States complain that we are dour.

What makes these topics »light and safe« is not that they exist on some list that specifies culturally approved »light and safe« topics. These topics are »light and safe« because they reliably enable speakers to conform to small talk's rules.

Roughly, the rules have the following shape. (In a moment, I'll replace some of these rules with more accurate but theoretically laden ones.)

- B1. Avoid open conflict.
- B2. Avoid the display of strong emotions.
- B3. Avoid discussing or making salient private matters.
- B4. Show interest in your interlocutor.
- B5. Show empathy with your interlocutor.

Small talk rules generate a treacherous Scylla and Charybdis. Many of the topics that easily enable us to satisfy the negative requirements (rules B1-3) do not enable us to easily satisfy the positive requirements (rules B4-5). And although we are often curious about or empathetic with our interlocutors, the targets of that curiosity and empathy are often too personal. They're off-limits. Many of us hate small talk, I suspect, because we hate navigating this tension.

For example, if I am at a cocktail party and remark to you, »Interesting wallpaper, huh?« you are unlikely to fly into a rage or bitterly reply, »No, it's not interesting at all.« But I risk expressing that the wallpaper is more interesting than the flesh-and-blood person in front of me. If we continue to discuss the wallpaper's aesthetic demerits, we may each struggle to demonstrate sufficient interest in or empathy with each other. At least if we discuss the Red Sox's pathetic loss, I can empathize with your pain. What's there to feel about bad wallpaper?

On the other hand, I generally cannot ask you, »How much money do you make?« or »Do you have an opinion on the Beijing-Taiwan conflict?« The former is private. The latter risks controversy or (if you do not know much about the conflict) embarrassment. Even a philosophical question like, »What's the meaning of life?« can trigger existential anxiety, an outpouring of vulnerability, or—and this is not uncommon

mon in many parts of the United States—one party's cringey attempt to convert the other party to her religion.

Once we select a topic, we carefully modulate what we express. Often, we voice only those views that we believe that the other person shares. (If we are in agreement, then we do not risk conflict and so do not risk violating rule B1.) If we judge wrongly and our interlocutor does not share our view, she may pretend to agree with us anyway. At its worst, the conversation can devolve into a useless string of affirmations and affirmations of the affirmations:

Minnie: This weather sucks.
 Theo: It really does.
 Minnie: I agree.
 Theo: Yeah...
 Minnie: Yeah...

Even political discussions can have this stilted quality. Within my community, it is permissible to discuss national politics during small talk—but only because we are so politically homogenous. Each party tends to assume that everyone else agrees with her overall political orientation. Small talk can look like this:

Flora: How are you doing?
 John: I've been glued to CNN. I can't believe Trump's latest executive order.
 Flora: I know. It's ridiculous.
 John: Dark times.

In my experience, political minorities tend to bitterly complain about this practice. To satisfy the demands of small talk, they find themselves suppressing or misrepresenting their views.

Because so many people find small talk so boring, lists of small talk prompts circulate. Writers promise that the prompts will »juice up« small talk—in a socially permissible way, of course. Many of these prompts are, quite frankly, horrible. Here are a few from Debra Fine's popular manual, *The Fine Art of Small Talk*:

- (1) Describe your most important work experience.
- (2) Tell me about the best vacation you've ever taken.
- (3) Tell me about a movie/book you've seen or read more than once.¹⁰

The topics themselves are not bad. But if you were to actually *utter* (1–3) as written, you would sound like a job interviewer or an elementary school teacher: either pre-

10 Fine: *The Fine Art of Small Talk*, pp. 22–24.

sumptuous or condescending. You would not sound like a competent small talker, and you would risk offending your interlocutor.

Why? The prompts don't seem to violate the commonsense rules in (B1-5). Perhaps that is why Fine—who may have been working from a similar set of self-generated rules—did not immediately recognize the problem.

Sociolinguists are clear that in small talk—like in many forms of socially-oriented talk—we are acutely sensitive to *relationship management*.¹¹ What and how we communicate with each other *encodes* and thereby *expresses* information about how we view ourselves and each other. And in American English, someone who uses a bare imperative tends to express that she has a much higher social position than her addressee.¹²

Either this is false. Then, the speaker of (1–3) is pretentious. Or it is true. Then, the speaker of (1–3) is gauchely »pulling rank.« This is because in small talk, Americans are expected to suppress many overt expressions of social rank difference. Thus, it is taboo to ask about salary (a proxy for class). Professors small talking with graduate students should not make salient their vastly greater purchasing power. And

11 This work emerged from Brown and Levinson's groundbreaking handbook (1978/1987), itself indebted to Erving Goffman's *oeuvre*, especially Goffman (1967, 1971). Work in this tradition includes Leech (1983), Locher (2004, 2006), Locher and Watts (2005), Spencer-Oatley (2008, 2011), Culpepper (2011), and Arundale (2010, 2020). Brown, Penelope/Levinson, Stephen (1978/1987): *Politeness. Some Universals in Language Usage*. Cambridge: Cambridge University Press; Goffman, Erving (1967): *Interaction Ritual*, New York: Pantheon Books; Goffman, Erving (1971): *Relations in Public*, New York: Basic Books Inc; Leech, Geoffrey (1983): *Principles of Politeness*, London: Longman; Locher, Miriam (2004): *Power and Politeness in Action: Disagreements in Oral Communication*, New York: de Gruyter; Locher, Miriam (2006): »Politeness Behavior Within Relational Work. The Discursive Approach to Politeness«, in: *Multilingual* 25, pp. 249–267; Locher, Miriam/Watts, Richard (2005): »Politeness and Relational Work«, in: *Journal of Politeness Research* 1, pp. 9–35; Spencer-Oatey, Helen (2008): »Face (Im)politeness and Rapport«, in: Helen Spencer-Oatey (ed.): *Culturally Speaking: Culture, Communication, and Politeness Theory*, London: Continuum, pp.11–47; Spencer-Oatey, Helen (2011): »Conceptualizing ›The Relational‹ in Pragmatics. Insights from Metapragmatic Emotion and (Im)politeness Comments«, in: *Journal of Pragmatics* 43, pp. 3565–3578, Culpepper, Jonathan (2011): *Impoliteness. Using Language to Cause Offense*, Cambridge: Cambridge University Press; Arundale, Robert B. (2010): »Constituting Face in Conversation. Face, Face-work, and Interactional Achievement«, in: *Journal of Pragmatics* 42, pp. 2078–2105. Arundale, Robert B. (2020): *Communicating and Relating. Constituting Face in Everyday Interacting*, New York: Oxford University Press.

12 Brown/Levinson: *Politeness*; Pinker, Steven (2007): »The Evolutionary Social Psychology of Off-Record Indirect Speech Acts«, in: *Intercultural Pragmatics* 4, pp. 437–461, here pp. 440–441.

for similar reasons, a higher ranked individual is expected to courteously decline to exercise her right to use the bare imperative.¹³

That does not mean that Americans must *never* express social rank difference in small talk. There are robustly asymmetrical, albeit subtle, rules about who can do what. (This fact tends to embarrass Americans, and so we do not discuss it. In fact, I have yet to find a small talk manual that makes this explicit to readers.) For example, the Canadian micro-sociologist Erving Goffman observed that:

Between superordinate and subordinate we may expect to find asymmetrical relations [of familiarity], the superordinate having the right to exercise certain familiarities which the subordinate is not allowed to reciprocate...in [some] American business organizations the boss may thoughtfully ask the elevator man how his children are, but this entrance into another's life may be blocked to the elevator man, who can appreciate the concern but not return it.¹⁴

The rules do not just regulate questions. Among American philosophy professors and graduate students (at least in my context), professors may congratulate students on the publication of an article. But at best, a graduate student may express her *admiration* for a professor's newly published article. An explicit congratulations is presumptuous.

Building on Goffman's work (especially Goffman 1967, 1971)¹⁵, the sociologists Penelope Brown and Stephen C. Levinson proposed that a single variable, *social distance*, governs what we can and must do within conversations; both intimacy and rank can modulate this variable.¹⁶

13 In many contexts, a boss has the *right* to say to her employee, »Show up at 3 pm tomorrow.« But it is more courteous for her to say, »Could you show up at 3 pm tomorrow please.« Usually, the boss' tone and prosody—a brusqueness, a lack of rising intonation—make obvious that this is an indirect order, not a genuine request. Similarly, Goffman records that a nineteenth-century American book of etiquette advises: »The best-bred man whom we ever had the pleasure of meeting always employed, in addressing servants, such forms of speech as these—'I'll thank you for so and so, —Such a thing if you please.—'with a gentle tone, but a very elevated key. The perfection of manner, in this particular, is, to indicate by your language, that the performance is a favour, and by your tone that it is a matter of course« (Goffman: Interaction Ritual, p. 62).

14 Goffman: Interaction Ritual, p. 64. I have personally encountered organizations that continue this practice, although it is now coded as a »traditional« or »conservative« one. In a non-academic but culturally conservative workplace, I witnessed an unwitting young man ask his older boss about his children. The boss bristled and declined to answer. In graduate school, I did not believe that I could permissibly ask senior faculty about their children and only made such inquiries after graduation. But my more casual friends reported to me that as graduate students, they asked this question.

15 Ibid.; Goffman: Relations in Public.

16 Brown/Levinson: Politeness, pp. 74–83.

The classical sociologist Georg Simmel, who inspired Goffman, imagined a single »ideal sphere« around individuals.¹⁷ Whether and how we may penetrate the sphere depends upon the nature of our relationship. Simmel's own approach is subtler than Brown and Levinson's: in some respects, a butler can encroach deeper into his employer's ideal sphere than can his friends. (The butler, after all, has the right to touch the employer while dressing him.)

Thus, a commonsense small talk rule like »Avoid discussing or making salient private matters« (B2) is actually a loose rule of thumb that helps us to conform to a rule like (B2*):

B2*: Express the appropriate degree of familiarity towards your interlocutor.

The more expansive rule in (B2*) explains why it is generally inappropriate to say:

- (4) You've lost weight.
- (5) You've got a bit of lipstick on your teeth.

In both cases, the speaker is observing a fact that is epistemically public. It is visually out in the open. Nonetheless, the speaker of (4–5) is acknowledging information that the »ideal sphere« protects.¹⁸ In small talk, someone who says (4–5) either assumes too much intimacy or arrogates to herself too high a status.

During the course of a conversation, our actual social distance may change. As we become more intimate during the conversation, we earn the right to penetrate deeper into each other's sacred sphere. More subjects become »on the table« as discussable. But conversational genre also seems to modulate social distance.

At the start of a therapy session, a patient may courteously say that her weekend was »Really nice, thanks for asking.« If the patient sobs about her terrible weekend ten minutes later during the actual therapy session, neither party will judge her behavior inconsistent. Similarly, business associates may speak much more frankly during a negotiation than they speak during the small talk that bookends it.

This shows that rules like (B2*) are sensitive not just to our actual relationship. They are sensitive to what we are *supposing* or *assuming* about it for the sake of our current conversational phase. (Here I depart from Brown and Levinson's analysis.) For this reason, the value that we assign to the social distance variable can encode information not just about our presumed relationship status but also about the nature of the interaction we are having. Thus, one way to *signal* to each other that we

17 Simmel, Georg (1950): *The Sociology of Georg Simmel*. Translated by Kurt Wolff. Glencoe, IL: Free Press, p. 332.

18 I develop this notion of non-acknowledgment in greater detail in Berstler, Sam (forthcoming): »Non-Epistemic Deniability«, in: *Mind*.

are making small talk is to presume more social distance than we know ourselves to have.

Why is small talk so hard? About this question, we can now say something more precise.

In describing the rules of interaction, Goffman quoted from Emile Durkheim: »The human personality is a sacred thing; one dare not violate it nor infringe its bounds, while at the same time the greatest good is in communion with others.«¹⁹ Most of Durkheim's work analyzed this push-pull tension within overtly religious practice. Inspired by Durkheim, Goffman believed that our everyday interpersonal norms derive from religious practice and thus exhibit the same tension.

In order to express our respect for someone, we must generally avoid assuming undue familiarity with her. But out of respect for her, we must also express prosocial attitudes towards her: that we trust her, that we like her, that we want to interact with her, that we share commonly valued traits and identities and have a basis for solidarity. Rules (B4) and (B5), which require us to express interest in and empathy for our interlocutor, are two small talk-specific ways to do this.

Goffman called the avoidance form of respect *negative deference* and the prosocial form *positive deference*.²⁰ Too much negative deference, and we are standoffish and cold. Too much positive deference, and we overstep. (Think of the graduate student effusively congratulating her advisor on her publication.)

Thus, a routinely successful small talker is someone who routinely solves the *Goldilocks Problem* of deference. She successfully displays exactly the right level of negative and positive deference. To effectively titrate between them, she must correctly identify the fine-grained details about her relationship with and status relative to her interlocutors. As we have seen, she also must consider the nature of small talk itself. Finally, to know how to *communicate* her deference, she must master the finely detailed rules and practices that constitute her culture's deference »expressive palette.«

It is no wonder so many of us worry that we chronically fail at the genre.

19 Durkheim, Emile (1915/1954): *The Elementary Forms of Religious Life*, Translated by Joseph Ward Swain, Glencoe, Illinois: Free Press, pp. 229. Quoted on Goffman: *Interaction Ritual*, p. 73.

20 In her analysis of small talk, Klüwer (2011, 2015) develops a Goffman-style taxonomy of what she calls social dialogue acts. She catalogues acts through which speakers construct, affirm, and seek affirmation of their social self-image or face. In my terminology, these are all acts of positive deference. Klüwer (2015): *Small Talk Capabilities for Dialogue Systems*, PhD diss, Saarland University; Klüwer, Tina (2011): »I like your shirt–Dialogue Acts for Enabling Social Talk in Conversational Agents«, in: *Proceedings of the 10th International Conference on Intelligent Virtual Agents*, pp. 14–27.

3. Small talk is not basic politeness

We have now identified the structure of small talk. Or at least, we have identified the rough structure of small talk within one community of middle-class Americans living in the Greater Boston area. What can we infer about the practice's function?

Small talk is a mundane social ritual. Everyone must do it, and they must do it frequently. Therefore, it's tempting to assimilate small talk to other rituals of etiquette: shaking hands, saying »please« and »thank you«, holding the door open for others. But I think that this would be a mistake.

When children ask us why they must say »please« and »thank you«, we tell them that it is *respectful* or *courteous* to do so. There is also a saying: politeness (or kindness) costs nothing. Contemporary analytic philosophers assume that both pieces of folk wisdom are correct: etiquette, politeness, or manners is a system of norms that functions to facilitate the »routine, manageable, and predictable« display of respectful attitudes towards others.²¹

According to what I will call the *En Passant Thesis*, etiquette enables us to display our respect for each other *cheaply* and so *efficiently*. Rather than taking the time to say:

Emmy:	I respect you so much!
Daigo:	I also respect you so much!
Emmy:	I'm so glad.
Daigo:	Me too.

we can communicate the same sentiment »in passing:« either quickly or during the routine course of other activities.²² Because the rituals are simple and scripted, performing them is neither meaningfully time-intensive nor cognitively demanding nor emotionally taxing.

For example, it requires only a few seconds to shake hands or to hold the door open for someone. The increase in time it requires to say (7) instead of (6) or (9) instead of (8) is negligible:

21 Eidelson, Benjamin (2023): »The Etiquette of Equality«, in: *Philosophy and Public Affairs* 51, pp. 97–139, here p. 102. Representative defenders include Buss (1999), Calhoun (2000), Olberding (2016), and Eidelson (2023). Buss, Sarah (1999): »Appearing Respectful. The Moral Significance of Manners«, in: *Ethics* 109, pp. 795–826; Calhoun, Cheshire (2000): »The Virtue of Civility«, in: *Philosophy and Public Affairs* 29, pp. 251–275; Olberding, Amy (2016): »Etiquette. A Confucian Contribution to Moral Philosophy«, in: *Ethics* 126, pp. 422–466; Eidelson, Benjamin (2023): »The Etiquette of Equality«.

22 I have pilfered the metaphor of *en passant* and »in passing« displays from Eidelson's analysis. Eidelson: *The Etiquette of Equality*, p. 6.

- (6) Gimme the mashed potatoes.
- (7) Could you please pass me the mashed potatoes?
- (8) Move!
- (9) Sorry, excuse me.

And substituting the word »undocumented worker« for »illegal immigrant« or »difficult personality« for »raging asshole« adds no increase in time whatsoever.

These rituals have a simple and script-like quality. Because of this, competent people can successfully perform them with minimal cognitive and emotional effort. Interpreting the Confucian tradition, one philosopher describes etiquette as a form of social »choreography«, which delimits »prescribed steps...in the dance of social intercourse«.²³ These steps are easy enough for small children, the acutely neurodiverse, and the profoundly socially awkward to master.

But this functional hypothesis makes a mystery out of the small talk. Given its structuring rules, small talk is simply *not* cheap in the same way. It is less »YMCA« dance routine and more improvised tango.

First, small talk is often time intensive and carries meaningful opportunity cost. If I run into my colleague at the airport and we make eye contact, I must generally make small talk with her. This conversation can preclude me from reading my book or grading papers. It can cause me to fail to notice my boarding call. And in my experience (as both advisor and student), small talk can extend routine academic advising sessions by upwards of 10 minutes.

Second, small talk is rule-governed but not script-like. Because the rules are subtle, sensitive to dynamically changing variables, and in tension with each other, it is cognitively and emotionally demanding to satisfy them. We may need to wrack our brain to conjure up a steady stream of acceptable topics.²⁴ And we may need to seriously exert ourselves to suppress some of our emotions: our rage at someone's off-hand political remark, our distress when someone asks about our (philandering, no good) spouse, our boredom at our interlocutor's fly-fishing story. Cocktail parties can drain us in the way that routinely making requests like (7) instead of (6) never could.

For all the same reasons, small talk almost always carries meaningful risk of embarrassing ourselves, accidentally offending our interlocutors, or both. Many of us regularly decline to approach someone only because we are worried that we will not adequately perform the ritual. Our concerns are not just reputational. Our success or failure at small talk can have direct material stakes: it can affect the outcome of

23 Olberding: *Etiquette*, p. 429.

24 In his dissertation, Goffman coined the charming term »safe supplies«—that is *supplies* of »light and safe« topics. Goffman, Erving (1953/2022): *Communication Conduct in an Island Nation*, Bethlehem, PA: Mediastudies Press, pp. 119–124.

business deals, negotiations, workplace promotions, and customer and patient retention.

Is small talk just a defective piece of social technology? Given its pervasive cross-cultural presence, that seems like a bad hypothesis. Instead, we should assume that small talk has a different social function. If small talk knits relationships closer together, it is not because (or not just because) it facilitates the efficient and routine expression of respect amongst its participants. In fact, I think that we should take seriously the possibility that small talk's demandingness—and our consequent difficulty in performing it well—is not an unfortunate *bug* of the practice but a central *feature* of it.

4. Small talk involves showing, not telling

How does small talk work? On my analysis, small talk, like other routine politeness rituals, has a communicative function. It is a piece of social technology that facilitates the flow of socially important information. What cleaves small talk from these other practices is the *mechanism* through which this information transfer happens.

Routine politeness rituals are language-like in a critical sense. They depend upon the existence of conventional codes, which both sender and receiver jointly know. These background codes directly transmute the significance of words and bodily movements. If I extend my hand to you, I express respect only because there is a convention that tethers that gesture to that attitude.

On my view, small talk is a social ritual, but it isn't language-like in the same sense. (This can seem ironic or even paradoxical, because we use language in order to conduct the ritual. I will say more about this in the next section.) When you make small talk with me, I usually thereby infer that you respect me. But I don't infer it (just) because we jointly know a rule like, »Small talking with someone means you respect them.«

Instead, small talk is a communicative ritual insofar the ritual motivates us to *directly display* aspects of our practical agency to each other. When we successfully make small talk with each other, we show each other that we can and will conform to the ritual's rules. (And insofar as we fail to conform to its rules, we usually show that we can't or won't do so.) That might not be *why* we are small talking. But the function of small talk, as a ritual, is to facilitate the *production* of this kind of evidence.

To make this idea more precise and to show why it predicts small talk's structure, I will rely on a body of work called *signaling theory*. (Really, it is a theory of costly or hard-to-fake signals.) Signaling theory emerged in the 1970s, with parallel devel-

opment in economics and evolutionary biology.²⁵ This theory identifies and studies a strikingly elegant way in which we transfer information within low trust environments. Rather than saying that we have thus-and-such quality, we demonstrate it.

Here some terminology will help. When we say that *x signals that p*, we are saying that some property or event or state *x* carries the information that *p*. Thus, smoke signals fire, and footprints in the sand signal that someone was on the beach. When Donald Trump says, »I am Trump«, he is signaling that he is Trump.

About any signal, we can ask two questions:

(10) *What information* is the signal carrying? For example, why does bowing in Japan carry the information that the bower respects the target of the bow?

(11) *In virtue of what* is the signal carrying that information? For example, what makes it the case that Donald Trump's assertion, »I am Trump«, signals that he is Trump?

Some signals carry information in virtue of a jointly known symbolic code—sometimes a full-blown natural language, sometimes a ritual code. But that is not the only way to answer the question in (11). Sometimes *x signals that p* because there is a prin-

25 In economics, Spence (1973) is credited as the founder; in biology, Zahavi (1975), Zahavi and Zahavi (1998), and Grafen (1990). For a survey, which discusses the theory's indebtedness to earlier ideas in Veblen (1899/1994), Mauss (1924/1954), and Bourdieu (1972/1977), see Gambetta (2011). While much of Goffman's work is best reconstructed within this theory, he himself never quite articulated it. Spence, Michael (1973): »Job Market Signaling«, in: Quarterly Journal of Economics 87, pp. 355–374; Zahavi, Amotz (1975): »Mate Selection. A Selection for a Handicap«, in: Journal of Theoretical Biology 53, pp. 205–214; Zahavi, Amotz/Zahavi, Avishag (1998): The Handicap Principle. A Missing Piece of Darwin's Puzzle, New York: Oxford University Press; Grafen, Alan (1990): »Biological Signals as Handicaps«, in: Journal of Theoretical Biology 144, pp. 517–546; Veblen, Thorstein (1899/1994): The Theory of the Leisure Class, New York: Dover; Mauss, Marcel (1924/1954): The Gift. Forms and Functions of Exchange in Archaic Societies, Translated by Ian Cunnison, London: Cohen and West; Bourdieu, Pierre (1972/1977): Outline of a Theory of Practice, Translated by Richard Nice. Cambridge: Cambridge University Press; Gambetta, Diego (2011): »Signaling«, in: Peter Bearman/Peter Hedström (eds.): The Oxford Handbook of Analytical Sociology, New York: Oxford University Press, pp. 168–194. With rare exceptions (cf. Funkhouser 2017, Pettit 2025), philosophers have mostly ignored theories of costly signaling. Skyrms' well-known work on signaling, indebted to Lewis (1969), is a theory of *conventional*, i.e. *costless*, signals (Skyrms 2003, 2010). Funkhouser, Eric (2017): »Belies as Signals. A New Function for Beliefs«, in: Philosophical Psychology 30, pp. 809–831; Pettit, Philip (2025): When Minds Converse, New York: Oxford University Press; Lewis, David (1969): Convention. A Philosophical Study, Cambridge, MA: Blackwell; Skyrms, Brian (2003): The Stag Hunt and the Evolution of Social Structure, Cambridge: Cambridge University Press; Skyrms, Brian (2010): Signals. Evolution, Learning, and Information, New York: Oxford University Press.

ciplered relationship between x 's ability to signal p and the truth of p itself. If not p , x could not easily signal p . These are so-called costly signals.

Conspicuous consumption is the classic example.²⁶ Suppose that as you are walking down the street, you spot a woman carrying an Hermès Birkin bag. You have a good eye for these things, and so you're sure that it's a genuine bag. Hermès Birkin bags are valued, at the low end, at \$10,000 USD. You infer that the woman is wealthy.

Why did you infer this? The act of *displaying* the bag—that is, sending the signal—generally requires purchasing the bag, and purchasing the bag requires wealth. Someone who is not wealthy could not acquire the bag. Either she could not acquire it in the literal sense: she lacks the money in her bank account. Or she could not acquire it in a more abstract sense: even taking into account the bag's signaling power, it is not rational for her to buy it. She cannot afford it. In technical terms, it is too costly for the middle or lower-class person to *send* the signal.

Biologists sometimes call these »unfakeable« signals. But it is important to emphasize that most costly signals are not literally unfakeable. They are merely difficult to fake. It is perfectly possible for a middle or lower-class woman to acquire what you believe is a Birkin bag. Maybe she spent \$500 USD on a high-quality knockoff, which fooled you. Maybe it's a real bag, but she didn't pay for it. She received it as a gift or stole it.

But notice that all of these ways to acquire the bag are *difficult*. It requires effort and fashionista know-how to identify a high-quality knock-off company. To receive a Birkin bag as a gift, the woman must have the right social network. And to steal a Birkin bag, she must have criminal savvy, not to mention high risk tolerance. So if you see a woman carrying what you believe is an Hermès Birkin bag, you cannot be *certain* that she is rich. But you have excellent evidence that she is.

When we say that a signal is »costly«, it is important to keep in mind which costs generate credibility. A costly signal, in the theoretical sense, is costly *for the would-be deceiver* to produce. For the honest signaler, sending the signal might cost next to nothing. If I am fluent in Russian, and I want to prove it to a monolingual English speaker, I can produce a paragraph of well-formed Russian as evidence. For me, that act is effortless and so relatively costless. The signal is credible because it would cost a *non-Russian* speaker time and effort to memorize and convincingly recite the same material.

For human agents, costly signals are a communicative backstop, a way to persuade others when our word cannot be our bond. It is easy for a non-wealthy person to produce the sentence, »I am wealthy.« And many people have motive to present themselves as wealthier than they know themselves to be. Talk is thus *cheap* in the technical sense.

26 Veblen: The Theory of the Leisure Class.

This is why wealthy people wear Cartier watches. It is why educated people obnoxiously pepper their speech with Latin or Shakespeare quotes. It is why social justice activists adopt an esoteric vocabulary. It is why many gang members prominently tattoo themselves.²⁷ And it is why mafiosi often require prospective initiates to commit a murder.²⁸

Small talk works according to the same logic. Small talk is an activity that facilitates the production of costly signals from each speaker to each interlocutor. As we will see, this information is socially useful: in acquiring it, each participant can better predict what the other will do. Moreover, whether or not the small talkers trust each other, the information they each send is credible. This is why small talk is such a useful practice on first dates, at cocktail parties, during employment interviews, and at the start of high-stakes negotiations.

Just in virtue of making small talk, what do small talkers signal, and how do they signal it? We can distinguish two categories of answers. There are the signals that we send in virtue of the fact that we can and will make small talk at all. And then there are the signals that we send in virtue of the fact that we can and will make small talk as *well* (or as poorly) as we are making it. Here, what we signal depends upon how well we perform the ritual. In this respect, small talk can have a test-like structure.

Let's start with the first kind of signal. When I choose to make small talk with you, I must generally expend effort, both cognitively and emotionally. I must incur risk (which in this context is a kind of cost): if I make small talk with you, I risk performing badly and thereby embarrassing myself, damaging my reputation, or insulting you. And I must expend time, which is to incur opportunity cost. As Pierre Bourdieu puts it, »*giving or squandering time* [is] one of the most precious of gifts«.²⁹ Why can I afford to give it to you?

In a normal context, there are two likely hypotheses, neither of which exclude the other. First, I want to interact with you, even within the strict confines of small talk. Maybe I want to interact with you because I simply like you. Or maybe I want to interact with you because I want a longer or deeper relationship. Small talk is my upfront investment in this future. The second hypothesis is a less flattering one: I am making small talk with you because I believe that I am socially required to do so, and I want to conform to that requirement.

If the second hypothesis is true, the first hypothesis might not be. But if the first hypothesis is true, the second hypothesis tends to be true as well. This is because most of us *dislike* small talk as a genre. If it were socially permissible to make silly banter, earnestly discuss politics, or directly talk about opportunities to collaborate

27 Cf. Gambetta, Diego (2009): *Codes of the Underworld: How Criminals Communicate*, New York: Oxford University Press.

28 Ibid.

29 Bourdieu: *Outline of a Theory of Practice*, p. 180.

as widget producers, most of us would generally pick these latter options. So even if I independently want to interact with you, I generally choose to make small talk specifically because I want to conform to social norms.

From a signaling perspective, our preferences are good ones. If you gain evidence that the second hypothesis is true, you gain a wealth of other evidence about me.

For example, you often gain information about how I view you. Some people seem to believe that they are not required to make small talk with people who are vastly socially inferior to them. (My best guess is that these people are wrong about what the social norms require us to do. But that's not essential to my point.) We call these people snobs and stuck-ups. If I am making small talk with you, I am credibly signaling that either I'm not snob or that I don't believe that you are vastly socially inferior to me.

Moreover, if you gain information that I want to conform to small talk norms, you normally gain information about my *orientation* towards social norms in general. If I am the kind of person who values conforming to small talk norms, then I am probably the kind of person who values conforming to other social norms. If I am the kind of person who wants to avoid the penalties associated with violating small talk norms, then I am probably the kind of person who wants to avoid the penalties associated with violating other social norms. And so on.

So if I am making small talk with you because I must do so, you gain credible evidence that (for whatever reason) I am a social rule follower. You can count on me to conform to basic social niceties in the future. This gives you some basic assurance that I won't commit egregious social *faux pas*, which could embarrass you. And it enables the basic social norms to render me predictable (or at least, more predictable than I had been). If you know what the rules are, and you know that all else being equal, I will follow them, you are in a good position to accurately predict what I am going to do.

Thus, the *mere fact* that I am making small talk with you at all opens a window onto my nature and my view of you. I like you, I want a relationship with you, I'm not a snob, I don't think I'm further up the social hierarchy than you, I'm a social norm follower, or some combination of the above. For the sake of exposition, I am presenting this information as disjunctive. But often context will easily resolve which set of hypotheses are the most likely. A doctor who makes small talk with her patient is often signaling lack-of-snobbishness. Someone who routinely pops into her colleague's office to make small talk is often signaling a desire for a further relationship.

Crucially, it is the *unpleasantness* of small talk that enables the ritual to act as this kind of window. The inanity of the topics, the repetitiveness, the fact that we generally don't share useful information, the suppression of many of our actual opinions—all of this ensures that it is evidentially meaningful when we choose to per-

form the ritual with each other. If you know that I love French wines, and you invite me to share an expensive bottle with you, you usually don't learn much when I accept the invitation. On the other hand, if you ask me to help you clean out your garage, and I accept, you tend to learn a great deal more about who I am and how I view you.

This serves as vindication of small talk, as we currently practice it. People who do not perform small talk because »I don't like it« or »small talk is boring« catastrophically miss the point. And ironically, how-to manuals that promise to make small talk »fun« or »painless« threaten to erode the utility of the very practice that they champion.

Couldn't any mildly irritating and difficult activity fulfill this function? Suppose that acquaintances had to recite Latin prayers when they find themselves on an elevator together. Or suppose that wedding guests had to solve difficult crossword puzzles as they mingle. Couldn't they accomplish the same signaling feat? No. As I will now argue, the signaling value of small talk does not just derive from the fact that we are willing to make it at all. When we are making small talk, we thereby show our interlocutors how *well* we can or will perform the ritual.

To elaborate this second claim, it will help to decompose small talk into three distinct tasks.

First, to make small talk well, I must exercise appropriate *control* over myself. This task has two sub-components: I must internally *suppress* some of my impulses, and I must outwardly *generate* the right palette of expressions.³⁰ If I compulsively glance at my iPhone screen, or if I accidentally guffaw when you mispronounce »escargot«, then I am not performing small talk well. Similarly, if I cannot seem interested while you ramble about fly-fishing, then—even if I actually *am* interested—I am failing in my social duties. The fact that small talk is boring often makes this task difficult.

Second, I must successfully solve the Goldilocks Problem. The Goldilocks Problem is the problem of deference: that is, the problem of successfully titrating between its positive and negative forms. When I have solved the Goldilocks Problem, I know how to conform to the rule in (B2*):

B2*. Express the appropriate degree of familiarity towards your interlocutor.

The task of solving the Goldilocks Problem has three *further* sub-components. (So we are now describing sub-components of sub-components.) First, I must resolve the contextually dependent social distance variable. This means that I must correctly identify what our background social relationship is, and I must identify how the

30 In focusing on the importance of control—both having it and signaling it—in interaction, I am indebted to Goffman (1967, 1971) and Velleman's subsequent development (Velleman 2001). Goffman: *Interaction Ritual*. Goffman: *Relations in Public*; Velleman, David J. (2001): »The Genesis of Shame«, in: *Philosophy and Public Affairs* 30, pp. 27–52.

genre of small talk influences what I should assume about it. Second, I must know how, in light of this variable, I ought to modulate my conduct. This requires general competency with deference as a ritual system. Finally, I must be willing to *actually* modulate my conduct in accordance with these rules.

If I think too highly or too lowly of myself, or if I have misjudged our level of intimacy, my conduct during small talk will quickly reveal this fact. For example, if I think we are much closer than we are, I might ask a question like (12) or (13):

(12) Are you in therapy?

(13) How much are you carrying in student loans?

You will judge my questions to be inappropriate, and you will infer that I have failed to correctly judge the degree of social distance between us.

Similarly, if my undergraduate student and I are making small talk, and she says (14):

(14) My other philosophy professor teaches much better than you.

I will probably take offense. My complaint is not that she *does* like her other philosophy professor better than me. I might even endorse that judgment. Rather, in openly assessing my teaching relative to my colleague's, she oversteps. (Of course, the problem with negative deference is that it systematically inhibits the flow of useful feedback.)

Thus, small talk reliably reveals disagreement about our relationship status. And it offers us an opportunity to indirectly resolve that disagreement, well before we transition into higher stakes »medium« and »big« talk. Through careful meta-communication—that is, communication about *how* we are communicating—we can negotiate the boundaries of our relationship in real time.³¹ Often, this proceeds through *testing*: the progressive introduction of more and more personal topics, until one party balks.

Similarly, if I am systematically incompetent with the local deference system or if I systematically refuse to use it, that will quickly shine through my conduct. Given the genre's demandingness, people who are systematically »awkward«, »cringe«, or »weird« will tend to be especially awkward, cringe, or weird during small talk. And people who generally refuse to pay the right sorts of homage—who refuse to leave

31 Laver (1975) makes a similar point, although he does not discuss signaling. Laver, John (1975): »Communicative Functions of Phatic Communion«, in: Adam Kendon/Richard M. Harris/Mary Ritchie Key (eds.): *Organization of Behavior in Face-to-Face Interaction*, The Hague: Mouton, pp. 215–238.

unacknowledged what ought to be left unacknowledged or to give lip service to what ought to be given lip service—will see no reason to start paying it during small talk.

Third and finally, in order to make small talk well, I must generally help *you* to make it well too—at least within reason. Goffman called this task *second-order tact* or *tact about tact*.³² He hypothesized that it is a requirement of any polite interaction. For example, second-order tact requires us to select topics that make it mutually easy for us to satisfy small talk's demands. (These are what we previously called »light and safe« topics.) Even if I know that I can keep my composure while discussing the Beijing-Taiwan conflict, I may not know whether you can keep your composure. In that case, I should not introduce the topic.

Thus, if I succeed in making near-perfect small talk, then generally I credibly signal: that I have control over my social performance, that I understand the nature of our relationship, that I am competent with the deference system, that I am willing to conform to the deference system, and that I can and will do my share to help you conform to the social norms that govern you. In short, I am a cooperative and socially skilled person, and you can count on my cooperativity and social skill going forward. By all conventional standards, I am an excellent target for future social interaction.

But much of the time, most of us do not make even *nearly* perfect small talk. From a signaling perspective, these cases are much more interesting. They tend to reveal much more targeted information.

For example, sometimes we could have performed better, if only we were willing to expend more effort. There is a literal sense in which I could have resisted the urge to check my smartphone, but I didn't. There is a literal sense in which I could have paid better attention to your micro-cues. But I didn't, and so I failed to recognize that I ought to have changed the subject.

In such cases, I tend to signal something about my orientation towards you or towards social norms or both. While I care enough to make small talk with you, I do not care enough to try to make it *well*. Since how well I perform small talk is gradable, this enables me to signal fine-grained information about my sociality or my view of you or both.

In a special subset of cases, my aims are actively malicious. I deliberately introduce topics that I know will upset you but not me, or I otherwise try to cause you to violate a social norm and so embarrass yourself. This is the inverse of second-order tact, and it is a way to signal aggression or a desire for dominance. When both parties mutually joust against each other in this way, they transform the ritual of small talk into a contest of skill.³³ This is the stuff of Jane Austen novels.

Sometimes, it is our current emotional state that imperils our ability to make small talk. In this way, small talk can serve as a preliminary mood test, a check before

32 Goffman: Interaction Ritual, p. 29.

33 Ibid.

we decide whether to enter higher stakes territory. If we are too distracted or angry or fatigued to succeed at small talk, we should probably terminate the encounter. Greetings can constitute a miniature version of this test. If my partner greets me after work, and I return a grumpy, »Hello«, he will wait to have a conversation with me.

Similarly, small talk can offer a window onto our affective relationship with our interlocutor. The day after my boss gives me a performance review, I may struggle to make appropriate small talk with her. My fury or distress or embarrassment may shine through my pretense of equanimity. My boss will thereby learn that I did not take the performance review well. (In an even more interesting case, my actions are strategic. I *simulate* that I am failing to suppress my fury at her because I want her to know that I am angry.)

This is one reason why we sometimes perform small talk as a way to transition out of difficult, awkward, or adversarial exchanges. If we each succeed at the genre, we thereby reaffirm that our mutual good will remains undamaged. Neither party needs long-term distance to »process« her negative emotions, and interaction can proceed as normal.

Finally, as we've already seen, small talk can be diagnostic of overall social skill. If you non-culpably lack the ability to reliably conform to social norms—if you are (for example) neurodivergent, a foreigner, or some other kind of outsider—it is usually a blessing to reveal this information through small talk. In future interactions, your interlocutor is less likely to misinterpret an accidental *faux pas* as a malicious one. And although she cannot reliably use social norms to predict you, she now has a »baseline« against which to judge your behavior. Finally, she can make informed decisions about whether she wants to expend the extra cognitive and emotional effort to interact with you again.

But these aren't the only reasons that you may have low social skill. In some cases, there is a clear sense in which you *could* have reasonably acquired the relevant knowledge and skill. The costs to acquire them—the effort and time you needed to expend—were reasonable. Your displayed lack of social skill thus reveals something about your values. You are generally an anti-social person, or you want to disaffiliate from the local culture.

Either way, your incompetence advertises that you do not *want* to be a good target for future cooperative interaction. For that reason alone, you are not one. Of course, the tragedy is that people in the former category are sometimes misidentified as belonging to the second category, and they are unfairly socially isolated.

Thus, small talk as ritual works for at least two reasons. First, it is costly to perform it at all. Second, once we are performing it, how we perform it carries a wealth of subtle and contextually specific information. This, in turn, can enable each small talker to decide whether and how to continue the interaction with her partner. In this sense, an episode of small talk is both exploratory and diagnostic.

What, then, is small talk really? It is a kind of evidence engine. Because it is a norm-governed activity and because of the specific norms that regulate it, small talk reliably motivates us to act in ways that reveal something important about who we are. Here's how Goffman puts the same point:

An act that is subject to a rule of conduct is...a communication, for it represents a way in which selves are confirmed—both the self for which the rule is an obligation and the self for which it is an expectation. An act that is subject to rules of conduct but does not conform to them is also a communication—often even more so—for infractions make news and often in such a way as to disconfirm the selves of the participants. Thus rules of conduct transform both action and inaction into expression, and whether the individual abides by the rules or breaks them, something significant is likely to be communicated.³⁴

Goffman's remarks presage what signaling theory helps us to clarify. All rules of conduct are expressively transformative. And the function of some rules—including the rules of small talk—*just is* their expressively transformative effect.

The rules of small talk transform what we do. If I institute a rule that says, »Wear blue to work tomorrow«, I have transformed the act of dressing for work. If my employees wear blue, they are no longer just wearing blue. They are also complying with my directive. And if they wear white or pink instead, they are no longer just wearing white or pink. They are now flouting my directive. Whatever color my employees wear tomorrow, I now learn something about their overall orientation towards my directives.

It is through this mechanism, not through what we openly *say*, that we »get to know each other« in small talk. Small talk can seem to rely on some inchoate, even magical principles. We »vibe« with our interlocutor or »like her energy«, and so we want to continue interacting with her.

But if I am right, what is happening is entirely mundane. In making small talk, we inevitably conform or fail to conform to the rules of the genre. Through how we interact with small talk's rules, we directly display our practical agency to each other: our preferences, dispositions, skills, and the values, commitments, and worldview that they presuppose. We thereby prove—or fail to prove—that we are good targets for social interaction.

34 Ibid., p. 51.

5. Genre goal and speaker goal

Have I over-intellectualized small talk? Invariably, when I present this analysis, someone complains:

But that's not what I am doing when I make small talk. I never think about all of this signaling stuff!

When I follow the rules, I'm doing it because I want to follow the rules. I'm not doing it because I want to *signal* that I want to follow the rules. And when I make small talk just because I like someone, I'm doing it because I like them. I'm not doing it because I want to *signal* that I like them. You are putting too many thoughts into my head.

It is indeed plausible that when people make small talk, many (most?) of them do not strategically calculate what their actions signal. If we were to ask them, »Why were you talking with your colleague in the elevator just now?« they would probably just say, »I wanted to make small talk« or »I was just being polite« or »I was curious how my colleague was doing.«

But this objection conflates two different kinds of aims: a conversational *genre's* aim and *the speakers'* aims when they converse within that genre. For this reason, it is not an objection to me. Let me explain.

My claims in this paper are about the aim of small talk *as a rule-governed social practice*. In talking about a practice's aim, I am talking about its function: the practice's primary contribution to the overall social system in which it is embedded.³⁵ (The contribution is *primary* just in case it explains why the practice emerged or persists.) Within the social sciences, it is completely routine to distinguish between a practice's function and the aims of agents who participate within it.³⁶

35 As a helpful contrast, consider my disagreement with Posner (2000). Posner has argued people conform to social norms (including norms about etiquette) *in order to* signal that they are good targets for further social coordination. Posner wants to explain and rationalize individuals' behavior. It is open to Posner to claim that social norms have functions *other than* the facilitation of such signaling. In contrast, I have remained neutral on why people conform to the rules of small talk, but I have made claims about their functioning. Note that I am using »signaling« in the loose sense of »making information available.« As I discuss later in this section, it is possible to signal without intending to do so. Posner, Eric (2000): *Laws and Social Norms*, Cambridge, MA: Harvard University Press.

36 Merton (1949/1968) famously distinguished between *manifest* functions and *latent* functions, the latter of which participants do not recognize. In tethering a practice's function to its existence or persistence, I am implicitly assuming an etiological analysis. For the *locus classicus* on etiological functionalism in philosophy, cf. Millikin (1984). For more on functionalism in the social sciences, see Haslanger (2020) and Berstler (2025). Merton, Robert K. (1949/1968): *Social Theory and the Social Structure*, New York: Free Press; Millikin, Ruth (1984): Lan-

For a classic example, consider Emile Durkheim's theory of religion.³⁷ According to Durkheim, the function of religious practice is to enhance social solidarity and cohesion. This is why religion is good social technology. Durkheim was not thereby making a claim about what *motivates* individual people to attend weekly church services.

It is no objection to Durkheim to point out, »Lots of people go to Church because they believe God commanded it, or because they like the music, or because their parents are making them!« If anything, Durkheim will retort that religion works best when its practitioners do not understand what it does. If they knew that their religion functions as mere social technology, that it is *not* a divinely mandated way to influence the universe, they may lack motivation to continue the practice.

Similarly, it is probably structurally beneficial that most of us do not understand small talk's inner workings. If you understand the practice's signaling function, your pay-off structure holistically changes. For example, antisocial con artists will realize that they have reason to *mimic* the behavior of prosocial people and so have reason to conform to small talk's more onerous rules. (Some of them have surely already realized this!) If everyone were to know exactly how small talk works and that everyone else knows this, our behavior during small talk would carry less information. The practice would therefore become less useful to us.

For the philosopher of language, there is a broader lesson here. Thanks to H.P. Grice's pioneering work, many philosophers have attempted to analyze conversation as a special species of coordination problem.³⁸ That is, they have attempted to reduce the theory of conversation to the theory of joint action.³⁹ But for all the program's advantages, small talk reveals its limitations.

Here's the Grice-inspired chain of thought. In order to make a speech act at all, I must *intend* to do it. In order to understand my speech act, you must recognize my

guage, Thought, and Other Biological Categories, Cambridge, MA: MIT Press; Haslanger, Sally (2020): »Failures of Methodological Individualism«, in: Journal of Social Philosophy 53, pp. 512–534; Berstler, Sam (2025): Erving Goffman. New York: Routledge. MS. On file with author.

37 Durkheim: The Elementary Forms of Religious Life.

38 Grice: Studies in the Way of Words.

39 The most influential representative of this program is Stalnaker (1984, 1999, 2002, 2014). Recent developments include Roberts (2012), Harris and Unnsteinsson (forthcoming), who offer a theory of conversational genre in terms of rational coordination, and Berstler (2025), who shows how to extend the program to non-cooperative conversations. Stalnaker: Inquiry; Stalnaker: Context and Content; Stalnaker: Common Ground; Stalnaker: Context; Roberts, Craige (2012): »Information Structure in Discourse. Toward an Integrated Formal Theory of Pragmatics«, in: Semantics and Pragmatics 5, pp. 1–69. Harris, Daniel W./Unnsteinsson, Elmar (forthcoming): »Genre and Conversation«, in: Nous; Berstler, Sam (2025): »The Grice is Right. Grice's Non-Cooperation Problem and the Structure of Conversation«, in: Philosophical Perspectives 38, pp. 26–40.

speech act-constitutive intentions. My goals and plans inform what I intend to do, and your beliefs about my goals and plans inform your beliefs about what I intend to do. So our goals, plans, and intentions structure what we do within conversation.

Thus far, this is unobjectionable. The next steps are the troublesome ones: first, that conversation *just* is a sequence of rationally planned and organized speech acts and second, that if we want to study conversation as such, we just need to study this form of interpersonal planning and organization.

The advantages of this explanatory paradigm should not be understated. (And I myself have worked within and defended it.⁴⁰) Since it is a reductionist program, it is parsimonious. It ensures that the purest form of conversational analysis can be done from the armchair—an outcome philosophers and formalists naturally love. And it buys cultural universality on the cheap. So long as people have the same goals and plans, their conversations will have the same deep structure.

But how can the Gricean reductionist program explain what happens within small talk? If you and I share a project like, »Let's get to know each other« or »Let's see if we want to have a further relationship«, why do we then have a weird and stilted conversation about the weather, which both of us mostly hate? Our behavior is perplexing.

Worse still, if you and I merely share a project like, »Let's engage in an episode of joint activity that constitutes small talk«—which I suspect happens all the time—the theorist then needs an independent analysis of what small talk is and why we want to make it.

What I have tried to show is the power of a *social structuralist* analysis of conversational genre. On a social structuralist interpretation, the rules of small talk are not rational constraints that bind speakers in virtue of their shared goal. They are social norms that regulate a genre. Depending upon our pay-off structure, it may be rational for us to conform to them. It may be rational for us to ignore them. But whatever we do, small talk will tend to work its social magic.

Whatever we do while making small talk, we find that we are displaying our practical agency to each other. We achieve (or fail to achieve) a social end through exchanging information about the kinds of people we are. But we needn't *intend* to exchange this information. When the antisocial person refuses to make small talk well, she reveals that she is antisocial *regardless* of whether she planned to do so. And when a socially charming person excels at it, she reveals her skill *regardless* of whether she intended to show this.

This is the power of costly signaling as a communicative technology. It is the power of conversational genre as social *infrastructure*: as a set of rules that systematically shapes our choice architecture and so systematically alters what we signal to

40 Ibid.

each other. This is why small talk is an enduring mode of human interaction. It is why the practice persists—no matter how much we rail against it.

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On Infrastructures of (Non-)Knowledge

Remains of the Disc, or Respinning the History of CD-ROMs and GIF 0.0

Till A. Heilmann

1. A blind spot in media history

The Compact Disc Read-Only Memory (CD-ROM) epitomizes the rapid obsolescence of digital infrastructures. For a brief period in the 1990s, the gleaming silver disc seemed to reflect a new age of knowledge, becoming the primary storage solution for a novel kind of encyclopedic and multimedia information. A decade earlier, its predecessor, the Compact Disc Digital Audio (CD-DA), had introduced digital media to mass consumer markets. Now, the CD-ROM promised an audiovisual world of electronic books, interactive artworks, video games with cinematic sequences, and hypertextual reference works.

The cultural weight of the CD-ROM is evident in what remains one of the most influential studies of digital media: Lev Manovich's seminal 2001 book, *The Language of New Media*. By the time of its publication, however, the CD-ROM had already lost much of its shine. For most, it was familiar mainly as a free insert in computer magazines or as a disposable installation disc for productivity software. Yet in Manovich's analysis of the emerging digital aesthetics, the »hypermedia CD-ROM« still played a central role, embodying what he identified as the »key form of cultural expression« of new media: the database.¹

Technically, the CD-ROM was a curious hybrid of rotating mechanics and quantum physics, offering a storage capacity of 650 megabytes—immense by the standards of its day. But by the end of the 1990s, its core function as a storage device was eclipsed by a different media logic: transmission. A technological revolution, anticipated since the disc's early years, swept it aside. With the rise of high-speed Internet access, optical storage media for home use became unnecessary. Instead of inserting a disc to consult a reference work, users simply opened a webpage. To put it succinctly: Wikipedia replaced *Microsoft Encarta*.

1 Manovich, Lev (2001): *The Language of New Media*, Cambridge, MA: MIT Press, pp. 4 and 218–221.

In home entertainment, the DVD had already established itself as the CD-ROM's audiovisual successor by the mid-1990s. (It was later adopted as the storage medium for Sony's *PlayStation 2*, which became the best-selling video game console of all time.) While the CD-ROM survived as a low-cost storage option for PCs until the late 2000s, it was finally displaced by affordable flash drives and the World Wide Web. And it was not the only optical storage medium to vanish: the rise of streaming services such as Netflix spelled the end of consumer discs altogether. DVD and Blu-ray drives disappeared from computers—first from laptops like the *MacBook Air*, then from desktop computers, and eventually from living rooms.

From a media studies perspective, the short life of the CD-ROM is notable for two reasons. First, it has been largely forgotten in media historiography. Its prominence was as brief as the scholarly attention it has received since its decline in the early 2000s, with very few recent studies devoted to the format.² Second, CD-ROMs remain invaluable as objects of historical inquiry. They preserve cultural material that is often inaccessible elsewhere. Precisely because the CD-ROM as a storage medium was superseded by the Internet as a transmission medium, the format salvages what the Internet and other platforms did not preserve. CD-ROMs thus form an essential infrastructure for our knowledge about the recent digital past.

2. A very short account of the short history of the CD-ROM

To make a short story even shorter: the CD-ROM was a transitional medium that shaped digital culture only for a brief time. Measured against the long histories of other storage technologies—printed books (now approaching their 600th birthday), safety film (in use for more than a hundred years), vinyl records (spinning for over eighty years), or even flash memory (around for three decades)—the CD-ROM's heyday lasted barely five years, from 1993 to 1997. Technologically, it arrived very early in the age of personal computers, and yet it came almost too late. Its trajectory can be divided into three phases: an initial decade of latency (1983–1992); a frantic, hype-fueled five-year run (1993–1997); and a gradual but inevitable decline (from the late 1990s to the mid-2010s).

2 Cf. Lessard, Bruno (2017): *The Art of Subtraction: Digital Adaptation and the Object Image*, Toronto: University of Toronto Press; Smith, Greg E. (ed.) (1998): *On a Silver Platter: CD-ROMs and the Promises of a New Technology*, New York: New York University Press.

Latency (1983–1992)

The first phase began in 1983, the year the CD-ROM's direct precursor, the CD-DA, was introduced to European and North American markets as the first mass-market digital medium. That same year, Japan's *Sony Corp.* and the Dutch conglomerate *Philips* collaborated to define the specification of the new optical storage format, the ›System Description Compact Disc Read Only Memory‹, later published as the so-called *Yellow Book*. In other words: CD-DA and CD-ROM were developed almost simultaneously.

The CD-ROM was conceived as a medium for personal computers and other digital devices. Because the CD-DA was already a digital format, it was a small technological step to adapt its encoding standard beyond music. The format had another advantage: it could piggyback on the existing industrial infrastructure for manufacturing audio CDs. Moreover, its ›read-only‹ character—as the name implies—seemed to promise a technological solution to the problem of unauthorized copying. The computer industry in particular considered the CD-ROM a way to transform the personal computer from a business machine into a household device: the multimedia computer. Yet the timing was problematic. In 1983, the IBM PC was just two years old, the Apple Macintosh had not yet been released, and Microsoft Windows was still on the horizon. In the first half of the 1980s, the graphics and sound capabilities of computers were rudimentary. For instance, the widely used Enhanced Graphics Adapter for IBM PCs supported a resolution of just 640×350 pixels in its ›high resolution‹ mode—and only in 16 colors.

Nevertheless, when the CD-ROM was introduced to the public in 1984, it was heralded as the imminent future of digital knowledge and multimedia. An article in *New York* magazine, titled ›The Everything Disc‹, emphasized its then astonishing storage capacity: ›Each disc holds 540 to 600 megabytes. That's equivalent to about 1,200 floppy discs, nearly half a million typed pages, the text of a 50-volume encyclopedia, or every video game ever written.‹³ The article also celebrated the disc's integrative function: ›Each compact disc is a multimedia device. It can store a rich combination of high-resolution graphics, still-video frames, digital audio, and computer data.‹⁴ What the CD-ROM promised was nothing less than the total integration of the digital media infrastructure: ›This is finally going to wed computers and video and audio technology into a single multifunction system.‹⁵

It was not, however, the entertainment industry—nor even Sony or Philips, the inventors of the disc—that secured the CD-ROM's place in the market. The format's

3 Hoban, Phoebe (1984): ›The Everything Disc‹, in: *New York*, Nov. 1984, pp. 22–25, here p. 22.

4 Ibid.

5 David Lachenbruch, quoted in *ibid.*, pp. 24–25.

most important advocate was the computer industry, led by Microsoft. Under Microsoft's initiative, a consortium of companies developed a standard file system (the *Yellow Book* had left this issue open). Starting in 1986, the company also hosted annual international conferences to promote the new format and establish it within the industry. To coincide with the inaugural conference in 1986, Microsoft published *The New Papyrus*, a book that introduced the CD-ROM to the public while situating it in a longer media-historical perspective.⁶ Its subtitle boldly proclaimed the CD-ROM to be not just the next digital medium, but the »current and future state of the art«, a technology that would unify all previous media forms. In his foreword, Bill Gates underscored the format's significance: »CD ROM [sic] is quite different from any other medium in existence, whether it be television, movies, video, slides, audio, books, or personal computers. In fact, one might look at CD ROM as the summation or combination of almost all of these.«⁷

The historical model for this grand vision of multimedia was the encyclopedia. The CD-ROM was intended to integrate all types of knowledge in a single new format. Appropriately, the book's first chapter reprinted Vannevar Bush's 1945 essay »As We May Think«—a foundational text for the utopian ideal of networked information infrastructure. The first major CD-ROM product, also presented at the 1986 conference, was itself an encyclopedia: Grolier's *The Electronic Encyclopedia*, a digital version of its 20-volume printed *Academic American Encyclopedia*, comprising some nine million words across 30,000 entries. And until its decline at the end of the following decade, the notion of a comprehensive—or even universal—summary of knowledge remained one of CD-ROM's defining characteristics.

Even so, widespread adoption came only gradually. Although the discs were inexpensive to manufacture, the PC drives required to read them were costly, restricting early uptake of the technology largely to institutions such as corporations and libraries rather than individual consumers.⁸ Furthermore, the computers of the mid-1980s lacked the necessary graphics and sound capabilities to fully realize the CD-ROM's multimedia promise. Finally, the format faced competition from CD-i, an alternative specification developed by Philips, which lingered until its eventual failure in the mid-1990s.⁹

In its initial phase, then, the CD-ROM functioned above all as a database medium. Growth was slow: from fifty titles available in 1985, the global catalog ex-

6 Lambert, Steve/Ropiequet, Suzanne (eds.) (1986): *CD ROM. The New Papyrus: The Current and Future State of the Art*, Redmond, WA: Microsoft Press.

7 Gates, Bill: »Foreword«, in Lambert/Ropiequet: *CD ROM*, p. xi.

8 Regazzi, John (2015): *Scholarly Communications: A History from Content as King to Content as Kingmaker*, Lanham: Rowman & Littlefield, pp. 105–117.

9 Rosen, David (1986): »History in the Making: A Report from Microsoft's First International Conference on CD ROM«, in: *Educational Technology* 26:7, pp. 16–19.

panded to only just under one thousand titles by 1990.¹⁰ Most discs were collections of scientific, bibliographic, or statistical data, texts (like legal libraries and encyclopedias), images (such as NASA datasets), or software, rather than true multimedia experiences.¹¹ Notable exceptions included the interactive music analysis *CD Companion to Beethoven's Ninth Symphony* and the game *The Manhole*, an early forerunner of the famous *Myst*.

Hype (1993–1997)

The CD-ROM's real boom began in the early 1990s, as personal computers became fixtures in households across industrialized nations. By then, hardware and software had matured enough to make multimedia genuinely viable. Intel's 486 and Pentium processors, Yamaha's FM-synthesis sound chips, and the VGA graphics standard made higher-quality audio and visuals possible. The release of Windows 3.0 in 1990 established the graphical user interface as the norm for IBM-compatible PCs. A year later, the Multimedia PC Marketing Council, an industry consortium, defined the »Multimedia PC« specification, which, among other things, made a CD-ROM drive mandatory.¹²

Pinpointing the exact start date of the CD-ROM boom is difficult, but 1993 stands out both economically and culturally. That year, sales of CD-ROM titles and drives skyrocketed,¹³ transforming the long-struggling medium into a »must-have« feature for computer owners. Rapid growth was fueled by falling hardware prices, with many units being sold as part of affordable »multimedia upgrade kits« that also included a sound card. Manufacturers such as Mitsumi reduced costs through innovations like the IDE interface (instead of the more expensive SCSI) and tray-loading drives (replacing cumbersome caddies, i.e. protective disc cartridges). Reflecting on the year, *PC Magazine* praised manufacturers for »making CD-ROM drives standard features with most of their machines«.¹⁴

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- 10 Helgerson, Linda W. (1986): »CD-ROM: A Revolution in the Making«, in: *Library Hi Tech* 4:1, pp. 23–27, here p. 23; Armstrong, Chris J./ Large, J. Andrew (1990): *CD-ROM Information Products: An Evaluative Guide and Directory*, Aldershot: Gower, pp. 417.
 - 11 Armstrong/Large: *CD-ROM Information Products*, pp. 367–417.
 - 12 Jones, Mitt (1991): »CD-ROM Drives: Finally up to Speed«, in: *PC Magazine* 10:18, pp. 283–300, here p. 285.
 - 13 Rassuli, Kathleen M./Tippins, Michael J. (1997): »History and Cyberspace. A Marketing History of the CD-ROM Book Industry«, in: *Journal of Macromarketing* 17:1, pp. 89–106, here pp. 91 and 95.
 - 14 Seymour, Jim (1994): »The Best of 1993: Thumbs up, Thumbs Down«, in: *PC Magazine* 13:1, p. 154.

By the summer of 1993, the CD-ROM was hailed as the »Mass Medium at Last«, according to a Bloomberg News headline.¹⁵ While only a few hundred titles had been available at the beginning of the decade, thousands were now released annually. The market grew large enough to sustain a dedicated U.S. magazine, *CD-ROM Today*, which offered reviews of new releases, hardware advice, and industry reports. At this point, further patronage by Microsoft was no longer needed: the company had already discontinued its series of promotional conferences the previous year.

A cultural shift was equally evident. As Bloomberg News observed, the predominant ways of using the CD-ROM had changed: »Early on, computer makers figured that CD-ROM [...] would be good for storing databases, documents, directories, and other archival information that would not need to be altered. Customers would be libraries and businesses.«¹⁶ In practice, however, the medium flourished with different content: »Today, the growth in CD-ROM is coming from interactive programming—such things as multimedia encyclopedias, live-action games, and troves of educational material.«¹⁷ Among the many new titles of 1993, there were a number of landmark releases that cemented the format's place in popular culture. These included iconic games like *Myst*, *Star Wars: Rebel Assault*, and *The 7th Guest*; artistic projects like Peter Gabriel's *Xplore* and an interactive edition of the Beatles film *A Hard Day's Night*; educational works like the richly produced *Who Built America?*; and the first edition of Microsoft's *Encarta*, an encyclopedia series that would remain successful for years.

As the latter two examples show, the database format remained an important part of CD-ROM production, with countless map collections, literary anthologies, telephone directories, art galleries, and atlases covering everything from the US road network to human anatomy. But the medium's breakout success came from multimedia content that took advantage of the era's improved graphics and sound. By the mid-1990s, the best-selling discs were video games and entertainment titles.¹⁸ At its peak, the CD-ROM market was a vibrant space for both commercial consolidation and artistic experimentation. The Voyager Company continued to release ambitious projects like *The Complete Maus* (1994).¹⁹ Brøderbund, in collaboration with Ran-

15 Schwartz, Evan I. (1993): »CD ROM: A Mass Medium at Last«, in: Bloomberg Businessweek (18.07.1993). Online: <https://www.bloomberg.com/news/articles/1993-07-18/cd-rom-a-mass-medium-at-last> (last access: 31.08.2025).

16 Ibid.

17 Ibid.

18 Ulanoff, Lance (1995): »The Top 100 CD-ROMs«, in: PC Magazine 14:12, pp. 102–165, here pp. 103–104.

19 Maher, Jimmy (2021): »The Best of Voyager«, The Digital Antiquarian (18.06.2021). Online: <https://www.filfre.net/2021/06/the-best-of-voyager-part-1/> (last access: 31.08.2025); Brown, Geoffrey (2012): »Developing Virtual CD-ROM Collections: The Voyager Company Publications«, in: International Journal of Digital Curation 7:2, pp. 3–20, here p. 4.

dom House, launched the *Living Books* series (1994–1998), interactive versions of children's classics, soon followed by Disney's *Animated Storybooks*.²⁰ Musicians also embraced the format: Prince released *Interactive CD-ROM* (1994), while David Bowie presented *Jump* (1994). Avant-garde artists like Chris Marker (*Immemory*, 1997) and Valie Export (*Bilder der Berührungen*, 1998) explored the format's creative potential. Entire magazines, with titles like *Blender* and *Substance*, appeared exclusively on CD-ROM (only to disappear a few years later).²¹ Even conventional books were accompanied by discs, most notably Bill Gates' *The Road Ahead* (1995).

By the end of its short boom in 1997, the CD-ROM had been fully normalized. Discs were sold at supermarket checkouts and bundled with a wide range of magazines. Beyond multimedia titles, the format had become the standard for software distribution, as applications and operating systems had outgrown floppy disks.²² When Apple introduced the first iMac in 1998 without a floppy drive, the move caused only a minor stir. By then, PCs and laptops were routinely shipped with CD-ROM drives, with OEM units priced below a hundred dollars. In just five years, the number of installed drives in the United States alone had increased more than tenfold, reaching roughly 160 million.²³ In the gaming sector, the CD-ROM (in slightly modified form) served as the standard medium for consoles such as Sony's Playstation (1994), Sega's Saturn (1995), and Dreamcast (1998). And while the recordable CD-R was technically a distinct format, the arrival of affordable CD-R drives in the latter half of the decade gave the silver disc yet another push, extending its everyday presence into home recording and personal archiving.

Decline (late 1990s to mid-2010s)

No sooner had the CD-ROM conquered the digital public sphere than the hype was over, ushering in the third phase of its life: a slow, gradual decline. As with its rise, cultural factors contributed to its fall, but the decisive causes lay in the technological limitations of the medium itself.

Ironically, the cultural forces that undermined the CD-ROM were tied to its own success. By the late 1990s, the format had become ubiquitous in PC computing, and

20 Madej, Krystina/Lee, Newton (2020): *Disney Stories: Getting To Digital*, Cham: Springer International Publishing, pp. 143–146.

21 Smith, Ernie (2016): »A Magazine You Can't Bend«, Tedium (23.02.2016). Online: <https://tedium.co/2016/02/23/cd-rom-magazines-launch-blender/> (last access: 31.08.2025).

22 Anyone without a CD-ROM drive had to install Windows 95 from thirteen separate floppies; Office 95 required even twenty-three; see Chen, Raymond (2005): »How Many Floppy Disks Did Windows 95 Come On?«, in: *The Old New Thing* (19.08.2005). Online: <https://devblogs.microsoft.com/oldnewthing/20050819-10/?p=34513> (last access: 31.08.2025); see https://archive.org/details/microsoft-office-95_agustus-1995 (last access: 31.08.2025).

23 Anon. (1997): »The CD-ROM Drive Sales Index«, in: *EMedia Professional* 11:7, p. 12.

the number of titles available had multiplied rapidly. Yet the quality lagged behind the quantity. The early promises of multimedia spectacle and radically new forms of interactivity largely went unfulfilled. Artistic experiments by Peter Gabriel, David Bowie, and Prince were abandoned after disappointing initial attempts. »Ground-breaking« CD-ROM magazines like *Blender* folded after only a handful of issues.²⁴ And in 1997, the Voyager Company—responsible for many of the format's most ambitious and acclaimed titles—was forced to shut down.²⁵ Increasingly, CD-ROMs were filled not with innovative multimedia projects, avant-garde artistic projects, or deluxe editions of games, but with second- and third-rate software and free promotional supplements.

The technological reasons that sealed the format's fate were manifold, but they all traced back to its predecessor. The CD-ROM was built on the decade-old foundation of the CD-DA and therefore essentially outdated already in its heyday. In the PC sector, several hardware generations had come and gone, but the CD-ROM could not overcome the mechanical limitations of its optical drive technology. Although manufacturers eventually managed to boost read speeds to fifty-two times the original rate, the crucial seek time—the delay in accessing random data—lagged far behind advances in hard disk technology.²⁶ Moreover, the once astonishing capacity of 650 megabytes proved insufficient for storing high-quality video.²⁷ These limitations were hardwired into the format and could not be significantly improved, even with faster drives or the recordable CD-R.

For industry observers, the format's decline was therefore no surprise. Even at the height of its popularity, it was clear that the CD-ROM was a transitional medium for a new digital age. As one critic noted in 1996: »The current CD-ROM standard will not be a mass medium for multimedia entertainment or information. Its technical limitations of access speed, data rate, and capacity are too restrictive to make possible aesthetic standards that rival those of other familiar media forms.«²⁸ At same time that the format was enjoying commercial success, a fundamental shift was underway in digital media. The local storage of information on physical media was giving way to its transmission over electronic networks like *CompuServe* and *America Online* (AOL), bulletin board systems (BBS), and, above all, through the rapidly expanding commercial Internet and World Wide Web. It was certainly no bold statement by Nicholas Negroponte in 1995 that the »longer-term view of multimedia [...]

24 Smith: A Magazine You Can't Bend.

25 Brown: Developing Virtual CD-ROM Collections.

26 Maher, Jimmy (2016): »A Slow-Motion Revolution«, in: The Digital Antiquarian (30.09.2016). Online: <https://www.filfre.net/2016/09/a-slow-motion-revolution/> (last access: 31.08.2025).

27 Chesher, Chris (1996): »CD-ROM's Identity Crisis«, in: Media International Australia 81:1, pp. 27–33, here p. 28.

28 Ibid., p. 33.

is not based on that fifty-cent piece of plastic, 5 billion or 50 billion bits, but will be built out of the growing base of online systems that are effectively limitless in their capacity.«²⁹

After the grand prophecies from Sony, Philips, and Microsoft in the 1980s, the telecommunications industry had anticipated this shift at the beginning of the 1990s, framing the CD-ROM as »a warm-up for the real thing: a fully digital nationwide network«; this »vast ›information superhighway‹«, it predicted, »could render the CD-ROM obsolete. [...] Digital networks will one day give consumers ›random access to movies and virtually anything that is currently on CD-ROMs‹.«³⁰ By the end of the decade, even the format's advocates could no longer ignore its built-in constraints and impending end: »Already it feels like a single CD-ROM is not enough. As I eject and substitute individual discs while playing a five CD-ROM game, I am reminded of turning vinyl records over on my now-defunct turntable, and I can feel the imminent obsolescence of the new medium.«³¹ All three domains that the CD-ROM had once seemed poised to transform—databases, multimedia, and interactive entertainment—were soon overtaken by more advanced technologies. The World Wide Web displaced encyclopedic reference works like *Encarta*; the DVD set the new standard for home video in 1997; and video game consoles like Sony's *Playstation* and PCs equipped with 3D graphics cards relied on CD-ROMs only as inexpensive storage media for increasingly complex game worlds.

The first obituaries for the CD-ROM were written at the peak of its commercial success—a success that had taken a very different form than many early proponents had imagined. The much hyped »everything disc« and »multimedia device«³² was often reduced in practice to a mundane distribution format for data from telephone numbers to clipart pictures and software utilities. The »summation and combination of almost all«³³ media could deliver little more than short, low-resolution video clips and animations. Most discs served as mass storage, installation media, or containers for promotional material. Yet it was precisely in this last role that the CD-ROM built a veritable bridge to the Internet age. In 1996, AOL began distributing its free trial software on CD-ROMs.³⁴ The discs arrived unsolicited in mailboxes, tucked in cereal boxes, slipped into Blockbuster video rentals, bundled with books at Barnes & Noble, or even placed on stadium seats at major sporting events and

29 Negroponete, Nicholas (1995): *Being Digital*, New York: Alfred A. Knopf, p. 68.

30 Schwartz: *CD ROM*.

31 Smith, Greg E. (1998): »Introduction: A Few Words about Interactivity«, in: Greg E. Smith (ed.): *On a Silver Platter: CD-ROMs and the Promises of a New Technology*, New York: New York University Press, pp. 1–34, here p. 4.

32 Hoban: *The Everything Disc*, pp. 22, 24–25.

33 Gates: *Foreword*, p. xi.

34 Swisher, Kara (1998): *aol.com: How Steve Case Beat Bill Gates, Nailed the Netheads, and Made Millions in the War for the Web*, New York: Random House, pp. 99–103.

served with in-flight meals on air travel. This marketing campaign not only made AOL a household name but also solved the practical problem of reaching potential customers who still lacked Internet access to download the software. By 2006, the company had distributed more than a billion discs and grown its subscriber base from 200,000 to over 25 million. According to AOL, the scale of this ›carpet bombing‹ was such that, at one point in the late 1990s, half of all CD-ROMs produced world-wide bore its logo.³⁵ In the guise of the AOL disc, the CD-ROM acted as a midwife to the commercial Internet and, paradoxically, hastened its own disappearance.

The AOL campaign demonstrates that CD-ROMs did not disappear overnight with the turn of the millennium. On the contrary, their numbers continued to rise, especially with the spread of their successors, the CD-R and DVD-ROM. It is therefore difficult to name a single year that marked the beginning of the format's decline. However, if one considers the cultural and technological factors discussed, 1997 seems a plausible choice: the collapse of the Voyager Company, on the one hand,³⁶ and the rapid growth of Internet traffic, on the other,³⁷ together signal the beginning of the end for the CD-ROM.

3. A source criticism of CD-ROMs as historical remains

Challenges and promises

As artifacts of digital culture, CD-ROMs now belong to history. The question, then, is what they can contribute to the writing of history. What place might they occupy in historiography and historically oriented media studies? Like any cultural artifact, CD-ROMs are potential sources for historical inquiry. Given the right perspective, research questions, and methods, they reveal themselves as valuable documents of their era. As mass storage media, they contain large amounts of information across a remarkable range of materials: software like applications and games, interactive artworks, and, perhaps most importantly, data in the form of texts, numbers, im-

35 Edwards, Phil (2015): »In Memoriam: AOL CDs, History's Greatest Junk Mail«, Vox (12.05.2015). Online: <https://www.vox.com/2015/5/12/8594049/aol-free-trial-cds> (last access: 31.08.2025). The discs that have survived live on today as coveted objects for hobby collectors; Cf. Pardes, Arielle (2015): »Inside the Intense, Insular World of AOL Disc Collecting«, Vice (07.10.2015). Online: <https://www.vice.com/en/article/inside-the-weird-world-of-aol-disc-collecting-511/> (last access: 31.08.2025), and the Facebook group *AOL Disk Collectors*, <https://www.facebook.com/groups/1965462353668737/> (last access: 31.08.2025).

36 Brown: Developing Virtual CD-ROM Collections.

37 Coffman, Kerry/Odlyzko, Andrew (1998): »The Size and Growth Rate of the Internet«, in: First Monday 3:10. Online: <http://dx.doi.org/10.5210/fm.v3i10.620> (last access: 31.08.2025).

ages, video, and sound. For the period stretching from the mid-1980s to the turn of the millennium, they preserve a rich archive for the study of digital culture.

CD-ROMs are not, of course, traditional sources such as manuscripts, statistics, or photographs, and they present the historian with distinctive challenges in terms of their readability, representativeness, and availability.³⁸ First, they are subject to the same issues of physical decay that plague other digital media (»disc rot«),³⁹ compounded by the difficulty of finding compatible hardware and software to read them.⁴⁰ Second, they pose questions of classification, as their sheer abundance makes a comprehensive overview impossible; at best, directories, catalogs, best-seller lists, and other compilations can provide insights into specific manufacturers, genres, time periods, and geographical areas.⁴¹ Third, many discs are inaccessible to research today, as copies have been discarded, destroyed, or recycled, while libraries and archives rarely collected them systematically. As a result, surviving copies are often preserved only in private hands or niche collections.

Once these obstacles are overcome, what kind of historical knowledge can CD-ROMs provide? Historians began to engage with this question at the height of the format's hype in the mid-1990s. At the time, however, CD-ROMs were primarily treated as educational tools or repositories of digitized sources.⁴² In terms of German historiography, they were understood as a new kind of *tradition* (»Tradition«)—materials deliberately created to transmit knowledge of the past. A good example is the aforementioned *Who Built America?* (1993), an electronic history textbook developed in collaboration between the Voyager Company, the American Social History Project, and the Roy Rosenzweig Center for History and New Media.

Decades later, however, it is clear that CD-ROMs of this kind have not played a significant role in historiography. Instead, their importance as *remains* (»Über-

38 For an introduction to digital sources, see Owens, Trevor/Padilla, Thomas (2020): »Digital Sources and Digital Archives: Historical Evidence in the Digital Age«, in: International Journal of Digital Humanities 1:3, pp. 325–341. Online: <http://dx.doi.org/10.1007/s42803-020-00028-7>.

39 Smith, Ernie (2017): »When Discs Die«, Tedium (02.02.2017). Online: <https://tedium.co/2017/02/02/disc-rot-phenomenon/> (last access: 31.08.2025).

40 Brown: Developing Virtual CD-ROM Collections, pp. 6–7.

41 See the series *The CD-ROM Directory* by TFPL Publishing, published between 1986 and 1995, and *CD-ROMs in Print* by Meckler, published in 14 editions between 1987 and 2004; for further examples, see Walnut Creek CDROM Inc. (1995): The 1995 Fall/Winter Catalog. Online: http://bitsavers.informatik.uni-stuttgart.de/pdf/walnutCreekCDROM/1995_Fall_Winter_Catalog.pdf (last access: 31.08.2025); Ulanoff, Lance (1994): »The Top 100 CD-ROMs«, in: PC Magazine 13:15, pp. 113–175; Trant, Jennifer/Large, Michael (1994): »CD-ROM Resources for Art and Design«, in: Art Documentation: Journal of the Art Libraries Society of North America 13:3, pp. 131–138.

42 Cf. for example Rosenzweig, Roy (1995): »So, What's Next for Clio? CD-ROM and Historians«, in: The Journal of American History 81:4, p. 1621.

reste»)—the complementary term to tradition—is growing with each passing year. Unlike traditions, which are explicitly created for posterity, remains are sources that have survived as testimonies of their time without design or curation. By this definition, almost all surviving CD-ROMs—games, art projects, software installation discs, and so on—are best understood as remains. They serve less as intentional histories and more as unfiltered fragments of a recent digital past, preserving a wealth of cultural material that has often disappeared from the World Wide Web and other platforms. As such, they represent vital, and still largely untapped, resources for historical research.

Historiography and media studies have only recently begun to take an interest in digital storage media as historical remains.⁴³ What CD-ROMs can offer in this capacity depends, of course, on the digital objects they contain. Unlike CD-DAs and DVDs, CD-ROMs are general-purpose storage media and can hold virtually any form of digital information. This range makes it difficult to know where to begin. Which titles should historians focus on? Judging by the attention they have received from both public and scholarly circles, the first CD-ROMs that come to mind are the ›big‹ titles in entertainment (like *Myst*), reference (like *Encarta*), education, and the arts—works often produced with considerable resources by large corporations like Microsoft and Disney. In terms of reach and sheer quantity, however, one might instead look to the countless CD-ROMs that served as installation discs for software, from operating systems to Internet clients. Both categories reflect the polished, commercial façade of digital culture.

More revealing, however, may be the ›small‹ titles, which offer a backdoor into the everyday online culture of the 1990s and 2000s. A typical example of such CD-ROMs—produced in vast numbers but now largely forgotten—is the shareware collection. Shareware refers to software distributed for free on a trial basis, with payment typically required for a full version.⁴⁴ In the 1990s, before high-speed Internet made downloads easy, the CD-ROM was the preferred medium for distributing shareware. Small, independent publishers like Night Owl would compile hundreds, sometimes thousands, of shareware titles onto a single disc and sell it at a low price. The quality of these programs was often so poor that the compilations were disparagingly called »shovelware«: »old and/or weak programs shoveled onto a CD to turn a quick buck«.⁴⁵ Yet these discs contained more than just

43 For floppy disks, see Roeder, Torsten (2022): »Rescuing Diskmags: Towards Scholarly [Re]digitisation of an Early Born-Digital Heritage«, in: *Magazén* 3:1. Online: https://edizionicafoscari.unive.it/media/pdf/article/magazen/2022/1/art-10.30687-mag-2724-3923-2022-05-006_toli4qB.pdf (last access: 31.08.2025).

44 The most famous shareware in history is probably the computer game *Doom* (1993).

45 Miller, Chuck (1994): »The Shiny New Face of Shareware«, in: *Computer Gaming World* 114, pp. 128–130, here p. 128.

outdated games, utilities, and miscellaneous software. In their search for royalty-free content, publishers frequently drew material from online services like bulletin board systems (BBSs), preserving not only programs from independent developers but also digital texts, images, and other files shared within these early networked communities. This brings us, finally, to a concrete example of how CD-ROMs can serve as historical sources, offering rare insight into the visual culture of early digital communication—much of which has not survived in any other form.

GIF 0.0: A sketch of a case study

The remains of the early 1990s preserved on CD-ROMs allow us to reconstruct the history of digital images in electronic networks with greater accuracy than before. Central to this story is the Graphics Interchange Format (GIF)—another transitional medium or format whose early significance has been largely overlooked.

Conventional accounts of the GIF often distinguish between two phases. The first one, sometimes labeled ›GIF 1.0‹, associates the format with the early World Wide Web: auxiliary graphics, decorated buttons, and small animated logos. The second one, dubbed ›GIF 2.0‹ in reference to Web 2.0, marks its resurgence and renaissance as a medium for Internet memes and short video clips on social media platforms such as Facebook, Tumblr, and Twitter.⁴⁶ This narrative, however, is flawed, or, at the very least, incomplete. CD-ROMs help correct the historical record. They fill in what is missing in the schematic discourse on GIF 1.0 and GIF 2.0 by documenting a forgotten prehistory of the format. In fact, the established historiography of the GIF begins nearly a decade too late. As should be well known, the format did not originate with the launch of the World Wide Web in 1991, nor with the graphical Mosaic browser in 1993, and certainly not with Netscape Navigator's support for animated GIFs in 1995. Before GIF 1.0 and 2.0, there was GIF 0.0.

The GIF was developed and introduced in 1987 by CompuServe, one of the early online portals that predated the rise of the public Internet. It established what was arguably the first universal standard for exchanging digital images across different computer and display systems. By the time ViolaWWW became the first browser

46 See for example Eppink, Jason (2014): »A Brief History of the GIF (so Far)«, in: *Journal of Visual Culture* 13:3, pp. 298–306; Miltner, Kate M./Highfield, Tim (2017): »Never Gonna GIF You up: Analyzing the Cultural Significance of the Animated GIF«, in: *Social Media + Society* 3:3. Online: <https://doi.org/10.1177/2056305117725223> (last access: 31.08.2025); Strauven, Wanda (2019): »Let's Dance: GIF 1.0 Versus GIF 2.0«, in: Marek Jancovic/Axel Volmar/Alexandra Schneider (eds.): *Format Matters: Standards, Practices, and Politics in Media Cultures*, Lüneburg: Meson Press, pp. 47–63; Baumgärtel, Tilman (2020): *GIFs*, Berlin: Klaus Wagenbach; Wentz, Daniela (2020): »Das GIF. Geschichte und Geltung eines Formats aus dem Geist des Tanzes«, in: *Zeitschrift für Medienwissenschaft* 22:1, pp. 42–52.

capable of displaying the format in 1992,⁴⁷ GIF images had already been circulating in electronic networks for over five years. Because CompuServe published the GIF's specification openly and without licensing restrictions, and because its compression algorithm kept file sizes small, GIF images quickly spread far beyond the company's proprietary platform. They migrated from CompuServe's forums and software libraries into the wider ecosystem of bulletin board systems and networks such as FidoNet and Usenet, which served as multipliers for the format. »Most of the GIFs in circulation during the late 1980s could be traced back to one of a dozen or so BBSs.«⁴⁸ Until the mid-1990s, when JPEG and broadband Internet established new standards, GIF was the dominant format for exchanging digital images in consumer and hobbyist circles.

Because CompuServe, most BBSs, and much of Usenet no longer exist, the first years of the GIF cannot be reconstructed *in situ*. But soon after CompuServe had released the first specification of the GIF in 1987, the CD-ROM started to gain traction—a medium that has preserved traces of GIF o.o to this day. GIF files quickly became popular with publishers of shareware CD-ROMs, who collected images in bulk, often from BBSs, and compiled them for their products. What served publishers as an attractive, inexpensive, and easily sourced commodity offered buyers of the discs considerable savings in time—and thus in telephone and provider fees—since they no longer had to download each image individually. This advantage of the medium, the ability »to retrieve information rapidly from a disk whose contents would take an entire week to transmit via 1,200-bit-per-second modem«,⁴⁹ had already been emphasized when the CD-ROM was introduced in 1986. At first, the new physical storage medium complemented, and sometimes even replaced, the still rudimentary infrastructure of online transmission. For historians, this is a stroke of luck: CD-ROMs save the remains of digital networks that have long since disappeared. Files drawn from BBSs and similar sources, archived on shareware and shovelware discs, are among the few surviving traces of that early online culture and can thus help close a gap in our historical knowledge.

GIF images appeared on commercial CD-ROMs as early as 1990. One of the first was C.A.R.R.S. from Night Owl's Publisher Inc., which spawned the popular *Night Owl's Shareware* series that ran until 1997.⁵⁰ Alongside a wide range of shareware programs, C.A.R.R.S. contains over 600 GIF images. Other publishers and titles fol-

47 See the source codes of early browsers at <https://browsers.flanigan.us/browsers.html> (last access: 31.08.2025).

48 Driscoll, Kevin (2022): *The Modem World: A Prehistory of Social Media*, New Haven, CT: Yale University Press, p. 129.

49 Stark, Craig L. (1986): »CD-ROM Conference: Lured by 600 Megabytes on Disk«, in: *PC Magazine* 5:8, p. 42.

50 See https://archive.org/details/C.A.R.R.S._CD-ROM_1990 (last access: 31.08.2025).

lowed, and soon entire discs were devoted exclusively to GIF images: *GIFs Galore* CDROM (1992, 6,683 files); *GIF-Galaxy, Volume 1* (1993, 4,138 files); *Perfect Pictures* (1994, 2,163 files); and *Nothing but GIFs* (1995, 3,128 files).⁵¹ At the height of the CD-ROM boom in the mid-1990s, however, the market for GIF collections on optical media dried up. The web and the new JPEG image standard now dominated digital visibility in electronic networks and assigned the GIF a new place in the ecosystem of digital image formats. The era of GIF 0.0 ended, and GIF 1.0 began.

How, then, can historians access this material today? Where can one find discs like *Night Owl's Shareware*, which have been out of print for decades and were never systematically collected by libraries or archives? In an ironic twist of history, the Internet—the very infrastructure that rendered CD-ROMs obsolete—has become the repository of their afterlife. On sites such as the Internet Archive and others maintained by enthusiasts, thousands of titles have been preserved.⁵² They are accessible either as browsable copies of their original file structures or as downloadable ISO disk image files, which can be mounted directly, burned to a CD-R to recreate a physical CD-ROM, or read using virtual drives. What becomes visible when studying these discs of GIF images from 1990 to 1993? Let us conclude our overview with a brief digital source criticism of said CD-ROMs and their contents.

The origins of many CD-ROM titles can no longer be reconstructed with certainty. Most publishers from that era have disappeared, and little information about them survives. The situation is even more difficult with the images themselves. Beyond often cryptic file names (limited under the ISO 9660 standard to eight-plus-three simple ASCII characters) and date and time stamps of questionable validity, metadata is usually absent. For most images, essential details cannot be determined: when, where, and by whom an image was created; the purpose and context of its production; the computer and software used to encode it as a GIF; where it was first published; and how it ended up on a CD-ROM. At best, some discs include lists with keyword-like descriptions (»1ST_1.GIF 34827 06-09-90 First hubble space telescope image«⁵³). Most CD-ROMs also provide no information whatsoever about how their contents were selected or organized. Files are typically spread across multiple directories, sometimes labeled with descriptive names giving categories—from »ab-

51 See https://archive.org/details/GIFs_Galore_CD-ROM_Walnut_Creek_August_1992; <https://archive.org/details/gifgal1>; <https://archive.org/details/perfect-pictures>; <https://archive.org/details/nothing-but-gifs> (last access: 31.08.2025).

52 See, for example, the collection at <https://discmaster.textfiles.com/cd-rom> (last access: 31.08.2025).

53 See the list for *Night Owl's PDSI-004-1* (1990): https://archive.org/download/Night_Owls_CD-ROM_-_PDSI-004-1_1990/Night_Owls_CD-ROM_-_PDSI-004-1_1990.iso/TEXT%2FDIR28 (last access: 31.08.2025).

stract« to »fantasy« and »nature« to »vietnam«. ⁵⁴ But overall, the discs give the impression of random, haphazard compilations. Some discs at least include catalog files with thumbnail previews, offering a quick overview of their contents (see Fig. 1).

Fig. 1



The two GIF specifications from 1987 and 1990 explicitly allow for so-called »extension blocks«, which can be used to embed metadata in the files. ⁵⁵ In practice, however, few GIF images made use of this feature. A source criticism of these files, therefore, depends largely on what the images themselves reveal. Such clues may include the artist's name (see Fig. 2), a date (see Fig. 3), a brief description (see Fig. 4), information about the BBS through which the file was distributed (see Fig. 5), ⁵⁶ and, in exceptionally rare cases, even a history of the image's creation (see Fig. 6). Technical details such as image dimensions, color values, or the fonts of drawing programs used for generating labels can also indicate the hardware and software by

54 See the categories list on *GIFs Galore CDROM* (1992): https://archive.org/download/GifsGalore_Aug92/GifsGalore_Aug92.cdr/GIFS%2Foo_DIRS.TXT (last access: 31.08.2025).

55 CompuServe Incorporated (1987): »Graphics Interchange Format(TM): A Standard Defining a Mechanism for the Storage and Transmission of Raster-Based Graphics Information« (15.06.1987). Online: <https://www.w3.org/Graphics/GIF/spec-gif87.txt> (last access: 31.08.2025); CompuServe Incorporated (1990): »Graphics Interchange Format(sm) Version 89a« (31.07.1990). Online: <https://www.w3.org/Graphics/GIF/spec-gif89a.txt> (last access: 31.08.2025).

56 Driscoll: *The Modem World*.

way of which a file was created. For instance, an image size of 640×350 pixels with a specific 16-color palette suggests the Enhanced Graphics Adapter (EGA) of IBM-compatible PCs (see Fig. 7).

Fig. 2



Fig. 3

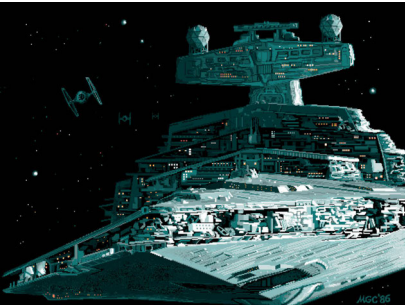


Fig. 4



Fig. 5



Fig. 6

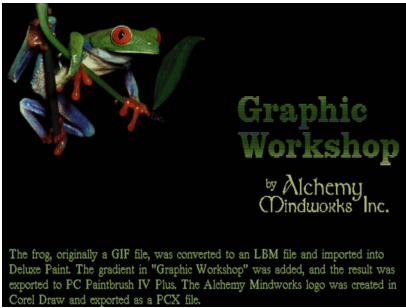


Fig. 7



Although a thorough source criticism of early GIF images is often extremely difficult, a brief survey of the collections preserved on CD-ROMs from around 1990 shows that conventional narratives in media history, which posit a development from GIF 1.0 to GIF 2.0, are misleading. Viewed primarily with the Internet and the World Wide Web in mind and traced in parallel with the transition from the ›original‹ Web 1.0 to the ›social‹ Web 2.0, two assumptions naturally arise. First, one might conclude that GIF images only became ›social‹ in their second generation. Second, the near-exclusive focus in media studies on animated GIFs encourages a linear, progressive history of the format—from static graphics to simple animations in Web 1.0 to video clips in Web 2.0—in line with the broader ›videofication‹ of the Internet by platforms such as YouTube, TikTok, and Netflix.

However, both assumptions are misleading because they overlook the format's early history: GIF 0.0. As the surviving CD-ROM collections clearly illustrate, GIF images predate not only Facebook, Twitter, and Tumblr but also the early web. Some twenty years before the memetic clips of Web 2.0, GIFs circulated widely in digital networks according to their own technologies, practices, economies, and aesthetics. The sheer variety of styles—ranging from simple clip art and diagrams to elaborate bitmap drawings, 3D graphics, digitized photography, and TV stills—demonstrates that the GIF was originally conceived, as CompuServe's specification stated, as a universal standard for »high-quality, high-resolution graphics« of all kinds (within the technological limitations of the time).⁵⁷ It was only with the popularization of the web, nearly a decade after its invention, that the GIF was reinterpreted as an auxiliary format for Hypertext Markup Language (HTML). At that point, GIF files were demoted and reduced to just one element within the web's modular design system. On HTML-based websites combining text, graphics, images, animations, and sound, the GIF was relegated to a niche role. From then on, it appeared in the guise of display color bars, logos, banners, counters, arrow icons, rotating globes, flying letters, flashing ›New!‹ stickers, and ubiquitous ›Under Construction‹ signs.

4. Resurfacing digital media history artifacts

The CD-ROM is a textbook example of the rapid obsolescence of digital media. Introduced in the mid-1980s and reaching its commercial and cultural peak in the mid-1990s, it was hailed as the »summation or combination« of all previous media »into a single multifunction system«. ⁵⁸ For a brief span, from 1993 to 1997, it seemed to fulfill that promise. By the end of the decade, however, the format had been eclipsed by the rapid rise of the World Wide Web and rendered obsolete. The very

57 CompuServe Incorporated: Graphics Interchange Format(TM).

58 Gates: Foreword, p. xi; Lachenbruch, David, quoted in Hoban: The Everything Disc, p. 22.

qualities that once made the CD-ROM appealing—its large capacity for local storage and its ability to deliver data without relying on slow and costly networks—also tied it to a specific technological moment. As dial-up connectivity spread and broadband access followed, the governing principle of digital culture shifted from local storage on physical media to the global transmission of information across electronic networks. The historical irony is that the CD-ROM, displaced by the infrastructure of the Internet, also helped to popularize it: AOL's ›carpet bombing‹ campaign of free trial discs provided millions of users with the client software they could not yet download themselves. In this sense, the CD-ROM was truly a transitional medium, bridging the gap between the offline computer and the networked age that would ultimately replace it.

If the CD-ROM failed to deliver on the grand promises of the 1980s, its very obsolescence has made it an important object of research today, with the potential to transform non-knowledge into knowledge. The discs that survive from the 1990s and early 2000s can become part of a historiographical infrastructure for understanding our recent digital past. More than being just technological curiosities, they constitute an archive of digital artifacts and information that either disappeared from pre-WWW networks or was never preserved elsewhere. Their significance lies less in the prestige of ›big‹ titles such as *Myst* and *Encarta* or in deliberate historical traditions like *Who Built America?* than in their capacity to serve as remains (›Überreste‹) that testify to the everyday digital culture of the time. The prehistory of the GIF format—GIF 0.0, documented in shareware discs of the early 1990s—offers one striking example of how CD-ROMs can reframe our perspective on digital media history. Yet the historiographical value of the format extends well beyond this single case. Collectively, the surviving discs form a mosaic of digital culture before the spread of high-speed Internet access and the always-on connectivity of social media: from grassroots programming and ephemeral online exchanges to the aesthetics of low-resolution graphics and the commercial strategies of independent software publishers. To engage with CD-ROMs as historical remains is therefore to move beyond linear tales of technological progress—from Web 1.0 to Web 2.0 or from GIF 1.0 to GIF 2.0—and toward a more nuanced genealogy of digital media, one that acknowledges discontinuities, dead ends, and forgotten artifacts as essential parts of our recent past.

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How to Know a Data Centre without Leaving your Cosmology at the Door?

An Augmented Reality Field Study

Sandra Abels, Jens Fehrenbacher, Mace Ojala, Estrid Sørensen

1. Introduction

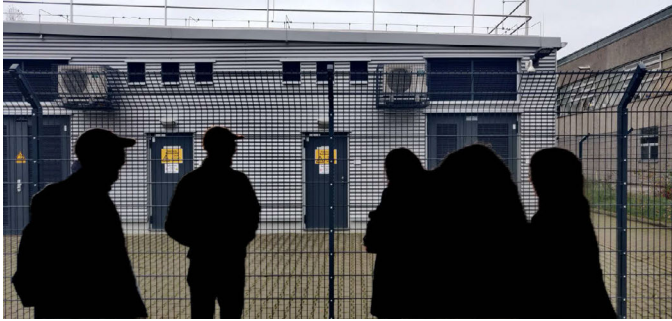
Data centres. Most people may have an idea of what they look like from the outside (cf. Fig. 1), perhaps also from the inside through stereotypical big tech PR photographs. Stories are told about them in the news when they are being built and when they cause trouble.¹ Yet, most of the time they are there, doing their job, usually unnoticed, and unknown by most. Such is generally the case with infrastructures.² This is particularly the case with cloud-technology, which is nothing more than IT running at a data centre. The cloud metaphor along with the uninterrupted availability of cloud services make end-users easily forget about the heavy CO₂ emissions, water and power consumption as well as the material extractions data centres, and thus the Internet, depend on. Popular media reports about how much tea water cooking is equivalent to a web search or an AI prompt may create some awareness of the electricity consumption of data centres, but they hardly help knowing data centres, even less care about their planetary relations. How can you know a data centre? How can you care? These are key questions of this chapter.

The distant relationship to data centres is related to the rational modes of knowing them. In the course of Modernity we have become more and more distanced from direct bodily experience of relations to the planet, leaving us with a distanced mode of knowing the plants and animals that are the basis of our nutrition, from the natural sources of heat and energy to our machines, and to the material foundation of the media by way of which we save our knowledge and process our data. This was entangled with the increased exploitation of plants and animals and the extraction of planetary minerals.

1 Cf. Starosielski, Nicole (2015): *The Undersea Network*, Durham, NC: Duke University Press.

2 Star, Susan Leigh (1999): »The Ethnography of Infrastructure«, in: *American Behavioral Scientist* 43:3, pp. 377–391.

Fig. 1: A university data centre, with some of the authors and other colleagues for scale



The standard story of rationalisation and exploitation is, however, further complicated by accounts establishing that bodily and experiential engagements have never completely vanished from the techno-science of Modernity.³ Some analyses point to bodily engagement with the material foundation of data storage and data processing machines as caring modes of knowing computers which are accompanied by a sustainable relationship between humans, technologies, and the planet.⁴ In the course of our ethnographic research on university data centres, scientists showed us their servers and pointed out their spinning sounds, their warm air flows and their flashing LED lights. »Listen«, one exclaimed during a visit, »someone just started a major computation task«. Like farmers caring for their animals⁵ or car mechanics for their vehicles⁶, scientists too use sensory clues to assess the wellbeing of servers if they are being pushed too hard or are running irregularly.

Such intimate, touching relationships with data centres, and such bodily knowledge of data centres are, however, reserved for the few. Data centres are bodily inaccessible to most. As large data fortresses they are carefully protected, and several

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- 3 Cf. Knorr Cetina, Karin (1999): *Epistemic Cultures. How the Sciences Make Knowledge*, Cambridge, MA/London: Harvard University Press; Latour, Bruno (1993): *We Have Never Been Modern*, Cambridge, MA: Harvard University Press; Latour, Bruno/Woolgar, Steve (1979): *Laboratory Life. The Construction of Scientific Facts*, Beverly Hills/London: Sage Publications.
- 4 Maak, Niklas (2022): *Servermanifest. Architektur der Aufklärung: Data Center als Politikmaschinen*, Berlin: Hatje Cantz Verlag; Mauro-Flude, Nancy/Akama, Yoko (2022): »A feminist server stack: co-designing feminist web servers to reimagine Internet futures«, in: *CoDesign* 18:1, pp. 48–62.
- 5 Law, John (2010): »Care and killing. Tensions in veterinary practice«, in: Annemarie Mol/Ingunn Moser/Jeannette Pols (eds.), *Care in Practice. On Tinkering in Clinics, Homes and Farms*, Bielefeld: transcript, pp. 57–72.
- 6 Dant, Tim (2010): »The Work of Repair. Gesture, Emotion and Sensual Knowledge«, in: *Sociological Research Online* 15:3, pp. 97–118.

scholars report about being chased off the premises by guards when trying to take photos or in other ways getting closer to data centres.⁷ Both scholars and other data centre users are kept non-knowing about what happens inside data centres.

Furthermore, like most state-of-the-art corporate data centres, the new university data centre which is the ethnographic source of the augmented reality data centre experience and which we discuss in this chapter, is operator-less. This makes any direct bodily and experiential knowing of a data centre even more unlikely. Servers are managed remotely, and only in exceptional cases is it possible for scientists to enter the university data centre, and only when accompanied by data centre staff. Software and dashboards provide all key indicators for monitoring server health, they state. It is technically no problem to maintain servers remotely—it is even beneficial, since one key risk to data security are humans. As one data centre staff told us, humans tend not to be able to keep their curious fingers to themselves, and often start touching things, although they have been told not to do so. This is when things tend to break. The tactile human mode of knowing servers is detrimental to their wellbeing. Bryan Cantrill's viral video »Shouting in the Datacenter« with Brendan Gregg of 2009 captures this idea in a humorous fashion.⁸ Consequently, when scientists of that university start transferring their servers from their local server rooms to a new data centre in the course of data infrastructure centralisation, the scientists' intimate bodily relationships with their servers and their experiential knowledge of data centres will come to an end. Will their caring as well? Do experiential and bodily modes of knowing servers come along with a more sustainable relationship to data centres and to the planet; do they cultivate response-ability?⁹

Besides the bodily inaccessibility and non-knowing of data centres, we are also concerned with their cosmological inaccessibility. Who cares about data centres? Some engineers do, specialised computer scientists do, data centre managers and architects do, people training AI models do, and businesspeople selling data centres do. They care not simply because they have bodily access to data centres but because they have access to knowing data centres in specific ways. These are all highly specialised professional people with specialised knowledge of data centres. Other people do not care much about data centres, because they cannot care; the high degree of professional specialisation keeps non-specialised people afar from data centres. Engaging with data centres makes them feel incompetent, because they do not hold

7 E.g. Hogan, Mél (2015): »Data flows and water woes. The Utah Data Center«, in: *Big Data and Society* 2:2, pp. 1–12; Vonderau, Asta (2017): »Technologies of Imagination. Locating the Cloud in Sweden's North«, in: *Imaginations* 8:2, pp. 8–21.

8 Cantrill, Bryan/Gregg, Brendan (2009): »Shouting in the Datacenter«, in: YouTube.com (01.01.2009). Online: <https://www.youtube.com/watch?v=tDacjrSCeq4> (last access: 11.11.2025).

9 Haraway, Donna (2016): *Staying with the Trouble. Making Kin in the Chthulucene*, Durham, NC: Duke University Press.

the specialised knowledge that has become the passage point for such engagements. Such non-knowledge makes them not care.¹⁰ Yet, care we should must. Data centres are infrastructures which affect the data practices of societies, require a large share of the limited electric power available, extraction of earthly minerals, dependence on components fabricated under toxic and exploitative circumstances, and are built instead of building something else. So, *everybody* should care. Yet, how can you care for data centres when you do not hold the legitimate kind of specialist knowledge? Paraphrasing the Aboriginal scholar Tyson Yunkarporta who asks whether he must leave his cosmology at the door when entering Euro-Australian academic knowledge practices,¹¹ we ask *how to engage with data centres without leaving your non-specialist cosmology at the door?* In other words, *how can you care for data centres without becoming a data centre specialist, as non-knowers, or other-knowers?* This question became our leading question and put us on a track to look for ways to know data centres both bodily and as non-specialists.

This is a question about modes of knowing and about which representations evoke which modes of knowing. Contrary to the scientists' mode of knowing, the data centre is grounded on experiential and bodily engagements, knowing the data centre through indicators on a computer dashboard implies a representational, cognitive, and rational mode of knowing. Also, our own experiences of the data centre when visiting it during our ethnographic research were bodily and tangible. Yet our academic representations of data centres through descriptive analyses evoke a rational mode of knowing. How to discuss experiences of the data centre which exceed words? How to care for a data centre when the relation exceeds words?

In their studies of electric power, Watts et al. state that electricity is sensorially subtle,¹² which made them turn to the genre of graphic novels to transport the experience of this intangible matter. In the server room of a data centre, electricity is anything but subtle. There we felt the heat coming from the servers, the cooling pushed up from the double floor and through the racks, along with the continuous loud roar of the servers. The heat, the cooling and the noise are all energy *overflows* which human bodies relate to through experience. Which representation of a data centre can convey such experiences? This question motivated us to experiment with the development of an *augmented reality data centre experience* that allowed visitors to relate sensorily to representations of a data centre which we had experienced during

10 Cf. The Institute for Technology in the Interest of the People (2022): »Counter Cloud Action Plan«, in: titipi.org (2022). Online: https://titipi.org/pub/Counter_Cloud_Action_Plan.pdf (last access: 18.11.2025).

11 Yunkarporta, Tyson (2019): Sand Talk. How Indigenous Thinking Can Save the World, Melbourne: The Text Publishing Company.

12 Watts et al. (2021): »Unda: A Graphic Novel of Energy Encounters«, in: James Maguire/Laura Watts/Brit Ross Winthereik, Energy Worlds in Experiment, Manchester: Mattering Press, pp. 119–151.

our ethnographic research. As we will lay out below, an augmented reality data centre experience intervention with co-present performers provides us with the opportunity to experiment with affective encounters, bodily relations and spatial speculations. Screen based media representations like images, videos or PDFs do not adapt to bodily movement and cannot offer such spatial speculations.

Based on our interest in bodily care about and planetary relations to data centres, in modes of knowing data centres and in representations that evoke different modes of knowing, the chapter will entangle these matters rather than keeping them separate. This means that the accounts of this chapter meander seamlessly between the design of the augmented reality data centre experience as a representation, the university data centre that the augmented reality data centre experience represented, visitors' experiences of the augmented reality data centre experience and the modes of knowledge it evoked. It is part of the point of this chapter to emphasise that representations, design or technologies of representation, modes of knowing, and the experiences of representation are intimately entangled and mutually constitute each other.

The chapter is structured as follows: first, we briefly introduce to the technology of augmented reality. Second, we report from the ethnographic research which is the source material for the augmented reality data centre experience. After explaining the three versions of the augmented reality data centre experience we have set up we reach the main section of the chapter, which is a walkthrough of the third version of the augmented reality data centre experience. This walkthrough describes and analyses the beginning of the augmented reality data centre experience visit, the installation of the software, the visits to the so-called uninterrupted power system, the visit to the server space, and finally the exit from the augmented reality data centre experience. The walkthrough is followed by a discussion in the course of which we analyse modes of knowing of a data centre through an augmented reality data centre experience, after which the chapter closes with brief conclusion.

2. What is »augmented reality«?

What then is our augmented reality data centre experience? Bluntly put, it is a smartphone or tablet application for site-specific installations we host. Before going into our own construction below, a few general words for background:

Augmented reality (AR) is a notion and a set of design ideas for human-computer interaction (HCI) developed throughout the latter part of 20th century. It differs from virtual reality (VR) where users are audiovisually fully surrounded by computer generated content, typically using head-mounted display (HMD) goggles. In contrast, augmented reality—as the term implies—takes the ordinary perceived surrounding of a person as a starting point and augments it by adding computer gen-

erated elements. Undoubtedly, the most notorious and obnoxious commercial AR product (so far) has been the now fortunately cancelled Google Glass. If the added elements are visual—which is most often the case—users can see them through the camera display of a mobile device—looking as if they were located within the physical environment. The point of augmented reality is therefore not to temporarily replace ordinary reality and immerse users in an entirely virtual one but precisely to add on and augment the familiar environment with helpful, useful, fun or strange elements. Furthermore, we complicate any straightforward notions of reality and add on to the controversies about normative ideals of augmentation and enhancement in the course of the discussion below.

Contemporary smartphones have the advantage of being programmable, powerful, networked computing devices with cameras, and of course of being ubiquitous commodity items of consumer electronics. In comparison to VR through head mounted displays, AR on handheld devices offers possibilities to provoke relational encounters on many layers, because their interference with the more-than-human environment is more obvious.¹³ Users see the physical and social space around them through the camera of the device and all around the device, so they can interact with their surrounding in the same ways as the surrounding affects their experience, forming a mutual »relational intervention«.¹⁴

We believe that such a reality-altering perception-technology has the potential to experiment with perceivable, relatable, and affective reality layers added to already reality augmenting technologies, such as data centres.

3. The assembling of an artificial augmented reality experience

We spent a few months on ideating, designing, prototyping and iterating the conceptual, material and performative elements of the augmented reality data centre experience. What we gradually developed was a smartphone app for Android and iOS devices and a scripted performance of a hosted visit to the data centre. The vertical, full-screen app displays a live preview of the camera viewfinder of the smartphone and overlays it with a three-dimensional computer-generated image model (Fig. 2). The performance script starts with an entry into the data centre and ends with checking out (the walkthrough describes how the script came to be performed).

13 Heemsbergen et al. (2021): »Conceptualising Augmented Reality. From virtual divides to mediated dynamics«, in: *Convergence. The International Journal of Research into New Media Technologies* 27:3, pp. 830–846.

14 Fehrenbacher, Jens (2024): »AR als Relationale Intervention. Dynamiken ästhetischer Aus- handlung zwischen Medientechnologie, Nutzenden und Umwelten«, in: *IMAGE. Zeitschrift für interdisziplinäre Bildwissenschaft* 39, pp. 78–102. Translation by the authors.

Fig. 2: Augmented reality data centre experience app in use



The augmented reality data centre experience visitor holds their phone in their hand, pointing the camera around them, while redirecting their attention to the space they see via the screen. As the visitor moves their smartphone and themselves, the app recalculates and renders the virtual objects around them in a sometimes smooth, sometimes irritating way.

3.1 The ethnographical material

The assemblage of the augmented reality data centre experience was based on extended ethnographic research on the relation between scientific practices,¹⁵ university data centres,¹⁶ and the planetary matter that, through fabrication and supply chains, are brought to and built into servers that help produce scientific knowledge

15 Çelik, Leman/Sørensen, Estrid (2025): »Scientific engagements with data infrastructures and their planetary matter«, in: Zeitschrift für Empirische Kulturwissenschaft 121:3.

16 Sørensen, Estrid/Laser, Stefan (2023): »Towards Artful Sustainable Integration of IT Infrastructures. A Report from the Construction of a University Data Centre«, in: Patricia Jankowski/Anja Höfner/Marja Lena Hoffmann/Friederike Rohde/Rainer Rehak/Johanna Graf (eds.), Shaping Digital Transformation for a Sustainable Society. Contributions from Bits & Bäume, Berlin: Technische Universität Berlin, pp. 87–90.

at German universities. For the augmented reality data centre experience we particularly selected material from visits to one specific university data centre. This data centre is located at a German university. Prior to the data centre, the university had what they called a »machine hall« which hosted racks of servers set up by scientists across departments. When we visited it several years ago, its key operator excused the *mess* lying around. They hinted at some boxes with cables in the corner as well as tools and rack parts lying around. Even a few plastic figurines were placed on a shelf in the middle of the room. To the ethnographers, this *mess* was all traces of social engagements with the servers.¹⁷ Now, the building hosting the machine hall was to be demolished due to asbestos, so a new solution for server hosting had to be found. This started a process that became strongly influenced by scientific and technological developments in the second decade of the 21st century: heavy increase in scientific knowledge generation through digital data processing, intensified competition between universities, trends towards centralisation and professional non-scientific management of computing facilities, among others. This led to the decision to build the university's own central, operator-less data centre, which came to be one of our ethnographic field sites. »Its really hot in here, everything seems to hum loudly. Tiny, coloured lights are doing their thing, blinking to their own rhythm«, one of us scribbled into their notebook during the visit. Although there were a few cautionary hints to not hit your head on sharp corners as well as warning tape on the floor that indicated human presence in the data centre, this new server farm was much more sterile than the no longer existing machine hall, and indeed a hostile place for human agency. Our visits to the university data centre resulted in a varied collection of audio and video recordings, photos, field notes, 3D scans, planning documents and memories. As is a general principle in ethnographic research, the collected material was not treated as isolated data to be analysed independently of the experience of the field. On the contrary, references to the field were kept alive and key to validating our interpretations. Regardless of whether we write a naturalistic representation of the data centre or develop an augmented reality data centre experience, the guiding principle for the interpretations and translations of the ethnographic observations is always to stay true to the heterogeneous experiences in and of the field. What Valentine says about SF—»science fiction/spookily familiar/strangely or strongly factual/so far«¹⁸—also applies to our augmented reality data centre experience: »SF worlds lie in the gap between real-world science and human [...] exploration on the one hand, and futurist/utopian thinking and sociopolitical experimen-

17 Law, John (2004): *After Method. Mess in social science research*, London/New York: Routledge.

18 Valentine, David (2018): »Evidently SF«, in: *culanth.org* (18.12.2018). Online: <https://www.culanth.org/fieldsights/evidently-sf> (last access: 18.11.2025).

tation on the other«.¹⁹ As discussed in the introduction, and as will be attended to in more detail in the walkthrough below, data centres are challenging ethnographic sites. They offer rich bodily and sensual experiences which are rarely conveyed in data centre literature and which are only poorly represented in the dominating analytical medium of ethnography, which is writing. This was the background for experimenting with augmented reality, which does, however, not compromise our commitment to the research's ethnographic reality.

3.2 Building process

We created three iterations of the augmented reality data centre experience for three different academic events (see below). The size of the three iterations ranged between 20 to 40 metres in diameter, each in different shapes depending on the location of the event. To respond to the differing local environments within which the augmented reality data centre experience spawned into appearance, it was necessary to get to know the respective sites. We scouted the locations, took photographs, inspected layout plans, measured and estimated, looked for nooks, crannies and other interesting physical features. Contrary to a virtual reality application, which is entirely computer generated and thus fairly independent of the place of use, an augmented reality needs to be situated and carefully adapted to the space of use. The virtual objects have to be placed within the four walls of a room, and physical objects have to be carefully worked around.

We built and collected three-dimensional models as virtual objects for the augmented reality data centre experience, and we experimented with their arrangements, lines of sight, feelings of space, interactions, and software code. We fervently hoped the presentation sites to be older campus buildings; walls which display the wear and tear of generations of students soon became our friends, because it is hard to convince the augmented reality data centre experience to perform at its best within a flawless environment. It slips away easily, as if refusing to stay in the same place.

The virtual objects of the augmented reality data centre experience were mainly generated from the digital material from the ethnographic visit to the data centre. In addition, we used some generic, prefabricated default objects. All objects and soundscapes of an engine and of wide spectrum noise were organised into a scene in the popular game development engine Unity. Some objects were in all three setups, others were included in only some of them. In later developments we employed data centre-based artificial intelligence to generate three dimensional objects from some of our photographs of the backup batteries and gas cylinders, as will be discussed below. In a way, we thus asked the data centre to describe itself. Designing

19 N.p.

the augmented reality data centre experience and adapting it to a specific environment needed tinkering. It also asked for constraint.

3.3 Three setups

We presented our augmented reality data centre experience three times: at the joint EASST/4S 2024 conference in Amsterdam, at the CRC 1567 *Virtual Lifeworlds* annual 2024 conference in Bochum, and at the STS-Hub 2025 conference in Berlin.

The first time, at EASST/4S 2024, it was staged as a curated intervention within a panel dedicated to planetary data infrastructures. Here, eight volunteering colleagues from the audience were invited to roam the front of the lecture hall, device in hand, as part of a staged and choreographed presentation—a kind of data theatre which foregrounded embodied engagement. Parallel, one of us gave a presentation analysing the planetary relation of the augmented reality data centre experience. The second installation of the augmented reality data centre experience featured as one of three stops on an »infrastructure walk« across the Ruhr University Bochum campus during the annual conference of the collaborative research centre *Virtual Lifeworlds*. Organised in rotating groups of twenty people each, the participants of the infrastructure walk encountered the augmented reality data centre experience while being themselves in transit—sometimes sharing a phone to access the data centre, sometimes using a single unit—as they passed through different scenes. Some were in a rush or restraint, some were rushed or restrained by us to keep the pace of the rolling format. This mode emphasised movement, circulation, and the partial, fragmented ways people interface with infrastructures. Finally, at STS-Hub 2025 in Berlin, the augmented reality data centre experience took on the form of an exhibition piece in a temporary exhibition space of the *Drift. Sink. Emerge. Repeat. Multimodal Submersion as Diffractive Practice* exhibition with many other works consisting of images,²⁰ installations, sculptures, and performances.²¹ The augmented reality data centre experience was open to visits during a single two-hour time slot, though participation often hinged on serendipity—on luring in curious passers-by and prompting spontaneous engagement.

Across these modes—staged, in-motion, and ambient—the augmented reality data centre experience shifted in function and form. It offered insights into the device itself and its design as a representation of a real data centre, into the knowledge and non-knowledge related to the augmented reality data centre experience and

20 Online: <https://sts-hub.de/25/exhibition.html> (last access: 20.10.2025).

21 Le Calvé, Maxime/Beck, Petra/Stock, Robert (2025): *Drift. Sink. Emerge. Repeat. Diffracting the Critical through Multimodal Submersion*. A Catalogue to the STS HUB 2025 Exhibition (07.03.2025). Online: <https://drift-sink-emerge-repeat.pubpub.org/pub/jt8j21yd/release/1?readingCollection=8775d7ad> (last access: 18.11.2025).

what was evoked by it, and also into how infrastructures are experienced through situated practices of presentation and interaction in and through an augmented reality data centre experience.

4. A walkthrough of the STS-Hub 2025 augmented reality data centre experiences

In this section we present a walkthrough through the third setup of the augmented reality data centre experience at the STS-Hub 2025 in Berlin. *Walkthrough* is a video gaming term referring to a processual description of how the gamer may get through the game.²² We find this method helpful to account for not only the design and design decisions of the augmented reality data centre experience but also for the experiences of the visitors and the representational references of the augmented reality data centre experience to the data centre we experienced during our ethnographic visits. As is typical for walkthroughs, ours starts from the entrance to the augmented reality data centre experience and ends with leaving the AR.

4.1 Passage into the data centre

As described before, the augmented reality data centre experience was set up in the space of the *Drift. Sink. Emerge. Repeat* exhibition at the STS-Hub 2025 conference in Berlin. In other words, the augmented reality shared its space with other exhibitions. This was in contrast to the *green fields* often referred to in data centre lingo when indicating a building site. It resonates the colonial idea of *terra nullius*—a space that is empty, where nothing exists—as justification for occupying and exploiting it. Situating the augmented reality data centre within the exhibition space intervened with this idea—a space is never empty, which also created challenges for visitors to the augmented reality data centre experience. That will become clear below.

The experience started with a sign-in procedure. Since an augmented reality application outside the device is just as unnoticeable as data centres are to most people in their daily lives, we designed a physical setup to draw people's attention to it. It consisted of a sign dangling above a neon-coloured high-visibility vest wearing team member at a desk in the exhibition room. On the desk two clipboards waited with lacklustre printed forms for people to sign-in.

The augmented reality data centre experience entry procedure was a reference to our own ethnographic visit to the data centre, which also started with signing our

22 Light, Ben/Burgess, Jean/Duguay, Stefanie (2016): »The walkthrough method: An approach to the study of apps«, in: *New Media & Society* 20:3, pp. 881–900.

names into the data sheet, additionally to the time of arrival. This security measure is required by the DIN EN 50600 Data Centre Norm. Access to data is closely regulated to protect the data. Upon our visit to one data centre, our guide and interlocutor shared an anecdote with us: When the technical supervisor came to examine the data centre for attaining the data centre protection class 3, the somewhat nervous data centre operator was quick to open the door to the server room for the supervisor to enter. The supervisor inquired discontent: »don't you sign in visitors here?« With a relieved laugh our data centre guide told us that this was when they almost lost the certificate even before the examination started. Of course, the supervisor was aware of the difficulty to perform a normal situation when it was indeed an examination and was happy to see the sign-in form ready next to the door of the data centre. Accordingly, we also asked visitors to the augmented reality data centre experience to sign in. This procedure indicates the exclusive place of the data centre—not everyone is allowed to enter, and only upon revealing their identity.

In the exhibition space of *Drift. Sink. Emerge. Repeat* at the STS-Hub we observed a similar display of trust regarding the registration process as we had experienced at the data centre. A vast majority of visitors entered their actual personal data. When one person hesitated, one team member pointed to the augmented reality of the experience and suggested to simply make up some data. This of course never happened during our visits to data centres. The suggestion was met with emphatic and ironic protest: »It's a form! I can't lie to a form!« At the other end of the spectrum one user inquired the whole set-up sceptically right from the start. After challenging the need to protect the data in the augmented reality data centre experience they commented: »Oh! And now you're collecting personal data?!« Marking our position as gatekeepers to the data centre, they hinted at the data paradox between legal obligations and daily practices of data protection which we met in real life during our own data centre visits as well.²³ The data the visitor form asked for are legally classified as personal, meaning that they require safe storage in accordance to specific norms for sensitive data. Yet, while signing in, visitors could glimpse completely unhindered at the personal information of former visitors.

After the signing-in process the visitors' attention was drawn to a metal stool and the cotton shopping bag from German supermarket discount chain *Netto* holding stocks of blue plastic shoe covers, or as we called them in the team: data protection. At our field visits to data centres we found these shoe covers next to the door to server rooms and were advised that servers are highly dust and dirt sensitive, making shoe covers mandatory. Importantly, they are there not to protect the shoes but to protect the data. Visitors were asked to wear these data protections during the entire visit of the augmented reality data centre experience.

23 Hoeyer, Klaus (2023): *Data Paradoxes. The Politics of Intensified Data Sourcing in Contemporary Healthcare*, Cambridge, MA/London: MIT Press.

The sign-in procedure brought on some curious observations. First of all, the hesitation to engage spontaneously might well be an indicator that people did not know (yet) how to engage with the augmented reality data centre experience that was at their disposal. In the explorative conversations, many appeared to look for ideas of what to expect, and maybe understandably so. A full-hearted decision in favour of a profoundly unknown endeavour is a courageous and sometimes dangerous step to take. In this situation of bafflement, a sign hanging from the ceiling was even instructing them to »Pay attention to how the data centre feels. You'll need it later!«

4.2 Installation

Having been subjected to the vigorous data protection procedures at the registration desk, the documented visitors were handed over to the colleague at an adjacent standing table to run through the technical preparation procedure.

With either an Android or an iOS device, visitors scanned a QR code to download the app. Given the prototype status of the application, this did not result in a smooth setup; instead, it offered a thematically fitting experience of the restrictions, barriers, and idiosyncrasies surrounding data storage, ownership, and access to computer resources. Entirely different processes had to be prepared and guided for installation on Android and iOS devices. The Android installation package was stored in a publicly accessible folder on Sciebo, a regional file-hosting university cloud service. To install this package, however, visitors first had to allow applications to be installed from what Google considers untrusted sources in the smartphone's settings. Trust has to be actively granted to all sources outside the Google's Play Store, which led to doubts on-site: »How do I know I can trust you and this application?«; »Do I want the application to access my camera?«.

On the other hand, Apple's iOS operating system does not provide an option for installing apps outside their own ecosystem. Here we had to upload the app to Apple's own data centre, where the file was (opaquely) checked and only released for beta testing on the second attempt.²⁴ The app was not publicly accessible via the App Store but only through TestFlight, yet another program designed solely for iOS beta tests, which also had to be installed on the visitors' smartphones. Furthermore, with both iOS and Android, the menu navigation varied depending on the device and operating system. For some we learnt workarounds during the event, for others we had to give up in frustration. At times we handed out our prepared tablet or even private phones if nothing else worked. Reframed as being productive, these troubles also led not only to communication and reflection on restrictions and platform politics, but

24 Cf. Nieborg, David/Poell, Thomas (2019): »The Platformization of Making Media«, in: Mirjam Prenger/Mark Deuze (eds.), *Making Media. Production, Practices, and Professions*, Amsterdam: Amsterdam University Press, pp. 85–96.

also to cooperation. Sometimes, when someone could not install the app, they spontaneously joined another person and their device and visited the augmented reality data centre together, which motivated more discussion and reflection.

4.3 Aligning

For the augmented reality data centre experience to start, it was crucial to align the app, the device, the users' bodies, and the physical space. Technically, this was necessary because the virtual objects were precisely adapted to the specific space of the exhibition. No room or object recognition were available to automatically align virtual and physical space. Users, therefore, had to start the app at a precise spot predefined by our design, facing a specific direction, to prevent the intended path to lead visitors through walls and for the objects to appear within the walls of the exhibition room. This technical necessity led to dynamics of aligning bodies with the technology.²⁵ Tape on the floor marked the starting point, and a photo of the data centre hanging from the ceiling indicated the orientation of the device. Instead of a seamless user experience at startup, this seamful interaction design created an experience of fragility: the virtual data centre required careful handling and meeting various requirements.²⁶ It demanded commitment from the users, turning them into participants of active experiences, different from a detached tourist gaze.

Upon launching the augmented reality data centre experience on the smartphone, the exhibition space—when watched through the display of the device—filled with virtual objects viewable from different angles and distances (Fig. 3). A purple line at floor level, roughly resembling a cable, guided users through the entire spatial and virtual arrangements and established a choreography for the walk.

The necessity of active contribution by the visitors underscores that the actualisation of virtuality includes the possibility of failure.²⁷ Contrary to smooth commercial applications, the augmented reality data centre experience included its technological infrastructure—and indeed the physical room—into the experience. If the app was started too early or in the wrong spot, the virtual objects could be placed behind a wall or outside a window—not matching the physical space—which made

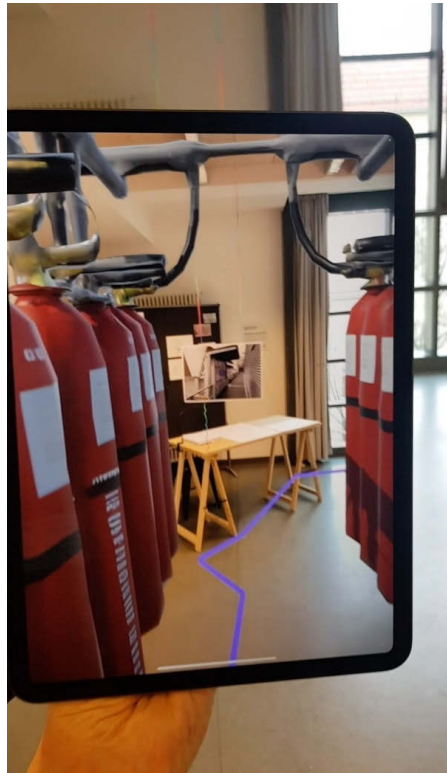
25 Friedrich, Kathrin (2021): »Imageability. Aligning bodies and imaging technologies«, in: Sara Hillnhuetter/Stefanie Klamm/Friedrich Tietjen (eds.), *Hybrid Photography. Intermedial Practices in Science and Humanities*, London/ New York: Routledge, pp. 71–78.

26 Chalmers, Matthew/Galani, Areti (2004): »Seamful Interweaving. Heterogeneity in the Theory and Design of Interactive Systems«, in: DIS2004. Proceedings of the 5th conference on Designing interactive systems: processes, practices, methods, and techniques, New York, NY: Association for Computing Machinery, pp. 243–252.

27 Stengers, Isabelle/Latour, Bruno (2015): »Die Sphinx des Werks«, in: Étienne Souriau, *Die verschiedenen Modi der Existenz*, Lüneburg: Meson Press, pp. 9–80.

objects inaccessible and required a restart. Alignment became an active, palpable engagement that demanded caution and came along with ongoing uncertainty.

Fig. 3: The start of the augmented reality data centre app: Exhibition room with virtual line, extinguishing gas cylinders and physical image hanging from the ceiling



4.4 Extinguishing gas

Even before visitors had become familiar with this strangely amalgamated scenery, they found themselves in the middle of a corridor of two-meter-high gas cylinders (Fig. 4). The purple cable showed the way beneath the photo pointing the way. Instead of walking around the photo and risking potentially moving through the virtual gas

cylinders, almost without exception participants ducked under the hanging photo. As it turned out, the virtual affordances possessed a decidedly urgent quality.²⁸

The virtual gas cylinders mimicked one of the many emergency systems within the real data centre. In there, they were filled with a fire extinguishing gas which was automatically routed to any fire source via a pipe system. The specific gas, 3M's Perfluoro(2-methyl-3-pentanone) product Novec 1230, also known as »dry water«, was chosen because—in contrast to, for example, the familiar wet water—it does not harm servers, as our data centre guide explained during our ethnographic visit: another hint that data protection is a priority for data centre operators.

Aiming at evoking experiences of relating with data centres rather than offering naturalist representations, we did not create a naturalistic representation of the equipment. However, grounding the augmented data centre experience in the ethnographic material was crucial, and we took great care in relating to the phenomenology of the physical objects of the data centre via size, quantity or materiality. They can thus be regarded »speculative reconstructions« in the course of which the process of translation is not considered frictionless but influenced by more-than-human agencies.²⁹ Using a commercial generative AI service, we created the 3D models with photographs from our field visits as input prompts. The cylinder models—just like the battery and diesel engine models we will discuss below—were virtually distributed, grouped, and scaled in the space in accordance with the real data centre to create both a physical impression of their size and mass as well as evoke an affective closeness between structures. Such algorithmic renderings themselves operate within large datasets, photos, graphics, and models distributed across various servers and remixed into networked images by neural networks.³⁰ The generative AI service uses considerable data centre power, and we hope we did not cause any fire that, while rendering the cylinders, was extinguished with Novec 1230 gas.

On the wall in the physical space of the exhibition room and next to the renderings of the gas cylinders in the augmented reality data centre experience, visitors could see a large photographic poster of the gas cylinders from the real data centre

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- 28 Breil, Patrizia/Kronberger, Alisa (2025): »Einleitung«, in: id. (eds.), *Eigensinnige Objekte. Virtuelle Möglichkeitsräume zwischen Aufforderung und Entzug*, Bielefeld: transcript Verlag, pp. 7–22; Alloa, Emmanuel (2019): »Undergoing an Experience. Sensing, Bodily Affordances, and the Institution of the Self«, in: id./Frank Chouraqui/Rajiv Kaushik (eds.), *Merleau-Ponty and contemporary philosophy*, Albany/ New York: SUNY Press, pp. 61–82.
- 29 Engemann et al. (2025): »Scalar Translation as a Method. Small Approaches to Scalability in Digital Cultures«, in: *Digital Culture & Education*, 15:1, pp. 92–111.
- 30 Dewdney, Andrew/Sluis, Katrina (2023): *The Networked Image in Post-Digital Culture*, London/New York: Routledge; Lee, Rosemary (2025): *Algorithm Image Art*, New York: Atropos Press.

which we had taken during our ethnographic visit. The difference between the rendered models in the augmented reality data centre experience and the ethnographic photos on the physical wall offered an estrangement effect. This way we hoped to evoke reflections on what the real data centre may be like and how it could be different. To push such imaginations, we added the text »standing reserve, for the case of fire« to the photo on the wall of the gas cylinders (Fig. 4). The gas cylinders reminded us of columns of soldiers and drew our attention to how the gas in the data centre is kept available, just like soldiers of the reserve, prepared and ready. We take inspiration from Marx's (1887) notion of a »reserve army of labour« to be called upon when necessary, and as disposable if not needed, as he theorised the socio-economic role of the unemployed.³¹ Contrary to the reserve army of labour, the gas flasks do not push down salaries. It is however the case that the excess of data, chips, data centres, production sites etc. standing reserve for digital capitalism to keep prices for digital services and digital devices down. Many of them will never be activated, just standing there for the sake they could become of need for data flows and to pressure other data brokers, investors, countries, etc. to offer better deals.

Fig. 4: The physical poster as part of the augmented reality data centre experience showing the gas cylinders from the university data centre »standing reserve, for the case of fire«

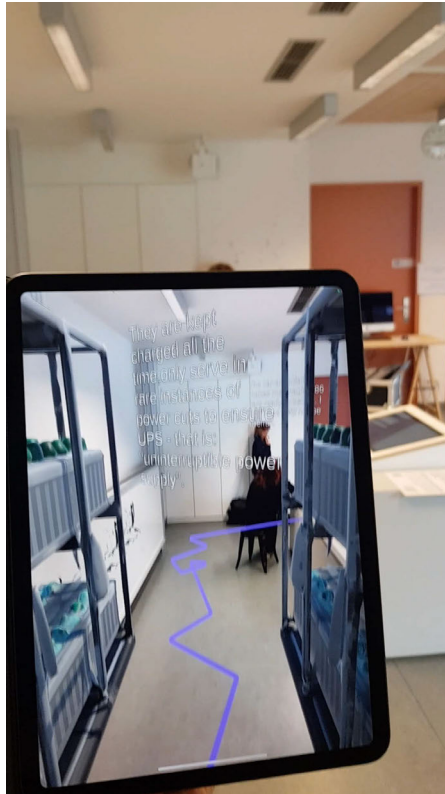


31 Marx, Karl (1887): Capital. A Critique of Political Economy, vol. 1, London: Sonnenschein, Chapter 25. Discussion of how reserves and stocks are crucial for digital economy result from conversation with Stefan Laser.

4.5 Batteries

Moving on along the purple line from the extinguishing gas onwards, the visitors encountered sets of virtual deep metal shelves covering an entire narrow room from floor to ceiling. The shelves were stuffed with batteries that, to our non-trained eyes, looked like car batteries—86 of them (Fig. 5). Like the extinguishing gas cylinders, the batteries in the augmented reality data centre experience were AI generated from photographs taken at the ethnographic data centre visit.

Fig. 5: Virtual batteries displayed in-app on the screen of a mobile device



We were told at our visit that these batteries are kept charged continuously, although only in rare instances of power outage they are activated to ensure the so-called uninterrupted power supply, which in data centre lingo is abbreviated to UPS. It is key to data centres; it is what defines data centres as Tier 1, 2, 3 or 4,

a ranking developed by a company which, without irony, is called »Uptime Institute«. Tier 3 data centres hold the promise of 99,982% uptime, which corresponds to a maximum of 96 minutes interruption per year. This promise is central to the conception of data centres as *clouds*. It gives users an impression of a technology—social media, storage space, webpages, online software, and basically anything that is related to the Internet—as being permanently available, similar to air that is just there for you to breathe (although also this is not the case everywhere all the time, and increasingly less so), always and effortlessly.³² We included the batteries into the augmented reality data centre experience because we wanted to draw attention to the fact that contemporary intense Internet use, which feels so unbearably light, is actually heavily loaded with lithium and other toxically mined metals, not just to run the Internet but to do so continuously and to create and serve demands of pause-less work and incessant consumption. The desire for continuous uptime comes along with a concentrated fear of losing data and interrupting computing processes, which is key to the data centre cosmology and to knowing a data centre like its operators do. This fear validates, performs, and concretises the technological unconscious of a data centre.³³ We placed a poster-sized photo of the batteries we took during our visit to the data centre on the wall in the exhibition room next to the 3D generated batteries in the augmented reality data centre experience (Fig. 6). It stated »a room full of fear«, emphasising the values and emotions that are folded into these seemingly sleek and innocent technologies. Fear and angst belong to a modern risk society preoccupied with anticipation of and preparation for failures to come, as analysed by authors of Modernity such as Anthony Giddens³⁴ and Ulrich Beck.³⁵ The advantage of batteries for calming this fear is that they can be kept loaded all the time and immediately take over the entire power load of the data centre in case of interruptions in the respective city's power grid (which in the city of the university data centre was the case for 6 minutes in the year 2023). Of course, this means that a lot of energy is consumed only to keep the batteries charged, to uphold the promise of uptime, and to keep the operators calm. The batteries can

32 Cf. Hu, Tung-Hui (2016): *A Prehistory of the Cloud*, Cambridge, MA/London: MIT Press.

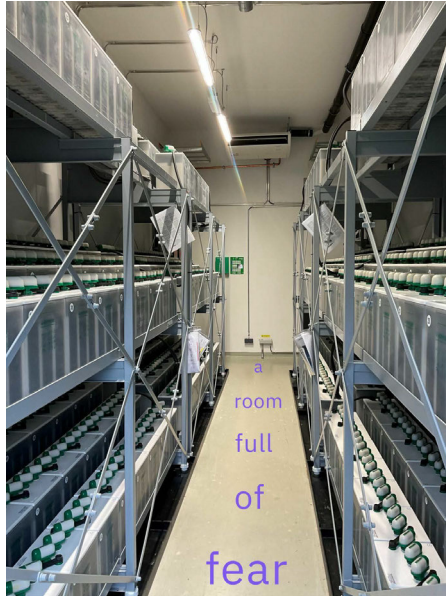
33 Clough, Patricia Ticineto (2000): *Autoaffection. Unconscious Thought in the Age of Teletechnology*, Minneapolis, MN: University of Minnesota Press; Thrift, Nigel J. (2004). »Remembering the Technological Unconscious by Foregrounding Knowledges of Position«, in: *Environment and Planning D: Society and Space*, 22(1), 175–190. Online: <https://doi.org/10.1068/d321t>; Kitchen, Rob/Dodge, Martin (2014): *Code/Space. Software and Everyday Life*, Cambridge, MA/London: MIT Press.

34 Giddens, Anthony (1990): *The Consequences of Modernity*, Cambridge: Cambridge University Press.

35 Beck, Ulrich (1992): *Risk Society. Towards a New Modernity*, London/Newbury Park/New Delhi: SAGE.

power the data centre for 15 minutes. »It is a lot of battery for such a short time«, our interlocutor commented dryly during our visit to the real data centre.

Fig. 6: The physical poster which, as part of the augmented reality data centre experience, hung on the wall and showed a photo of the university data centre battery room as »a room full of fear«



Due to the sloppy alignment of the visitors' devices with the physical space of the exhibition room, several of the visitors to the data augmented reality data centre experience walked away from the batteries head-first, right through the delicate and beautiful work *Walking with the Verticality of Björkö—Im/Possible Maps* by Arba Bekteshi (2025) (Fig. 7). Their piece poses questions about how to walk, and about vertical affordances for movement on the island of Vaddö in the Baltic Sea and offers a meditation on the relative vertical movement of the island's bedrock. With one hand holding their smartphone with the augmented reality data centre app, some visitors made their way with the other hand through the very fragile work of stones and other objects hanging on strings. This unintended material and conceptual diffraction between our work and Bekteshi's hinted at a data centre—just like Bekteshi's work—is interrelated with other spaces and landscapes. They even intervene with them, sometimes harmfully so.

Fig. 7: A visitor of the augmented reality data centre experience at the STS-Hub Berlin 2025 pondering when confronted with Arba Bekteshi's work



4.6 Diesel Engine

Following the purple line on the floor of the augmented reality data centre experience, the visitor encountered a new sensorial experience: The sound of an engine starting got louder and louder with every step, flooding the room with a mechanical beat. It was not the high pitch of a sewing machine or the snarling sound of a moped but a deep voluminous roar like that of a fishing trawler. The display soon revealed that the sound came from a massive diesel generator, taller than a human and as long as a small locomotive. It was difficult not to feel small amidst this overwhelming metal body. In the augmented reality data centre experience the diesel engine was not as pretty as the prior technologies. We had taken a generic pre-fabricated 3D model of a diesel engine from a 3D asset store, which interestingly looked quite a lot like the generator we had seen at the data centre.

Diesel engines are the headaches of data centre designers. They undermine the trend towards energy efficiency and ecological sustainability of the industry. Unlike batteries, which contaminate the environment somewhere else—at their place of production and at sites of mining for e.g. lithium—diesel engines pollute at the location of the data centre. Nonetheless, few data centre designers will abstain from including a diesel generator. These machines are needed to take over from the batteries when they run out of power after around 15 minutes and if the grid interruption lasts longer than that. The diesel generator can run the data centre for around 48 hours. Could not data centres at least skip the batteries? No, since it takes around 10

seconds for a diesel engine to start up, enough time for servers to suffer a so-called unclean shut down, which is likely to cause both software and hardware damages. The relative quick start of the diesel generator, however, is only possible if the engine is already warm. For this reason, the oil of the generator is constantly kept warm. Furthermore, the diesel generator is tested once a month, which is the main reason why data centres burn a considerable amount of fossil fuel. On the physical wall next to the virtual diesel generator there hung a poster-sized photograph of the real diesel engine of the university data centre. It was so large that it did not even fit into the image, which seemed cramped. »fossile planet data« we printed on the photograph, reminding of the connection between this planetary resource and the processing of data (Fig. 8).

Fig. 8: Poster as a physical object hanging on the wall as part of the augmented reality data centre experience, showing the diesel engine of the university »fossile planet data« centre



Above the diesel engine sentences were hovering mid-air in the augmented reality experience, such as »The car association makes me imagine cars ready to set off. I only hope I will not be overrun«. These were excerpts from field notes from the ethnographic visit to the data centre that commented on the data centre and invited further reflections.

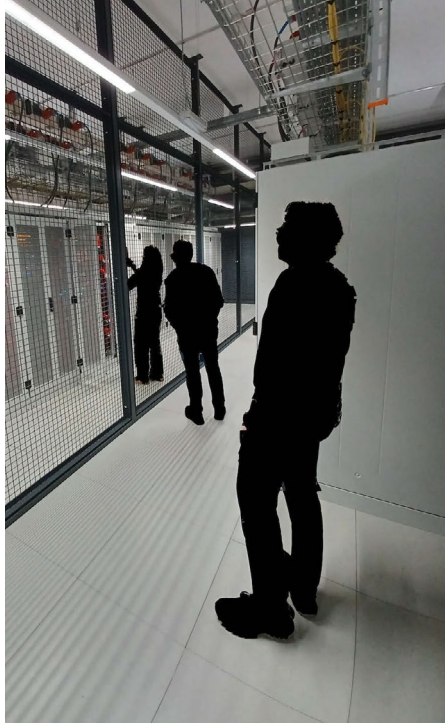
The visit to the augmented reality data centre experience began with extinguishing gas, batteries and the diesel generator, thus focussing on what the data centre operators call the »technology« in contrast to the »IT«. We decided to first confront the augmented reality data centre experience visitors with this industrial underbelly of plumbing, cylinders and engines, which is often not associated with data centres. We hoped that visitors would wonder »is this a data centre?« and that the augmented reality data centre experience would answer »yes«, thus intervening into the stereotypical idea of data centres as symmetric rows of blinking servers. All these technologies are dedicated *ifs*. Just-in-cases. Standing-ins. Lumped together, and measuring taller than our bodies, they loom over us and demand human attention. Maintenance, for example. The technology furthermore requires labour and material effort. The equipment is continuously inspected, refilled, charged, and, if in doubt, replaced to be fully operational when needed. And they are all a burden to the planet. While the server rows merrily blink outside, performing daily compute operations, here among the »technology« we encounter the infrastructure that manifests a cosmology in which an outage, perhaps followed by a loss of data, constitutes an absolute catastrophe.

4.7 Server racks

Moving on along the purple line and leaving the UPS and emergency technology behind, the visitors were led out of the room of the *Drift. Sink. Emerge. Repeat.* exhibition space, across the lobby and down a corridor of the STS-Hub 2025 venue. There they encountered the core machineries of data centres running computing and storage services and which our data centre operator interlocutors call »the IT«: server racks.

The whole project of making an augmented reality data centre app had started with the rendering of the server racks. With the Scaniverse software running on an iPad, we spent considerable effort trying to scan the server racks (Fig. 9).

Fig. 9: Estrid Sørensen being observed by employees at a university data centre while trying to scan a server rack with the Scaniverse app

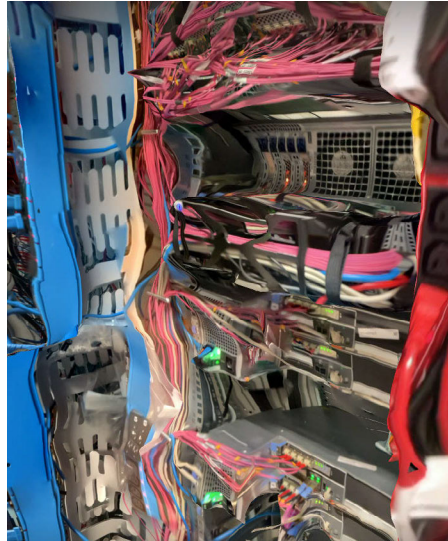


Scaniverse promises easy and perfectly naturalistic 3D scans. It worked well for kitchens, domestic objects and even our children during our trials. Scanning server racks was a different experience. The filigree pattern of server walls and rack doors, the many little sockets, cables and LED lights overburdened the software. Scans of tiny edges, of which there are many in a server rack, were often distorted, creating round and almost melting or organic looking corners (Fig. 10). They reflected how data centres are not contained within a closed space but spreading out. Dalí might have appreciated the liquefied looking server racks, confusing softness and hardness, fixity and ambiguity, which does indeed describe the paradoxical character of data.³⁶ As the scan is only a fragment of one open rack of servers' back panel, the fringes of the 3D-model were as obvious as they are dubious: a new virtual materiality which carried the traces of the scanning process. The rack model was not a solid technological entity but a spatial snapshot which might from one perspective

36 Cf. K. Hoeyer (2023): Data Paradoxes.

have realistic appeal and look glitchy from another, porous and just wrong. Being results of computing, the deformed models of the server racks could be speculated as a data centre's self-reflection, able of acknowledging clear surfaces but confused when it comes to juggling different levels of depth.

Fig. 10: Screenshot of a Scaniverse scan of a part of a server rack



With these reflections and speculations, the failed scans appeared to be particularly well-suited for an augmented reality experience that aims to evoke thoughts about how to know a data centre. A queer and surprising representation requires the spectators to think more intensively to understand it than does the iconic tidy and glossy photographs provided for the public by data industry's PR departments.

We copy-pasted a large number of copies of the one single scan model of a rack next to each other in a long narrow corridor in the augmented reality, not unlike in the iconic PR photographs of data centres, thus thematising the exchangeable and standardised nature of server hardware units at a data centre (Fig. 11). However, we multiplied the scanned rack in many (dis)orientations, in different sizes, and with different animations, thus highlighting that despite the idea of a standardised commodity unit a server is not stable and self-contained but always in relation to different environments all at once.

Fig. 11: Copy-pasted server racks

Visitors to the augmented reality data centre experience did not only see the racks. Many of them did hear them more than anything else. The server racks emitted a loud wide-spectrum noise we had recorded on site at the university data centre during our fieldwork. The extremely loud sound of the many servers strikes most people visiting data centres as one of their distinctive characteristics. The data centre we visited was no different. Our guide was shouting when he explained specifics of the racks, cooling system etc., and we were struggling to keep a polite intimacy distance to him, tending all the time to move up too closely to be able to hear his explanations. The noise brought its own message: it requires enormous amounts of energy for these little machines to produce so much sound. We versioned the fieldrecordings across hi-fi and lo-fi sound, exploring various settings of the MP3 audio format, and playing with the qualitative nature of the sounds we had recorded. Especially the obvious glitches and artefacts of extreme compression evoke the ghosts of data compression. These are usually masked by computational models such as MP3 encoders, which are based on psychoacoustics research and do their best to make the computation imperceivable to the faculties of the human sen-

sorium.³⁷ Retreating from human sensibility and knowability is a routine feature of computation. Beyond embodying values of their creators, as has meanwhile widely documented and pointed out to by critics, it is further conceptualised by post-humanist research that algorithmic and computational systems produce preferences and forms on their own. Setting this idea in motion blended the visitors to the augmented reality data centre experience into an ambisonic surround sound noise experience through their little smartphone speakers as they roamed through the augmented reality data centre experience's IT area around the racks. Although the sound was stronger from some racks than from others, which indicated that some were computing particularly much, the surround sound made it hard for visitors to figure out where the noise was coming from and where exactly data computation was taking place. It blurred between a screaming loudspeaker, a fluctuating field of resonance, merging with other sounds of the conference, out of tune with the situation of the data centre; posing the question of whether—or in what ways—this odd spatiality and temporality of data centres are ever in tune with everyday life outside of it.³⁸ To several of the visitors to the augmented data centre experience we talked to, the unusually repulsive harsh noise escaping their devices, else designed to please them, dominated their experience. »It's exhausting«, »Can't I turn it off?«, »With that noise, I can't really concentrate on the visuals« were among their reactions. Knowing data centres and other machines through their sound can indeed be harmful to human beings.³⁹ As mentioned in the introduction, scientists also use the sound of servers to sense their well-being. Server sounds are a source of knowing them and a foundation for caring for them.

4.8 Heat and cooling

We coloured some of the racks of the augmented reality data centre experience in a glowingly hot red to indicate the heat emitted from the hard-working servers. Server temperatures as well as the essential cooling air arising from under the floor tiles and circulating in cold aisles or blown through racks proved the limited representational ability of the audio-visually dominated digital devices through which the

37 Sterne, Jonathan (2012): *MP3. The Meaning of a Format*, Durham, NC: Duke University Press; Maguire, Ryan (2014): »The Ghost in the MP3«, in: Anastasia Georgaki/Georgios Kouroupetrolou (eds.), *Music Technology Meets Philosophy. From digital echos to virtual ethos – Proceedings of the 40th International Computer Music Conference joint with the 11th Sound and Music Computing conference*, Athen: National and Kapodistrian University of Athens, pp. 243–247.

38 C.f. Trofimov et al. (2022): »Industrial Music, Noise, and the Sound of Machines«, in: *Technology and Language* 3:3, pp. 58–72.

39 Bijsterveld, Karin (2006): »Listening to Machines. Industrial Noise, Hearing Loss and the Cultural Meaning of Sound«, in: *Interdisciplinary Science Reviews* 31:4, pp. 323–337.

augmented reality data centre experience was accessed. It pointed to the non-knowledge of digital devices. Contemporary game engines like Unity allow for implementing original sound bites, but heat needs translation—a re-coding into a colour palette: blue indicating cooling, red and orange cues used to heat things up visually. While aiming to enable visitors to know data centres bodily through the senses, colour coding temperature failed to address the respective human senses. We found our means of expressing warmth by augmenting reality and blending virtuality with bodily impressions from our ethnographic fieldwork. A transgression of accessing the augmented reality data centre experiences through phones and tablets was needed. This resulted in visitors suddenly experiencing hot air blown into their faces or through their hair while walking through the aisles of server racks of the augmented reality data centre experiences, most often with their eyes fixed on the screens of their devices, not noticing a person coming up to them with the mundane coiffure instrument of a blow dryer. Directing the hot air at participants' faces absorbed both the participants' and the spectators' attention. One visitor to the augmented reality data centre experience at EASST/4S conference in Amsterdam commented being hit by the stream of hot air was a palpable astonishment as they were completely focused on the augmented reality data centre experience on the mobile screen in their hands. This is not just a metaphor but an apt analogy to academics and their ways of using data: Stuck in their usual virtual relation to data somewhere or nowhere, the augmented reality data centre experience grounded those data in a located, defined, bodily reality. Employing a blow dryer to convey the unexpectedly high air temperature corrupted academics' distanced relation to their data. It made them literally face the heat data processing is generating and thus involved senses which are rarely activated in the academia of the Humanities and Social Sciences.

What was true for hot air, was not less so for the cold air of the augmented reality data centre experience. One member of our team wearing a neon yellow high-visibility vest and a Venetian half-mask wagged two wooden fans at the visitors re-directing the surrounding air into a concerted cool stream towards them (Fig. 12). Some visitors smiled at the person—mostly somewhat shyly—, some frowned, and some were utterly disturbed. One visitor recounted afterwards: »I didn't even realise [the person's] presence until they were right beside me. When I looked up there was this bizarre figure I just couldn't make any sense of«. The visitor stated that their reaction was largely provoked by the Venetian half-mask the living, breathing human directly next to them was equipped with. Another visitor, struggling to comprehend this odd figure, kept asking »who are you, who are you?« until they finally answered the question themselves: »Oh, you are Gaia«. What a wonderful interpretation! Gaia, a Greek goddess and a controversial and ambiguous figure in modern science that connects life and the planet, the key issue the augmented reality data centre was developed to contemplate about.

Fig. 12: Team member dancing in a high-visibility vest with mask and fans



4.9 Passage out of the data centre

The purple line led the visitors through the adventurous experience of the IT area and back to the starting point. There they went through a small rite of passage to exit the augmented reality data centre and return to their less—or differently—augmented reality: Each visitor removed and gave back the shoe covers, resuming their ordinary bodily look and feel. They were asked to sign out in exchange for a postcard. They were also offered help to uninstall the app and re-establish the smartphone security settings, a step which only a few accepted. The sign-out procedure furthermore contained an invitation to reflect on the experience, being reminded of the sign to »Pay attention to how the data centre feels. You'll need it later!«

Many visitors did not need a prompt to give feedback. Some asked for more information about specific items and what they meant. As with the sign-in, those conversations covered the whole spectrum from having a friendly chat about a specific topic to fully enacted scene-plays on both sides. One returning visitor embraced the role of a terrified person, inquiring almost shyly about the ontic state of the monster right outside the door. Some people inquired about physical objects that were not part of the design of the augmented reality data centre experience. Such contingencies—one could say artefacts from the ongoing life around them outside the augmented reality data centre—suggest a heightened sensitivity in visitors towards their surroundings while struggling with the unusual way of knowing the

augmented reality data centre experience has brought upon them. Some expressed an experience of being overwhelmed: it was »too much« or »very loud«, the latter a familiar bourgeois reaction to all kinds of industrial noise.⁴⁰ Visitors expressed that knowing a data centre through the augmented reality of virtual and physical objects made them feel small and inside a system they did not fully grasp, that has its own agency and makes you feel like an intruder. There was a kind of joint insecurity among organisers and participants, blurring the boundary between those different relations to data centres. As the setup was very different depending on device and needed improvising/troubleshooting, some nagging questions persisted: Does it work? Is the AR correctly aligned? Do they find their way and not crash other installations? Is there something missing? Am I the one who is missing something? Does the design balance well the familiar and the strange? As some users struggled with this way of knowing the data centre, including finding their way, searching, and trying different routes, they engaged in conversations with others. Entangled with the multi-sensual augmented reality data centre experience, their mode of knowing involved testing different strategies to make sense of the embodied exploration of a data centre, just as we did when composing the augmented reality data centre experience and when adapting it to the specific contingencies of the place.

5. Discussion

We set up the augmented reality data centre experience in order to create an opportunity to know data centres in a different way than professional engineering and through what we know from business representations, which are often intimidating to non-professionals and thereby exclude them from engaging in debates and having a say about data centres. Such non-knowledge prevents people from developing even an interest in these ubiquitous technologies.⁴¹

Any representation is created out of materials and data or traces of the phenomenon it represents. This was no different with the augmented reality data centre experience, which was based on an ethnography of university data centres. However, taking another direction than the PDF-based written and printed representations usually seen in academia, the augmented reality data centre experience was non-naturalistic and held only-almost-naturalistic virtual objects such as gas cylinders, batteries, diesel engine and server racks. This character of the data centre and its objects drew attention not only to the installation and the objects but indeed to

40 Bijsterveld: *Listening to Machines. Industrial Noise, Hearing Loss and the Cultural Meaning of Sound*; Trofimov et al.: *Industrial Music, Noise, and the Sound of Machines*.

41 The Institute for Technology in the Interest of the People: Counter Cloud Action Plan.

how they were represented. Representationality was further emphasised by creating passages into and out of the augmented reality data centre experience, what theatre scholar Erika Fischer-Lichte calls a »change of roles« [*Rollenwechsel*].⁴² The arrangement around the signing-in procedure, putting on shoe covers etc. initiated a theatrical situation and transformed conference participants into participants of a performed representation of a data centre, thereby augmenting the conference situation with a theatrical layer. The augmented reality data centre experience did not only mark an intervention into the conference space but also into logics of representing data centres: they are not only knowable through written and printed representations which primarily speak to the distanced and cognitive engagements with data centres. Through the augmented reality data centre experience data centres became knowable through bodily and sensorial engagements. It invited visitors to step into affective and bodily relations to data centres.

Through its only-almost-naturalistic and unfamiliar representational—or even non-representational—character the augmented reality data centre experience created opportunities for reflection.⁴³ The visitors seemed to engage intuitively in what Vinciane Despret (2005) calls *the virtue of politeness*:

Despret's sort of politeness does the energetic work of holding open the possibility that surprises are in store, that something interesting is about to happen, but only if one cultivates the virtue of letting those one visits intra-actively shape what occurs. They are not who/what we expected to visit, and we are not who/what were anticipated either. Visiting is a subject- and object-making dance, and the choreographer is a trickster.⁴⁴

Just like the jester at a royal court, the augmented reality data centre experience let its visitors know a data centre through emphasis or neglect, thus presenting an altered, succinct way of accessing and assessing. The augmented data centre was disturbing, unfitting, distorting, and challenging matters: spaces, people, and its local environment which were simultaneously its essence, inseparably folded into the concept of augmented reality. Different from professional engineering and business representations of data centres, the augmented reality data centre experience was very far from evoking a rational engagement, an engineering cosmology.

This was not only true for the visitors of the augmented reality data centre experience. Representing the data centre in an augmented reality app involved inquiring both the workings and the lures and flaws of the technologies we used, such as 3D-

42 Fischer-Lichte, Erika (2017): *Ästhetik des Performativen*, Frankfurt a.M.: Suhrkamp.

43 Thrift, Nigel]. (2008): *Non-representational Theory. Space, Politics, Affect*, London/New York: Routledge.

44 Haraway: *Staying with the Trouble*.

scanning, smartphone sensors, software development frameworks, the AI-rendering of objects and the standard objects offered by 3D asset stores. Assembling the augmented reality data centre experience as a (non-)representation was a process of playful and speculative pondering, arranging and testing, and at the same time remaining faithful to what we encountered empirically.

As discussed, building the augmented reality data centre experience furthermore required careful engagement with the space within which it was to be visited. While standard written and pictorial representations of data centres gain the agency of an *immutable mobile*⁴⁵ through the infrastructures of producing and circulating these representations, the learnt competencies of how to engage with them etc. this mobile immutability of modern scientific representations also contributes to generating a distance between the reader and the represented phenomenon. This resonates with the programme of modernism, making room and clarity for a work of art to stand on its own, in isolation, in the so-called *white cube* aesthetics. As a critique of this aesthetics—and the mode of knowing that accompanies it—the post-modernist concept of *site-specific art* emphasises that whatever exists before and besides the artwork is considered an essential part of the work and a resource to know it, to draw from and add on to.⁴⁶ Such works interact and are in conversation with the place and time where they are set up. In a similar gesture, our augmented reality data centre experience added a temporary reflective layer to the pre-existing space. This aligns well with the undoubtable fact that we are always-already inside the data centre—always being calculated and always calculating. This is one way of conceptualising the representational character and the knowing of data centres through the augmented reality data centre experience: it situated representations of data centres in a very specific place, and it situated visitors in visual, auditory, tactile and bodily relations to data centres, adding a media-technological layer to the notion of situated knowledge.⁴⁷

Engaging with situated representation raises the question of how a data centre was in *this* place, at *this* time, and how we might imagine it *here*. To enable other conceptions of programs labelled AR/VR, Verhoeff and Drescher propose to think of »Crossed Realities«,⁴⁸ embracing interrelation instead of the separation of different realities:

45 Latour, Bruno (1983): »Give Me a Laboratory and I Will Move the World«, in: Karin Knorr Cetina/Michael Mulkay (eds.): *Science Observed*, London, UK: Sage, pp. 141–70.

46 Rebentisch, Juliane (2012): *Aesthetics of Installation Art*. London: Sternberg Press.

47 Haraway, Donna (1988): »Situated Knowledges. The Science Question in Feminism and the Privilege of Partial Perspective«, in: *Feminist Studies* 14:3, pp. 575–599.

48 Verhoeff, Nanna/Dresscher, Paulien (2020): »XR. Crossing and Interfering Artistic Media Spaces«, in: Larissa Hjorth/Adriana de Souza e Silva/Klare Lanson (eds.), *The Routledge Companion to Mobile Media Art*, London/New York: Routledge, pp. 482–492.

»Working through and beyond understanding these confrontations as the crossing—or intersecting—of separable and fixed domains of ›physical‹ or ›virtual‹ realities, we approach their interrelation in XR from a perspective on their performative qualities as relational reinforcement«.

By translating the data centre into different socio-material sites and situations away from the social, architectural and epistemological data centre we confronted it with unforeseen social and material constellations: the sometimes orderly, sometimes chaotic interplay of bodies, the spaces and virtual objects which allowed for irritations to evoke new questions and a different re-situated knowing of data centres.

At the exit of the augmented reality data centre experience the visitors were given a postcard with an invitation to »reclaim the data centre«, to take it with them and place it elsewhere—on the beach, in the woods, at home—and to reflect on which new relations it generates elsewhere. This again emphasised the situated character and thus mutability of knowing the data centre. Przybylka describes that AR and VR often formulate an »Allverfügbarkeitsanspruch« [all-availability claim],⁴⁹ the promise to transport users to other times and other places, stepping into other perspectives, what Nakamura calls »toxic embodiment«.⁵⁰ By their design these applications tend to enact a *Euroamerican common sense realism* while presenting objects independently of observers and environments to be controlled via interfaces hiding the inherent relationality of user,⁵¹ device and more-than-human environments.⁵² Trying to represent a data centre naturalistically would fall into the same trap as describing a data centre as a merely technological entity. It would maintain a certain insularity of the data centre while leaving users with touristic impressions between entertainment and superficiality. The somewhat crooked and only-almost-naturalistic representations included into the augmented reality data centre experience, involving frictions within the mixture of virtual objects, physical space and physical objects, co-present people involved and not involved in the AR experience—all this was crucial to avoid the pitfall of toxic embodiment, and offering instead reflective bodily engagements—which were also disturbing and overwhelming.

49 Przybylka, Nicola (2022): »Medienkulturwissenschaftliche Perspektiven auf Augmented und Virtual Reality in formalen Bildungskontexten«, in: MedienPädagogik. Zeitschrift für Theorie und Praxis der Medienbildung 47, pp. 331–354, here p. 348.

50 Nakamura, Lisa (2020): »Feeling good about feeling bad: virtuous virtual reality and the automation of racial empathy«, in: Journal of Visual Culture 19:1, pp. 47–64.

51 Law, John (2012): »Collateral realities«, in: Patrick Baert/Fernando Domínguez Rubio (eds.), The Politics of Knowledge, London/New York: Routledge, pp. 156–178.

52 Heemsbergen et al.: Conceptualising Augmented Reality; Fehrenbacher: AR als Relationale Intervention.

6. Conclusion

Refraining from offering visitors to know the data centre in rational and technical terms and instead translating it into an evocative experience, the augmented reality data centre generated new relations between the ethnographically experienced data centre, our inquiry, and the visitors we address by our research. Letting go of arguments about data centres, which are so central to critical humanities and social science, we instead initiated augmented, experiential, affective and exploratory engagements with data centres. This also meant giving up on the illusion of control that comes with writing—giving up the desire to build up arguments and monologues. An open-ended arrangement addressing body, affectivity and relationality can never be sure which feelings and relations emerge. Following the virtual cable, avoiding virtual gas cylinders and bumping into physically present people required constant switching between planes of knowing. Overwhelmed, frustrated, confused, curious, sad, nervous, shy, extravagant, bored visitors brought social experiences and affective knowledge of many kinds into play. Although it had been the initial idea, the augmented reality data centre experience only partially allowed people to bring their cosmologies into the data centre. As we have discussed above, the unusual representation rarely made visitors feel confident and familiar with the data centre, which would be a prerequisite for them to bring their cosmology into the augmented reality data centre experience. It did allow visitors to engage with data centres in bodily and experiential ways, which nonetheless enabled them partially to know the data centre. The estrangement effects of representations must be balanced between giving space for knowing through reflection and new experiences on the one hand and scaring them away and not knowing anything on the other.

Our hope was furthermore that the engagement with the augmented reality data centre experience would make visitors relate to the planetary relations of data centres. Most did at least get a strong idea of the heavy energy consumption of data centres, and a somewhat more detailed understanding of this compared to popular comparisons between the power consumption of data processing and of making cups of tea.

Knowing a data centre through one's own cosmology is a requisite of reclaiming data centres. We do not know whether visitors actually did, but we brought it with us and set it up in a park in Copenhagen where it was sniffed at and urinated on by dog companion Oscar (Fig. 13), to Halde Schöttelheide, a place which hides our industrial remains in a beautiful stockpile biotope landscape (Fig. 14), and Neanderthal where the traces of ancient humans are exhibited (Fig. 15). Wherever it is taken, the re-situated character of the augmented reality data centre experience opens up an experiential mode of knowing, poses different questions, offers new relations, tickles a shiver of wondering.

Fig. 13: Augmented reality data centre app re-opened during a dog walk with Oscar, one month later

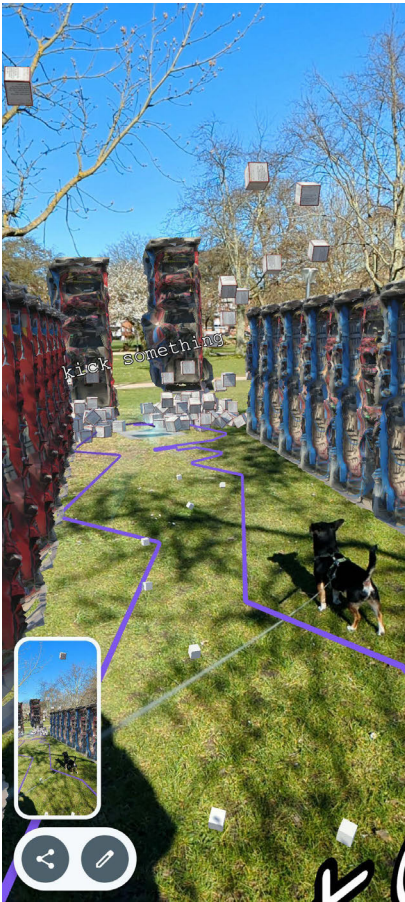


Fig. 14: Augmented reality data centre app re-opened while hiking in a stockpile biotope, one and a half months later



Fig. 15: Augmented reality data centre app re-opened in Neanderthal



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A Virtual University, envisioned by Hans Magnus Enzensberger

Armin Schäfer

»I remember us thinking:
Tomorrow things will be better, and if not
tomorrow, then the day after. O.K. —
perhaps not much better really,
but different, anyway. Yes, everything
was going to be quite different.
A marvelous feeling. Oh, I remember it.«
*Enzensberger, Hans Magnus (1980): The Sink-
ing of the Titanic. A Poem, Boston: Houghton
Mifflin, p. 8*

1.

In 1920 Charles Sanders Peirce set up a definition of the word »virtual«.¹ According to the entry in *The Dictionary of Philosophy and Psychology*, a virtual X has the »efficiency (virtus) of an X« but is not the X itself.² Peirce defined the notion as follows: »(1) A virtual X (where X is a common noun) is something, not an X, which has the efficiency (virtus) of an X. This is the proper meaning of the word«.³ He draws a distinction between a virtual X and X proper by directing the attention to »efficiency«, i.e. to functions and performance, force and effects. From a pragmatic point of view, a virtual X is almost, nearly, or practically like the X but different in its essence or nature. Peirce's definition brackets materiality and media, which might lend the X

1 Cf. Steinle, Friedrich (2024): »How to Conceive Virtual Entities. Peirce's Proposal«, in: *Perspectives on Science* 32:3, pp. 269–277, here pp. 271–274.

2 Peirce, Charles Sanders (1920): »Virtual«, in: James Mark Baldwin (ed.): *Dictionary of Philosophy and Psychology*. Vol. II, new edition, with corrections, New York: Macmillan, pp. 763–764, here p. 763.

3 Ibid.

proper and its virtual variety its efficiency. In this respect, it is close to a basic common understanding of virtual entities: »we mean the thing in some way, not in its real form but rather in a sort of substitute reality, typically on a display, and in most cases just for the eyes and perhaps the ears.«⁴ Although Peirce's definition seems to be plausible, it becomes questionable when applied to entities where it is dubious what the efficiency of an X, despite its ontological deficiency, consists of at all. Any application of Peirce's definition to »university«—which is the purpose of my contribution to this volume—has to leave open how this definition should be related to the *definiendum* that is considered mostly an organization, but also an institution.

In 1979 philosopher Jean-François Lyotard presented to »the Conseil des Universités of the government of Quebec at the request of its president« a »report on knowledge«. His working hypothesis was that since the rise of computerized societies »the status of knowledge is altered.«⁵ This transformation had taken place in the institutions of research and teaching, especially the universities. Since the time digitization had taken command on the production, distribution, organization of knowledge, universities were informed by the state of computer technologies. The role and function of digitization as the impellent factor that has captured both knowledge and the university cannot be underestimated. The more the digitization of higher learning is progressing, the more often universities are attributed as »virtual«.

Against this background, such perspectives gain a peculiar interest which do not collate a virtual university's functions, performance, outcome, and effects to a university proper which, for its part, would be then considered the regular kind of university. On the one hand, new ideas of such a virtual university seem to linger in pre-forms of the real, having to be located in a field that is characterized by notions such as fiction, utopia, project, plan, or model. On the other hand, since the 1960s new ideas of this kind emerged in pedagogy and didactics with Open Universities and distant learning formats, especially in TV programs. In the wake of 1968, all over Europe fresh ideas for universities were articulated with respect to new places of location, formats of education, and media of teaching and lecturing.⁶

4 Steinle: How to Conceive Virtual Entities, p. 269.

5 Lyotard, Jean-François (1984): The Postmodern Condition. A Report on knowledge, Translated from the French by Geoff Bennington and Brian Massumi. Foreword by Fredric Jameson, Minneapolis: Minnesota University Press, p. 3, see also p. 67.

6 Cf. Weizsäcker, Ernst Ulrich von/Dohmen, Günther/Jüchter, Heinz Theodor (1970): Baukasten gegen Systemzwänge. Der Weizsäcker-Hochschulplan, München: Piper.

2.

German poet Hans Magnus Enzensberger (1929–2022) acted as a public intellectual who shaped both the literary and the political discourse since the 1960s. He was a node in an international network of left-wing authors, journalists, artists, editors, publishers, and opinion leaders. In 1972 he delivered the essay »Remarks Concerning the New York Universitas Project«⁷ as his contribution to a symposium on the future of the university, which took place in New York City at the Museum of Modern Art that same year. The concept of »virtuality« or the notion of »virtual university« was not used in his essay, although the »Remarks« can be inserted in histories of digitization and higher education and be related to preforms of a virtual university. In the 1970s the educational sector tested advanced media and communication technologies.⁸ Enzensberger's essay was thus contemporaneous with forerunners to a development in pedagogy and didactics who used new technologies and computers. The beginnings of a new idea, however, often lead to a situation that cannot be clearly overlooked by its actors. It is a typical feature of new beginnings that one sees their contours only in retrospect: »The essence of a thing never appears at the outset, but in the middle, in the course of its development, when its strength is assured.«⁹ Enzensberger did not lament the decline of the university or the corruption of its ideal but, rather, took advantage of the unforeseen effects that accompany the introduction of new technologies. He used the literary genre of the essay for articulating his idea and pointing out to a certain openness of the ongoing process of what he had called the industrialization of mind, which in 1962 had not yet reached its full deployment.

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- 7 Enzensberger, Hans Magnus (2006): »Remarks Concerning the New York Universitas Project«, in: Emilio Ambasz (ed.): *The Universitas Project. Solutions for a Post-Technological Society*. Conceived and directed by Emilio Ambasz, New York: The Museum of Modern Art, pp. 105–110. In the following Enzensberger's essay will be cited with the abbreviation »E« and page number(s) in brackets. Cf. also Scott, Felicity D. (2004): »On the »Counter-Design« of Institutions. Emilia Ambasz's Universitas Symposium at MoMA«, in: Grey Room 14, pp. 46–77; Holt, Matthew (2018): »The Black Book. Emilio Ambasz's University of Design«, in: Pieter E. Vermaas/ Stéphane Vial (eds.): *Advancements in the Philosophy of Design*, Cham: Springer, pp. 523–548.
 - 8 Cf. Holert, Tom/Haus der Kulturen der Welt (Berlin) (eds.) (2020): *Bildungsschock. Lernen, Politik und Architektur in den 1960er und 1970er Jahren*, Berlin: De Gruyter; Brachliotis, Georg (2022): »Classroom without Walls. Von Teachings Machines zu Learning Machines«, in: *Arch+Zeitschrift für Architektur und Urbanismus* 55:249, pp. 164–173.
 - 9 Deleuze, Gilles (1986): *Cinema 1. The Movement-Image*, Translated by Hugh Tomlinson and Barbara Habberjam, Minneapolis: Minnesota University Press, p. 3. Cf. Deleuze, Gilles (1989): *Cinema 2. The Time-Image*, Translated by Hugh Tomlinson and Robert Galeta, Minneapolis: Minnesota University Press, p. 43.

»Up to now it [the mind industry; A.S.] has not managed to seize control of its most essential sphere, education. The industrialization of instruction, on all levels, has barely begun. While we still indulge in controversies over curricula, school systems, college and university reforms, and shortages in the teaching professions, technological systems are being perfected which will make nonsense of all the adjustments we are now considering. The language laboratory and the closed-circuit TV are only the forerunners of a fully industrialized educational system that will make use of increasingly centralized programming and of recent advances in the study of learning. In that process, education will become a mass medium, the most powerful of all, and a billion-dollar business.«¹⁰

Despite Enzensberger's apprehension that business will take over higher education, he holds on to his idea that higher education could be revolutionized by implementing both the new technological infrastructure and new organizational principles at university.

This article does not intend to evaluate Enzensberger's methodological optimism but to turn the attention to the literary text by making a detour which, by a first step, will outline the guiding principle and peculiarity of the university as a place and institution as related to Wilhelm von Humboldt. Humboldt characterized both the sciences and the humanities in an abstract way, by a guiding principle that will be connected to an idea expressed by philosopher Gilles Deleuze who emphasized »becoming« as a component in the concept of virtuality. By a second step, the chapter traces down how the very idea of becoming as the defining principle of both the sciences and the humanities was used for directing the planning of a university. By a third step, the article will present Enzensberger's »Remarks«. Finally, a closer look will be taken at the literary genre that he proposes as the vehicle for envisioning a virtual university.

3.

In the draft of his exposé »On the inner and outer organization of the higher institutions of learning in Berlin«, written in 1809 or 1810 and published posthumously, Wilhelm von Humboldt claimed that »the principles ruling their [the institutions]';

10 Enzensberger, Hans Magnus (1982): »The Industrialization of Mind«, in: Reinhold Grimm/ Bruce Armstrong (eds.): Hans Magnus Enzensberger. Critical Essays, New York: Continuum, pp. 3–14, here p. 6. The original German essay was published as »Bewußtseins-Industrie« in 1962; the English version was translated by Enzensberger himself and first published in 1972. Cf. Enzensberger, Hans Magnus (1964): »Bewußtseins-Industrie (1962)«, in: id. (1964): Hans Magnus Enzensberger. Einzelheiten I: Bewußtseins-Industrie, Frankfurt a.M.: Suhrkamp, pp. 7–17.

A.S.] administration are isolation and freedom«. ¹¹ He characterized the peculiarity of higher institutions of learning in contrast to elementary and secondary schools, in that the latter »take as their subject only the completed and agreed upon results of knowledge and teach these.« ¹² The institutions of higher education, in contrast, are also performing science and humanities. »It is a further characteristic of higher institutions of learning that they treat all knowledge as a not yet wholly solved problem and are therefore never done with investigation and research. This in contrast to the schools, which take as their subject only the completed and agreed upon results of knowledge and teach these.« ¹³ Due to this peculiarity, as Humboldt explains, one can see easily »that in the inner organization of higher institutions of learning everything depends on the preservation of the principle that knowledge is to be regarded as something not wholly found and never wholly findable, but as something ever to be searched out.« ¹⁴ Thus, in addition to the prevalent principles of solitude and freedom that will guide the university as an actor, Humboldt specified as the basic idea of knowledge that it is in the making:

»As soon as one stops searching for knowledge, or if one imagines that it need not be creatively sought in the depths of the human spirit but can be assembled extensively by collecting and classifying facts, everything is irrevocably and forever lost, lost for learning which soon vanishes so far out of the picture that it even leaves language behind like an empty pod, and lost for the state as well.« ¹⁵

The history of the reception of Humboldt's idea of the university, which began in the 20th century ¹⁶, has rightly so nourished the suspicion that the pathos attached to

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- 11 Humboldt, Wilhelm von (1963): »On the relative merits of higher institutions of learning«, in: Humanist without Portfolio. An Anthology of the Writings of Wilhelm von Humboldt, Translated from the German with an Introduction by Marianne Cowan, Detroit: Wayne State University Press, pp. 132–140, here p. 132. The title of the German original is: Humboldt, Wilhelm von (1903): »Über die innere und äussere Organisation der höheren wissenschaftlichen Anstalten in Berlin.«, in: Königlich Preussischen Akademie der Wissenschaften (ed.): Wilhelm von Humboldts Gesammelte Schriften, Band X. Zweite Abteilung. Politische Denkschriften I, Berlin: B. Behr's Verlag, pp. 250–260, here p. 251. As »vorwaltende Prinzipien« Humboldt named »Einsamkeit« and »Freiheit«.
 - 12 Humboldt: On the relative merits, p. 251 (»die Schule es nur mit fertigen und abgemachten Kenntnissen zu thun hat und lernt«).
 - 13 Ibid., p. 132.
 - 14 Ibid., p. 134.
 - 15 Humboldt: On the relative merits, p. 134
 - 16 Paletschek, Sylvia (2002): »Die Erfindung der Humboldtschen Universität. Die Konstruktion der deutschen Universitätsidee in der ersten Hälfte des 20. Jahrhunderts«, in: Historische Anthropologie 10, pp. 183–205.

concepts such as solitude and freedom now sounds hollow: they have become »ubiquitous as buzzwords« and »at the same time have long since been largely worn out«¹⁷. A re-reading of Humboldt is therefore promising, insofar as it does not belong to the genre of »the idea of the university literature«¹⁸ which is endlessly lamenting on the corruption of an ideal. Humboldt's ideal is rather grounded in a principle that governs science itself.

»Humboldt does indeed declare that science obeys its own rules, that the scientific institution ›lives and continually renews itself on its own, with no constraint or determined goal whatsoever.‹ But he adds that the University should orient its constituent element, science, to ›the spiritual and moral training of the nation.‹ How can this *Bildung*-effect result from the disinterested pursuit of learning? Are not the State, the nation, the whole of humanity indifferent to knowledge for its own sake? What interests them, as Humboldt admits, is not learning, but ›character and action.«¹⁹

Humboldt's idea of science in the making and knowledge as a task that will never be completed can also lay the foundation for a virtual university. This requires a conceptualization of the virtual that defines it not only as a variety of the possible emerging from digitalization. Rather, the virtual should be understood as a reality in its own right that awaits its ongoing actualization. However, this actualization is not the realization of something that has already existed for a long time in an identical but immaterial pre-form. Instead, it is the peculiarity of such an actualization that it breaks with similarity. Thus, the updating of a virtual university is sometimes no longer recognizable as a university at a first glance, insofar as it leads the institution into a region of dissimilarity. Actualization and virtualization are neither opposing concepts nor reversible processes. As little as virtuality can be adequately defined by its supposed counter-concept of reality or by its actualization, it is ultimately impossible to foresee what effects will be produced by that actualization. In other words, virtuality is a privileged place of becoming. In this respect, it is essentially related to Humboldt's understanding of science.

Pierce insisted on not confusing the modes of the virtual and the possible. ›Virtual« has been seriously confounded with ›potential«, which is almost its opposite. For, the potential *X* is of the nature of *X* but without actual efficiency. A virtual velocity is something not being a velocity but a displacement; but equivalent to a ve-

17 Strohschneider, Peter (2017): *Arbeit am Status. Philologien im Spannungsfeld von Wissenschaft und Gesellschaft*, Göttingen: Vienna University Press, V&R unipress, p. 17. Translation by the author.

18 Collini, Stefan (2017): *Speaking of Universities*, London/New York: Verso, p. 72.

19 Lyotard: *The Postmodern Condition*, p. 32.

locity by the formula »what is gained in velocity is lost in power.«²⁰ The pinch of this definition is to draw a distinction between virtuality and the possible regarding »efficiency« without considering material, media, and processes that provide a virtual X with its efficiency.

Gilles Deleuze distinguishes between the virtual and the possible by examining the passages from the possible to reality and from the virtual to reality. He does not take into account the different functions, performances, effects of the different modes but differentiates between two types of passages into the real: »The possible is opposed to the real; the process undergone by the possible is therefore a »realization«. By contrast, the virtual is not opposed to the real; it possesses a full reality by itself. The process it undergoes is that of actualization.«²¹ In a more spontaneous way of thinking the distinction between the possible and the virtual is far more easily conceived. One finds the feature of existence that will be added to a possible X in order to transform it into the real X:

»Every time we pose the question in terms of possible and real, we are forced to conceive of existence as a brute eruption, a pure act or leap which always occurs behind our backs and is subject to a law of all or nothing. What difference can there be between the existent and the non-existent if the non-existent is already possible, already included in the concept and having as the characteristics that the concept confers upon it as a possibility?«²²

The formation of concepts plays into the hands of a common sense understanding of what virtuality might be. According to widespread assumptions on the role and function of the formation of concepts, concepts are allegedly congruent and concordant to reality: »Existence is *the same* as but outside the concept. Existence is therefore supposed to occur in space and time, but these are understood as indifferent milieu instead of the production of existence occurring in a characteristic space and time.«²³ The distinction between the possible and the virtual cannot be separated from the ways in which concepts are related to reality at all. Therefore, definitions should not conceive the virtual as a mode of the possible. The possible has its own form of identity in the concept; the virtual, however, is a »multiplicity«²⁴ which cannot be reduced to a concept but should, instead, be conceived as an idea. The idea is neither restricted in the same way as the concept is to premises, assumptions, and conditions, nor is the idea limited as the concept is to correspondence. An idea does

20 Peirce: Virtual, p. 763.

21 Deleuze, Gilles (1994): Difference and Repetition, Translated by Paul Patton, New York: Columbia University Press, p. 211.

22 Ibid.

23 Ibid.

24 Ibid., p. 203.

not recuperate terminological clarity. The concept does designate the same referent in its areas of application, especially in fictions and possible worlds which seem to be analogous to the real »while the real is supposed to resemble the possible«²⁵. The formation of concepts plays a crucial role in the investigation of the virtual. Concepts shape both the basic understanding of the ontology of a virtual X and the passage from the possible to the real X. »That is why it is difficult to understand what existence adds to the concept when all it does is double like with like.«²⁶ The actualization of a virtual X is not the realization of what already exists in an identical but immaterial preform, but it is rather the characterizing feature of the actualization that defies the likeness. One cannot define the virtual in relation to its alleged antonym reality. Rather, it is unpredictable which effects will come along with the actualization of a virtual X. The virtual is first and foremost the place for *the making of*. How could one envision, under the guiding principle of *the making of*, a convergence of the sciences and the humanities with the virtual in the university?

4.

In 1965 the Minister for Regional Planning, House Building and Public Construction of the Federal State of North Rhine-Westphalia (»Minister für Landesplanung, Wohnungsbau und öffentliche Arbeiten des Landes Nordrhein-Westfalen«) published an overall plan for the »University of Bochum«. The Minister explained the general idea that had been serving as a guide to the location where the university buildings were to be erected as follows:

»To begin with, it seems to be remarkable and almost incomprehensible that in this urban landscape, inhabited by 5.7 million people, no place of academic learning could be found. The four state universities are located beyond the mining region: in Bonn, in Cologne, and Munster the three full universities, and in Aachen the technical university (in Dusseldorf a medical university). The rationale is to be looked for, on the one hand, in the classical German idea of a university that, besides the freedom of science and humanities, requires the unity and loneliness of education and research, on the other hand, they have to be looked for in the development and the previous structure of the mining region.«²⁷

25 Ibid., p. 212.

26 Ibid., p. 212.

27 Der Minister für Landesplanung, Wohnungsbau und öffentliche Arbeiten des Landes Nordrhein-Westfalen (ed.) (1965): Die Universität Bochum. Gesamtplanung, Stuttgart/Bern: Karl Krämer, p. 5. Translation by the author. In the following this publication will be cited with the abbreviation »Bo« and page number(s) in brackets.

Planning at the ministry had developed an »idea for the construction in Bochum« that both allowed for the »necessity of sociological integration of the university« (Bo 11)²⁸ and met the demands that are founded in Humboldt's ideal of higher education (Bo 11): »Unity of Education of Research, freedom of teaching and research, community of scholars and students (*magistrorum et scholarium*) and solitude for doing science and humanities.« (Bo 11) Although the demands, deriving from the idea of construction, appeared »contradictory (for example, the demands of integration and solitude)«, the »design of the buildings« was deduced from »the founding principles« of the new university (Bo 11).

It was questionable whether the university had a specific form of construction which is adapted to its tasks and whether one could speak of a unique construction design for the University of Bochum (Bo 11). Yet, answers were found by the universities in Britain and the US. The idea of the university did not allow for inferring an idea of construction: »The university is a legal form and a form of organization—as such it was founded in the 12th century. There is no special building design for the university. The design of the buildings for the colleges originated from the requirements of the *universitas magistrorum et scholarium*, while facilities [or infrastructures; A.S.] of the city were used as lecture halls.« (Bo 11–12) The university »impregnates the city—it is all but »univer-city« and not a building of its own or a sealed construction, respectively«. (Bo 12) The colleges took their own shape in their own areas of the town. The requirements of scholarly representation within the city finally enforced a representation with ostentation and a monumental form of expression, which were restricted by functional limitation: »The type of construction is limited to the main building.« (Bo 12) The university expanded into the town, the suburbia or beyond the city in its own locality. This evolution has especially defined the British universities with integrated colleges. This other type of university has produced the specific form of the campus. The campus cannot so much be defined by its location in town or its relation to the city but, rather, by the idea of the academic village.²⁹

The planning for the university of Bochum recognized the campus university (Bo 13) as the only form that could be followed (Bo 13). The tension between the demand of solitude—the university had to be detached from the pragmatism that governs its surroundings (Bo 13)—and the integration into a lively and social milieu had to be released by opening up the campus: »The campus has to be open to its environment.«

28 »[D.] h. Attraktivität, Anreiz, um die der Hochschulbildung bisher fernstehenden Bevölkerungskreise anzusprechen, leichte Erreichbarkeit mit öffentlichen und individuellen Verkehrsmitteln und vor allem Wohnungen für mindestens 30% der Studenten unmittelbar bei der Hochschule und in den Haushalten der Revierbevölkerung.« (Bo 11) About the situation of higher education in Germany during that period cf. Georg Picht, Georg (1964): Die deutsche Bildungskatastrophe. Analyse und Dokumentation, Olten/Freiburg i.Br.: Walter.

29 Turner, Paul Venable (1984): Campus. An American Planning Tradition, London/Cambridge, MA: MIT Press, p. 3 (Preface: »The American Campus as an »Academical Village«).

(Bo 13)³⁰ Other than the Anglo-Saxon form of the campus, which is a widely ramified city where every faculty is a small university of its own and which is arranged around a sub-center, the plans for Bochum tried to realize their main goal by the design of the buildings. On a campus that is like a decentralized city one cannot recognize—or only with difficulties—how the faculties are interrelated, therefore the unity of the sciences and humanities, interdisciplinarity will not be accomplished. The text about the plans for the campus in Bochum concluded: »The faculties have to close ranks, in order to meet the demands that were highlighted as the main objective—i.e. cooperation—in Bochum«. (Bo 13) The first conclusion concerned the design of the campus: »The decentralized University-City has to become a central, urban and dense university« (Bo 13).³¹

The second conclusion concerned the form of the buildings: »Bochum tries to go one step beyond and to materialize the idea of interdisciplinary cooperation and of the unity of the sciences under one roof—all in a single building.« (Bo 15) The »design of the building in Bochum« (Bo 15) should meet both the demands of cooperation and the solitude of the sciences and the humanities, and it should contribute to sociological integration. The overall planning of the university of Bochum aimed at implementing the principle of solitude, lay grounds for the principle of freedom through the opening up of the campus, and take into account the making of sciences and humanities based on an infrastructure that supported cooperation and interdisciplinarity.

5.

Hans Magnus Enzensberger envisioned his idea of a virtual university in »Remarks Concerning the New York Universitas Project«. The essay was his contribution to the *International Symposium* which took place in New York on January 8th and 9th in 1972. The head of the Department for Architecture and Design at MoMa, Emilio Ambasz, was in charge of the *Universitas Project*. In 2006 the proceedings of the symposium, with contributions by Octavia Paz, Jean Baudrillard, Umberto Eco, Anatol Rapaport, Stuart Hampshire, Hannah Arendt, Thomas A. Sebeok and others, were published.

30 In the 21st century universities seem to question the campus as a place that seeks to realize its goal of integration through its openness. At Anglo-American universities in particular, the definition of the campus as a place that is open to its environment and has a relationship to other places in the city has been overlaid by other aspects. Cf. Catlin, Samuel P. (2014): »The Campus Does Not Exist. How campus war is made«, in: Parapraxis 4. Online: <https://www.pa.raprxismagazine.com/articles/the-campus-does-not-exist> (last access 16.09.2024).

31 The Ministry refers to the Illinois Institute of Technology in Chicago, planned by Mies van der Rohe. (Bo 13)

Enzensberger sent his essay, which was translated by Wieland Schulz-Keil and Barbara A. Becker, to New York but did not participate in the symposium, due to his protest against the United States' war in Vietnam.

Ambasz's invitation to the symposium came with a *Project Working Paper* and a questionnaire in the broadest sense: »The Universitas Project is aimed specifically at establishing a new type of University concerned with the evaluation and design of our man-made milieu. The issues involved and the implications are immense. It is necessary, therefore, to define the field of the problem before addressing ourselves to the specific aspects.«³² Enzensberger's »Remarks« begin with »Theoretical Premises« that underline the political dimension of a new university. He does not discuss whether the new university will be a profit or non-profit institution and where funding will come from. Instead, he states, as the starting point of his essay: »The founding of a university is a political act.« (E 105) The examples that demonstrate the political dimension of such new foundations are derived from Europe: »This statement can be verified by considering the history of numerous institutions of higher learning founded since World War II (e.g., Nanterre in France; Bochum, Bremen, Constance, and Ulm Academy of Design in Germany; Essex in England; Trömsö in Norway; etc.).« (E 105) It has to be expected, Enzensberger straightens out, that »already, the constitution of such a university will bring about vehement conflicts« (E 105), that it will settle a dispute especially »between necessary means and desirable goals« (E 105).

It was the design department at MoMa that hosted the symposium, but Enzensberger sees the obligation of the new university to the concept of design as »deeply ambiguous«: »On the one hand, this concept belongs to the commodity aesthetics, which serves no other purpose than to maximize profits.« (E 106) On the other hand, theories and practices of design that were not meant for maximizing profits were lacking. Ideas are always weaker than capitalism. Enzensberger cites an anonymous maxim: »If an idea collides with an interest, the idea always comes out looking ridiculous.« (E 107) The *Project Working Paper*, which provided the invitation to the symposium, disregarded »categories of domination, social power, and material interest« (E 106). Without a »correct working theory of society« (E 107), however, any project for the new founding of a university will be questionable. With respect to this situation, practical proposals have to be favored that show what a new university could perform in its service for society: »in its own institutional form, the Universitas has to anticipate the proposals it offers to society as a whole as far as possible. That is, it must be assured that not only the results, which Universitas will publish, but also its very existence, can be used as an effective example.« (E 107)

32 Ambasz, Emilio (2006): »Institutions for a Post-Technological Society. The Universitas Project. Project Working Paper«, in: id (ed.): *The Universitas Project. Solutions for a Post-Technological Society*, New York: The Museum of Modern Art, pp. 17–48, here p. 19.

How to connect an idea directly with structures is a directing consideration in the *Project Working Paper* that aims at the organizational division of the institution: »Obviously, departmental divisions are unsuitable for this university, a point which the Project Working Paper has made unmistakably clear.« (E 107) There is a list to be completed with organizational aspects that have to be surveyed: »the faculty hierarchy, the differentiation according to academic rank, the setting up of curricula, the system of examinations, the collecting of credits, the uses of quizzes, multiple-choice test, etc., to check learned material, and the role of sports on campus.« (E 107) Not least the publication as the elementary as well as the fundamental act in the sciences and the humanities has to be questioned and should be replaced by social commitment. The argument about what kind of organizational structure would be suitable for the new foundation has to be replaced by experimenting with the abolition of privileges.

Enzensberger brings in specific proposals for the organization of the new university. »The university should not have a central administration building«. (E 108) The administration should no longer follow the principle of the delegation of agency: »All administrative functions should be reduced to an absolute minimum and should be performed by people whom they afflict.« (E 108–109) Administration will be replaced by academic self-government that has to be performed by both academic staff and students. In this respect, the records management can be limited because the actors are deciding themselves. »It is superfluous to make and keep records of every procedure.« (E 109) Neither will the university to come have spacious offices nor is there any necessity for controlling the actors. That is to say, Enzensberger questions the traditional idea of the campus.

Instead of a campus with its usual infrastructure, he proposes »to build new kinds of apartment houses, to be used by teachers and students alike, and equipped with all services and communication devices possible today.« (E 109) Advantages will come to the fore with flexible appointments and meetings. »Principally, meetings for instruction purposes should take place in a private, informal atmosphere (>at home<) and at times chosen freely, not fixed by a central administration.« (E 109) On the other hand, the traffic will be relieved: »The overcoming of physical distances and, with it, traffic problems, can so be avoided to a large extent.« (E 109) Eventually, Enzensberger is presenting his fantasy about the facilities: »Each of these buildings has to be equipped with all of the following means of communication: videophone, real-time computer consoles, video recording and cameras, closed circuit TV, and telephone xerography (that is, access to the library via telephone).« (E 109) The investment costs will be higher than for other newly founded universities. But the investment is justified by the university's benefits: »the productivity of the university, its diversity, and its openness would all be higher«. (E 109) The technical infrastructure will allow for new ways of interaction or, for example, new ways of accessing libraries and archives: »This allows discussions between groups at very different locations via

conference lines, and common use of a central library (books, newspapers, circulars, sound and picture archives).« (E 109)

Enzensberger doubts that tenure is beneficial for the quality of teaching: »the contracts reached with members of the faculty must only cover short terms, so as not to create a permanent pensionable teaching staff (>tenure<).« (E 108) Long-term contracts are blocking innovations in education. The quality of teaching and education cannot be deduced from the academic qualification of the staff. The cutback of privileges of the faculty has to be accompanied with reinforcing the student's position: »The Universitas Project should provide the students with extensive participatory rights in the governing bodies of the university, to a degree as yet uncommon in American institutes of higher learning.« (E 108)

Particularly the new infrastructure will transform the institution of higher learning into a university in progress or university in the making: »A university founded on the basis of this proposal would be quasi-uncontrollable; it is possible to predict neither the results of such a university nor the rules that such a university would develop for itself. Whoever considers this unpredictability a disadvantage will fight against the founding from the beginning. Whoever considers it an advantage—and that refers particularly to teachers and students—will be willing to fight for such a university. The Universitas Project will be controversial, or else it will not be.« (E 110)

6.

Michel Foucault was invited to the symposium but did neither contribute a paper nor attend the *Universitas Project* as a debater. The philosopher asked the organizers of the symposium what they expected from his contribution—and rejected the invitation. Felicity Scott cites his query in her reconstruction of the *Universitas Project*:

»From the beginning, Ambasz's interdisciplinary dialogue caused confusion as participants were faced with the irreconcilable nature of competing discourses. [Michel] Foucault registered a sense of mistaken identity regarding the very nature of Ambasz's request in a letter of [31st] August 1971. After noting his interest in the Universitas project, Foucault continued: »I must confess that I don't really understand which kind of paper I am supposed to write as a contribution to this project.—Do you expect very large and philosophical considerations about design and science, nature and man-made milieu, values and technology, etc.? In this case, I am ashamed to say that I am not in [the] mood to write anything about those abstract and difficult problems.« Foucault proposed, instead, send-

ing research about ›social repressors‹ in our ›manmade milieu,‹ (police, justice, etc.).«³³

In contrast to Foucault's query, Enzensberger accepted the invitation to the symposium but turned his contribution into a protest. For this purpose, he used the literary genre of the essay, drifting away from the indecisiveness that was inherent in the interdisciplinary approach of the *Universitas Project*. His »Remarks« do not belong to any special discourse, such as pedagogy, didactics, architecture, or sociology, but they follow the rules governing the literary genre of the essay, as distinguished from scientific and philosophical papers. The literary genre of the essay has the advantage that it does not belong to any specific kind of discourse. It was (or, maybe, still is) prerogative of literature that it has autonomy and is not limited by the rules of other specific discourses. One might also say that the essay could move easily from one discourse to another within the framework of the literary genre. Philosopher Theodor W. Adorno argued that the essay as a genre »takes presentation more seriously than do modes of proceeding that separate method and object and are indifferent to the presentation of their objectified contents. The manner of expression is to salvage the precision sacrificed when definition is omitted, without betraying the subject matter to the arbitrariness of conceptual meanings decreed once and for all.«³⁴ The essay's »own conceptual organization« can compensate for a deficiency in scientific rigor, while the literary form opens up to the author's experience which is mediated by the rhetoric, literary devices and performative strategies of the literary text: »the essay proceeds, so to speak, methodically unmethodically.«³⁵

Enzensberger's idea takes shape in a situation when computers, fax, and telecommunication were already in use, video cameras and recorders were about to become affordable for non-professionals: The new university has to be »equipped with all services and communication devices possible today«. At the heart of the idea, however, were not the devices but their interplay that he considered to bring unforeseen possibilities. Even if the idea made its way to become real, it could not be anticipated where one would arrive. If Enzensberger's idea of a new university was characterized by computer, tele-communication technology and video equipment, it lacked any detailed plan of how the interaction on the campus would take place. Enzensberger's remarks, however, should not be considered shortcomings but, rather, a stimulus to open up towards new and unexpected opportunities. In

33 Scott, On the ›Counter-Design‹ of Institutions, p. 62.

34 Adorno, Theodor W. (2019): »The Essay as Form«, in: Rolf Tiedemann (ed.): Notes to Literature. Adorno, Theodor W., Translated from the German by Shierry Weber Nicholsen. Introduction by Paul A. Kottman, New York: Columbia University Press, pp. 34–48, here p. 37.

35 Adorno: The Essay as Form, p. 38.

retrospect, one could extrapolate his idea from the literary genre of its articulation, compare it to the history of universities in Western Societies and measure it against the principle of reality. It would be easy to demonstrate that most of the elements of the new university he mentioned (video, fax machines, computers, self-administration, decoupling of research and teaching, a mandate for students), in one way or another, here and there, with less or more efficiency, have since been implemented at universities. One could compare his idea with the passages on the possible making its way to become real in the planning of universities. The Ruhr University of Bochum, for example, was derived from Humboldt's ideal that guided an idea of construction that was specified in a construction plan which eventually resulted in the infrastructure of a campus and its buildings. Here, the idea defined something possible that guided the planning step by step and directed the passage to the real. The nexus between the idea and its realization was tight with every step. Enzensberger considered also architecture and infrastructure—as constituted through the apartments—but was not interested in details of practical suggestions. The idea seemed to be self-explaining, and it seemed as if the passage to the real could at the most be hindered by political »conflicts« or lacking »resources«.

It would be futile to make Enzensberger responsible for the blind spots of his idea, which by now are all too obvious. The regime of control implemented by digitization seems far more effective than the effects of liberation and resistance at the virtual university. In retrospect, it seems that the criteria for the evaluation of Enzensberger's idea can be found in the planning of new universities in the 1970s, but the writing mode is neglected. The literary genre of the essay seems to be merely accidental to his idea. Nevertheless, the intense use of rhetorical tropes and figures, literary procedures and performative strategies is remarkable. By a paratextual act, Enzensberger called into question the nature of the entire project. The essay itself took up the paratextual action in its first sentence, when it stated: »The founding of an university is a political act.« (105) Enzensberger the author, so to speak, was still accountable for his contribution, although his idea was put in limbo. In the state of virtuality it remained undetermined how the idea was to be actualized. In any case, it was not the absent author at the symposium who gave his idea a specific direction or concretization by answering questions by other participants and providing further information. The instance that takes the floor in the »Remarks« cannot or will not provide an explanation of how these elements interact, although the elements are named. Instead, the ellipse becomes the figuration of the idea of a virtual university. Even if a general ordering scheme can be deciphered in the course of the presentation, the presentation itself leaves it with an exemplary and incomplete list of elements which does not describe the interactions between communication technologies, architectural infrastructure and administrative organization, stimulating instead the reader's imagination. Enzensberger's idea did not descend to the locality of the campus and the materiality of infrastructures but rose to a life form or way of

life. It was not about something possible on its way to become real but about the actualization of an idea. However, after its passage to the reality that gives it existence, this idea has neither achieved its goal nor has it been exhausted.

The very last remark of Enzensberger's essay emphasizes that the implementation of his idea will evade control by the new university: »it is possible to predict neither the results of such a university nor the rules that such a university would develop for itself«. (E 110). The horizon of the essay is not the university whose proceedings and functions are already familiar. The optimism that such a new university will produce unforeseen knowledge is grounded in the omission of conditions, limitations, and restrictions that govern the modern research university. It is rather difficult to conceive of the absence, lack of or even non-existence of conditions and factors. The prospect of the university as a way of living seemed to be liberating and stimulating. Enzensberger's idea of a virtual university derived from the principle of science and humanities that can be defined, according to Wilhelm von Humboldt, as something becoming.

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Text—Codex—Library

The *Sunte Marien Wortegarde* between Institutional Practices and Literary History

Christof Kleinfelder

1. Libraries as Infrastructures of Knowledge

Libraries are commonly regarded as places where books are collected and made available for public use. But libraries are more than just collections of books; they are, as Andreas Speer puts it, spaces of thought and institutions of organised knowledge, spaces for thinking and orders of knowledge.¹ In libraries knowledge is not only collected but also organised, structured and—in doing so—constituted at the same time.² Therefore, I understand libraries not only as repositories of texts but as places where texts are constituted as objects of knowledge both through material practices and through gestures of virtualisation.³ Moreover, it is crucial to acknowledge that the role of libraries is not confined to mere collections; they also function as institutions that facilitate the transfer of media. This process of transfer can be illustrated by the evolution of media from parchment to paper, from manuscripts to printed materials, and ultimately to digital formats. Such ›transcriptive‹ processes⁴ change the status of a text and affect its reception just as much as the descriptive library practices do. This raises the question of how and in what way libraries are involved in the constitution of texts as objects of knowledge.

1 »Räume des Denkens und Institutionen geordneten Wissens, Denkräume und Wissensordnungen«, Speer, Andreas (2020): »Die Bibliothek. Denkräume und Wissensordnungen«, in: id./Lars Reuke (eds.): Die Bibliothek – The Library – La Bibliothèque. Berlin/Boston: De Gruyter, pp. XV–XXV, here p. XX.

2 Schlottheuber, Eva (2021): »Mittelalterliche Bibliotheken und (digitale) Wissensordnung. Zur Aktualität einer alten Forschungsfrage«, in: Bibliothek. Forschung und Praxis 45:2, pp. 221–229, here pp. 221–222.

3 On the virtualisation of texts see for example: Lévy, Pierre (1998), *Becoming Virtual. Reality in the Digital Age*, New York: Plenum Trade, esp. chapter 3 »The virtualization of Text«, pp. 45–64. The following explanation on libraries follows: Speer: Die Bibliothek, pp. XX–XXII.

4 Cf. Jäger, Ludwig (2002): »Transkriptivität. Zur medialen Logik der kulturellen Semantik«, in: id./Georg Stanitzek (eds.): *Transkribieren. Medien/Lektüre*, München: Fink, p. 19–41.

How and by what means do they co-determine what is perceived as a ›text‹ and how a text is categorised?

By posing such questions, I firstly follow considerations concerning the praxeology of literary studies, as for example recently discussed by Steffen Martus and Carlos Spoerhase.⁵ Secondly, I follow the suggestions by Michelle R. Warren, who, in her book *Holy Digital Grail*,⁶ traces the history of an Arthurian novel-manuscript over the course of its various historical media changes and transcriptions. In the present study, the unique transmission of the *Sunte Marien Wortegarde* by Könemann of Jerxheim is examined, along with its manuscript, the quarto-sized *Codex Manuscriptus Theologicus 153*. The paper manuscript, dating from the 15th century, is traced through various libraries and media infrastructures. The study also explores the practices of description and cataloguing, which serve for constituting their status as objects of knowledge.

2. A Codex in Brunswick

Prior to its acquisition by the Göttingen University Library, the 4° Cod. Ms. theol. 153⁷ had been in the possession of numerous other libraries. The earliest evidence pertaining to this manuscript leads to the private library of the Brunswick town clerk, Gerwin of Hameln. Anette Haucap-Naß considers his book collection as one of the most significant private libraries of 15th century Germany.⁸ The library contained a total of 336 volumes.⁹ Following Gerwin's demise in 1496, they were bequeathed to the *Andreana* in Brunswick, which was part of St. Andrew's Church. Gerwin's bequest stipulated that his collection be kept permanently in Brunswick and made accessi-

5 Cf. Martus, Steffen/Spoerhase, Carlos (2022): *Geistesarbeit. Eine Praxeologie der Geisteswissenschaften*, Berlin: Suhrkamp.

6 Cf. Warren, Michelle R. (2020): *Holy Digital Grail. A Medieval Book on the Internet*, Stanford, CA: Stanford University Press.

7 SUB Göttingen, 4° Cod. Ms. theol. 153. To avoid disrupting the reader's flow, the manuscript is abbreviated in the following as Cod. 153. In order to facilitate the identification of individual manuscripts in databases such as the ›Handschriftencensus‹ (www.handschriftencensus.de), the manuscript shelfmarks always include the German names of the institutions which hold them.

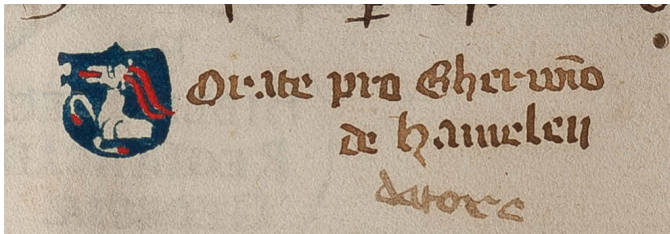
8 Haucap-Naß, Anette (1995): *Der Braunschweiger Stadtschreiber Gerwin von Hameln und seine Bibliothek*, Wiesbaden: Harrassowitz, p. 1.

9 Lehmann, Paul (1935): »Gerwin van Hameln und die Andreasbibliothek in Braunschweig«, in: *Zentralblatt für Bibliothekswesen* 52:11, pp. 565–586, here pp. 570–571; Haucap-Naß: *Der Braunschweiger Stadtschreiber Gerwin*, pp. 1 and 140. A transcription of Gerwin's testament (written in Low German) can be found: *Ibid.*, appendix 3, pp. 295–301.

ble to experts.¹⁰ The fact that Cod. 153 belonged to Gerwin's collection can be verified with some certainty:

Gerwin labelled all his manuscripts and incunabula on the first page with his family crest—a red-horned, silver ibex on a blue ground—next to which the prayer petition *Orate pro Gherwino de Hamelen* can be found. Both elements can be found in Cod. 153. Here, the family crest and prayer petition were supplemented by a later hand with *datore*—a donation record (Fig. 1). The codex, marked by Gerwin as an object of personal and family memory, hence becomes part of a hybrid collection of objects from various donors in the *Andreana*.

Fig. 1: Family crest, prayer petition and donation record.



Since the family crest can only be found at the commencement of Cod. 153, it may be assumed that the manuscript, which consists of two fascicles—a Latin part from fol. 1–158 and a Low German part from fol. 159–220—, had already been bound prior to its acquisition by Gerwin, or alternatively, that its components were bound by Gerwin immediately after. The fact that the two parts of the manuscript, i.e. the Latin and the vernacular part, were originally independent is shown by the staining seen on fol. 1r as well as on fol. 159r (the beginning of the *Sunte Marien Wortegarde*). This suggests that once both parts must have been stored independently and unbound.¹¹

The practice of binding, which places a text within a certain context and provides a framework for the way in which it is understood by placing it among its co-transmission, cannot be dated, but it can be proven in principle. The context within which the text is placed corresponds to the profile of Gerwin's library. According to Haucap-Naß, it not only reflected Gerwin's personal reading interests, which included theological literature such as sermons or texts on current theological debates, legal literature, medical writings, historiographical works, and scholastic literature.¹² But

10 Ibid., p. 140.

11 Breucker, Fritz (1904): »Gedichte Brunos von Schonebeck«, in: Jahrbuch des Vereins für niederdeutsche Sprachforschung/Niederdeutsches Jahrbuch 30, pp. 81–146, here p. 81.

12 Ibid. (and in detail), pp. 132–136.

also the »Wunsch nach umfassender Bildungsmöglichkeit«¹³ (desire for comprehensive education) was the determining factor for Gerwin's interest in the collection, and the library can therefore be categorised as a »Gebrauchsbibliothek«¹⁴ (reference library), which included the following topical categories:¹⁵

- a) Religious/Theological literature
- b) Conciliar literature
- c) Legal literature
- d) Historiography
- e) Grammars and dictionaries
- f) Ancient authors (especially those who were important for humanist education)
- g) Medicine and astrology
- h) Humanist authors (such as Petrarch, Barbaro and Albrecht of Eyb)

Only eight out of the 359 texts from Gerwin's library which are known today are in vernacular language.¹⁶ These are primarily medical recipes, documents, legal writings, and (geo)political reports. Könemann's *Sunte Marien Wortegarde*, Brun of Schönebeck's *Ave Maria* excerpt (the *Theophilus* legend) and the other following vernacular texts in Cod. 153 as well as a bound maculation containing a part of the Middle High German *Graf Rudolf* are the only known evidence of vernacular poetry in this collection. Haucap-Naß therefore concludes that Gerwin had no particular interest in literary texts and that the transmission of the *Sunte Marien Wortegarde* and the texts following it should be regarded merely coincidental—as a »by-catch«.¹⁷

The codex, which in its Latin part includes religious/theological works as well as texts related to the Council of Basel and sermons, probably came into Gerwin's possession because of its topical profile. Personal interest may also serve as an explanation because of the existence of written traces of Gerwin himself. His handwriting is known from his autographs, for example his last will, and therefore it can be identified with certainty by palaeographical means.¹⁸ Therefore, his marginal notes, annotations and headings can be found in most manuscripts of his collection; in Cod. 153, however, they can only be found in the Latin, but not in the vernacular layers of the volume.¹⁹ Gerwin's notes assign addressable names and titles to the texts. Furthermore, they introduce the distinction between unread and read texts and mark

13 Ibid., p. 137.

14 Ibid., p. 130.

15 The topical categories were taken from: Ibid., pp. 102–124.

16 Haucap-Naß: Der Braunschweiger Stadtschreiber Gerwin, pp. 100–101.

17 Ibid., pp. 125–129.

18 Ibid., p. 132.

19 Ibid., pp. 1 and 132.

texts that are to be read—such as in: »*Evangeli[um] Nichodemi legi* [ChrK]« (Cod. 153, fol. 86r). A total of 16 traces of Gerwin's hand can be found in Cod. 153:²⁰

- a) fol. 2r: Family crest, prayer petition and a »[q]uerseitige Unterschnittbeschriftung *theologia*...«²¹.
- b) fol. 2r: *autoritates biblie ad decretum* (1.)
- c) fol. 31rv: *proverbia*
- d) fol. 32r: *Salomonis*
- e) fol. 41v: *Machabeorum*
- f) fol. 81r: *expliciunt concordantie biblie cum decreto*
- g) fol. 82r: *de materia successionum* (3.)
- h) fol. 86r: *evangelium Nichodemo legi* (4.)
- i) fol. 97v: *legi*
- j) fol. 112r: *exlicit sermo Jo(hannis) de Zago(via)* (5.)
- k) fol. 113r: *lectura circa arbores* (6.)
- l) fol. 130r: *disputatio de conceptione beate Marie* (7.)
- m) fol. 147v: *explicit disputacio de conceptione Marie*
- n) fol. 148r: *bullae de translacione concilii legi* (8.)
- o) fol. 155v: *legi*
- p) fol. 156r: *de collacione bonorum* (9.)

The labelling on the tail edge of the book *theologia* not only indicates which way round the book may have been on its shelf in the library but also assigns a topical heading and a librarian classification to the text collection. It provides the keyword ›theology‹ under which Gerwin subsumed the content of the manuscript and topically located it in his library. Considering the texts preserved in the codex, such a classification/categorisation is reasonable, and the current Göttingen shelfmark *Codex Manuscriptus Theologicus 153* once again takes up the keyword *theologia*.

In addition to Gerwin's notes, there are traces of at least one other hand in both the Latin and the vernacular fascicles of the codex. Unlike Gerwin, this user is

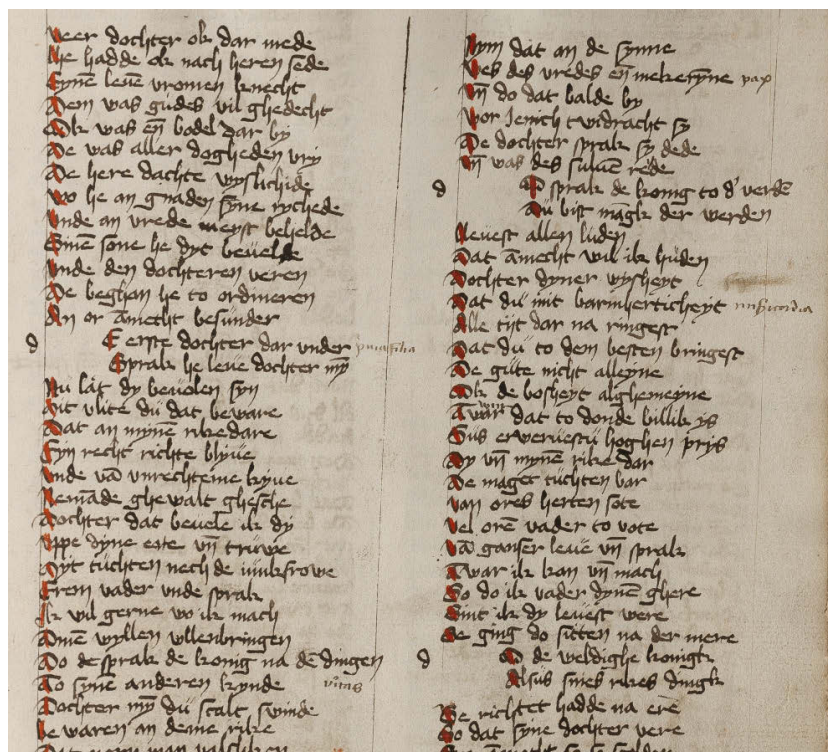
20 The list of Gerwin's traces was taken from the manuscript description of Cod. 153 in: id., pp. 183–185, a list of Gerwin's traces can be found on pp. 184–185. The Arabic numbers in brackets indicate the position of the text within Cod. 153, i.e. (1.) means the first text of the manuscript. The counting follows Haucap-Naß, although she does not consider the pre-attached letter and the notes on inheritance law in her counting of the texts.

21 Ibid., p. 184. The categorization *theologia* is followed by a hardly readable word indicated by Haucap-Naß by the three dots (ibid.) that might be a second (sub-)classification. Fritz Breucker assumes the Latin word »*jus*« (Breucker: *Gedichte Brunos von Schonebeck*, p. 81), meaning ›law‹, ›right‹. Considering the texts on the Council of Basel or the notes on inheritance law in Cod. 153—although it is uncertain when these were written down—, such a (sub-)classification is reasonable.

not content with inserting (sub)headings and marking texts as having been read. In fact, structuring marginal notes, annotations, highlightings, maniculae, even corrections etc. were left in the texts.

Such interventions can also be found in *Sunte Marien Wortegarde*: Verses were added in places where the rhyme scheme is broken, and corrections were made where scribal errors were suspected.²² Furthermore, glosses in Latin were added to the text, for example to mark the first appearance of a particular figure. Fig. 2 shows where this hand highlights the four daughters of God by adding their Latin names »[ver]itas«, »pax«, and »mi[ser]icordia« or by giving them a reference number »[pri]ma filia« (Cod. 153, fol. 160r). Moreover, the beginnings of interesting passages were also marked with glosses in Latin which are additionally emphasised by lines next to the body of the text (fol. 194rb-195ra, 195va, 202rb, and 202v).

Fig. 2: Marking of the first appearance of the different daughters in Könemann's *Sunte Marien Wortegarde*.



22 These can be found e.g. on fol. 194rb to 195ra, 195va, 202rb, and 202v.

Such interventions show that this hand reshaped *Sunte Marien Wortegarde* according to aesthetic considerations—e.g. to avoid orphaned rhymes—as well as regarding its own reading interests. The corrections and the addition of verses in places where the rhyme scheme is interrupted, as well as the Latin glosses, establish a new, smoothed textual structure to the poem and change its textuality. This altered version of Könemann's poem is finally given a title by the Latin heading *Viridari[um] b[ea]te [vir]ginis* (fol. 159r), meaning ›Garden of the Blessed Virgin‹, a translation of the vernacular, metaphorical title mentioned in the epilogue (Fig. 3 and 4).²³ This title makes this version of the text addressable and distinguishable from the first-hand *Sunte Marien Wortegarde* (and that necessarily means the first hand of the manuscript). Although Könemann also mentions himself by name in the epilogue (fol. 210ra), his name is not noted above the text. But the Latin title with its keyword of ›*Viridarium*‹ does not only translate the metaphor of picking rhetorical flowers (*flores*) but also refers to a specific textual practice and text genre well established in the world of Latin script. It emphasises the Latin quotations in the text—the necessarily anonymous excerpt character of the poetry—or, to be more precise, of the poems in the second fascicle as a whole.²⁴ *Sunte Marien Wortegarde* as well as the texts following it in Cod. 153 may be considered a ›*Viridarium*‹. They share the same Mariological subject, and they all carry Latin quotations. Hence, they are indeed a ›*Viridarium*‹ of the virgin, and this ›*Viridarium*‹ responds to the Mariological sermons of the first part of the manuscript by surrounding the Latin quotations in praise of Mary with vernacular poetic texts.²⁵

23 The epilogue says: »Dú lefer scalt dat weten / Dúffe breff scalt heten / S[un]te marien wortegarde / Dar scalt de vnghelarde / Spacieren gan yñne / Mit vornúft finer fýnne / V[nde] mang den wort en / Sine ftunde korten / V[nde] blom[en] lefen / Dat scalt ghenftliken wesen« (Cod. 153, fol. 210rb).

24 Lechtermann, Christina (2025): »Könemanns von Jerxheim *Sunte Marien wortegarde*«, in: Franz-Josef Holznagel/Jan Cölln in cooperation with Ricarda Bauschke-Hartung and Mathias Herweg (eds.): *Wolfram-Studien XXVII. Literatur im mittelniederdeutschen Sprachraum (1200–1600). Produktion und Rezeption Rostocker Kolloquium 2021*, Berlin: Erich Schmidt, pp. 315–348.

25 The first Mariological sermon starts with a quote from the Biblical *Canticum canticorum* (Song 4.7)—»(T)ota pulcra est amica mea et macula n[on] est inte« (fol. 130r)—and can be found on fol. 130r–137r. The second one, beginning with »(S)apiencia aperuit ora«, a quote from the Biblical *Book of Wisdom* (Sap 10, 21), can be found on fol. 137r–147v. Both sermons are titled »*Disp[utacio] de Concep[cione] b[ea]te Marie*« (Cod. 153, fol. 130r). In the sermons—just as in Könemann's *Sunte Marien Wortegarde*—many Latin quotations can be found.

Fig. 3: Latin heading »Viridari[um] b[eat]te [vir]ginis« at the beginning of Sunte Marien Wortegarde.

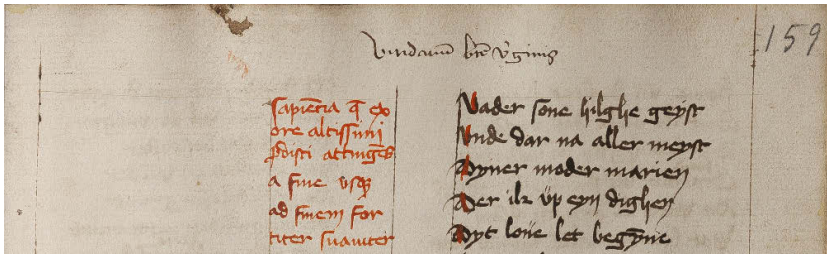
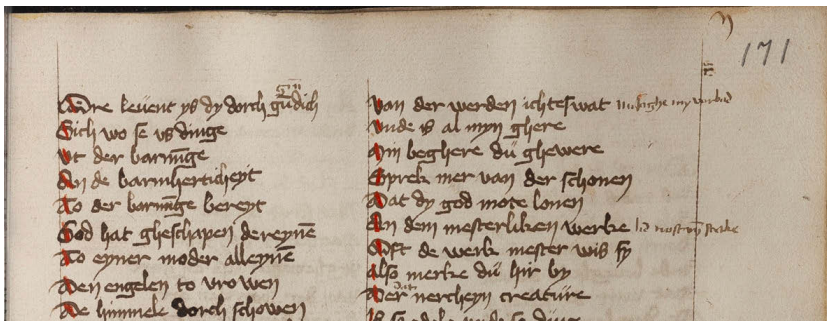


Fig. 4: Correction and added verses in Sunte Marien Wortegarde.



3. From Brunswick to Helmstedt

In a letter addressed to Rudolf August, Duke of Brunswick-Wolfenbüttel, Hermann von der Hardt, a Helmstedt theologian, stated the following during a research visit to the Andreana at the conclusion of the 17th century: »*Uti nos his diebus in sacra nostra aede inter multas chartas laceras et vetustate detritas codicesque ante plura saecula scriptos haud contemnenda offendimus monumenta*«²⁶. Based on this statement, Paul Lehmann concludes that von der Hardt had already recognised the gradual disintegration of the Andreana and therefore took care that some of the books were transferred to the library of Duke Rudolf August and later donated to the Helmstedt University Library. Furthermore, several books were also transferred to von der Hardt's private library,

26 Taken from: Lehmann: Gerwin van Hameln, p. 575; Translation (ChrK): »As in these days, among many torn papers and volumes worn down by age, written many centuries ago, we have encountered not insignificant monuments in our sacred building.«

including the Cod. 153²⁷—presumably for his personal research. Lehmann's hypothesis is that von der Hardt travelled to Brunswick with the intention of conducting research on the Council of Constance and the Council of Basel.²⁸ Cod. 153 contains some texts connected to these events. A letter addressed to an unknown recipient and dated 11 October 1736 is bound in at the beginning of the codex (fol. Ir-Iir). This finding serves for substantiating the hypothesis that previously the codex was part of von der Hardt's library. In this letter, a certain *Jac[ob] Chr[istian] Hersenius* thanks the recipient for having been given the manuscript and thus »*Viridarium illud Kone-mannianum B. Mariæ / Virginis*« (Cod. 153, fol. Ir).

Not only did Hersenius read Könemann's *Sunte Marien Wortegarde*, but he also copied it. The original copy was part of the »Gymnasialbibliothek« collection in Salzwedel.²⁹ Presently, it is part of the holdings of the Berlin State Library.³⁰ In the preface to this copy of *Sunte Marien Wortegarde* Hersenius states that his source is a 15th century manuscript that belonged to the library of the »*Praepos-/siti Mariaeber-gensis, Hermann von der Hardt* [emphasis in original]« in Helmstedt in 1736.³¹ In his copy (Fig. 5) Hersenius isolates the texts of the second fascicle from the composite manuscript. He transcribes both the German and the Latin text elements while normalising and expanding the abbreviations. However, he only counts the German verses on the margins of each respective column. In Hersenius' transcription, *Sunte Marien Wortegarde* appears as a numerical quantity whose components can be addressed individually. The vernacular text is now conceived as a coherent entity

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- 27 Herbst, Hermann (1941): »Die Bibliothek der St. Andreaskirche zu Braunschweig«, in: Zentralblatt für Bibliothekswesen 58:9/10, pp. 301–338, here p. 336. It is not possible to determine with certainty which books exactly were involved, due to the absence of a catalogue of the books that were removed from the *Andreana*.
- 28 Cf. Lehmann: Gerwin van Hameln, p. 575. The fact that von der Hardt was doing research on the Council of Basel is evident from the course catalogue for the 1730/31 semester: »*Hermann von der Hardt caliginosa feculi XV. monumenta perscrutatur in magni Bafilienfis concilii lucem*« (Niedersächsisches Landesarchiv-Staatsarchiv Wolfenbüttel, StAWF 23 Alt 4023, *Catalogus Lectionum et exercitationum quae proximo semestri a festo Michaelis anni MDCCCXXX. Vsque ad festum Paschatos Anni MDCCCXXI. In Academia Iulia habebuntur*. Helmstedt 1730, fol. 3v, online: <http://diglib.hab.de/periodica/ed000004-ws1730-1731/start.htm?image=00005> (last access: 09.09.2024)). Translation (ChrK.): »Hermannus von der Hardt investigates the obscure monuments of the 15th century in the light of the great Council of Basel.«
- 29 Borchling, Conrad (1899): »Mittelniederdeutsche Handschriften in Norddeutschland und den Niederlanden«, in: Nachrichten von der Königlichen Gesellschaft der Wissenschaften zu Göttingen. Geschäftliche Mittheilungen 1898:2, pp. 79–316, on Hersenius' copy of the *Sunte Marien Wortegarde* see pp. 190–191.
- 30 Staatsbibliothek zu Berlin – Preußischer Kulturbesitz, Ms. germ. fol. 1229, online: <https://resolver.staatsbibliothek-berlin.de/SB00035E3F00000000> (last access: 13.10.2025).
- 31 Ms. germ. fol. 1229, fol. 1v; Translation (ChrK.): »Provost of Mariaberg, Hermann von der Hardt.«

with the Latin elements added to it. Hersenius's primary interest lies in the Middle Low German dialect, and consequently his examination of the vernacular text is conducted from a philological perspective. Here, individual words are underlined and sometimes explained (in Latin). Although this first philological doppelgänger of *Sunte Marien Wortegarde* arises from a decidedly material practice, a gesture of virtualisation is inherent in it: more precisely, it makes a decision concerning main text and addition, thereby creating a version of Könemann's poem that did not historically exist in this way, yet one that will nonetheless shape both subsequent editions and accounts of literary history.³²

Conrad Borchling has identified a second manuscript from the 18th century (Hanover, Landesbibliothek. Ms. IV 483) that contains *Sunte Marien Wortegarde*—or at least parts of it.³³ According to Borchling, the manuscript consists of copies of older German texts from the 9th to 15th centuries, which were written by Johann Georg Eccard³⁴. The manuscript under scrutiny comprises excerpts and commentary on Könemann's poem, arranged on a single folio sheet, with Borchling failing

32 See for example: Ehrismann, Gustav (1935): *Geschichte der deutschen Literatur bis zum Ausgang des Mittelalters*, Vol. II/2, München: C. H. Beck, pp. 678–679; Cordes, Gerhard (1960): »Alt- und Mittelniederdeutsche Literatur«, in: Wolfgang Stammer (ed.): *Deutsche Philologie im Aufriß*, 2nd, revised ed., Vol. II, Berlin: Erich Schmidt, col. 2473–2519, part. col. 2484–2486; Halbach, Kurt Herbert: »Epik des Mittelalters«, in: Wolfgang Stammer (ed.): *Deutsche Philologie im Aufriß*, 2nd, revised ed., Vol. II, col. 397–684, here 663; Wolff, Ludwig (1980): Art. »Pfaffe Konemann (Könemann)«, in: *Neue Deutsche Biographie* 12, pp. 484–485. Online: <https://www.deutsche-biographie.de/pnd172511461.html#ndbcontent> (last access: 07.11.2025); Beckers, Hartmut (1985): Art. »Könemann von Jerxheim«, in: Kurt Ruh et al. (eds.): *Die deutsche Literatur des Mittelalters. Verfasserlexikon* 5, Berlin/New York: De Gruyter, col. 64–68; Bumke, Joachim (2004): *Geschichte der deutschen Literatur im hohen Mittelalter*, 5th ed., München: DTV, pp. 383–384; Jonta, Johannes (2004): »Orientierung durch volkssprachige Schriftlichkeit (1280/90–1380/90)«, in: Joachim Heinzle (ed.): *Geschichte der deutschen Literatur von den Anfängen bis zum Beginn der Neuzeit*, Vol. III/1, Tübingen: Max Niemeyer, p. 274; Müller, Mario (2011): Art. »Könemann von Jerxheim«, in: Wolfgang Achnitz (ed.): *Deutsches Literatur-Lexikon. Das Mittelalter*, Vol. I: *Das geistliche Schrifttum von den Anfängen bis zum Beginn des 14. Jahrhunderts*. Berlin/New York: De Gruyter, col. 1002–1004.

33 As an in-depth analysis of the manuscript is still pending, the information refers to: Conrad Borchling (1898): »Ueber mittelniederdeutsche Handschriften des nordwestlichen Deutschlands«, in: *Jahrbuch des Vereins für niederdeutsche Sprachforschung/Niederdeutsches Jahrbuch* 23 (1897), pp. 103–124, here p. 115.

34 On Johann Georg Eccard see for example: Wegele, Franz Xaver von (1877): Art. »Eccard, Johann Georg von«, in: *Allgemeine Deutsche Biographie* 5, pp. 627–631. Online: <https://www.deutsche-biographie.de/pnd118958461.html#adbcontent> (last access: 07.11.2025) or Brill, Richard (1959): Art. »Eccard, Johann Georg von«, in: *Neue Deutsche Biographie* 4, pp. 270–271. Online: <https://www.deutsche-biographie.de/pnd118958461.html#ndbcontent> (last access: 07.11.2025).

To date, the only printed edition of *Sunte Marien Wortegarde* was prepared by Ludwig Wolff in 1953. It maintains Hersenius' distinction between the actual vernacular text and the Latin additions.³⁵ Wolff as well understands the red Latin elements as additions that stand out from the black written vernacular text due to their colour and therefore could be skipped, if necessary, when reading *Sunte Marien Wortegarde*. Therefore, he shifted them, like the additions by a second hand, from the vernacular ›main text‹ into the apparatus. His objective is to present a ›cleansed‹ Low German text which he considers to be a later version of an ›original‹ *Sunte Marien Wortegarde*. Assuming that the ›actual‹ *Wurzgarten Mariens* must have been a Middle High German-Middle Low German hybrid version, Wolff interpreted Cod. 153 as evidence of a specific tendency towards Low German forms in the later Middle Ages.³⁶ In the wake of Gustav Roethe's 1899 assertion that a paradigm shift had occurred in the pre-eminence of Middle High German as a literary language in the late 13th century, Wolff's perspective elucidates the role of Low German forms, which had garnered Hersenius' interest, as a manifestation of this transformation.³⁷

The text transmitted uniquely in a 15th century manuscript now appears as a copy that is separated by several—albeit only deduced—intermediate stages from a text written in 1304. Furthermore, the text as a numerical order gains new relevance in Wolff's edition: Following the interpretation of Gustav Roethe that there had been a mix-up of individual layers in one of the intermediate manuscripts,³⁸ which the scribe of Cod. 153 had not noticed (or had noticed too late), thus mistakenly transposing some verses, Wolff rearranges parts of the text according to the presumably correct order. In the manuscript, the confession of man's guilt and repentance for his sins, and Christ's willingness to perform the work of redemption, are followed by a lengthy conversation between Divine Wisdom (*Sapiencia*) and Mercy (*Misericordia*), centred on the question of Mercy, where a woman can be found who can conceive the Son of God. Wisdom responds with lyrical praise of Mary, saying that she has already been found. It is then that the dispute between the four daughters of God finally begins, leading us back to the court assembly.

Although the (proto-)philological annotations and transcriptions by Hersenius and Wolff shape the text in different ways, thereby affecting its coherence and addressability, the descriptive practices of libraries focus on the creation of an authorial text: After the death of Hermann von der Hardt in 1746 his library was be-

35 Wolff, Ludwig (1953): *Die Dichtungen Könemanns. Kaland, Wurzgarten, Reimbibel*, Neumünster: Wachholtz; Könemann's *Sunte Marien Wortegarde* on pp. 125–306.

36 Wolff: »Einleitung«, in: id. (ed.): *Die Dichtungen Könemanns*, pp. 1–68.

37 Ibid., part. pp. 28–29; compare Roethe, Gustav (1899): *Die Reimvorreden des Sachsenspiegels*, Berlin: Weidmannsche Buchhandlung, esp. pp. 29–67, for Könemann's *Sunte Marien Wortegarde* pp. 33, 35–36, and 52–59.

38 Cf. C., »Ueber mittelniederdeutsche Handschriften des nordwestlichen Deutschlands«, p. 118, Ann. 1.

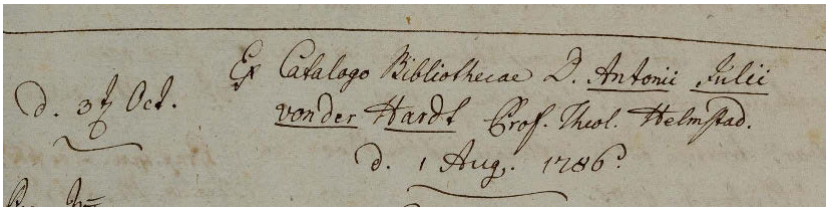
queathed to his nephew Anton Julius von der Hardt.³⁹ After Anton Julius von der Hardt had died, the library was auctioned off in 1786. On this occasion an auction catalogue was published by Paul Jakob Bruns.⁴⁰ This catalogue is a comprehensive index of all books, meticulously organised by language. Cod. 153 was categorised as a Latin manuscript. Furthermore, Bruns organizes the books according to their material (parchment and paper) and format and differentiates them regarding to their contents: manuscripts which mainly contain texts on the Councils of Constance and Basel, manuscripts from Hermann von der Hardt's personal collection on the Council of Basel, ›other‹ writings from the period before and after the 16th century.⁴¹ Cod. 153 is categorised as ›other‹ writings, although it contains texts on the Council of Basel. Hence, what might have particularly interested Hermann von der Hardt about the codex seems to be of secondary importance in the new description of the codex. Bruns' entry lists the texts it contains, using the headings added to the codex by Gerwin and the second hand. A reference to the ›german‹⁴² language and the ›actual‹ date of the composition of the text, February 1304, is added to the title *Sunte Marien Wortgarde*. The other vernacular texts, which lack headings, are simply referred to as »[a]liud poema similis argumenti ead[em]. lingua«⁴³. From this moment on, *Sunte Marien Wortgarde*, written down around the mid-15th century, is regarded as a text from 1304 in the library catalogues.

As indicated in the catalogue of acquisitions and donations of the Göttingen University Library, the library acquired Cod. 153, along with 70 other volumes, from von der Hardt's library and transferred it to its holdings on October 3rd, 1786.⁴⁴ The

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- 39 Cf. Mulzer, Martin (2019): Art. »von der Hardt, Hermann (1660–1746)«, in: WiBiLex, Online: <http://www.bibelwissenschaft.de/stichwort/200104/> (last access: 02.07.2024), no page numbers. For further information on Anton Julius von der Hardt see e.g. Herzog August Bibliothek Wolfenbüttel, Niedersächsisches Ministerium für Wissenschaft und Kunst (2014): Professorenkatalog der Universität Helmstedt. Online: <http://uni-helmstedt.hab.de/index.php?cPage=5&Page=prof&wWidth=1920&wHeight=957&suche1=gnd&pnd1=&muster1=116474734> (last access 03.07.2024).
- 40 Bruns, Paul Jacob (1786): *Catalogus Bibliothecae D. Antonii Iulii von der Hardt Abbatis Michaelsteinensis, Theologiae Et LL. OO. Professoris Publ. Ordin. ... Quae Codicibus Manuscriptis Et Libris Impressis ... Inter Quos Rarissimi Deprehenduntur, Constat In Aedibus b. Possessoris A. D. I August. Etc. Anni MDCCXXXVI Publica Auctionis Lege Dividendae*, Helmstedt: Schnorr. A digitised version of the catalogue can be accessed here: <http://resolver.sub.uni-goettingen.de/purl?PPN646418793> (last access: 03.07.2024). In the catalogue, Cod. 153 can be found on pp. 27–28 no. 123.
- 41 Bruns, Paul Jacob: »Praefatio«, in: id.: *Catalogus Bibliothecae D. Antonii Iulii von der Hardt*, pp. Ir-IIv.
- 42 Bruns: *Catalogus Bibliothecae D. Antonii Iulii von der Hardt*, p. 28.
- 43 Ibid. Translation (ChrK): ›Another poem on a similar subject in the same language.‹
- 44 SUB Göttingen, Manual 1786. Online: <http://resolver.sub.uni-goettingen.de/purl?DE-611-HS-3745123> (last access 03.07.2024), the new acquisitions from the library of Anton Julius von

first cataloguing from Göttingen focuses on the previous owner of the object (Fig. 5), who appears only incidentally in today's descriptions. Therefore, Cod. 153 is included into a list labelled »*Ex Catalogo Bibliothecae D. Antonii Iulii / von der Hardt Prof. Theol. Helmstad d. 1 Aug. 1786* [emphasis in original]«⁴⁵. Furthermore, a reference to the former owner can also be found in Cod. 153. In this manuscript, a hand that is very similar to the one that wrote the entry in the present Cod. 153 in the 1786 manuscript also left a provenance entry on fol. 1v: »*Ex Bibliotheca Ant[onius]. Iul[ius]. van der Hardt. d. Oct. 1786* [emphasis in original].«⁴⁶ In 1786 the reference to von der Hardt constituted the address for Cod. 153 and its texts (Fig. 6).

Fig. 6: Heading on the new acquisitions of the Göttingen University Library from the holdings of Anton Julius von der Hardt.



Although this catalogue mainly focuses on von der Hardt, it also offers information regarding the size and format of Cod. 153. Today's quarto-sized Cod. 153 is described as a folio-sized manuscript (Fig. 7).⁴⁷ This indicates that it might have had another format by the time of acquisition and that the manuscript was trimmed and rebound shortly after its acquisition by the Göttingen University Library, as evidenced by the 18th century cardboard binding in which it is bound today.⁴⁸

der Hardt can be found on pp. 140–148, the 4^o Cod. Ms. theol. 153 p. 141 (with reference to the page and number of the auction catalogue by Bruns (»pag. 27 N^o 123.« (ibid., p. 141)).

45 SUB Göttingen, Manual 1786, p. 140. Furthermore, a reference to the former owner can also be found in Cod. 153. In this manuscript, a hand that is very similar to the one that wrote the entry in the present Cod. 153 in the 1786 manuscript also left a provenance entry on fol. 1v: »*Ex Bibliotheca Ant[onius]. Iul[ius]. van der Hardt. d. Oct. 1786* [emphasis in original].«

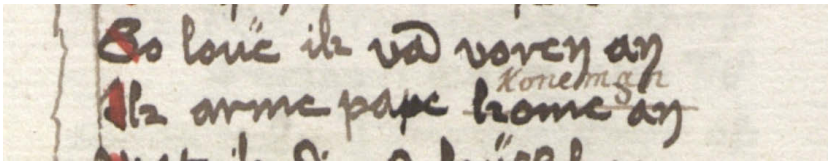
46 Cod. 153, fol. 1v.

47 SUB Göttingen, Manual 1786, p. 141.

48 Haucap-Naß: Der Braunschweiger Stadtschreiber Gerwin, p. 185.

This characterisation of our Codex was changed in 1893, with the reorganisation and re-description of the Göttingen manuscripts by Wilhelm Meyer, who listed the manuscript under the shelfmark *Theol. 153*.⁴⁹ Meyer was the first to date the manuscript to the 15th century and to specify the Latin abbreviation »*german.*«⁵⁰ as late medieval Low German. Accordingly, Meyer lists the poem as *Sunte Marien Wortgarde* and names Könemann as the author: »Der Dichter nennt sich auf Bl. 195b und 210a.«⁵¹ While the name on fol. 210a is written by the very first hand of the manuscript, the author's name on fol. 195va is an addition by a later hand (Fig. 8)—probably by Hersenius and therefore dating back to the 18th century⁵²—, Meyer does not mention this in his description. However, this later addition is also part of what he perceives as the ›text‹ of *Sunte Marien Wortgarde*. In addition, stylistic features are now attributed to the poem that are consistent with this author.⁵³

Fig. 8: Later addition of the name *Koneman* perhaps by Hersenius.



In contrast to the auction catalogue by Bruns, the vernacular texts are now referred to at the beginning of the description and appear as essential parts of the manuscript. This also includes the texts categorised as »*aliud poema*«⁵⁴. They are not only given titles, but missing authors and parallel transmissions are also added where possible. While the texts that follow *Sunte Marien Wortgarde* are now being given their due in terms of literary history, insofar as they are understood as excerpts and testimonies of independent poems, the idea that the ›*Viridarium*‹

49 Meyer, Wilhelm (1893): *Die Handschriften in Göttingen*, Bd. 2: Universitäts-Bibliothek. Geschichte – Karten – Naturwissenschaften – Theologie – Handschriften aus Lüneburg, Berlin: A. Bath, the entry for *Theol. 153* is on pp. 383–385. The following explanations refer to this very description by Meyer.

50 Bruns: *Catalogus Bibliothecae D. Antonii Iulii von der Hardt*, p. 28.

51 Meyer: *Die Handschriften in Göttingen*, p. 384.

52 A comparison with the handwriting of the already mentioned letter by Jacob Christian Hersenius as well as the already discussed one from his copy of *Sunte Marien Wortgarde* shows that this addition of the name was made by Hersenius and therefore dates from the 18th century.

53 Meyer: *Die Handschriften in Göttingen*, p. 384: »Das Gedicht ist wie der ›Kaland‹ Konemann's in Abschnitte mit dreireimigem Schluss getheilt.«

54 Bruns: *Catalogus Bibliothecae D. Antonii Iulii von der Hardt*, p. 28.

and the excerpt section belong together, as seems to be implied by the phrase »*smilis argumenti ead[em]. lingua*«⁵⁵, is abandoned. Similarities and analogies between the vernacular texts of the second half of Cod. 153 are neglected in favour of differentiation, which takes the taxonomy of literary history into account.

Meyer's entry for *Sunte Marien Wortegarde* quotes both the Latin praise of wisdom (referencing the use of red ink) and the first vernacular verse that follows this praise. This shows that, in Meyer's understanding, the Latin and vernacular elements do constitute the »text« of Könemann's *Wortegarde* and that the bilingualism is therefore co-determining for its textuality. The entry is concluded by quotations from the epilogue (giving the vernacular title), the verses from which the time and place of composition emerge, and the *explicit* (again with reference to the red ink for the Latin part), in which the writer names himself. The last eight verses of the text, which Meyer considers to be the writer's verses and thus a later addition to the text, are reported, but they themselves are not quoted. By citing only the beginning and end of the author's text, the boundaries of the text are defined and recorded here for the first time.

4. Into the 20th Century

While Meyer's catalogue was meant for taking inventory of all medieval manuscripts in Göttingen, in Berlin the *Königlich Preussische Akademie der Wissenschaften* initiated a plan in 1903 to establish an archive of descriptions of all German-language medieval manuscripts to counter the lack of knowledge of medieval vernacular manuscripts. In a memorandum classified as secret by Konrad Burdach, Gustav Roethe and Erich Schmidt, the lack of editions of medieval German texts from the years after 1250 was criticised, as well as the lack of knowledge of which manuscripts had been transmitted at all, making it impossible to comprehensively analyse the history of German literature and language. For this reason, it was decided that all vernacular texts, codices, and fragments should be fully catalogued in philological, codicological and literary-historical terms, and the Berlin *Handschriftenarchiv* (in short: HSA) was created alongside the edition series *Deutsche Texte des Mittelalters* (in short: DTM). Both are continued to this day at the *Berlin-Brandenburgische Akademie der Wissenschaften* (short: BBAW).⁵⁶

55 Ibid.

56 Wolf, Jürgen (2007): »Hilfsmittel für die Editionspraxis: Das Handschriftenarchiv der Berlin-Brandenburgischen Akademie der Wissenschaften und der Handschriftencensus«, in: editio 21, pp. 152–168, here pp. 153–154.

In 1903/4 *Grundsätze zur Inventarisierung der deutschen Handschriften des Mittelalters und der frühneuhochdeutschen Zeit*⁵⁷ were published for the HSA, which were re-issued several times until 1944 and served as a template for *Richtlinien zur Handschriftenkatalogisierung der Deutschen Forschungsgemeinschaft*, first published in 1963.⁵⁸ In addition to the shelf mark of the manuscript, the entries should include information on provenance, materiality, palaeography, size and format, page layout and decoration, binding and watermarks. A list of the relevant contents should be made, stating the leaves and citing the beginning and end of each text (*incipit* and *explicit*). Furthermore, headings, marginalia and/or other traces of users should be recorded. Shorter, previously unprinted texts with up to approximately 20 verses should be copied in full. Moreover, there are guidelines on formalities, paper quality—**gute[s], dauerhafte[s] Papier** [emphasis in original] (womöglich [...] amtliche[s] deutsche[s] Normalpapier Qualität IIa)«⁵⁹—and regulations on the use of Latin and German script and ink colour. Also, the corpus relevant for German studies is defined: It includes manuscripts up to about the year 1520 which contain vernacular texts that were considered ›literary‹ in the sense of the 19th/20th century.⁶⁰

57 BBAW, Archive of the DTM, no signature, and Archive of the BBAW, inventory PAW (1812–1945), II-VIII-16, 6–9^R. A new website of the HSA is under construction (<https://handschriftenarchiv.bbaw.de>, last access: 30.04.2025) and does not yet provide any digitised version of these documents. Currently the documents can only be accessed through the web archive of the BBAW, Online: <https://webarchive.bbaw.de/default/2021123094110/http://www.bbaw.de/forschung/dtm/HSA/Grundsaeetze-Inventarisierung.html> (last access: 30.04.2025). Further information on ›Grundsätze zur Inventarisierung‹ by Konrad Burdach and Gustav Roethe, their historical development, and a reprint ›Grundsätze zur Inventarisierung‹ of 1904 can also be found in: Ricke, Anne-Beate (2000): ›Die Inventarisierungsgrundsätze des Handschriftenarchivs der Berlin-Brandenburgischen Akademie der Wissenschaften und ihre Entwicklung‹, in: Becker, Peter Jörg et. al. (eds.): *Scrinium Berolinense. Tilo Brandis zum 65. Geburtstag*, Vol. I, Wiesbaden: Reichert, pp. 425–435, ›Grundsätze zur Inventarisierung‹ are on pp. 426–430. All information and quotes from ›Grundsätze zur Inventarisierung‹ in this paper were taken from the digitised version from 1904, accessible through BBAWs web archive.

58 Schubert, Martin J. (2005): ›Die ›Deutschen Texte des Mittelalters‹ und das ›Handschriftenarchiv‹ seit 1904‹, in: Martin J. Schubert (ed.): *Deutsche Texte des Mittelalters zwischen Handschriftennähe und Rekonstruktion*. Berliner Fachtagung 1.–3. April 2004, Tübingen: Niemeyer, pp. 297–310, here p. 298.

59 Burdach/Roethe: *Grundsätze zur Inventarisierung*, p. 4.

60 This did not include documents, minutes and business records. However, translations, edifying literature, sermons, scientific texts (e.g. law books, cookbooks) as well as letters and texts in poetic speech were included. More recent manuscripts from the period after 1520 should only be included if they contained medieval works or ›schöne Literatur: (Poesie und weltliche erzählende Dichtung)‹ (Burdach/Roethe: *Grundsätze zur Inventarisierung*, p. 1). Religious, historical and scientific prose texts were not included. Of the Latin manuscripts up to the 17th century, only those that transmit texts of (an unspecified) aesthetic standard and

A total of two descriptions of Cod. 153 were produced for the HSA: the first one by Ludwig Pfannmüller (1911)⁶¹, and the second one by Ludwig Wolff (1937)⁶². Since Wolff's description primarily provides additional information regarding watermarks, the layer structure of Cod. 153, and bibliographic references and is therefore classified as an »Ergänzung zu der Beschreibung Pfannmüllers«⁶³ by Wolff himself, I will focus on the older description.

Pfannmüller starts his description of Cod. 153 with »metadata«— shelfmark, information on the age and materiality of the manuscript (15th century paper manuscript) including a sketch of the watermark, the volume (»220 Blätter«⁶⁴), the format and a reference to the two originally independent parts. Furthermore, information on the hands, the binding, the page layout and decoration and the book binding can also be found here. Corresponding to the occasion, the vernacular texts appear prioritised over the Latin texts which Pfannmüller simply refers to as »lat. Prosastücke«⁶⁵. According to the guidelines, these information are written in German script to distinguish it from everything that was taken verbatim from the codex in Latin script. On pp. 2r and 3r, *Sunte Marien Wortegarde* is described and listed as »Konemanns Wurzgarten«⁶⁶ (Fig. 9).

were written in the German-speaking countries or by authors who also wrote in German (e.g. Konrad of Megenberg or Martin Luther) were of interest to the authors of *Grundsätze*. Here, too, religious, historical and scientific prose was only considered for the descriptions if it contained versified passages. Manuscripts in other languages are only included if they contain translations of medieval German texts; Burdach/Roethe: *Grundsätze zur Inventarisierung*, pp. 1–2.

61 Ludwig Pfannmüller (1911): »[Manuscript description of] Göttingen, Staats- und Universitätsbibliothek, 4° Cod. Ms. theol. 153«, in: HSA of the Berlin-Brandenburger Akademie der Wissenschaften. Online: <https://handschriftenarchiv.bbaw.de/id/70034090> (last access: 30.04.2025).

62 Ludwig Wolff (1937): »[Supplementary manuscript description of] Göttingen, Staats- und Universitätsbibliothek, 4° Cod. Ms. theol. 153«, in: HSA of the Berlin-Brandenburger Akademie der Wissenschaften. Online: <https://handschriftenarchiv.bbaw.de/id/70034090> (last access: 30.04.2025).

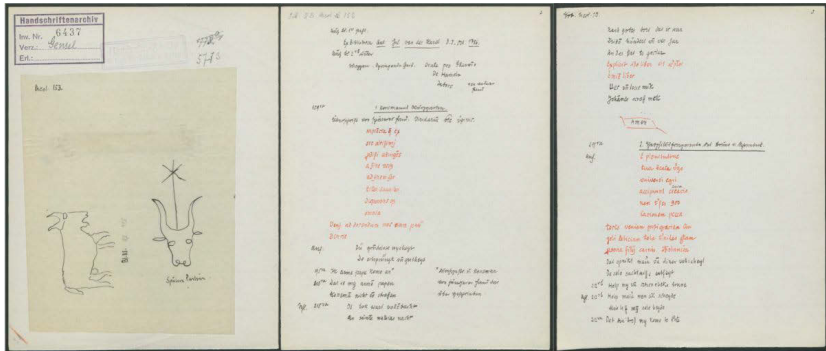
63 Wolff: [Supp. desc. of] Göttingen, Staats- und Universitätsbibliothek, 4° Cod. Ms. theol. 153, p. 1. Due to the supplementary status of Wolff's description, his and Pfannmüller's descriptions of Cod. 153 are now accessible in a single digital file via the HSA, as one can see from the URLs referenced above.

64 Pfannmüller: [Ms. desc. of] Göttingen, Staats- und Universitätsbibliothek, 4° Cod. Ms. theol. 153, p. 2.

65 Ibid., p. 1.

66 Ibid., p. 2.

Fig. 9: Description of the *Sunte Marien Wortegarde* by Ludwig Pfannmüller.



The heading *Viridari[um] b[ea]te [vir]ginis* is labelled as having been inserted by a later hand, as well as the mention of Könemann's name on fol. 195va. Pfannmüller records the text boundaries of *Sunte Marien Wortegarde* in accordance with the guidelines. Although he transcribes the Latin praise of wisdom at the beginning of the text diplomatically and (according to the codex) in red ink, he only marks the two vernacular verses in black ink as »Anf[ang].«⁶⁷ For him, the actual text is the German one, to which the Latin verses are subordinated as accessories. The Latin quotations, which were previously fundamental to the text's identity as a *viridarium*, are now regarded as secondary elements and assigned a subordinate status, akin to paratexts. However, it remains uncertain whether Pfannmüller also ascribes such a paratextual status to the Latin verses contained in *Sunte Marien Wortegarde*, as the description of the manuscript does not explicitly address this point. Looking at the description of the texts that follow *Sunte Marien Wortegarde*, it becomes clear that the Latin entries, which can also be found there, are treated differently: Although all vernacular texts have the interweaving of Latin and Low German elements in common, their status, their belonging to the »text«, is defined differently from one work to another; the guiding factor seems to be a direct reference of the German text to the Latin excerpt.

Pfannmüller also copies the verses in which the date and place of origin and the name of a scribe (»*Johānes screffmek*«⁶⁸) are mentioned, but the following eight verses are not quoted but only indicated by three dots within the description. The »*Amen*«⁶⁹ at the end of the text is copied again and is even framed in red like in the codex. This approach differentiates what is generally referred to as the »writer's verse« from Könemann's text and marks it as an addition. The thus constituted text is a vernacular author's text, from which the Latin material as well as additions by the writer can

67 Ibid.

68 Ibid., p. 3.

69 Ibid.

be distinguished as supplement or addendum. In this form—as a discernible early 14th century Low German poem that can be attributed to a specific author and that has been copied at some point by a scribe named Johannes and incorporated into Cod. 153 in the mid-15th century—the text will enter the literary history of German studies. On the other hand, its status as *viridarium* as a collection of Latin excerpts embellished by a poetic commentary, which responds to the theological elements of the first fascicle and which will be followed by »*fimilis argumenti ead[em]. lingua*«⁷⁰, falls into oblivion.

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70 Bruns: Catalogus Bibliothecae D. Antonii Iulii von der Hardt, p. 28.

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Understanding the System in its Entirety?

Digital Corpora, Language Models and Low Resource Languages

Gabriel Viehhauser

1. Texts from the pre-printing era as epistemic objects in the Digital Humanities

Since the institutionalization of the discipline at the beginning of the millennium, it has become common sense that one of the core tasks of Digital Humanities is not only to use computer-assisted methods to answer research questions from the humanities but also to reflect on their application. In fact, digital philology and digital literary studies (a traditional core area of the Digital Humanities) in particular have produced no shortage of work reflecting on how digital methods can be used meaningfully to do justice to literary objects despite (or precisely because of) the formalization that is inevitable in the computer field.¹ However, it seems that the observation that digitization and methodology also affect the constitution of the objects has been given comparatively fewer consideration.²

The fact that texts are texts not in a ›self-evident‹ way but rather as the results of fundamental conceptualizations of textuality may be more relevant to those fields of literary studies whose objects of investigation are not (or no longer) subject to the paradigms of the print age and modern book production, thus to medieval literary studies (and also more and more in research that focusses on born digital literature). In fact, questions such as how textuality is constituted outside the book medium, how the concept of literature (beyond a differentiated literary industry)

1 Cf. e.g. Reiter, Nils/Pichler, Axel/Kuhn, Jonas (2020): *Reflektierte algorithmische Textanalyse. Interdisziplinäre(s) Arbeiten in der CRETA-Werkstatt*, Berlin/Boston: De Gruyter; the »Debates in the Digital Humanities« series (Online: <https://dhdebates.gc.cuny.edu>, last access: 21.09.2025); or the debate on Da's critique in Da, Nan Z. (2019): »The Computational Case against Computational Literary Studies«, in: *Critical Inquiry* 45, pp. 601–639.

2 Cf. Limpinsel, Mirco (2016): »Was bedeutet die Digitalisierung für den Gegenstand der Literaturwissenschaft?«, in: *Zeitschrift für digitale Geisteswissenschaften*. Online: https://zfdg.de/2016_009 (last access: 21.09.2025).

should be conceived, and how far it stretches (›narrow‹ vs. ›broad concept of literature‹) have been extensively discussed in medieval philology long before the advent of digital technology, because they impose themselves due to the media difference between the manuscript and the print paradigm—even though medieval characteristics such as orality and performance were also overlooked for a long time, mainly because medieval texts were conceived as books, especially in print editions.³

2. Varieties of the virtualization of medieval literature

2.1 Modelling the material text: Facsimiles

However, as has been shown by Lechtermann and Stock, the digital transformation adds a new layer of disruptions in the construction of ›literature‹ and ›text‹ as objects of medieval literary studies.⁴ In the case of pre-modern texts, Lechtermann and Stock observe two contradictory effects of digitalization:⁵ In its first variety, digitization emphasises the material dimension of the text. Digital facsimiles of manuscripts, for example, enable the examination of the materiality of medieval texts and the conduct of meticulous palaeographic and codicological studies of subtle characteristics of handwriting. Compared to the mere lettering of a print edition, they thus open up a view of the material embedding of the text and, to a certain extent, reverse the transformation of the manuscript text into book form brought about by the print paradigm.⁶ But because these facsimiles are always only images and virtual conceptualizations of the codex, not the object itself, they can never comprehensively catch up with the materiality of the manuscript. A digital

3 Cf. e.g. Baisch, Martin (2013): »Textualität – Materialität – Materialität – Textualität. Zugänge zum mittelalterlichen Text.«, in: Literaturwissenschaftliches Jahrbuch 54, pp. 9–30; Strohschneider, Peter (1997): »Situationen des Textes: Okkasionelle Bemerkungen zur ›New Philology‹«, in: Helmut Tervooren/Horst Wenzel (eds.): *Philologie als Textwissenschaft. Alte und neue Horizonte*, Berlin: Schmidt, pp. 62–86; Strohschneider, Peter (1999): »Textualität der mittelalterlichen Literatur: Eine Problemskizze am Beispiel des ›Wartburgkrieges‹«, in: Jan-Dirk Müller/Horst Wenzel (eds.): *Mittelalter: Neue Wege durch einen alten Kontinent*, Stuttgart/Leipzig: Hirzel, p. 19–41; Strohschneider, Peter (2014): *Höfische Textgeschichten. Über Selbstentwürfe vormoderner Literatur*, Heidelberg: Winter.

4 Lechtermann, Christina/Stock, Markus (2020): »Virtuelle Philologie«, in: Dawid Kasprowicz/Stefan Rieger (eds.): *Handbuch Virtualität*. Wiesbaden: Springer, pp. 425–454; Lechtermann, Christina/Stock, Markus (2021): »Virtuelle Textkonstitutionen: Die Philologie und ihre mittelalterlichen Objekte«, in: Stefan Rieger/Armin Schäfer/Anna Tuschling (eds.): *Virtuelle Lebenswelten: Körper – Räume – Affekte*, Berlin/Boston: De Gruyter, pp. 63–86.

5 Lechtermann/Stock: *Virtuelle Textkonstitutionen*, p. 71.

6 For the moment, I will leave aside the fact that manuscripts themselves can in many cases also be second-level representations of texts that were originally intended for oral presentation.

facsimile misses the haptic and other sensory qualities of the codex as an object, and the screen display levels the latter's three-dimensionality.⁷

Thus, facsimiles could be considered models of the text, and it is in the nature of models to highlight certain aspects of reality while reducing others. This reduction is necessary in order to create knowledge and to not get lost in the flood of nuances. Models therefore always serve a specific purpose.⁸

Accordingly, it is precisely the possibility of manipulating the facsimile that separates the virtual from the ›real‹ material object. One example of this would be the ability to change the size of facsimiles as desired, which offers a flexible display for analysis but may also obscure the true dimensions of the manuscript object. In digital repositories, manuscript pages are usually levelled regardless of the actual size of the codices in order to optimize the screen display, so that the sense of different proportions is lost in virtualization.⁹ Although the addition of size specifications or photos with scales theoretically allows for the reconstruction of the ›true‹ proportions, these are not as immediately apparent in the digital form as they are with the analogue object. At repositories the focus is clearly on comparison, on the bigger picture, not on the individuality of the manuscripts (at least at a first glance), even if this material individuality does only come into view and can only be explored by taking the overview as a starting point.

Adjusting the size of a facsimile thus allows for the examination of materiality (e.g. by enlarging a detail of the manuscript page) as well as for its departure from materiality at the same time. The separation of the size-dimensions from the real proportions of the page in virtual space is actually a prerequisite for examining the page when viewing the facsimile and transposing it into different functional contexts. In a similar vein, only the virtual extraction from the codex enables (or at

7 Lechtermann/Stock: *Virtuelle Textkonstitutionen*, p. 76.

8 Cf. the general definition of models in Stachowiak, Herbert (1973): *Allgemeine Modelltheorie*, Wien/New York: Springer. In the theoretical discussion of the Digital Humanities, modelling has been highlighted as the key concept of the discipline, McCarty, Willard (2004): »Modeling: A Study in Words and Meanings«, in: Susan Schreibman/John Unsworth/Ray Siemens (eds.): *A Companion to Digital Humanities*, Oxford: Blackwell, pp. 254–272; Flanders, Julia/Jannidis, Fotis (2018): *The Shape of Data in Digital Humanities. Modeling Texts and Text-based Resources*, London: Taylor and Francis; Piper, Andrew (2017): »Think Small: On Literary Modeling«, in: *PMLA* 132, pp. 651–658.

9 This is particularly true for digital synoptic editions: With digital scholarly editions it has become common practice to offer a digital facsimile of the manuscript page next to the transcribed text. This option is also increasingly available with synoptic editions. However, the size of the facsimiles is determined not by the actual size of the codex but rather by the organizing grid layout that arranges the specific windows for each witness: Thus, all facsimiles appear adjusted to the same size. Since synoptic editions usually serve for line-by-line comparisons of differences between versions, the organizing principle of the online display is the text as a transcription, not the text in its material form.

least facilitates) a comparison between different forms of materiality: Manuscript facsimiles can easily be viewed side by side or even analysed with the help of the computer regarding e.g. different layout designs or other palaeographic or codicological peculiarities.¹⁰ The ability to analyse is achieved precisely by distancing oneself from the manuscript object.

2.2 Modelling between material and semiotic text: Markup

As a second variety, contrary to this first effect of digitization, virtualization may also emphasize a notion of text that can be described as semiotic text:¹¹ In this notion, text is conceived of as a system of characters, abstract from its material and individual concretization. Semiotic texts are produced through the rendering of text in an abstract code, especially in plain text files. However, as has already been seen in the above discussion on the abstractness of facsimiles, it would be too simplistic to map the distinction between material and semiotic text onto that between image and text files. Rather than a strict demarcation, it is a scalable relationship that allows for different degrees of proximity to materiality—or abstractness—when transferring text into code.

This holds true especially since plain text can easily be enriched with markup, as it is the case with XML and the guidelines of the Text Encoding Initiative (TEI).¹² As Patrick Sahle has pointed out, the TEI actually is a hybrid between a material-agnostic abstraction of text and the attempt to retrieve the description of the source document in the encoding.¹³ This hybrid status results from a tension between the fundamental purpose of the TEI to provide a data model for all kinds of electronic texts, regardless of their materiality as well as the nature of their source documents, and the tendency of its users to not only record an abstract structure of the text but rather to document the structural properties of the source.

10 Lechtermann/Stock: *Virtuelle Textkonstitutionen*, p. 75. The spatial reorganization can be seen for instance in the scholarly edition »Welscher Gast Digital« (Šimek, Jakub/Schmidt, Peter/Schneider, Christian (eds.) (2015ff.): *Thomasin von Zerclaere: Welscher Gast. Text-Bild-Edition »Welscher Gast digital«*. Heidelberg: Universitätsbibliothek. Online: <https://doi.org/10.11588/edition.wgd> (last access: 21.09.2025), where all the manuscripts of the transmission that offer pictures or paratext for the same motif of the text can be arranged as a tableau (compare e.g. <https://wgd.materiale-textkulturen.de/illustrationen/motiv.php?m=1>, last access: 21.09.2025). Thus, instead of the syntagmatic arrangement of the linear text, the paradigmatic relations between the witnesses are emphasized.

11 Lechtermann/Stock: *Virtuelle Textkonstitutionen*, p. 76

12 Online: <https://tei-c.org/> (last access: 25.09.2025).

13 Sahle, Patrick (2013): *Digitale Editionsformen. Zum Umgang mit der Überlieferung unter den Bedingungen des Medienwandels*. Norderstedt: BoD, volume 3, pp. 341–390, especially p. 355.

As XML, the TEI-scheme follows the basic principles of descriptive markup.¹⁴ Unlike its counterpart, procedural markup, descriptive markup aims to describe data solely in terms of its structure and does not specify how this data should be implemented or presented. Instructions for presentation are reserved for a separate code layer, which can variably be exchanged due to the separation of encoding and presentation.¹⁵ This is what makes descriptive markup powerful and opens up the possibilities for arbitrary transformation that are typical of the digital world: Data stored in descriptive markups can be presented in various ways, whether as online displays or as printed books, simply by changing the code of the representation layer, and it can even be rearranged into indexes or diagrammatic visualizations. Basically, descriptive markup is agnostic with regard to materiality (even though electronic data always has its own materiality as such). Comprehensive functionality can only be achieved by disregarding and abstracting from the material form. Therefore, as was the case with the scalable facsimiles described above, here descriptive markup demonstrates its model properties: only the reduction of details (in this case, the omission of materiality) enables functionality.

However, this logic appears to be weakened with the actual use of the TEI: Precisely because of the shift in editorial practice towards materiality in recent decades, with most projects the TEI does not only serve for describing the structure of an ideal text but also for describing the properties of the source document or the process of text creation.¹⁶ Especially with digital scholarly editions it is now standard practice for all transcriptions as well as reconstructed texts to be encoded in TEI. Most of the editions also trace at least a basic set of the manuscript characteristics like abbreviations, initial letters and corrections.¹⁷ Thus, even if XML-files might be more distant from the material source object than facsimiles, they can still be geared towards the material text.

In the case of digital editions, shifts in the scale from the semiotic back to the material text arise also from their ability to juxtapose any number of text views or variant readings: While single-text editions in the print paradigm were necessarily dependent on reducing this diversity to an abstract edition text even in the case of rich traditions, because more than one text is difficult to display in a printed book,

14 Ibid., pp. 133–156, also for terminological extensions of the dichotomy.

15 Within a web environment, the layer of descriptive markup usually consists of an HTML code, whereas the presentation layer draws on CSS (for layout) and JavaScript (for functionality).

16 This focus, which was only added to the TEI at a later stage, is also evident in the fact that, shortly after its initial formulation, special interest groups (SIGs) were formed for the encoding of manuscripts and genetic editions, the results of which have now been largely integrated into the TEI; P. Sahlé: *Digitale Editionsformen*, vol. 3, pp. 354–355.

17 To a certain extent TEI allows for encoding both, a material and a semiotic text view, by employing the tag <choice>, by which e.g. abbreviations as well as their expansions can be recorded.

the digital medium fosters the presentation of different text versions that are always individual and usually linked to a specific text carrier. Virtualization thus leads to an archive of a variety of text versions that can eventually also be interesting in terms of their materiality.

Of course, as it was the case with the facsimiles, this materiality can only be modelled in the digital realm, i.e. reproduced only approximately, but this modelling leaves its traces in the code. This means that at least in the case of digital editions also the digitization of text as a string of characters (and not only the rendering of text as facsimile images) does not necessarily lead to complete abstraction, as it tends to do with print media, but very often rather to a more meticulous focus on specific details. One might also say that this kind of text encoding offers a greater consideration of complexity compared to print and thus ultimately a complication of the constitution of the text.

2.3 Models for distant reading: Plain text

However, digital editions and their transcriptions are only one way of text encoding. At the other end of the spectrum there is another variant of digitization that is particularly widespread in digital philology, which actually tends even more towards a semiotic constitution of text and is in some respects diametrically opposed to text encoding using markup. I am referring here to the reproduction of texts in plain text files, which is particularly relevant in the field of text analysis.¹⁸

Digital text analysis usually focuses on large amounts of text, on the macro level. This is at least partly because the most powerful methods of digital text analysis are ultimately statistical and probabilistic in nature. And statistics work particularly well for a large amount of data, not for individual cases.

The best-known approach in this field is distant reading, a concept first introduced in 2000 by Stanford comparative literature scholar Franco Moretti.¹⁹ The starting point for the development of distant reading is provided by Moretti's hard-to-refute observation that the mass of texts that exist in the world is simply too large for any single researcher to read them all. According to a now outdated and, of course, somewhat ironic estimation by Google, fifteen years ago there were exactly 129.864.880 books in the world, a significant portion of which Google wanted to digitize.²⁰ In contrast, it has been suggested that an avid reader can read a maxi-

18 In some markup typologies these texts are also referred to as ›no markup‹ texts; P. Sahle: *Digitale Editionsformen*, vol. 3, p. 152.

19 Moretti, Franco (2000): ›Conjectures on World Literature‹, in: *New Left Review* 1, pp. 54–68.

20 Cf. Taycher, Leonid (2010): *Books of the World, Stand up and Be Counted! All 129,864,880 of you*. Online: <http://booksearch.blogspot.de/2010/08/books-of-world-stand-up-and-be-counted.html> (last access: 21.09.2025).

mum of 10.000 books in their lifetime. This cannot be reconciled; a single person can only ever survey a tiny fraction of the cultural production.

Moretti's answer to this dilemma is well known and quite provocative: since reading more and more books is pointless anyway, Moretti simply recommends stopping reading altogether; or, to put it less bluntly, reading in a different way: instead of close reading, which Moretti considers typical of literary studies, he advocates reading from a distance.²¹ Moretti originally conceived of distant reading as a kind of patchwork research in the course of which, instead of the primary texts, only and exclusively secondary research literature is read. But of course, distant reading is particularly suitable when you have a large amount of digitally available texts that can be evaluated by applying digital methods. And one might say that it was only with the transfer of the distant reading approach to the Digital Humanities that the method really took off.

Of course, and Moretti was aware of this, reading from a distance always entails a loss of accuracy—an effect that ultimately always occurs when you look at the big picture, because you have to neglect the subtleties and idiosyncrasies—there is no other way than to accept this loss:

»If we want to understand the system in its entirety, we must accept losing something. We always pay a price for theoretical knowledge: reality is infinitely rich; concepts are abstract, are poor. But it's precisely this ›poverty‹ that makes it possible to handle them, and therefore to know. This is why less is actually more.«²²

The necessity for abstraction that Moretti calls for is supported not only by a logical-epistemological argument—if there are more books than one can read, one can never know the whole truth—but also by a moral one: For despite this reading gap, literary studies have of course always been practiced, but only by applying a trick, so to speak. And this trick consists of preselecting the number of texts worthy of study by choosing a canon. Close reading can only be practiced if one considers some books to be better or more valuable than others.²³ However, from a postcolonial perspective this leads to undesirable effects, such as that Western literature by white men is at the heart of the canon. Close reading, one might paraphrase, is therefore not only logically wrong but also, to a certain extent, morally wrong.

At this point at the latest it becomes clear that distant reading not only entails a change of the methodological approach but also of the constitution of the object: the individual text is replaced by a system that must be elucidated ›in its entirety‹. Instead of dealing with texts in detail, analyses at the macro level neglect nuances.

21 Moretti: *Conjectures*, p. 57.

22 *Ibid.*, pp. 57–58.

23 *Ibid.*, p. 57.

As a consequence, aesthetic evaluation is less important than the investigation of structural patterns.

In a later essay, which implicitly addresses critical positions towards his distant reading approach, Moretti once again emphasized this shift of focus from individuality to the collective, using Schleiermacher's classical hermeneutics as a foil.²⁴ While Schleiermacher is concerned with understanding text in its individuality, with formal structural patterns in texts being only a means to an end, quantitative hermeneutics bring about a reversal of these relationships, turning hermeneutics, so to speak, from its head to its feet: »computational criticism clearly reverses the hierarchy: conventions matter for us much more than any individual text: they matter as such, unlike what happens in the hermeneutic project.«²⁵

The virtualization of literature in large corpora thus brings along a formalistic approach that is finally justified by Moretti's sociological or even neo-Marxist grounding.²⁶ For him, formal patterns are primarily relevant in terms of elucidating social power relations: »Forms are the abstract of social relationships: so, formal analysis is in its own modest way an analysis of power.«²⁷ Unlike Schleiermacher, Moretti is not concerned with understanding individuality and the author better than she understands herself but rather with understanding conventions and formal patterns, »better than their society ever did.«²⁸ By disregarding the individuality of the texts (and thus ultimately also the material individuality), this third variation of virtualization moves furthest on the scale between ideal and material text towards the pole of abstraction. Its corresponding data format is provided by the markup-less plain text, where the materiality of the source document no longer leaves any traces.

What is particularly striking about Moretti's conception is the metaphor of »entireness« and the claim to completeness that seems to be associated with it. In the critical debate surrounding Moretti and the distant reading approaches that followed him, objections to such a claim to completeness soon arose. Jeremy Rosen e.g. contested »that it ought to be a goal of scholarship ›to say with any certainty what

24 Moretti, Franco (2017): »Patterns and Interpretation«, in: Pamphlets of the Stanford Literary Lab 15, pp. 1–10.

25 Ibid., p. 7.

26 Moretti also points out that this results not only in a shift of method but also of the subject of literary studies—from the individual text to a collective, abstract corpus that has no meaning in itself, only formal traces that have been socially attached to it, cf. *ibid.*, p. 1. On the embedding of Moretti's concept in the tradition of the sociology of literature cf. Underwood, Ted (2017): »A Genealogy of Distant Reading«, in: Digital Humanities Quarterly 11. Online: <http://www.digitalhumanities.org/dhq/vol/11/2/000317/000317.html> (last access: 21.09.2025).

27 Moretti: *Conjectures*, p. 66.

28 Moretti: *Patterns*, p. 8.

contemporary cultural production as a *whole* looks like [...], in other words, that analyzing more texts, or even, in a fantastic scenario, everything produced in a given moment, would be necessary or desirable even if it were possible;²⁹ And even if Ted Underwood argues that the notion that distant reading entails the construction of a »database that includes »everything that has been said and thought« is but a cliché and that Moretti in his initial conceptions actually was aware that »entirety« can only be approximated by way of samples,³⁰ I agree with Kathrin Bode that the idea of completeness in the field of distant reading has long been virulent and still leaves its mark.³¹

In a 2016 »pamphlet« from the Stanford literary lab on the relation between the archive and the canon e.g. Mark Algee-Hewitt et al. discern three »preliminary notions«: the published, the archive and the corpus.³² And they continue:

»The first is simple: it's the totality of the books that have been published (the plays that have been acted, the poems that have been recited, and so on). This literature that has become »public« is the fundamental horizon of all quantitative work (though of course its borders are fuzzy, and may be expanded to include books written but kept in a drawer, or rejected by publishers, etc.). The archive is for its part that portion of published literature that has been preserved—in libraries and elsewhere—and that is now being increasingly digitized. The corpus, finally, is that portion of the archive that is selected, for one reason or another, in order to pursue a specific research project. The corpus is thus smaller than the archive, which is smaller than the published: like three Russian dolls, fitting neatly into one another.«³³

The entirety appears graded here and bound to publication, but »the totality of the books« is still the goal, as is the convergence of the three spheres that seems to be in reach with digitization:

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- 29 Rosen, Jeremy (2011): »Combining Close and Distant, or, the Utility of Genre Analysis. A Response to Matthew Wilkens's »Contemporary Fiction by the Numbers«, in: Post45. Online: <https://post45.org/2011/12/combining-close-and-distant-or-the-utility-of-genre-analysis-a-response-to-matthew-wilkenss-contemporary-fiction-by-the-numbers/> (last access: 21.09.2025).
- 30 Underwood, Ted (2015): A dataset for distant-reading literature in English, 1700–1922, in: The Stone and the Shell. Online: <https://tedunderwood.com/2015/08/07/a-dataset-for-distant-reading-literature-in-english-1700-1922/> (last access: 21.09.2025).
- 31 Bode, Katherine (2017): »The Equivalence of »Close« and »Distant« Reading. Or, Toward a New Object for Data-Rich Literary History«, in: Modern Language Quarterly 78, pp. 77–106.
- 32 Algee-Hewitt, Mark et al. (2016): »Canon/Archive. Large-scale Dynamics in the Literary Field«, in: Pamphlets of the Stanford Literary Lab 11, pp. 1–13, here p. 3.
- 33 Ibid., p. 3.

»But with digital technology, the relationship between the three layers has changed: the corpus of a project can now easily be (almost) as large as the archive, while the archive is itself becoming – at least for modern times – (almost) as large as all of published literature. When we use the term ›archive‹, what we have in mind is precisely this potential convergence of the three layers into one; into that ›total history of literature‹, to borrow an expression from the *Annales*, that used to be a mirage, and may soon be reality.«³⁴

As the fuzzy borders of books in a drawer or those rejected by publishers might reveal (that also resist the neat fit of the three dolls, since the sphere of the archive can sometimes be larger or simply structured differently from the sphere of the published books), this model of literature appears to be organized around the unit of the printed book, publication processes and other notions connected to the print paradigm. This raises the question of the extent to which it can be transferred to the pre-print conditions underlying medieval literature. To answer this question, it seems advisable to examine the infrastructures that contain digital corpora or the digital archive of medieval literature.

3. Infrastructures for a distant reading of medieval texts

3.1 Counting medieval texts

One of these infrastructures, which holds digital texts for analysis, is the *Mittelhochdeutsche Begriffsdatenbank* (MHDBDB, Middle High German Conceptual Database), a tremendously worthwhile pioneering project that has existed since the 1970s and offers a somewhat comprehensive collection of medieval German texts.³⁵ The version of the database that has been online for many years contained exactly 666 texts.³⁶ The database has been redesigned for several years but this redesign has never progressed beyond beta status. In the course of the relaunch, a few duplicates have been removed, and the beta version now holds 664 entries.³⁷ In the meanwhile,

34 Ibid, p.3. In the following the authors concede that this is just a theoretical conception that cannot be easily put into practice because the sampling of digital archives is heterogenous. But this does not seem to affect the foundations of the model of the three spheres that converge into one total archive and a ›total history of literature‹.

35 Zepezauer-Wachauer, Katharina (2022): »50 Jahre Mittelhochdeutsche Begriffsdatenbank (MHDBDB). Eine Jubiläums-Zeitreise zwischen Lochkarten, Pixel-Drachen, relationaler Datenbank und Graphdaten«, in: Elisabeth Lienert et al. (eds.): *Digitale Mediävistik. Perspektiven der Digital Humanities für die Altgermanistik*. Oldenburg: BmE, pp. 161–86. Online: <https://doi.org/10.25619/BME20223203> (last access: 21.09.2025).

36 Online: <https://mhdbdb-old.sbg.ac.at/> (last access: 21.09.2025).

37 Online: <https://mhdbdb.sbg.ac.at> (last access: 21.09.2025).

a Github repository has been published, where the 666 texts of the older version can be retrieved in plain text or in TEI encoding.³⁸

These differences in numbers alone reveal that the relationship between the database and Moretti's totality appears to be not a straightforward one. The question that has been bothering me for a long time, therefore, is this one: Is this the system in its entirety of medieval German literature that Moretti speaks of? Is the MHDBDB as complete as Moretti envisions or does it at least come close to representing a population, the convergence of published and archived texts?

Lechtermann and Stock have pointed out that medieval German texts could, in some respects, actually be a very rewarding data corpus because the velocity of the data volume is relatively low.³⁹ Today, new medieval German texts are simply no longer being produced, except perhaps in the private closets of fanatical philologists. The number of medieval German texts is therefore, in principle, at least limited. However, we will never have all medieval German texts, because some of the texts have been lost in the process of manuscript transmission. Conversely, the limited corpus of medieval German manuscripts could grow precisely because originally lost texts reappear through new manuscript discoveries. But this growth will be marginal.

Thus, one should basically be able to count the number of all medieval German texts. But of course, since medieval German texts are not bound to books, not only the question arises of what is a medieval German text but rather: what is *one* text?

In the context of medieval literature, for example, it is a problem of conceptualization whether each handwritten manifestation of a text should be counted as a separate text or whether the tradition of sometimes more or less divergent text versions should be aggregated into one single work. In the MHDBDB, for instance, four versions of the *Nibelungenlied* are included: The *Nibelungenlied* according to manuscripts A, B and C, but also according to the edition of Bartsch and de Boor, which is based on a mixture of the B and the C text.⁴⁰

The texts of the manuscripts of the *Nibelungenlied* differ in quite a few rather decisive variants, but still there are far ranges of text that are similar. Would it pro-

38 Online: <https://github.com/Middle-High-German-Conceptual-Database> (last access: 21.09.2025).

39 Cf. Lechtermann/Stock: *Virtuelle Philologie*, p. 437.

40 However, it seems that this does not result from an increased sensitivity to the medieval transmission but rather, quite pragmatically, from the availability of the manuscript texts in digitized printed editions, as revealed by other comparable cases of texts that are also transmitted in multiple manuscripts but not represented in such a variety in the database. Not least due to the prominence of the *Nibelungenlied*, the text of manuscripts A, B and C have all been published in such print editions. For a reference of the used editions see the text list of the MHDBDB under <https://mhdbdb-old.sbg.ac.at/mhdbdb/App?action=TextList> (last access: 21.09.2025).

vide a more concise picture of the totality of literature to include each version of the text in a corpus for distant reading, or would that privilege a canonical text over more sparsely transmitted texts? In a frequency analysis of words in texts of the time around 1200 e.g. terms that are typical for the *Nibelungenlied* would be counted four times and skew the results, the same would be true for a descriptive statistic of how many texts were written around that time. But if one includes only one version of the *Nibelungenlied*, which one should it be?

The question of what should be regarded as a (separate) text is also difficult across genres. This is illustrated for example by the pragmatic classification of texts in the MHDBDB: longer novels and chronicles are generally considered to be one text, but short stories are often aggregated into text corpora which are usually organized by author name and counted as one entry in the total of 664 to 666 texts. The situation becomes even more difficult with lyric, because here it is often difficult to say whether different stanzas belong to one song or not. In line with the phenomenon of *mouvance*, the relative instability of verse groups in the tradition, stanzas are sometimes attributed to different songs or even authors in different manuscripts.⁴¹ Unlike in the print era, there are no clear conventions for how verse groups are graphically marked in manuscripts, and the lack of such a clear demarcation is also in accordance with the medieval performance practice, in which stanzas could presumably be freely restructured. The MHDBDB solves this problem in a very pragmatic way, by not recording individual songs but rather aggregating the poetic production and assigning it to an author.

But even with longer texts the equation ›one data record equals one text‹ does not always hold true. For example, the very extensive *Prosa-Lancelot* is divided into three files, obviously primarily for pragmatic reasons. The *Prosa-Lancelot* thus accounts for three of the entries of the MHDBDB. And even for longer texts, the tradition poses pitfalls for assessing the question of text constitution and separation: well-known cases include the formally different texts *Nibelungenlied* and *Nibelungenklage*, which are consistently preserved together in the manuscripts, or the *Mantel*, which replaces the probably lost prologue to Hartmann's of Aue *Erec* in the only complete manuscript.

The second problem with delimitating the ›totality of medieval German literature‹ is that even Middle High German itself is not a clearly defined concept. The MHDBDB contains texts from the 11th to the 16th century, i.e. from a period that encompasses much more than what is considered Middle High German in linguistic history classifications. During this period the German language changed quite significantly, but of course continuously. So, there is no point at which one could say

41 Zumthor, Paul (1984): *La Poésie et la voix dans la civilisation médiévale*, Paris: Presses universitaires de France.

that some texts are still Middle High German and some texts are not. In addition, the language is not orthographically standardized and varies from region to region.

3.2 Exploration of the database

Leaving aside the question of what a complete collection of Middle High German literature might look like in general, it is quite obvious that, despite its impressive size, the MHDBDB can only offer a selection of medieval German literature. In the terminology of Algee-Hewitt et al. it represents an archive or, so to speak, the second layer of the Russian doll.

Unlike in a library, i.e. a ›real‹ archive, the texts in the virtual database are deprived of their object qualities. E.g. the size of the corpus can initially only be estimated based on the number of database entries, but as explained above, counting the entries is not without problems. If you have texts in book form, you can estimate the length of a text based on the size and thickness of the book. This can sometimes be misleading, as text editions can vary in format and density of printing or include paratext. And, of course, it is even more misleading in the case of medieval literature, since book editions are only derivatives of manuscripts (which in turn are partly derivatives of oral practices). But if you disregard this inaccuracy, you get a rough idea of the length of the text in analog form. It is of course unlikely that a single researcher has seen all medieval German texts at one library or even anywhere near as many as there are in the MHDBDB. But it is very likely that she has seen individual texts side by side and already has a sense of the proportions. With the digital repository it is almost the opposite: Theoretically, you have all the texts at a glance, but the entries reveal nothing about the length of the text. The file size would provide a rough indication or, more precisely, the number of words contained in a text file. However, simply listing the numbers would not provide clarity with such a large corpus, since the number of data points is simply too large; only the presentation of the numerical ratios in a diagram provides an intuitive ›feel‹. In the virtual world, diagrammatic visualizations serve as surrogates for lost sensory quality.

Fig. 1: Word count of all texts of the MHDDB in chronological order.

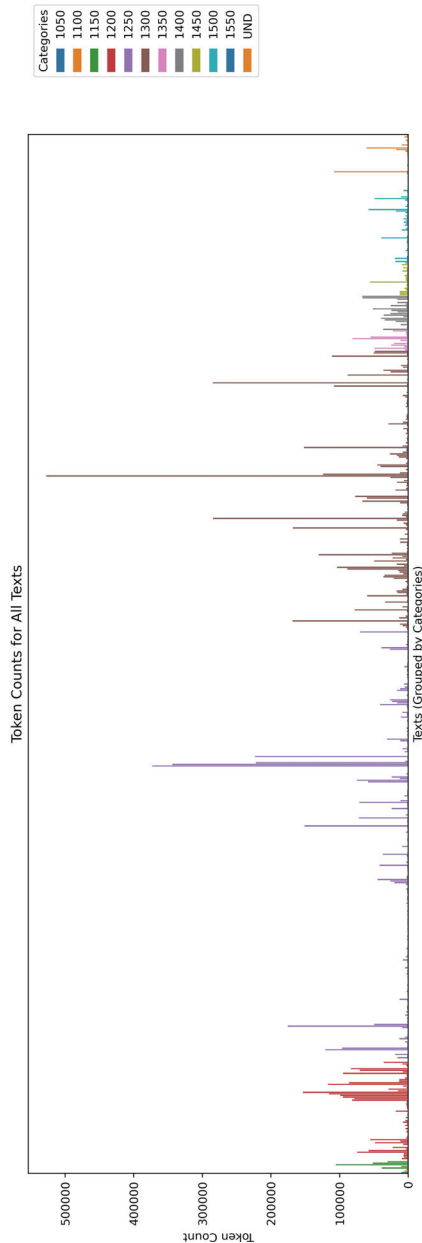


Figure 1 shows a barplot of the word count of all the texts in the database. The texts are distributed on the x-axis according to temporal bins, covering timespans of 50 years. Thus, the x-axis builds an approximate timeline, with older texts to the left and more recent texts tending to the right, while the height of the bar indicates the text size in tokens. However, a chronological division presents the next problem with classifying the corpus: In the case of medieval German literature, such a division can once again only be done imprecisely, because a large part of the pre-modern texts are not provided with an exact date in their transmitting manuscripts, but this can only be deduced secondarily, for example from references and allusions in the text. This means that many of these data are also controversial in research. Nevertheless, I have attempted to divide the texts into approximately 50-year periods, which I have compared with relevant encyclopedias such as the *Verfasserlexikon*.⁴² Texts that offer no clues at all as to their chronological classification have been placed in a separate group (UND, for undefined). These are shown on the far right of the diagram.

What immediately catches the eye with the diagram is the fact that the length of the texts varies greatly. Texts with only a few tokens are juxtaposed with those with up to more than 500.000 tokens.

Fig. 2: Distribution of the Token count in the MHDBDB

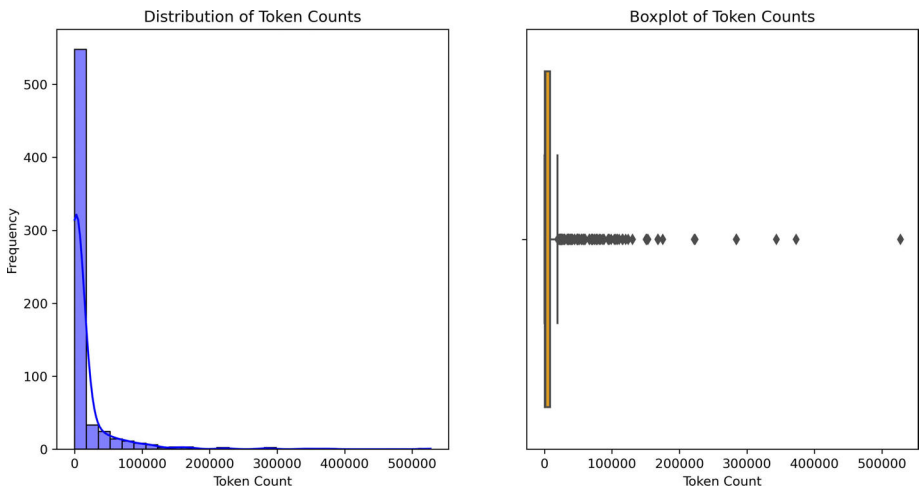


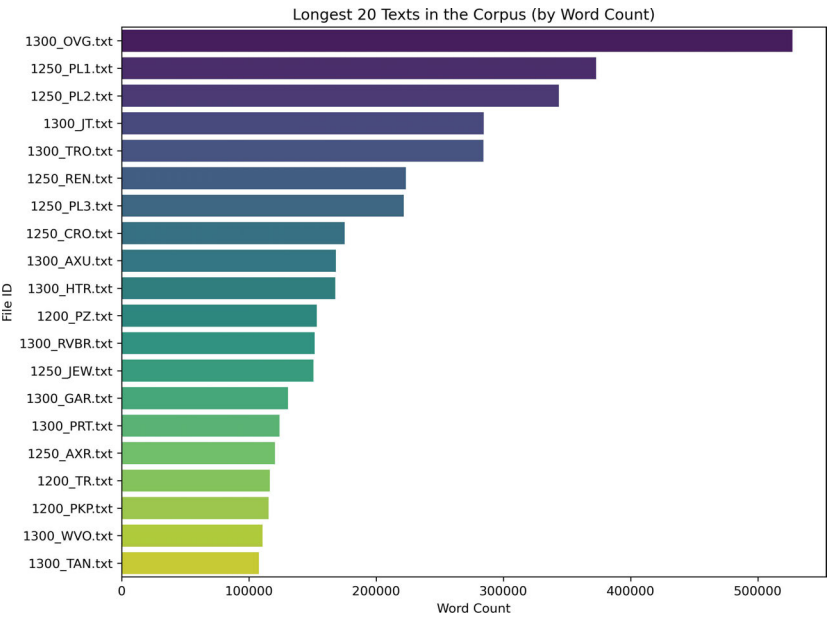
Figure 2 provides two plots that offer a more detailed picture of the distribution. As can be seen on the left, a vast majority of 548 texts belong to the first bin

42 Ruh, Kurt et al. (eds.) (1978ff.): *Die deutsche Literatur des Mittelalters. Verfasserlexikon*. 2nd, revised edition, Berlin/New York: De Gruyter.

that ranges from 51 tokens (the size of the smallest text in the corpus) to 17.625 tokens. A similar picture can be seen in the boxplot. The average count for all texts is 15.172 tokens, but deviations are extremely high, ranging up to 527.245 tokens for the longest text.

Figure 3 shows the 20 most extensive texts of the corpus.⁴³ Rank 1 is Ottokar's *Steirische Reimchronik*, but positions 2, 3 and 7 are held by the above-mentioned parts of the *Prosa-Lancelot* that was split up in the MHDDB. If all three parts were combined, the text would encompass 938.283 tokens and stand out from the other texts even more than the *Reimchronik*.

Fig. 3: The 20 most extensive texts of the corpus

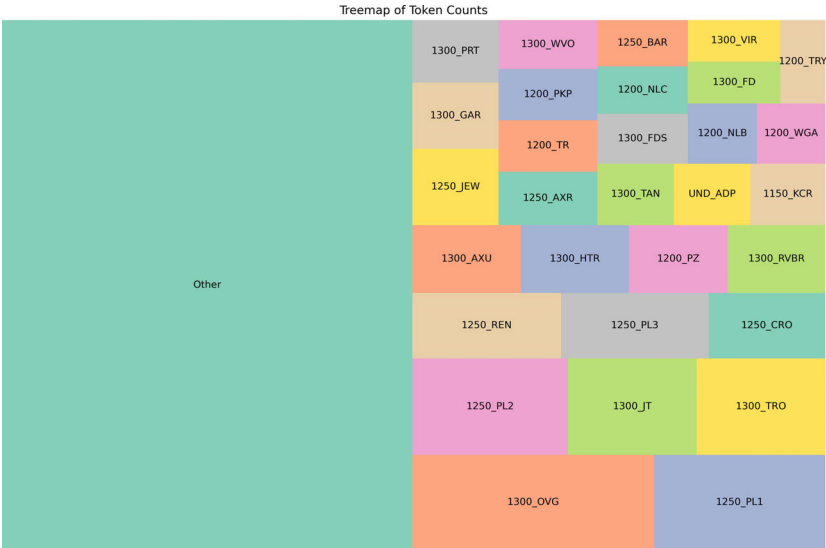


Finally, the treemap in Figure 4 shows how much the proportions are distorted by just a few texts, revealing that the first 30 texts account for half of the entire corpus.⁴⁴

43 The file names are drawn from the short references of the MHDDB, preceded by the first year of the time bin they have been sorted into. The resolution of these abbreviations (which are not relevant in my context) can be done by help of the MHDDB text list at <https://mhd bdb-old.sbg.ac.at/mhd bdb/App?action=TextList> (last access: 21.09.2025).

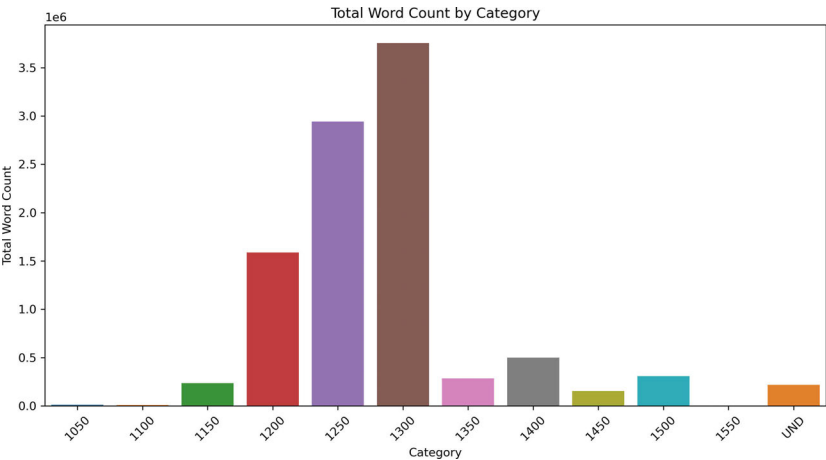
44 The diagram visualizes the single texts as rectangles that are sized according to the token count. As can be seen, two of the versions of the *Nibelungenlied* mentioned above are also among these thirty texts (NLB and NLC), which makes the problem of their multiple versions particularly acute.

Fig. 4: Treemap of size relations in the corpus.



However, this is not the only imbalance of the corpus. If we aggregate the texts from the individual periods over 50 years, it becomes apparent that some of these periods are very poorly represented, whereas others make up a large part of the corpus, as can be seen in Figure 5.

Fig. 5: Number of Tokens by 50-year periods.



As can be seen, the MHDBDB has a clear focus on the period from 1200 to 1350.⁴⁵ However, it cannot be expected that the balance of the corpus will improve significantly by adding more and more texts. For some periods there are simply not enough texts available to close the gap. In addition, the problem of the great heterogeneity of the corpus would persist or even increase, as it is not possible to ensure uniformity when adding new texts.

Thus, if one wants to examine the ›system in its entirety‹ by drawing on more and more texts, one will soon notice that necessarily this system shows a degree of imbalance and is dominated by certain texts and eras. This becomes particularly clear when we have a relatively small corpus at our disposal, such as medieval German.

Such a distortion of the archive does not mean, of course, that analyses based on the material are fundamentally impossible. What is required is a skilful selection of the corpus from the archive, according to the model of Algee Hewitt et al., the transition from the second to the third layer.⁴⁶ However, any selection leads to a restriction of the data material which may cause problems in languages such as Middle High German, where the amount of data is ultimately limited.

These problems are likely to become particularly relevant when looking at the latest developments in natural language processing towards large language models. The decisive breakthroughs of recent years, which have enabled computers to generate meaningful texts or translate into other languages, for example, are ultimately based on the shift in computational linguistics toward distributional semantics and the representation of words in word embeddings. Distributional semantics is based on the assumption that the meaning of a word does not arise from the word itself but from the context within which it appears.⁴⁷ For example, if the word ›bank‹ is surrounded by many expressions from the financial sector, then it is likely to refer to the financial institution. If there are many words referring to nature in the vicinity of the word, then the meaning is likely to be that of a landscape feature.

These contextual probabilities can also be expressed as numerical values and packed into vectors, i.e. series of numbers that characterize words as embeddings and can also be used for calculations. This allows for a surprisingly good modeling

45 This may be due to the original focus on ›Middle High German‹ evident in the title of the database, as this would be the period for which this language stage can actually be roughly estimated.

46 In corpus linguistics the problem of distortion is counteracted by creating balanced corpora. One such balanced corpus is the Middle High German Reference Corpus, currently the second largest resource for medieval German literature (Online: <https://www.linguistics.rub.de/rem/index.html>, last access 21.09.2025). However, the necessary reduction means that the corpus is significantly smaller than the MHDBDB (2 million tokens compared to approx. 10 million), and not all texts of literary significance can be included.

47 Cf. Lenci, Allesandro/Sahlgren, Magnuns (2023): *Distributional Semantics*. Cambridge et al.: Cambridge University Press.

of deeper text meanings that go beyond the explicit surface of the text. However, to calculate these context probabilities with any degree of stability, a great deal of data is required.

Even though modern language models offer the possibility of transfer learning and the fine-tuning of existing models, the amount of data plays a decisive role, which is why one would not want to further limit the text basis. A corpus philology that makes use of these methods therefore cannot always afford to constrain itself to certain domains (like genres or epochs) that are too finely subdivided. With the embedding model, texts of all kinds are mixed together; who wrote them is irrelevant, they lose their author signature and become training material of equal rank. This represents the highest level of abstraction: not only do these texts lose their connection to a specific, individual carrier, but as semiotic texts they are no longer relevant in their individuality, but only as components of the corpus.

However, this circumstance seems to be much more precarious for a text corpus such as medieval German, for which only small amounts of text and thus training data are available, than for modern languages, where much more extensive data sets can be drawn upon. I will attempt to demonstrate this by referring to a few experiments with word embeddings that I have conducted for Middle High German. Specifically, I trained a token-based embedding model on the MHDBDB corpus using the Word2Vec method. Word2Vec is a simplified method for creating word embeddings that was developed by Google in 2013.⁴⁸

Even training such a model, which is still quite basic compared to today's LLMs, requires extensive data sets, which raises the question of whether what we have in the MHDBDB, for example, is sufficient for creating such a model in a valid way. The database encompasses approximately 10.000.000 tokens, which is not insignificant, but it must be borne in mind that, as already mentioned, the MHDBDB contains a wide variety of texts, some of which represent different levels of German and may exhibit dialectal peculiarities. The training material is therefore by no means as uniform as it would be in the case of modern languages.

Nevertheless, at a first glance it seems possible to generate a reasonably useful model.⁴⁹ Once a Word2Vec model is created, one can approximate the similarity of words by comparing their embedding vectors, and also perform calculations with

48 Cf. Mikolov, Tomas et al. (2013): »Efficient Estimation of Word Representations in Vector Space«, in: 1st International Conference on Learning Representations, ICLR 2013, Scottsdale, Arizona, USA, May 2–4. Workshop Track Proceedings, pp. 1–12. Online: <https://arxiv.org/pdf/1301.3781.pdf> (last access: 21.09.2025). See for an introduction also Schumacher, Mareike (2023): »word2vec«, in: forTEXT. Literatur digital erforschen. Online: <https://fortext.net/routinen/methoden/word2vec-1> (last access: 21.09.2025).

49 Cf. Viehhauser, Gabriel (2024): »Digitale Methoden für die Altgermanistik. Eine exemplarische Bestandsaufnahme«, in: Literaturwissenschaftliches Jahrbuch 65, pp. 9–60. Online: <https://doi.org/10.3790/ljb.2024.1445301> (last access: 21.09.2025).

these vectors. In most models of natural language texts, subtracting the vector of the word ›man‹ from the vector of the word ›king‹ and adding the vector of the word ›woman‹ results in a vector that is closest to the vector of the word ›queen‹. Such a calculation obviously also works for a model trained on the MHDBDB. Table 1 lists the ten words that show the highest vector similarity to the result of the calculation *küninc + vrouwe – man*, and indeed, the vector of *küninginne* is in first place.

Table 1: most similar words to the vector calculation *küninc + vrouwe – man*

küninginne	0.64
juncvrouwe	0.58
tohter	0.53
küningîn	0.51
Gezogenfiche	0.48
Herzogîn	0.46
Maget	0.46
Keiserinne	0.44
Neve	0.44
Swester	0.43

However, further exploration of the model has revealed that the embeddings only work well for words that occur with reasonably high frequency in the already relatively small and heterogeneous corpus. The representations for words that occur less frequently are far less stable. I therefore endeavoured to expand the corpus with additional digital texts and trained new models on this expanded corpus. However, the surprising effect that occurred was that at a first glance, some of the models did not appear to have improved but rather had become worse. For example, after adding some texts from Digitales Mittelhochdeutsches Textarchiv,⁵⁰ the Word2Vec model was no longer able to ›correctly‹ calculate the equation ›king‹ minus ›man‹ plus ›woman‹ because the word ›juncvrouwe‹ had overtaken the word ›küniginne‹ in the ranking.

At the same time, however, the question immediately arises: Can one say that this model is wrong at all? Or does it simply reflect the semantic relationships that come to the fore when less canonical texts are fed into the corpus? Perhaps in the semantic reality of these texts, ›king‹ does not behave in relation to ›man‹ in the

50 Online: <http://www.mhgt.uni-trier.de/> (last accessed 21.09.2025).

same way as ›queen‹ does in relation to ›woman‹, but rather in the same way as ›juncvrouwe‹ does in relation to ›woman‹. Once again, the question arises of what the ›totality of texts‹ would look like for medieval German texts: The MHDDBD tends to focus on literature in the emphatic sense, especially courtly literature of the 13th and 14th centuries. A logical extension of the textual material could be, for example, the inclusion of more religious texts (e.g. legends of saints, which are only comparatively sparsely represented in the database) or even *Gebrauchstexte* (such as charters, that are available in large numbers at the monasterium.net archive),⁵¹ but it seems quite clear that such a shift of the domain would lead to totally different results in the conception and analysis of a possible ›system in its entirety‹. At least for medieval texts, the ›preliminary notion‹ of the totality of ›published literature‹ seems to be not as simple, as Algee-Hewitt et al. suggest.

4. Conclusion: On the adequacy of virtual models

As has been seen, the virtualization of medieval texts can lead to a wide range of effects that can be sorted along a scale that ranges from notions of a more concrete, material text to a more abstract, ideal text. Virtual reconstructions always—and necessarily—miss their subject, they are models of texts rather than these texts themselves. Even facsimiles, which are photographically exact reproductions of the material text carrier, are not limited to the depiction of the source document but are entities with their own functionality precisely because of their difference from this text carrier. The same holds true in more evident cases such as the conception of texts in large corpora. Here, the license to abstraction and to neglect details is particularly strong. In the macro perspective, the individual text is not important or at least not important in all its details.

Nevertheless, it seems crucial to me not to overlook the fact that these virtualizations, despite their oblivion of detail, also have a strong claim to tell the truth about literature, in a similar way as a facsimile brings with it the promise of representing the original text of the manuscript. Lechtermann and Stock have pointed out that behind every editorial reproduction of a medieval text there is a promise of authenticity which consists of claiming to reproduce the text correctly, even though this reproduction does not take place in the original form of the manuscript.⁵² The edited text is *the* text or should be the text itself, even if it was originally transmitted differently.

51 Online: <https://www.icar-us.eu/cooperation/online-portals/monasterium-net/> (last accessed 21.09.2025).

52 Lechtermann/Stock: *Virtuelle Textkonstitutionen*, p. 69.

In the case of plain texts in text corpora it seems to me that a promise of authenticity also comes into play, albeit in a less explicit form than is the case with edited texts. The digital texts from the MHDDB do not blatantly proclaim their authenticity. In fact, some of the text editions the database builds on are from editions that would now be considered outdated and no longer authentic. On the contrary, the compilation of texts is primarily pragmatic in nature, as the operators of the database would readily admit.

When conducting text mining on these texts, complete authenticity is not essential. As explained above, a macro-perspective, distant reading analysis is not overly concerned with detail anyway, so a degree of vagueness can be tolerated; the focus is on the big picture. As the example of the *Nibelungenlied* has shown, taking into account nuances in the history of transmission and text variants can even lead to difficulties that might distort the statistical findings.

Thus, the fact that macro analyses do not take into account all the details cannot be blamed on them. In many cases it is precisely the distance of the model that produces a clearer picture.⁵³ The more critical question would rather be if the model is actually appropriate for the domain on the one hand and whether the modelling does not unconsciously make claims to authenticity that are not clarified.

In this regard, it seems to me that empirical evaluation brings a claim to truth or authenticity back into play which culminates in Moretti's idea of »understanding the system in its entirety« (see above): only if you have all the texts, or at least large quantities of them, can you finally learn the truth about literature, and in particular about literature that does not belong to the canon. As I have tried to show, this notion seems to be driven inherently by a book paradigm and therefore is not easily applicable to medieval literature, because of the specific textuality of its texts, but also because of the limited scope of the medieval corpus that fray into different domains that are not easy to set off against each other. The greatest infrastructural challenge would be to combine the extremely abstract textual concept of digital corpora with the concrete handwritten manifestations of text versions of medieval texts.

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53 Cf. in a similar vein Underwood, Ted (2016): »The real problem with distant reading«, in: The stone and the shell. Online: <https://tedunderwood.com/2016/05/29/the-real-problem-with-distant-reading/> (last access: 21.09.2025).

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Wikipedia

Opportunities for an Infrastructure of Knowledge

Henrike Haug

1. Introduction

A conference on infrastructures of (non-)knowledge invites to considering some ideas on how to engage with Wikipedia from the perspective of an art historian. Thereby, the *opportunities* mentioned in the title do not focus on the *raison d'être* of the free encyclopedia, nor—as so often—on whether one should be ›allowed‹ to use the content found there, if this information can be considered ›credible‹ or on how one must approach this project of ›non-specialists‹. Rather, the *opportunities* take up a critical question from the article »Eine vertane Chance? Wikipedia und die Geisteswissenschaften« by Gleb Albert, published in 2021 to mark the 20th anniversary of the project launched in 2001.¹ Albert asks »why, in fact«, academics (hereinafter referred to as *we*) persist on their reluctance to use the platforms offered by the Wikiverse (including Wikipedia and other sister projects, such as Wikidata, Wikisource, Open GLAM, etc.)² to publish new results from their research.³

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- 1 Albert, Gleb (2021): »Eine vertane Chance? Wikipedia und die Geisteswissenschaften«, in: Geschichte der Gegenwart. Online: <https://geschichtedergegenwart.ch/eine-vertane-chance-wikipedia-und-die-geisteswissenschaften/> (last access: 10.06.2025). German Wikipedia was founded two months after English Wikipedia, cf. https://de.wikipedia.org/wiki/Deutschsprachige_Wikipedia (last access: 10.06.2025); with more than 3 million articles (increasing), the project is significantly more comprehensive than, for example, the *Brockhaus Encyclopedia*, which in its last, the 21st edition of 2014, comprised around 300,000 lemmata in 30 volumes, or (just for comparison) the 35-volume *Encyclopédie ou Dictionnaire raisonné des sciences, des arts et des métiers* with 70,000 entries, cf. <https://www.goethe.de/prj/zei/de/art/24771010.html> (last access: 10.06.2025); for the prehistory of Wikipedia, cf. Richter, Pavel (2020): *Die Wikipedia-Story. Biografie eines Weltwunders*, Frankfurt a.M./New York: Campus, pp. 93–117.
 - 2 Wikipedia: Wikiversum, <https://de.wikipedia.org/wiki/Wikiversum> (last access: 10.06.2025).
 - 3 <https://geschichtedergegenwart.ch/eine-vertane-chance-wikipedia-und-die-geisteswissenschaften/> (last access: 10.06.2025); cf. for the field of the historical sciences Wozniak, Thomas (2012): »Zehn Jahre Berührungängste. Die Geschichtswissenschaften und die Wikipedia. Eine Bestandsaufnahme«, in: *Zeitschrift für Geschichtswissenschaft* 60, pp. 247–264.

After all—and this is often forgotten—there is no anonymous *Wikipedia community* to be blamed for a lack of information, under-complex descriptions and outdated positions but only *we* ourselves, or rather our lack of willingness to participate: as *we* (see above: the community of academics) continue to not sufficiently contribute to this collaborative project based on democratic principles.⁴ User-generated content either contains our knowledge—or it does not. Regretting that our positions have not yet found their way into Wikipedia makes about as much sense as sighing at the sock in your hand and pondering why it is not on your foot.

2. *kuwiki*: living handbook

In 2021 the *kuwiki* working group was founded in order to connect scholars from the field of art history with Wikipedians who volunteer in the field of art history. The idea was to create a forum in which the expertise of both groups merges to ensure that »die Kunstwissenschaften die freie Online-Enzyklopädie Wikipedia als Wissensspeicher, Arbeitsinstrument und wichtiges Medium der Wissenskommunikation anerkennen und reflektieren« (the sciences of art recognize and reflect the Wikipedia free online encyclopedia as a knowledge store, tool and important medium of knowledge communication)—and finally start to contribute significantly to the online encyclopedia.⁵ Different formats were created for this purpose; among other things,

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- 4 Wikipedia depends on the commitment of volunteers to protect this free encyclopedia, otherwise it will fall into the hands of trolls and political groups who abuse it for their agenda, cf. Sockenpuppentzoo – Angriff auf Wikipedia.
<https://www.ardaudiothek.de/sendung/sockenpuppentzoo-angriff-auf-wikipedia/13996869/>; for Wikipedia's »verifiability policy« (Wikipedia: Verifiability, <https://en.wikipedia.org/wiki/Wikipedia:Verifiability> (last access: 27.11.2025).) among others Famiglietti, Andy (2019): »Wikipedia«, in: Niels Brügger/Ian Milligan (eds.): The SAGE Handbook of Web History, London: SAGE, pp. 315–329. See also: O'Sullivan, Dan (2009): Wikipedia. A new Community of Practice?, Farnham: Ashgate, esp. chapter 13: Wikipedia and the Nature of Knowledge zum Gebot des Neutral Point of View (Wikipedia: Neutral point of view, on trolls, edit wars and vandalism, etc. Lorenz, Maren (2006): »WIKIPEDIA. Zum Verhältnis von Struktur und Wirkungsmacht eines heimlichen Leitmediums«, in: WerkstattGeschichte 43, pp. 84–95; another threat to Wikipedia is the still too homogeneous group of authors, cf. Rosenzweig, Roy (2006): Can History be Open Source. Wikipedia and the Future of the past, <https://rrchnm.org/essays/can-history-be-open-source-wikipedia-and-the-future-of-the-past/> (last access: 10.06.2026) »... Wikipedia's authors do not come from a cross-section of the world's population. They are more likely to be English-speaking, males, and denizens of the Internet.«
 - 5 Wikipedia: Arbeitsgemeinschaft Kunstwissenschaften + Wikipedia, https://de.wikipedia.org/wiki/Wikipedia:Arbeitsgemeinschaft_Kunstwissenschaften_%2B_Wikipedia (last access: 27.11.2025).—Unless otherwise stated, the translations are by Mirko Wittwar, whom we would like to thank warmly for his efforts.

we jointly developed a *living handbook* with the objective—using monographic articles on works of art and buildings in Wikipedia as a starting point—of offering guidelines and suggestions for creating and editing art historical entries. Due to its self-image, the established structure and the operating routines, this *living handbook* cannot and will not limit the polyphony of Wikipedia to a standardized norm. This would not be within our competence, nor can it be in our interest; rather, the idea was to develop recommendations for the structure of articles, for the correct use of terminology and for improving the scientific quality through the cooperation between specialised scientists and committed volunteers (= Wikipedians): An effort like this always provides the opportunity to reflect (for ourselves and for others) on hidden narratives, outdated forms of knowledge and problematic terminology we continue to use. After all, Wikipedia does not have to be the site of some 'improved' art history but can only show the results of what the discipline has created so far.⁶ Nevertheless, we can play an active role with ensuring that inherited concepts, attitudes and approaches are not propagated without critical reflection.

Our *living handbook* is available to everyone for use and improvement⁷: After general information aimed primarily at art historians who want to start working in Wikipedia, specific considerations follow on how to logically structure and organise articles on individual works of art or buildings. In addition to the basic how-to, we focussed on taking up specific points we found problematic and tried to clarify them within a broad context. This covers topics such as a sensitive way of describing objects⁸ or the importance of their object history (Objektgeschichte)⁹, which not only include the *genesis* of the work (Werkgenese) but also suggest its *background* (Entstehungshintergrund), *function*, *spatial situation*, *historical contexts*, *location(s)*, *translocations*, *provenance* and *exhibition history* as well as *alterations/restorations* as possible fields of inquiry.

6 It is a well-known fact that this is one of the basic principles of the online encyclopedia: »Die Wikipedia bildet *bekanntes Wissen* ab (Wikipedia depicts *known knowledge*).« Wikipedia: Keine Theoriefindung, https://de.wikipedia.org/wiki/Wikipedia:Keine_Theoriefindung#:~:text=Als%20originäre%20Forschung%20unzulässig%20sind,entw%20Erklärungen%20und%20Theorien%20beruhen (last access: 10.06.2025).

7 Wikipedia: Arbeitsgemeinschaft Kunstwissenschaften + Wikipedia/Living handbook, https://de.wikipedia.org/wiki/Wikipedia:Arbeitsgemeinschaft_Kunstwissenschaften_%2B_Wikipedia/Living_handbook (last access: 10.06.2025).

8 Ibid.

9 Ibid.

3. The Importance of Naming an Artwork

Using the topic of *lemma/object reference/title*, I would like to illustrate that this is not art-scientific nitpicking but that titles—such as historical classifications, period terms and stylistic evaluations¹⁰—may transport influential hierarchies and assessments that may have political impact and must be recognised; the *living handbook* comments on this: »In einem Lexikon ist ein Gegenstand unter einem Lemma verzeichnet, in der Wikipedia ist das der Seitentitel der Beitragsseite. Anders als bei Begriffen (Kunst, Malerei ...) ist die Auswahl des Lemmas bei Werk-Artikeln oft eine Setzung der Autor:innen. Das gilt besonders bei älterer Kunst. Anders als moderne Kunstwerke haben die meisten vor dem 19. Jahrhundert entstandenen Kunstwerke keinen feststehenden Namen oder Titel, den ihnen die Künstler:innen gegeben haben. Nur sehr wenige Objekte besitzen einen fixen, in Fachwelt und Öffentlichkeit akzeptierten und üblichen Namen (z.B. Sixtinische Madonna)« (in an encyclopedia a subject is listed under a lemma, with Wikipedia this is the title of the site. Other than with technical terms, choosing the lemma for contributions on objects is often left to the authors. This is particularly true for older works of art. Other than modern works of art, most works of art produced before the 19th century have no fixed name or title given to them by the artists. Only very few objects have a fixed name accepted by experts and the public (e. g. the Sistine Madonna)).¹¹

This seeming banality is significant, as for many years names have been established for artworks that are allegedly their *titles* in the public consciousness. However, these names were by no means chosen by the artists (by an authorial, even intentional gesture) and must therefore be understood and interpreted as part of the historical creative process and the »intended« meaning of the work. Rather, these are conventions established much later and mostly by third parties, including interpretations that reflect the current state of research and can (and must) be modified

10 See also the article by Huth, Andreas (2024): »Unordnung. Zur Kritik kunstwissenschaftlicher Ordnungssysteme«, in: von Engelberg-Dočkal, Eva/Herold, Stephanie (eds.): *Ordnungssysteme. Auswählen, Werten, Sortieren, Siegen*: Universitätsverlag, pp. 91–95 on the critique of the »chronological and geographical points of view« according to which works of art are classified and the conceptual figures concealed therein (genre, progression, decay, masterpiece, centre/periphery, mannerism/styles, etc.) as well as the invitation to use Wikipedia to tackle the usual categories in a constructive manner and to name the artist's place(s) of work instead of, for example, anachronistic nationalities, p. 94: »Die Wikipedia kann als Schnittstelle einer solche Fragen reflektierenden Kunstgeschichte und der Öffentlichkeit eine entscheidende Rolle bei der notwendigen »Umordnung« einnehmen.« (As an interface of a kind of art history reflecting on such issues and the public, Wikipedia may play a crucial role for the necessary »restructuring«).

11 Wikipedia: Arbeitsgemeinschaft Kunstwissenschaften + Wikipedia/Living handbook, https://de.wikipedia.org/wiki/Wikipedia:Arbeitsgemeinschaft_Kunstwissenschaften_%2B_Wikipedia/Living_handbook#Lemma,_Objektbezeichnung,_Titel (last access: 10.06.2025).

and updated over time. Take a work by Rembrandt that is known today under the title *Self-Portrait as Zeuxis*:¹² This title is not by Rembrandt himself, the work is one of his many self-portraits, the artist's advanced age is notable. The second face to the left and Rembrandt's facial expression, which has been interpreted as ›laughter‹, are also noteworthy; the mahlstick he is holding (which identifies him as a painter) is not immediately recognisable. The age, the face, the laughter and the stick have led—to not immediately and not without controversy—to the interpretation that a legend of an ancient artist has been depicted here: According to this legend, the famous Greek painter Zeuxis died of laughter over the vanity of an old woman he was commissioned to portray. This may be valid, but a new article might, in the future, suggest a completely different interpretation of the picture's content. The important thing is a. that not only the academic community develops an awareness that today's titles of artworks are suggestions and agreements; and moreover, b. that biases may be encapsulated in many of these apparently neutral denominations. In Rembrandt's case, this is clearly a misogynist verdict, which—consistent since antiquity—perceives the aged female body as useless and ugly (unlike the old male body, which is associated with wisdom and dignity) and which condemns the desire for visibility and representation of women as vanity to be sneered at. Moreover, in many cases the brevity of the title is trivialising—for example, a work of art should not be called *Apollo and Daphne* (or even better *Apollo, inflamed with love*) but rather *Daphne flees in fear from a man; she only manages to escape with the help of her father who sacrifices her shortly before Apollo is about to rape her by turning her into a laurel tree*. This practice of denomination becomes even more problematic if it perpetuates forms of racism as an apparent ›historical fact‹; and the case of the *Old Masters* in Dresden is an impressive example of how this can be exploited by fascist forces. In Dresden, the recent renaming of 143 objects (out of a total collection of 1,488,059 works of art) was followed by a parliamentary enquiry by the AfD.¹³ This was less about the fact itself, but rather the renaming (which included the cancellation of racism) was being raised to

12 Wikipedia: Selbstbildnis als Zeuxis, https://de.wikipedia.org/wiki/Selbstbildnis_als_Zeuxis (last access: 10.06.2025).

13 Homepage AfD | Fraktion Sachsen: Herr Kretschmer, stoppen Sie die Sprachpolizei!, <https://afd-fraktion-sachsen.de/herr-kretschmer-stoppen-sie-die-sprachpolizei/> (last access: 10.06.2025) and Kleine Anfrage des Abgeordneten Thomas Kirste (AfD) | Drs.-Nr.: 7/7287 | Thema: »Umbenennungen« von Objekten durch die Staatlichen Kunstsammlungen Dresden, https://edas.landtag.sachsen.de/viewer.aspx?dok_nr=7287&dok_art=Drs&leg_p=7&pos_dok=1&dok_id=undefined (last access: 10.06.2025); the AfD intentionally uses the democratic instrument of parliamentary questions to harass institutions and disrupt their work, often in the media, for example: Rosbach, Jens (2018): AfD contra Demokratie-Vereine. Die parlamentarische Anfrage als Kampfmittel, <https://www.deutschlandfunkkultur.de/afd-contra-demokratie-vereine-die-parlamentarische-anfrage-100.html> (last access: 10.06.2025).

the level of a cultural war and staged as a kind of public iconoclasm. The Staatliche Kunstsammlungen Dresden (SKD) felt compelled to issue a public statement and a clarification on their website, in which they answered the question »Won't the SKD's cultural treasure be jeopardised by the renaming? Some speak of *iconoclasm*«. Their answer was calm and objectively (but not as publicly visible as the AfD with its advertised outrage)¹⁴: »No, because the artworks themselves remain untouched. Earlier iconoclasts destroyed the works because they considered them dangerous or obscene. The SKD's task is to preserve and protect the works. This includes giving them correct and contemporary names. The historical titles are preserved internally for research purposes. The more precisely the various titles are recorded in the database, the better the works of art can be analysed in terms of their history.«¹⁵ This episode may vividly underline how important it is not to create a false perception of the naming of artworks in Wikipedia—being a highly visible and therefore highly effective public medium.

4. How to use Wikipedia ... for teaching

In his article in the special issue *Wikipedia* of the journal *Geschichte in Wissenschaft und Unterricht* Winfried Schulze asks what degree of »scientific reliability can be attributed to an information system such as Wikipedia« and »what consequences can be drawn from this for university education«.¹⁶ In our post-factual times this question sounds like greetings from a simpler era in the face of the challenges of AI use by students—be they schoolchildren or university students. But at the same time we can find parallels regarding educational situations, as the discussion about whether Wikipedia (or AI) should be used remains absurd. Since everyone does so anyway, the aim must be to provide a *correct* (in the sense of *purposeful, creative, enriching*) approach to Wikipedia instead of the generally ignorant approach of condemnation.

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- 14 And also in conjunction with Bild newspaper, which headlined on 14 September 2021: »Weil sie ›rassistisch‹ oder ›diskriminierend‹ sein sollen: Sprach-Polizei benennt 143 Kunstwerke um. Aus ›Zwerg‹ wird zum Beispiel ›kleinwüchsiger Mann‹, aus ›Knabe‹ wird ›Junge‹.« (Deutschmann, Michael (2021): »Weil sie ›rassistisch‹ oder ›diskriminierend‹ sein sollen. Sprach-Polizei benennt 143 Kunstwerke um. Aus ›Zwerg‹ wird zum Beispiel ›kleinwüchsiger Mann‹, aus ›Knabe‹ wird ›Junge‹.«, in: Bild 14.09.2021, online. (Because they are said to be racist or discriminating: language police renames 143 works of art. For example, ›dwarf‹ becomes ›growth-restricted man‹, ›lad‹ becomes ›boy.‹)
- 15 Dresden, SKD: Berichte aus der Forschung | Information zur Aktualisierung von Werktiteln (in Reaktion auf die Parlamentarische Anfrage der AfD), <https://www.skdmuseum/forschung/werktitel/> (last access: 10.06.2025).
- 16 Schulze, Winfried (2012): »Editorial«, in: *Geschichte in Wissenschaft und Unterricht* 63:5/6, p. 260.

To this end, a second *kuwiki* group project is promoting the active use of Wikipedia for university teaching among art historians, as there is hardly anything that increases critically informed expertise more than trying it out for oneself. To this end, university teachers must first be given the necessary skills and thus be enabled to start working with Wikipedia, as it helps nobody if traditionally written papers are simply 'unloaded'.¹⁷ As an encyclopedia, Wikipedia follows its own structure and logic; the collected knowledge is organised in a specific way and follows rules the acknowledgement of which is a fundamental prerequisite for sustainable work. To answer questions relating to the broad field of art-scientific knowledge and action, the working group has established the online series *tips & tools*.¹⁸ After all, there is often a lack of basic knowledge in the academic disciplines of how to work with and within Wikiverse. It is not just a matter of creating completely new articles, it is much more important to edit existing knowledge material, correct texts, to update references and/or provide missing images. One of the purposes of *kuwiki* is therefore to provide the community with existing image collections that are stored in the private archives of art historians as hitherto unused research data, so that *kuwiki* can also offer advice on technical issues relating to uploading and naming image files.¹⁹

In addition, becoming familiar with the basic rules of Wikipedia can be integrated into the seminar as a constitutive part of the learning process, thereby sharpening media literacy, as I would like to illustrate by a brief example: A seminar on the *Heribert Shrine* (a goldsmith work of art from the mid-12th century) with the aim of expanding the existing article in Wikipedia began with an analysis of the given text:²⁰ Since when has the article existed, who can be identified as the author, how can the development of the text be traced, which literature was used, were there any

17 This practice has led to—quite comprehensible—disgruntlement among the Wikipedia community which has been forced to edit incorrect layouts, false references and texts that are per se unusable—a task that remains the responsibility of the supervisors at universities. In many cases, overly restrictive module catalogues with rigid examination requirements also prevent meaningful work in and with Wikipedia, so that our colleagues need more information in order to be able to implement effective modifications to the study guidelines.

18 Wikipedia: Arbeitsgemeinschaft Kunstwissenschaften + Wikipedia/tips & tools, https://de.wikipedia.org/wiki/Wikipedia:Arbeitsgemeinschaft_Kunstwissenschaften_%2B_Wikipedia/tips_%26_tools (last access: 10.06.2025).

19 Kulac, Kurt (2015): »Wikipedia. Wissen ist Macht – Wissen teilen ist mächtiger«, in: Friesinger, Günther et al. (eds.): Open Culture. Ökonomien zwischen Öffnung und Begrenzung, Wien: edition mono, pp. 43–51, about the images and Wiki loves Monuments (»Der größte Fotowettbewerb der Welt ist also aus der größten Enzyklopädie der Welt entstanden«), pp. 49–50; Wiegand, Alice (2024): »Raimond Spekking verstärkt das Präsidium«, in: Wikimedia Deutschland. Online: <https://blog.wikimedia.de/2024/07/25/raimond-spekking-verstaerkt-kt-das-praesidium/> (last access: 10.06.2025).

20 Wikipedia: Heribertschrein, <https://de.wikipedia.org/wiki/Heribertschrein> (last access: 10.06.2025).

controversies, what is good, what is deficient, what is lacking? On this basis, specific subject areas can be named and further elaborated—and the structure of the article can be discussed together to determine which information should be outsourced to other articles and which links are necessary. Does the vita of St Heribert belong in the article on the artwork or in the biographical article on Heribert of Cologne—even if enamel medallions on the shrine depict scenes from his life?

Should the technique of enamelling (= *émail champlevé*) be explained in the Shrine article—or should it be linked to a summary article on artistic techniques concerning enamel technique; and how comprehensive is the *émail champlevé*-article? Does an entry on reliquary forms of the High Middle Ages exist, is there an article on reliquary shrines—and is the Heribert Shrine already listed there? How do we deal with the fact that the Shrine's current appearance is the result of extensive restorations since the mid-19th century—and how can this be concisely presented in the article (see above: living handbook, object histories)? The benefits of such seminar work are not only obvious for the cognitive and psychomotor learning objectives—it is motivating for the students to see how their work has an impact and is noticed, how they contribute to the growth of Wikipedia while also gaining many insights (including affective learning objectives): on collaborative ways of writing, on the question of what can actually be communicated regarding art historical knowledge—and which way—, on image rights, on the organisation of very complex and interwoven bodies of knowledge, on linking in Wikipedia, on interacting with their previous authors and much more.

5. Two Cultures ... Authorships

There are further opportunities in the merging of Wikipedia and art history, as C. P. Snow also emphasises in his consideration of two cultures: »the clashing point of two subjects, two disciplines, two cultures—of two galaxies, so far as that goes—ought to produce creative chances. In the history of mental activity that has been where some of the breakthroughs came. The chances are there now. But they are there, as it were, in a vacuum, because, those in the two cultures can't talk to each other...«²¹ With this in mind, it is important to point out the obstacles and challenges that need to be overcome in order to eliminate this ›can't talk to each other‹ and to emphasise the great opportunities that lie in ›talking to each other‹ when Wikipedia and art history come together. Here, after all, where one begins the conversation and the reflection on how academic debates can be organised in an encyclopedic structure,

21 Snow, C. P. (1961): The two Cultures and the Scientific Revolution. The Rede Lecture 1959, New York: Cambridge University Press, p. 17.

fundamental questions arise for one's own discipline and the possibilities and limits of its communication.

In 2026 it remains a common practice to make generalised complaints about supposedly poor content quality—without being open to looking at where Wikipedia is excellent; without engaging with what can be depicted; without being capable of creatively engaging with these other forms, or without asking what we could contribute ourselves. But Snow very clearly states that the opportunities are there—as a challenge to art history to think about what characterises its discipline, what can be transported and in which ways an encyclopedia could do so.

The academia is an acknowledged meritocratic system—your own authorship is of great importance for your career path. Not only the number of contributions but also the right place of publication, the intellectual home of a series or the citation rate are relevant. In addition, it is generally essential to closely link one's own name with certain positions within the scientific community—for example, the study *Facets of Specialisation and Its Relation to Career Success: An Analysis of U.S. Sociology, 1980 to 2015* demonstrated the benefits of specialisation as a career strategy: the clearer the topical consistency, the faster the rise to professorship.²² In Wikipedia, this understanding meets a completely different culture in which authorship does not have, or at least does not appear to be, top priority.²³ For example, the list of names and the pie chart for the article on Leonardo da Vinci's *Mona Lisa*—every article in Wikipedia has such a summary—shows the authors' contributions to the article. It is easy to see that there is no dominant main author, ›Immanuel Giel‹ has the most shares on the article with 10%; the largest percentage, however, is taken up by the many co-writers, most of whom do not contribute more than 2%.²⁴ It is equally striking (and common) that only a few of the authors appear with their actual names: Many contribute under pseudonyms, many are (probably) not experts in the eyes of the discipline but belong to the group of highly committed citizen scientists who are not recognised

22 Heiberger, Raphael H./Munoz-Najar Galvez, Sebastian/McFarland, Daniel A. (2021): »Facets of Specialization and Its Relation to Career Success. An Analysis of U.S. Sociology, 1980 to 2015«, in: American Sociological Review 86:6, pp. 1164–1192. Online: <https://doi.org/10.1177/00031224211056267> (last access: 10.06.2025), cf. Forschung & Lehre »Welche Publikationen die Karriere befördern« vom 9. Dezember 2021.

23 Stegbauer, Christian (2009): Wikipedia. Das Rätsel der Kooperation, Wiesbaden: Verlag für Sozialwissenschaften, investigates the motivations of the contributors who are willing to cooperate in a project like Wikipedia beyond traditional sociological explanations such as personal benefit / individual advantages, demands or values (religious, communal; conscience collective; altruism, benevolence); in his analysis he examines the relationship between different authors, the structures offered by Wikipedia and the related hierarchies, etc. pp. 207–236.

24 Wikipedia: Autorschaft | Mona Lisa Article, https://xtools.wmcloud.org/authorship/de.wikipedia.org/Mona_Lisa?uselang=de (last access: 10.06.2025).

within the scientific system.²⁵ They have a different set of skills: first of all, they have mastered Wikipedia's writing rules, are ranked higher within the Wikiverse due to a large number of edits, have long been part of a community that for newcomers is difficult to understand at first, and much more.²⁶ Wikipedia emphasises that it is of no importance who edits the knowledge, as the aim is not to produce hitherto unknown knowledge from new sources but to present established information in a way that is easy to understand, verifiable and accessible to many. The habitus of the scholarly world and the habitus of Wikipedians are known to repeatedly clash here.²⁷ Another

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- 25 Ciffolilli, Andrea (2003): »Phantom authority, self-selective recruitment and retention of members in virtual communities. The case of Wikipedia«, in: First Monday 8:12. Online: <https://doi.org/10.5210/fm.v8i12.1108> (last access: 10.06.2025) identifies the concealment of authorship as a potential problem for Wikipedia in the future: »The reputation of Wikipedians grows with the number of their contributions. By visiting the previous version pages of each article, it is possible to go back to its author or authors. However, the names or the nicknames of the authors, unlike print encyclopedias, do not appear at the bottom of the articles. In my view, this is a pity because the possibility to directly show the names of the authors would represent a powerful incentive and a strong gratification for contributors. The current anonymity may represent, in the long run, a threat to retention of members.«
- 26 Pentzold, Christian (2007): Wikipedia. Diskussionsraum und Informationsspeicher im neuen Netz, München: Reinhard Fischer, pp. 24–32 for user classification and (3.3.) the power structure, p. 31: »Nutzer begegnen sich ›auf Augenhöhe‹ in einer relativ strukturarmen Kommunikationssituation. Zur Beschreibung dieser völligen Gleichordnung der Autoren schlägt [Schmalz] das Konzept der Heterarchie vor. Merkmal heterarchischer Organisation im Vergleich zu hierarchischer ist die dynamische, kompetenzabhängige, sich aus dem Arbeitsprozess heraus entwickelnde Rollenausprägung, welche gleichwohl nicht mit der oben beschriebenen Abstufung der Nutzungsrechte (Admin, Steward etc.) zusammenfällt, sondern sich im Editierhandeln mehr oder minder spontan ausbildet.« (Users meet at ›eye level‹ in a rather unstructured communication situation. To describe this absolute equality of the authors [Schmalz] suggests the concept of heterarchy. The typical feature of heterarchy compared to hierarchical organisation is the dynamic characteristic of the role, which develops from the work process but is not the same as the above-described levelling of usage rights (admin, steward etc.) but develops more or less spontaneously in the course of editing.)
- 27 G. Albert (2021) considers whether this is perhaps the main reason why academics do not contribute to Wikipedia: »Mein Verdacht ist eher, dass die größte Zumutung der Wikipedia für etablierte Forscher:innen in der kompletten Aushebelung akademischer Hierarchien liegt, die durch die meritokratischen Hierarchien der Wikipedia-Community ersetzt werden: So wird in einer Artikeldiskussion die Stimme einer pensionierten Postbeamtin, die über Jahre hinweg Tausende *Edits* vorgelegt hat, höchstwahrscheinlich mehr Gewicht haben als die eines Universitätsprofessors, der sich erstmals traut, einen Artikel zu seinem Forschungsfeld zu korrigieren, und sich, aus Angst vor einem vorgeblichen Reputationsverlust, womöglich nicht einmal als solcher zu erkennen gibt.« (My suspicion is rather that the greatest imposition of Wikipedia on established researchers lies in the complete undermining of academic hierarchies, which are replaced by the meritocratic hierarchies of the Wikipedia community: For example, in an article discussion, the voice of a retired postal worker who has submitted thousands of edits over the years will most likely carry more weight than that of a university

problem, however, seems almost more important to me and does not emerge clearly in the dualism of ›expert knowledge‹ vs. collaborative and invisible authorship.²⁸ After all, in the current academic discourse we hear repeated calls for authors to clearly position themselves. Not only since Donna Haraway's influential essay on *situated knowledge* has the concealment of the speaker's position been exposed as a gesture and a strategy used to marginalise ›other‹ positions and to devalue them as unscientific, supposedly being linked to an agenda.²⁹ The traditional—male, western, humanistic, enlightened—position appears as being disembodied, decoupled from a speaker perspective—Haraway calls it the *God Trick*—that cannot be located either spatially or temporally and thereby proclaims eternally valid truth. Her concept has been taken up and transformed time and again since then, be it in the motifs of the »home-works« called for by Gayatri Spivak in 1990, which commission speakers to develop a »historical critique of your position as the investigating person«,³⁰ or the loci of enunciation designed by Walter Mignolo, which encompass both the speakers as well as their own scientific traditions and places of speech.³¹ They as well as many other theorists are vehemently calling for the disclosure of one's own point of view, as the idea of objective science seems to be less and less sustainable: Who gets to decide what knowledge is considered relevant?³² Who has to disclose which

professor who is daring to correct an article in their field of research for the first time. And who for fear of a supposed loss of reputation, may not even identify themselves as such.) But at the same time he suggests a possible way out: »Doch gerade für Akademiker:innen gibt es die Möglichkeit, ihr symbolisches Kapital aus der Wissenschaft in die Wikipedia-Community zu transferieren: Durch offenes Auftreten als Expert:innen.« (But academics in particular have the opportunity to transfer their symbolic capital from academia to the Wikipedia community by openly presenting themselves as experts.) Albert: Eine vertane Chance?. See also Adams, Julia/Brückner, Hannah/Naslund, Cambria (2019): »Who Counts as a Notable Sociologist on Wikipedia? Gender, Race, and the *Professor Test*«, in: *Socius. Sociological Research for a Dynamic World* 5, pp. 1–14.

- 28 Wolf, Anneke (2006): »Wikipedia. Kollaboratives Arbeiten im Internet«, in: Thomas Hengartner/Johannes Moder (eds.): *Grenzen und Differenzen. Zur Macht sozialer und kultureller Grenzziehungen*. Leipzig: Leipziger Universitätsverlag, pp. 639–650.
- 29 Haraway, Donna (1988): »Situated Knowledges. The Science Question in Feminism and the Privilege of Partial Perspective«, in: *Feminist Studies* 14:3, pp. 575–599.
- 30 Spivak, Gayatri (1990): *The Postcolonial Critic. Interviews, Strategies, Dialogues*, Routledge: London, p. 62.
- 31 Mignolo, Walter D. (1994): »Editor's Introduction«, in: *Poetics Today* 15:4 (Loci of Enunciation and Imaginary Construction. The Case of (Latin) America, I), pp. 505–521.
- 32 Prodöhl, Ines (2011): *Die Politik des Wissens. Allgemeine deutsche Enzyklopädien zwischen 1928 und 1956*, Berlin: Akademie/De Gruyter—emphasizes on p. 1 as *pars pro toto* for the research on hidden narratives in seemingly objective sites of knowledge, such as archives, encyclopedias, etc., the role of dictionaries as »Verhandlungsort dessen, was eine Gemeinschaft für wissenswert hält« (place of negotiating that what a community considers worth knowing)—with the resulting criteria for exclusion and the actively generated and perpetuated gaps,

fields of knowledge have not been considered at all—for a variety of reasons which certainly include the positions of speakers and the institutions, politics of citation, money, visibility etc. associated with them?³³ This demand for the disclosure of one's own origins, scientific traditions and the prejudices inherent in the field itself, which is becoming increasingly important to me as a scientist and which always includes reflection on value judgements and canons, is difficult to map in the structure provided by Wikipedia.³⁴

6. Linking as an opportunity

One further point concerns the question of structures and networks regarding the absence of women in Wikipedia.³⁵

and she defines p. 23: »Allgemeine Enzyklopädien sind das Medium einer national geprägten Zivilgesellschaft, die sich beeilt, ihre Begriffswelt und ihr Selbstverständnis anderen Nationen als »Allgemeinwissen« anzubieten.« (Common encyclopedias are the medium of a national civic society which hastens offering its own world of concepts and its own self-understanding to other nations as »common knowledge.«)

- 33 Grashöfer, Katja (2020): »Wikipedia. Virtuelle Autorschaftskonzepte, virtuelle Enzyklopädie«, in: Dawid Kasprowicz/Stefan Rieger (eds.): *Handbuch Virtualität*, Wiesbaden: Springer, pp. 533–555, is investigating the use of bots that are involved in the community as a separate user group.
- 34 A small insight into the mindset of the authors in Wikipedia is possible via the respective author pages, which can provide information about the fields of interest of the (after all anonymous) authors: For more information on how this data can be used, see Haber, Peter (2012): »Wikipedia. Ein Web 2.0-Projekt, das eine Enzyklopädie sein möchte«, in: *Geschichte in Wissenschaft und Unterricht* 63:5/6: Schwerpunkt Wikipedia, pp. 261–270, p. 264. In 2014 a project was launched to analyse the progress of discussions: <https://contropedia.net> (last access: 10.06.2025).
- 35 Ebersbach, Anja (2013): »Wikipedia. Lexikon sucht Frau«, in: Kampmann, Birgit et al (eds.): *Die Frauen und das Netz. Angebote und Nutzung aus Genderperspektive*, Wiesbaden: Springer Gabler, pp. 159–171, lists the well-known reasons why the number of female authors is so small, among them the rough, misogynistic tone, the lack of time, which often excludes women who are additionally burdened with care tasks from voluntary (also political) commitment, but also a lack of self-confidence; Paling, Emma (2014): »Wikipedia's Hostility to Women«, in: *The Atlantic*. Online: <https://www.theatlantic.com/technology/archive/2015/10/how-wikipedia-is-hostile-to-women/411619/> (last access: 10.06.2025); Ford, Heather/Wajcman, Judy (2016): »Anyone Can Edit, Not Everyone Does. Wikipedia's Infrastructure and the Gender Gap«, in: *Social Studies of Science* 47, pp. 511–527; Fister, Barbara (2016): »The Woes of Wikipedia. There's a lot to like about Wikipedia, but it's becoming a hostile place for many editors«, in: *Inside Higher Ed*. Online: <https://www.insidehighered.com/blogs/library-babel-fish/woes-wikipedia> (last access: 10.06.2025); Steinert, Hanna (2023): »Feministische Kritik an und in der Wikipedia«, in: *kritische berichte* 51:1, pp. 58–65. Online: <https://doi.org/10.11588/kb.2023.1.92830> (last access: 10.06.2025); Schwarzl, Anna (2024):

The problem is a well-known one: the majority of Wikipedia's authors are male, they continue to refuse to use gender-appropriate language,³⁶ and many articles on female researchers, writers, politicians, artists, composers, etc. are missing from the encyclopedia which ›actually‹ aims to bring together the world's knowledge, after all.³⁷

As part of the working group on women in art history, I contribute to making more women visible with their specific involvement in and contribution to art studies.³⁸ Certainly the necessity needs no justification anymore, but the question of ›how‹ is still a major concern, and not just for us.³⁹ This cannot, however, be solely a process of reconstructing lost biographies or reflecting on where women were structurally and systemically excluded from institutions and centres of influence.⁴⁰ Such

Macht und Geschlecht in der Wissensproduktion von Wikipedia. Eine qualitative Untersuchung der Herausforderungen von Wikipedianerinnen* beim Einbringen von Wissen in einer offenen Organisation, <https://unipub.uni-graz.at/obvurgs/content/titleinfo/10599102/full.pdf> (Masterarbeit Graz) (last access: 10.06.2025).

- 36 Wikipedia: Generisches Maskulinum, https://de.wikipedia.org/wiki/Wikipedia:Generisches_Maskulinum (last access: 10.06.2025) und Wikipedia: WikiProjekt Frauen/Geschlechtergerechte Sprache, https://de.wikipedia.org/wiki/Wikipedia:WikiProjekt_Frauen/Geschlechtergerechte_Sprache (last access: 10.06.2025).
- 37 Menking, Amanda/Rosenberg, Jon (2021): »WP:NOT, WP:NPOV, and Other Stories Wikipedia Tells Us. A Feminist Critique of Wikipedia's Epistemology«, in: Science, Technology, & Human Values 46, pp. 455–479; <https://suegardner.org/2011/02/19/nine-reasons-why-women-dont-edit-wikipedia-in-their-own-words/> (last access: 10.06.2025).
- 38 Ulmer Verein. Verband für Kunst- und Kulturwissenschaften e.V.; http://www.ulmer-verein.de/?page_id=14618 (last access: 27.11.2025), see also Chichester, K. Lee/Sölch, Brigitte (eds.) (2021): Kunsthistorikerinnen 1910 – 1980. Theorien, Methoden, Kritiken, Berlin: Reimer; Chichester et al. (eds.) (2025): Kunsthistorikerinnen im 20. Jahrhundert. Institutionen, Strukturen, Handlungsräume, Berlin: Reimer.
- 39 Richter: Die Wikipedia-Story., p. 201: *Wikipedia in Gefahr – und nur Autorinnen können sie retten*, p. 204 based on a study by the Leibniz Institute for the Social Sciences in Mannheim and ETH Zurich (2015): »In Artikeln über Frauen sind Beziehungsstatus oder Familie häufiger Thema, als dies bei Artikeln über Männer der Fall ist. Hier zeigt sich, dass die Männer, die Wikipedia bisher überwiegend schreiben, bewusst oder unbewusst Frauen anders darstellen als ihre Geschlechtsgegnossen. Offensichtlich erscheint ihnen bei Frauen wichtig, mit wem sie verheiratet sind und ob sie Kinder haben.« (Contributions on women discuss relationship status or family more often than those on males. Here it becomes obvious that those males who as yet write mostly in Wikipedia consciously or unconsciously depict women in different ways than their male counterparts. Obviously, in the case of women they believe it to be important to whom they are married or if they have children.)
- 40 Bösl, Elsbeth (2024): »Quellen. Fragmentiert, lückenhaft oder ganz ohne Frauen«, in: AktArchä. Online: <https://doi.org/10.58079/12zmo> (last access: 10.06.2025) illustrates for the discipline of archaeology how difficult the reconstruction of forgotten women is in itself; for sociology cf. Holzhauser, Nicole (2023): »Die unsichtbare Hälfte. Frauen in der Geschichte«, in: Soziopolis. Gesellschaft beobachten. Online: <https://nbn-resolving.org/urn:nbn:de:0168->

an approach does not change the ways in which we think about the histories of art as a discipline; the reconstruction of female positions, as we all know, no longer requires simply emphasising that women ›also‹ participated in a discipline but rather that they pursued art historical studies ›despite‹ their systematic structural exclusion. Furthermore, it is important not to stop at this point but to examine what other paths female scholars took in art history, whether and how their marginalised position affected their choice of fields and theoretical formation, and how it is possible today to ensure sustainable and structurally impactful recognition and participation from this ›despite‹.

It is well known that there are many initiatives that fight the gender bias in Wikipedia, one project with great prominence is *Women in Red*, »a project that focuses on creating content regarding women's biographies, women's works, and women's issues.«⁴¹ *Women in Red* is just one example out of many initiatives that try to make female positions and protagonists more visible—but I chose it for a specific reason: as the title refers to a feature of Wikipedia, a structure that works not only with isolated stand-alone articles but also with references and networking through linking. A link, as we all know, is indicated by a word highlighted in blue and informs me as a reader that I can click on this word to be directed to the next article. A black word is not linked, but a red word indicates that an article would be desirable here: after all, it is already set up as a link. And for women, it is great to already appear as a link, because this indicates that the missing part has been recognised and that an article exists in which the name of a woman or a female position should be inserted because of its absence. It cannot, however, be our goal to augment the existing canon of male theorists with some hitherto deliberately forgotten female researchers. It cannot be about perpetuating the established—and inherently misogynistic—narratives of mastery, virtuosity and genius, after all;⁴² but rather in the spirit of Umberto Eco's characterisation of an encyclopedia that has »neither a centre nor a margin«:⁴³ to start telling other stories, to build other

ssoar-87470-0 (last access: 10.06.2025); Siân, Evans/Mabey, Jacqueline/Mandiberg, Michael (2015): »Editing for Equality. The Outcomes of the Art + Feminism Wikipedia Edit-a-thons«, in: Art Documentation. Journal of the Art Libraries Society of North America 34:2, pp. 194–203.

41 Wikipedia: Women in Red, https://en.wikipedia.org/wiki/Women_in_Red (last access: 01.12.2025).

42 Pollock, Griselda (1988): »Feminist Interventions in Art's Histories«, in: kritische berichte, 16:1, pp. 5–14, p. 12: »No doubt theories of the social production of art combined with the structuralist assassination of the author would also lead to a denunciation of the archaic individualism at the heart of art historical discourse. But it is only feminists who have nothing to lose with the desecration of Genius.«

43 Eco, Umberto (1989): Im Labyrinth der Vernunft. Texte über Kunst und Zeichen, Leipzig: Reclam, p. 106. In his chapter *Die Enzyklopädie als Labyrinth*, pp. 104–111, Eco categorises the image of the labyrinth according to three types: the linear one, in which one must reach the centre (Theseus and Minotaur); the maze, with choices between alternative paths that

networks, with other centres, and if one almost wants to get a little utopian, with not so many *margins*.⁴⁴

7. and last but not least: the state of research

My final example stems once again from the field of medieval art history and focuses on the importance of outlining the research history. The living handbook comments on this under the caption ›The fiction of the factual‹: »In vielen Artikeln zu Kunstobjekten in der Wikipedia fehlt der Forschungsstand—vermeintlich gehört ›so etwas‹ nicht in einen populärwissenschaftlichen Artikel, der kurz, übersichtlich und verständlich die wichtigsten Fakten zu einem Werk vermitteln soll. Aber ist der Forschungsstand tatsächlich etwas, das nur die Fachwissenschaft interessiert? Und was genau ist mit ›Fakt‹ in der Kunstgeschichte gemeint? Was ist fundierte Forschungsmeinung, was steile These, worauf basiert gesichertes Wissen?« (Many contributions on art objects in Wikipedia do not refer to the state of research—allegedly ›something like this‹ has no place in popular-scientific contributions which are supposed to tell the most important facts on a work briefly, clearly, and in an understandable manner. But is the state of research really something only the discipline is interested in? And what exactly is meant by ›fact‹ in the history of art? What is established research, what is a bold thesis, on what is safe knowledge based?)⁴⁵ The article on the famous Cappenberg Head illustrates the extent to which the state of research can evolve (and what further implications may arise as a result): the version dated 25 December 2013 identifies the head as a *portrait bust of Emperor Freder-*

in parts lead nowhere; the network or rhizome as an entanglement, with the typical feature that every point can be connected to every other point, »und wo die Verbindungen noch nicht entworfen sind, können sie trotzdem vorgestellt und entworfen werden« (and where the links have not yet been drafted, nevertheless they can be presented and drafted).

44 Of course, what has been said above does not only apply to the expertise and achievements of women but must also be claimed for other marginalised groups—not only in Wikipedia but in all encyclopedias, cf. Velden, Maja van der (2011): »When knowledge meet. Wikipedia and other Stories from the Contact Zone«, in: Geert Loving/Nathaniel Tkacz (eds.): *Critical Point of View. A Wikipedia Reader*, Amsterdam: Institute of Network Cultures, pp. 236–255. Online: https://www.networkcultures.org/_uploads/%237reader_Wikipedia.pdf (last access: 18.02.2026) and Ford, Heather (2011): *The Missing Wikipedians*, in: Loving/Tkacz (eds.): *Critical Point of View*, pp. 258–268.

45 Wikipedia: Arbeitsgemeinschaft Kunstwissenschaften + Wikipedia/Living handbook, https://de.wikipedia.org/wiki/Wikipedia:Arbeitsgemeinschaft_Kunstwissenschaften_%2B_Wikipedia/Living_handbook#Rezeptionsgeschichte,_Forschung,_Deutung (last access: 10.06.2025).

ick I Barbarossa,⁴⁶ while the version dated 21 May 2025 speaks of a »head reliquary dedicated to St John the Evangelist«⁴⁷ Here, the version history function offered by Wikipedia, which is logged and stored with a lot of other information in the background, once again proves to be helpful: the readers can access the older version at any time and thus recognise the writing process, the additions to and the changes of the state of knowledge. Changing insights, new findings replacing old certainties do not come as a surprise but are an integral part of research. However, what does not become visible in this example is an important aspect of my own understanding of the discipline: as a medievalist, I am not only concerned with the current state of knowledge. I am also always interested in the archaeology of this knowledge, including the question of why certain objects were researched; who the protagonists were, who took care of the conservation of these objects; what the history of the institutions was where the objects were exhibited and kept on display, why specific fields of research became relevant (and worthy of funding) at which times and in which places. After all, these economies of attention tell a lot about the values and self-conception of societies; just as the changes of supposed knowledge always reflect, as a whole or partly, the changes of these societies. These very general statements can be specified with regard to the Cappenberg Head: It is no coincidence that the so-called baptismal bowl of Frederick Barbarossa associated with the head, today in the Kunstgewerbemuseum (Museum of Decorative Arts) in Berlin, emerges in the circle around Freiherr vom Stein, the initiator of the *Monumenta Germaniae Historica* (MGH), an organisation founded in 1819 to restore the memory of the perished Empire of the medieval Emperors as the collective history of all Germans after the defeat of Napoleon and the Congress of Vienna, and commissioned to collect and publish documentary sources from the period from 500 to the year 1500.⁴⁸ The Cappenberg Head, discovered in 1882 and in 1886 identified as a portrait of the Emperor, is closely linked to the social imperatives in the context of nation building and the creation of a distinct historical depth of German Imperial heritage after the unification of 1871. This may explain why the Cappenberg Head has repeatedly attracted a great deal of attention, much more than other 12th century head reliquaries, which have been researched considerably less – a fact that is also reflected by the articles

46 Wikipedia: Cappenberg Kopf, https://de.wikipedia.org/w/index.php?title=Cappenberger_Kopf&oldid=125771871 (last access: 10.06.2025).

47 Wikipedia: Cappenberg Kopf (ältere Version), https://de.wikipedia.org/w/index.php?title=Cappenberger_Kopf&oldid=256183601 (last access: 10.06.2025).

48 Müller-Mertens, Eckhard (1982): »Die Begründung der *Monumenta Germaniae Historica* durch den Freiherrn vom Stein. Bemerkungen zu den politisch-konzeptionellen Positionen«, in: Sitzungsberichte der Akademie der Wissenschaften der DDR. Gesellschaftswissenschaften no. 1/G, pp. 138–150; Berger, Stefan (2008): »Narrating the Nation. Die Macht der Vergangenheit«, in: Aus Politik und Zeitgeschichte, issue 1/2 (Europäische Nationalgeschichten), pp. 7–13.

in Wikipedia. This contextual knowledge surrounding the Head can hardly be depicted in the Wikipedia article format, and yet it should also be communicated to the so-called ›interested public‹. It addresses effective social hierarchisations that still determine our canon today; it is part of the origins and institutional formation of art history which were established in the 19th century and whose methods and subject areas still partly transport the legacy of this period, hierarchisations that will always have an impact on what we can describe as art historical knowledge—although the question of non-knowledge often seems much more relevant to me: which objects were scarcely addressed and for what reasons? Out of interest, I checked which of the other popular reliquary heads have their very own article in the German Wikipedia—and the result meets my expectations and reflects the extent to which the historical assessments of our disciplines are perpetuated in the virtual space: Only the Cappenberg Head was given a longer article. There are merely traces of the other known works; only the head reliquary of St Vitalis or Candidus⁴⁹ from the treasury of St Lambert's Church in Düsseldorf and the bust reliquary of St Paul⁵⁰ from the Cathedral Chamber of St Paul's Cathedral in Münster (without illustration) are mentioned in very brief articles—which is doubtless also due to the fact that they did not attract the same scientific attention as the alleged Emperor's head from Cappenberg.⁵¹

49 Wikipedia: Reliquienbüste St. Lambertus, [https://de.wikipedia.org/wiki/Reliquienbüste_\(St._Lambertus\)](https://de.wikipedia.org/wiki/Reliquienbüste_(St._Lambertus)) (last access: 18.06.2025).

50 Wikipedia: Pauluskopf, <https://de.wikipedia.org/wiki/Pauluskopf> (last access: 18.06.2025).

51 Random searches for other works revealed that the head reliquary of St Eustachius has an article in Wikipedia English https://en.wikipedia.org/wiki/Reliquary_of_Saint_Eustace; the reliquary bust of St Baudimus is mentioned in the article on the Church of St Nectaire [https://de.wikipedia.org/wiki/St-Nectaire_\(Saint-Nectaire\)](https://de.wikipedia.org/wiki/St-Nectaire_(Saint-Nectaire)); the image file of the Alexander reliquary (https://de.m.wikipedia.org/wiki/Datei:Pope_Alexander_head_reliquary,_from_Abbey_Saint-Remacle_de_Stavelot,_Mosan_workshop,_c._1145_AD,_silver_partially_gilt,_brass_enamel_precious_stones_-_Cinquantenaire_Museum_-_Brussels,_Belgium_-_D_SCo8823.jpg#filelinks) is referenced on the page ›History of Art‹ as well as on the English-language page of the presumed maker https://en.wikipedia.org/wiki/Codefroid_de_Claire; an entry for the head reliquary from Fischbeck seems to be completely missing, and the bust reliquary of St Candidus has been included into the article on Saint Maurice Abbey https://de.m.wikipedia.org/wiki/Abtei_Saint-Maurice (last access: 18.06.2025)

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An Outlook

The Virtual University

Patrizia Breil, Anne Dippel, Christoph Engemann, Estrid Sørensen, Iris van der Tuin

Contemporary students may experience the university as being distributed across places and domains. Studying by help of laptops and even smart phones implies that they are no longer tied to campus (a central point) or to commuting between home and campus (a line) or between separate buildings of a decentralized university (a flat network). Studying is now an arrangement within which individuals and activities seek to gear themselves to one another. Educators and researchers have already made this experience for a long time, as we have always been collaborators in multiple teams within one institution and/or across several. Even if living in one's university town or having a predictable commute, one travels zigzaggingly for guest lectures, research meetings, archival, field, and library research, on-site committee work or conferences. Still, something has changed post-COVID and we feel a more fundamental shift is under way towards a university that may even go beyond the »mode 3 networked university«.¹ Although in some fields of research, like high-energy physics, this kind of doing university has been established for a long time,² it now seems to become the signature of all faculties and research fields. This is a shift towards the virtual university.

As fundamental as this shift appears to be, it is not an easy one to grasp. It is certainly not limited to a ubiquitous use of Internet communication technologies or the digitisation of university administrative, research, and teaching structures. And yet another important insight emerged when the pandemic forced academics to go digital: The university has always been an institution of potentials, of as-if, of experiments, of systematized experiences and their deconstructions, and of virtuality. Way before the advent of smart learning management software or hybrid teaching scenarios the university has dealt with the virtual: Ever since its foundation it has been a place where one's own, other, becoming, fantastic and utopian worlds, societies, forms of knowledge, natures and technologies are scrutinized,

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- 1 Matthews, Adam (2024): »The Mode 3 Networked University: A New Materialist Perspective«, in: Proceedings of the International Conference on Networked Learning 13.
 - 2 Dippel, Anne (2017): »Das Big Data Game. Zur spielerischen Konstitution kollaborativer Wissensproduktion in der Hochenergiephysik am CERN«, in: NTM. Zeitschrift für Geschichte der Wissenschaften, Technik und Medizin 25, pp. 485–517.

categorized, imagined, and shaped. The natural and life sciences may train and convey a predictable research process and objective truth claims, based on measurements and statistics. Nevertheless, as Science and Technology Studies and STS inspired research have taught us, the university's on-the-ground processes and even insights are often filled with serendipity. The humanities and the social sciences train in modes of understanding. Their researchers, teachers and students are dealing with ambiguities, imagining the impossible, in speculation on signs and symbols, multiplicities, tensions and ambivalence. How do these sciences work (together) in the virtual university of the future? How are its infrastructures and its architectures designed? How do we study, research and administer at and through virtual universities? And what does the virtual university make humans feel like?

1. A playful experiment in practicing a virtual university

This text has been co-authored by the five panelists from the panel *Virtual University* at the annual conference *Infrastructures of (Non-)Knowledge* of the CRC 1567 *Virtual Lifeworlds* on 10 October 2024. Our co-laboration is the realization of the virtual university in the present, not in the future. In what follows we are going to speculate, by practicing the virtual, about answers to the above questions—the last one in particular—based on our current academic experiences and our pedagogical, epistemic and organizational ideals and ethics. We are situated in a context where internal and external university funding again leads to austerity measures in most European countries, where academic freedom is again being questioned all over the world, not only in Europe, or—in a particularly intense manner after January 20, 2025—in the US. From this situation we speculate,³ that is, etymologically speaking, we think about potential and the spectrum of the—i.e. virtual—university formations by making a set of conjectures about it. The method of this piece—situated speculation—is both descriptive of, normative and visionary about and reflective of what is produced at virtual universities.

As point of departure we have collected ideas and material for this piece by engaging in a writing game that consisted of a series of guided steps. Anne introduced the game, she used mechanics first encountered for the sake of thinking along together within the Spectrality Working Group of Max-Planck-Institute for Social Anthropology in Halle, as well with the *virtuelle ethnographische schreibwerkstatt*.⁴ It was

3 Irigaray, Luce (1985): *Speculum of the Other Woman*, Ithaca, NY: Cornell University Press, pp. 13–20.

4 Amy McLachlan introduced this game to Dippel first at the MPI »Spectrality Working Group«. She continued to develop it together with her colleagues in the virtual *ethnographische schreibwerkstatt*. Dippel, Anne et al (forthcoming): »Die Empirisch-Kulturwissenschaftliche Schreib-Jam-Session. Kontingenz und Zufall in kollaborativ-kreativen Schreibspielen«, in: Kongress-

the first time for the other four participants to play the game, and the first time for all of us to play a writing game as part of a video conferencing system, to collectively develop raw text for a common publication. Beyond this experimental setup we shared a common experience, having participated in the conference in October 2024, albeit in a hybrid form, since some of us could not attend in person due to illness. The online experience was intimate, yet the participants' relationship was quite distant. In essence, the entire setting served as an example and experiment in practicing virtual university.

The game consisted of four rounds, with Anne as the facilitator and leader, alongside being a participant. Video and audio were not shared during writing sessions. In the first round we were tasked with inventing a word or term that critical scholars would need to theorize the virtual university but which did not yet exist. We generated *odradology*, *participationsprojection*, *speculability*, *the university with grace*, and *virtual vigilance*. Without further discussion we proceeded to the next round. In this round we passed on the invented word to the person who typed after us, creating a differential circulation of ideas. We had five minutes to write about the (potential) meaning of the word or term for the virtual university and did not share our texts. This second round connected our thoughts, and we utilized the short-circuit technology⁵ to entangle our academic and disciplinary perspectives and visions. Thus, we contributed to developing and working on new modes of knowledge production adapt to our contemporary technical conditions within our shared virtual world, wired and infrastructured by the planet's finest minerals, rare earths and metals.

In the third round we engaged with the question posed in the panel abstract: »How do we study, research, and administer in and through virtual universities?« We had five minutes to write and then shared one sentence of our text and passed it on. In the final round we used or modulated the sentence directly or took it as inspiration to continue writing on the question. We then spent 40 minutes discussing our ideas and shared thoughts, bibliographical references, and agreed upon the procedure for writing this text. We decided not to smooth out our text into a single-author voice but to collectively write it, including disruptions, diffractions,⁶ and the dissemination of ideas that might cause long-circuit⁷ reactions with the reader. Since the multiple authorship will thus become transparent upon reading the text, our ideas on and practices of virtual universities will be actualized. Thus, reading this

band der 45. Tagung der Deutschen Gesellschaft für Empirische Kulturwissenschaft (DGEKW), Kiel.

- 5 Stiegler, Bernard (1994): *La Technique et le Temps*. 1. *La Faute d'Epiméthée*, Paris: Éditions Galilée, pp. 123–125.
- 6 Barad, Karen (2014): »Diffracting Diffraction: Cutting Together-Apart«, in: *Parallax* 20:3, pp. 168–187.
- 7 Stiegler: *La Technique et le Temps*, 52 ff.

text is a continuation of our writing exercise in circularity not only as a way of thinking about the world but as a mode of experiencing. »Following a chain of connections, it hops from one pre-determined location to another«⁸ in a spiral-like movement, this point-to-point connections are symbolically discrete *and* interconnected. The text turns into an intra-active phenomenon through virtual co-laboration.

After the writing game this piece was written iteratively by all co-authors equally. Given that working with materials of others was part of the writing game, not a single insight or idea is owned individually by one of us. The set of conjectures about studying, researching and administering at and through virtual universities is a shared, co-created and co-curated one. We hope the conjectures and their interrelations are open and relatable. That is, we hope that they can be worked with by yet other ›others‹ as well. We invite readers to engage in reading as an exchange⁹ of gifts, as circulation beyond economic modes of commodification.

Given the conference we were part of and given the volume in your hands or on your screen, we focus more specifically on the relationship between knowledge on the one hand and infrastructures and technologies on the other. This includes, thirdly, reflecting on the positions and positioning of the participants in these virtual ensembles. While reading, we encourage you to ask yourself what specific focus would you bring to the discussion?

The following is thus both a documentation of our encounter and a generated evocative exchange as well as an invitation to imagine virtual universities.

2. OrganogrammatICS

Unlike the fixed gears in the administrative machineries of distinguishedly modern universities, digital times are creating seemingly seamless, sometimes even fluid research modes, ways of teaching and ways of administrating universities, thus demanding new organograms. In this section we speculate about a potential organogrammatological re-ordering of how university is done.

Virtual universities are matrixial universities (inspired by Bracha Ettinger)¹⁰ where relationalities and emergence are key, since these universities are providing experiences of the real and symbolic beyond language, yet through material-discursive co-creation. They no longer provide one anchor point for their students,

8 Ingold, Tim (2007): *Lines. A Brief History*, London/New York: Routledge, p. 101.

9 Liboiron, Max (2020): »Exchanging«, in: Kat Jungnickel (ed.), *Transmissions. Critical Tactics for Making and Communicating Research*, Cambridge, MA/London: MIT Press, pp. 89–107; RUSTlab et al. (2024): »Please Go Away... We're Reading: A Practice Approach to a Taken-for-Granted Academic Craft«, in: *On_Culture* 16. Online: <https://doi.org/10.22029/oc.2024.1415>.

10 Ettinger, Bracha (2006): *The Matrixial Borderspace*. Minneapolis, MN: University of Minnesota Press.

educators, researchers, not even for managers. The concept of the ›line manager‹ is becoming obsolete at the virtual university, as hierarchical lines no longer exist (albeit that they may re/emerge un/expectedly, given their historically determining force).¹¹ Organograms can no longer be drawn up as structured hierarchical representations of organizations, borrowing from graph and order theories. The virtual university is no longer visualisable as a tree. Organisations also tend to be visualized as nested Venn diagrams, thus borrowing from set theory. For the virtual university, however, their attractive and seemingly inclusive circles must be changed—their edges should become Möbius strips rather than circles simply being straightforward and enclosing, still representing hierarchically structured groupings. When nested Venn diagrams meet the topology of the Möbius strip, inside and outside of circles are in conversation or even entangled, yet—unlike the topological Möbius strip and much like the hierarchy of graphs, order and sets—relations of in- and exclusions do not *not* materialize at the virtual university. Students, educators and researchers may temporarily reside in a circle of the ›Möbius-stripped Venn diagram‹, or they are fully on the move on an edge that makes orientation a challenge and the organisational experience ambiguous. Circles may choose a manager for the time being. Hopefully this manager creates non-hierarchical relatings inside the circle and walks the stripped edge for individual, collective and/or institutional ›cutting together-apart‹.¹² There are no permanent closing doors in careers and studies at the virtual university. There are only sets and subsets, and encircling studying, teaching, or research teams and their multi-experiential edges that oscillate between inside and outside. The institution's glue is provided by the navigational experience of the edges of the nested circles.

But these diagrammatic and phenomenological musings can only be the start of developing new organograms, since Möbius-stripped Venn diagrams are simple 2-D manifolds, useful only for rethinking vertical hierarchies of line management and institutional prejudice and bias. At an information-based university such as the virtual one we need many-dimensional organograms for fluid hierarchies which incorporate flat and vertical structures through fully Möbius-strip-like interconnections. In order to accommodate the complexity of a virtual university, which has a planetary scope and produces planetary knowledge,¹³ we could figure an organogram that draws inspiration from multi-dimensional manifolds in modern mathematics and

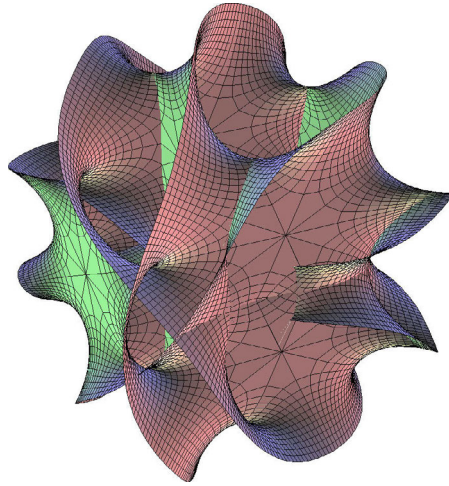
11 See Sara Ahmed's older and more recent work on what happens during institutional encounters: Ahmed, Sara (2000): *Strange Encounters. Embodied Others in Post-Coloniality*, London/New York: Routledge; Ahmed, Sara (2012): *On Being Included. Racism and Diversity in Institutional Life*, Durham, NC/London: Duke University Press; Ahmed, Sara (2021): *Complaint!*, Durham, NC/London: Duke University Press.

12 Barad: *Diffractioning Diffraction: Cutting Together-Apart*, pp. 168–187.

13 Sørensen, Estrid (2025): ›Planetary Knowledge and a spheric academia‹, in: sts-hub.de. Online: <https://sts-hub.de/25/panels.html> (last access: 10.06.2025).

mathematical physics, such as the Calabi-Yau manifold (Fig. 1) or other folded phenomena, incorporating the idea of the Mandelbrot fractal and connecting it fully with the intra-active relationality of quantum mechanics as well as socio-cultural dynamics.¹⁴

Fig. 1: Calabi-Yau Manifold.



What is created at such a virtual university? First, a new institutional reality. Obviously, the position and role of individuals and groups change towards themselves and others and towards the institution. But these individuals and groups also relate to society at large, through its permeable and dynamic borders. Second, what is created is what academics bring to each other and to society: facts about nature and society and speculations about where society and nature are going to. At the virtual university, speculations have the same value as facts. After all, facts are nothing but dutiful descriptions of how virtual reality has, in the here and now, actualized.¹⁵ Projecting actualized fact-based descriptions onto reality, science and scholarship risk getting stuck and fail to prepare people for what may come and for realising that the

14 For further suggestions on integrating multidimensional manifolds into cultural theory, see also: Dippel, Anne (2025): »Erfahrungen fangen, Erkenntnis gestalten. Ethnografische Reflexionen unter imaginären Weltverstehenden und realistischen Traumfangenden«, in: Sabine Eggmann/Martina Röthl/Barbara Sieferle (eds.): *Lesebuch Erfahrung*, Münster: Waxmann.

15 Deleuze, Gilles (1991): *Bergsonism*, New York: Zone Books. Grosz, Elizabeth (2004): *The Nick of Time. Politics, Evolution, and the Untimely*, Durham, NC: Duke University Press. Grosz, Elizabeth (2005): *Time Travels. Feminism, Nature, Power*, Durham, NC: Duke University Press.

planet is, for lack of imaginative methods, damaged.¹⁶ Widening our scope for speculation means increasing our awareness of the multitude of possible actualizations of, and at, the virtual university.

Let us try some more organogrammatology. A virtual university might need new modes of diagrammatic representation, since the university is *rhizomatic and arboretic*.

In *A Thousand Plateaus*, Gilles Deleuze and Félix Guattari write:

»Let us summarize the principal characteristics of a rhizome: unlike trees or their roots, the rhizome connects any point to any other point, and its traits are not necessarily linked to traits of the same nature; it brings into play very different regimes of signs, and even nonsign states. The rhizome is reducible neither to the One nor the multiple. [...] It has neither beginning nor end, but always a middle (*milieu*) from which it grows and which it overflows. [...] In contrast to centered (even polycentric) systems with hierarchical modes of communication and preestablished paths, the rhizome is an acentered, nonhierarchical, nonsignifying system without a General and without an organizing memory or central automaton, defined solely by a circulation of states.«¹⁷

The virtual university generates an interesting response to Deleuze and Guattari's seductive plea for rhizomatics. But the digital infrastructure of virtual universities is built on tree-diagrammatic structures, categories, algorithms, referencing towards IP-addresses as much as shared documents, it is also *arboretic*. While Deleuze and Guattari question the need for trees and highlight the need for rhizomes, the virtual university will need both—tree-diagrammatics for the informatic aspects of virtuality, and rhizomatic approaches for both the socio-material and cultural-natural entanglements. The digital era brings back the *porphyric tree*¹⁸ of knowledge, only that now it is embedded within the informatic architecture through which we create knowledge, but also embedded in positionalities, situated at intersections of all kinds. In contrast to Foucault's critique of classical porphyric knowledge concepts, bound to spatio-temporality, these trees of knowledge are based on digital lineages, on electronic *agencements*, on discrete operations, including more-than-living into the experience of life. Based on data lineages and informatic arboretics as much as

16 cf. Tsing et al. (eds.) (2017): *Arts of Living on a Damaged Planet. Ghosts and Monsters of the Anthropocene*, Minneapolis, MN: University of Minnesota Press.

17 Deleuze, Gilles/Guattari, Félix (1987): *A Thousand Plateaus. Capitalism and Schizophrenia*. Translated by Brian Massumi, Minneapolis, MN: University of Minnesota Press, p. 21.

18 Dippel, Anne/Aksoy, Filiz Laura (2025): »Auf der Suche nach der verlorenen Violdimensionalität. Gedanken zum Un/Möglichen von digitalen Plattformen im Bündnis mit Cornelius Castoriadis und Jacques Derrida«, in: Sandra Hofhues/Julia Schütz (eds.), *Plattformen für Bildung*, Bielefeld: transcript, pp. 389–403.

rhizomatic entanglements, the knowledge generated is rooted in multiple spatio-temporalities more akin to the social time of complex kinship-systems and their diagrammatic representations.¹⁹

Thus, the knowledge emerging out of matrixially experienced and virtually designed universities implies the notion of radical situatedness, which includes questioning the situatedness of situatedness itself.²⁰ Here, questions like »where am I situated within the university's organogram?« or »who am I at the virtual university?« are not situated enough. Those working at virtual universities are situated not only on the edges and in the circles but also at the intersections of these Möbius-stripped Venn diagrams, in the folds or fractals, in rhizomatic dynamicity, and they experience an *odradological condition*, i.e. a condition of radical openness and uncertainty of their ontological position. Their work at various points on the permeable and moving Möbius-stripped Venn diagram enfolds in the atmosphere of productive uncertainty regarding the meaningfulness of their own working process and the processuality of meaning in general. In line with the obstinacy of the Odradek, which is both a »fragile yet indestructible thing« and a human-like being who acts »like an orphan child, an unbegotten child«,²¹ working at virtual universities is shrouded in paradox and uncertainty. This condition contains a situated uncertainty coming along with living in topologies that are manifolds beyond a four-dimensional space-time—at least when it comes to the experience of living and working within the virtual university. The odradological condition is connected to the situatedness of all of us within the virtual and calls for new diagrams which could inspire new choreographies, to navigate the cuts and ruptures in the course of academic work at the university along with the multiplication of its tasks and needs. Given the current situation, when we experience the odradological condition as part of the matrixial university but lack any proper organogrammatological re-ordering of doing university and producing knowledge, we are tempted to ask:

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- 19 Dippel, Anne (2024): »Schaltkreisexistentialismus. Zu den elementaren Auswirkungen algorithmischer Kuratierung auf das Verhältnis von abstrakter und sozialer Zeit in der Digitale«, in: Hannes Moser/Libuše Hannah Veprek (eds.), *Kulturwissenschaften und neue Technologien. Zwischen Technikentwicklung und öffentlichen Diskursen*, Bielefeld: transcript, pp. 169–194.
- 20 Compare the genealogy of situatedness at: Sprenger, Florian (2025): *Ich-Sagen. Eine Genealogie der Situiertheit*, Berlin: August Verlag.
- 21 Gross, Kenneth (2022): »Odradek«, in: id. (ed.), *Dangerous Children. On Seven Novels and a Story*, Chicago, IL: University of Chicago Press, p. 103. Within this indeterminate space, the Odradek unfolds as a virtual entity, oscillating between the potentials that constitute it, cf. Rieger, Stefan (2024): »Kafkas Odradek. Wenn Literatur in die VR geht«, in: *virtuelle-lebenswelten.de*. Online: <https://www.virtuelle-lebenswelten.de/blog-post/kafkas-odradek> (last access: 14.10.2025).

3. What do the members of virtual universities do, and how do they feel?

For those trying to make a living, vying for an academic career within the shifting structures of the university, there arise virtual and real challenges. The historian of neo-liberalism and recent commentator on the rise of neo-fascism, Quinn Slobodian,²² helps us to understand that beyond the liberal drift, governmental attacks on critical thought emerging within university life might be an acceleration of the already precarious status of much academic work. In terms of an increase of possibilities, virtualizing the university accelerates these processes. Universities create online spaces as junctions where scholars and students meet and connect through shared experiences and exchange ideas, some of which are turned into notes, often never to be looked at again, to be left behind while searching for the Zoom link for the next meeting. Still, such notes shape and demonstrate the pregnancy of hidden documents all around and within us. Potential data, potential potentiality.

In a situation of precarious working conditions and accelerating academic competition, the ever-increasing speed of CPUs and GPUs—regardless of the slowing down of Moore's law—and thus of parallel processing and digital multitasking motivates us to do all at once and at the same time until the server breaks down. Every waiting and emptiness to start pondering. This moment of interruption is hardly likely, though, since data centres mostly guarantee a minimum of 99,999 % uptime. A mere five minutes of downtime per year leaves little room for untethered thoughts.

Futures mostly come in tales of utopia or dystopia. The virtual university oscillates between the two and is fuelled by the tensions between them. A dystopian imaginary of a virtual university may include a call for efficiency that works with your fear of not being good enough, of being less than the always-on, always-conferencing other. As Bruno Latour notes, modernity is driven by the anxiety of missing-out, of being left behind, a mode that intensifies in more-than-modern worlds.²³ And then sometimes such ›FOMO‹ (fear of missing out) is moved to a space of as-if and transforms into an idea. We enter digitality through ›circuit existentialism‹,²⁴ an era of a nearly entangled kind of planetary kinship, beyond species, held together by data lineages, experiencing the necessity to switch off and be here, to become *ibilocal*, i.e. part of those who relate to and care for the space and place and their atmospheres and biospheres. The virtual university asks for experiencing our surroundings in the present, taking infrastructure walks, as we did together during the conference that was the starting point for this text, thinking about redesigning

22 Slobodian, Quinn (2023): *Crack-Up Capitalism. Market Radicals and the Dream of a World Without Democracy*, New York: Metropolitan Books.

23 Bruno Latour: *The Ultimate Interview of the Most Famous French Sociologist* (2022) (France, D: Camille de Chenay/Nicolas Truong).

24 Dippel: *Schaltkreisexistentialismus*, p. 179.

spaces, plant communities, stone, iron and rust. The virtual is not to be confused with the digital sphere. The utopia of the virtual university is a planetary-minded one, situated on a planet nestled or planted at the outskirts of the realm of Sagittarius A*, the black hole at the centre of our galaxy. Thus, doing and practicing the virtual university creates knowledge which forms and is forming, shapes connections and is connecting, allows for experiencing education that transforms, serves the awareness of communal beingness. It is a place of education (*Bildung*) for an individual that is a relational one and not a singular alone. The members of the virtual university engage in practicing, search for knowledge that is agential, and creates value beyond the economic principles of growth. Those who are doing virtual university seek to learn and teach self-reflection as well as empathy to create new forms of knowledge for new formations of life on planet earth. The virtual university is granting grace to what is there, for acknowledging heterogeneity and acting upon this experience accordingly, respecting creation(s) and being creative.²⁵

Re-ordering universities may induce new and unexpected topologies, new forms of dependencies, new and perhaps yet-to-be-described relations of exploitation, knowledge extractivism and accumulation. Where do all these take place; how do they relate to each other? What do they feel like? A virtual university appeals not only to virtues but also to senses. Where is the body in cyberspace? Cyberspace, no longer only the online but the physical not as a contrast to the cyber space—a new sensual situation.

Entangling both utopia and dystopia, the virtual university may leave a space for a diffracting mode of critique, generating productive conflict rather than fertilising a better model for a nepotistic academic system which mostly educates students as soon-to-be-minions at companies and start-ups, serving industries who understand education as training grounds for strong-acting and weak-minded market players. While the humanities and social sciences are engaged in critique, companies and other scientists develop technologies and objects that seduce people with never needed objects, while often numbing their taste and making them hungry for more. Turning away from the critique of concern²⁶ and perhaps even care,²⁷ a university with grace may emerge and relax both bodies and servers, thus offering moments of slow creativity²⁸ and collaboration across differences, benefitting from the heterogeneity of universities. Profit-oriented academics are right concerning one

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- 25 Breil, Patrizia/Sprenger, Florian (2026): »Zur Virtuellen Universität«, in: Patrizia Breil/Florian Sprenger (eds.): *Virtuelle Universität. Geistes- und gesellschaftswissenschaftliche Zugänge*. Bielefeld: transcript, pp. 11–17.
 - 26 Cf. Latour, Bruno (2004): »Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern«, in: *Critical Inquiry* 30, pp. 225–248.
 - 27 Cf. Puig de la Bellacasa, María (2017): *Matters of Care. Speculative Ethics in More Than Human Worlds*, Minneapolis, MN: University of Minnesota Press.
 - 28 Stengers, Isabelle (2018): *Another Science is Possible*, Cambridge: Polity Press.

point: It is good to think about the good²⁹ rather than to envision the bad. Experimenting with better futures may start within the institutions of universities themselves, considering the correlation between burned-out scientists and the burning planet, and between healthy bodies and a healthy planet. A virtual university may start by building an institution that is not driven by the digital but indeed by the virtual, carving out spaces for both healthy bodies and a healthy planet in the distributed situation that we have found ourselves in post-COVID.

We may think of speculability as defining the critique of the inherent need of western philosophy for a spectacular representation of knowledge combined with the critique of speculative ontologies, most prominently featured in statistical-stochastic approximation to truth via informatic means. It is considered part of political theory in the tradition of Hannah Arendt and Audre Lorde to put the critical analyst into the position of enabling for new modes of thinking within the current conditions that take hermeneutics and serendipity as inherent and serious to the matter.³⁰ The question that follows concerns the virtual architectures of knowledge themselves—how critique moves through them, how knowledge roots and flows within algorithmic conditions.

4. Virtual disciplines, or: how does one speak (truth) at virtual universities?

»I am rooted but I flow.«³¹ What does it mean for knowledge at virtual universities to both being rooted and flow? Is the river just a flow or can a river also be where one finds the roots for a pedagogy, at least?³² Is computation a form of rooting, or can it represent a flow? Is the generativity of Generative Artificial Intelligence (GenAI) also a flow, including its hallucinations hence glitches? Is artificially enhanced writing by

29 cf. Mol, Annemarie (2008): *The logic of care. Health and the problem of patient choice*, London/New York: Routledge.

30 Arendt, Hannah (1958): *The Human Condition*, Chicago, IL: University of Chicago Press; Lorde, Audre (1984): *Sister Outsider: Essays and Speeches*, Trumansburg, NY: Crossing Press.

31 The quotation comes from: Woolf, Virginia (1931): *The Waves*, London: Hogarth Press. It has been famously mobilized by: Braidotti, Rosi (2002): *Metamorphoses. Towards a Materialist Theory of Becoming*, Cambridge: Polity Press. The link between Woolf and Braidotti, including the quotation, is discussed in: Adkins, Peter/Clemens, Ruth Alison/Ryan, Derek (2022): »Guest Editors' Introduction. Reading Braidotti / Reading Woolf«, in: *Comparative Critical Studies* 19:2, pp. 115–127.

32 Serres, Michel (1997): *The Troubadour of Knowledge*, Ann Arbor, MI: The University of Michigan Press. Serres, Michel (2015): *Thumbelina. The Culture and Technology of Millennials*, London/New York: Rowman & Littlefield International. Van der Tuin, Iris/Zuurmond, Anouk (2021): *Serres on Education*: William Temple Foundation.

academics still following the same flow as the one still rooted in the reclusive experience of solitary or the communal experience of co-laborative writing? Is GenAI rooting? Rooting and flowing, we may conclude, are no opposite movements. They are both transformative, matrixial and part of experiencing emergence as state of being. We can transpose this insight to what we think about a university: Are a university's roots its flowing disciplines?³³ Are a university's flows its habitual processes, for better or for worse? A university that is both rooted and flows also questions habitual definitions and practices of rooting and flowing. It does so through *argumentation*. And it needs language.

Will the virtual university be a place of the many languages or of a lingua franca? Artificially enhanced writing and reading call for precise argumentations. They need a wide range of diverse grammars to create the tempo-spatial movements of an argument that reflects the complexity of life. As a place of life and living, the virtual university serves as the infrastructure for these kinds of argumentation. The virtual university might be shattered by the return of pre-colonial worlds through large language models and the return of the necropolitical colonizer through informational economy.³⁴ But it is a living organism and thus exemplifies a new episteme, freeing the world from the Platonian cave and the constant gravitating towards Newtonian cages. The virtual university thus seeks to combine hermeneutical, anti-hermeneutical and non-hermeneutical methods, qualitative and quantitative reasonings, it attempts to attain sound argumentations.

Speaking thus of epistemology, how do virtual universities deal with truth? Under postmodern conditions, knowledge is said to have lost its seemingly natural connection to truth, becoming instead indebted to an economic teleology that aims at maximum efficiency.³⁵ In the era of digital reason, this method of optimising efficiency is increasingly being incorporated into the temporal logic of speed and

33 Klein, Julie Thompson (1993): »Blurring, Cracking, and Crossing. Permeation and the Fracturing of Discipline«, in: Ellen Messer-Davidow/David R. Shumway/David Sylvan (eds.), *Knowledges. Historical and Critical Studies in Disciplinarity*, Charlottesville, VA: University Press of Virginia, pp. 185–211. Weingart, Peter (2018): »Interdisciplinarity: The Paradoxical Discourse«, in: Id./Nico Stehr (eds.): *Practising Interdisciplinarity*, Toronto/Buffalo/London: University of Toronto Press, pp. 25–41.

34 For a striking filmic rendering of the historically determined entanglement of ICTs (Information and Communication Technologies) and AI-driven platforms, knowledge and information economies, and pre- and post-colonial relations, see *Ghostworkers* by researcher Claartje ter Hoeven and maker Lisette Olsthoorn: Olsthoorn, Lisette/Ter Hoeven, Claartje (2024): »Ghostworkers«, in: lisetteolsthoorn.com. Online: <https://www.lisetteolsthoorn.com/ghostworkers> (last access: 23.06.2025).

35 Lyotard, Jean-François (1984): *The Postmodern Condition. A Report on Knowledge*, Minneapolis, MN: University of Minnesota Press.

accessibility, i.e. the idea of »fast knowledge«.³⁶ Digital technologies enable large amounts of data to be processed and made available quickly. The expectation of constant access to information, supposedly independent of the individual, places new demands on universities and their employees. As knowledge administrators, academics merely function as a nexus for personal development by distributing symbolic knowledge attributes such as degrees and credit points. Once recognised as a key driver of innovation in the post-industrial era, theoretical knowledge has become an important currency for social change³⁷ and the accumulation of symbolic capital. In this knowledge-based society, the motive behind institutional knowledge production is not unconditional but rather focused on producing knowledge as a calculable, controllable resource that can be presented as credentials in CVs and funding proposals. This turns knowledge into a commodity and transforms the university into a factory.

Virtual universities are no such factories. Lecturers are not service providers, and excellence at the virtual university is not defined by marketability criteria. Knowledge at virtual universities is not bound by the concept of universal truth or any notion of an objective, context-free ›thing in itself‹. Taking a comfortable distance from ambitions of universalised truth or economic profit, the »situated knowledges«³⁸ generated in and through the virtual university painfully acknowledge the unknown, the not knowable and non-knowledge which is always other to any knowledge claim. Virtual universities work with and against the fluid ontology of truth. This stands in stark contrast to GenAI, which seemingly remains committed to a single, bodiless, universal truth. While ›on-site‹ warnings say that the specific GenAI *may* ›make mistakes‹ and that answers must be checked thoroughly, Ritzer et al. (2024) emphasise that a major problem could arise ›if people rely on knowledge ›generated‹ by AI and come to see it as accurate, even if it is not«.³⁹ However, as little as one important follow-up question is enough for GenAI to confess: it did not manage to produce an exact answer, it just guessed, reproduced or created text based on probabilities. When working with GenAI, another kind of knowledge enters university co-working practices and renders academics to take another matrixial rotation on the strips of their scientific production. At the same time the prompt becomes a site of situatedness: Individual intuitions and statistical arrays of knowledge called AI-Models are coming together to create meaning. Should then

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- 36 Peters, Michael A. (2015): »The University in the Epoch of Digital Reason. Fast Knowledge in the Circuits of Cybernetic Capitalism«, in: *Analysis and Metaphysics* 14, pp. 38–58.
 - 37 Bell, Daniel (1976): »Welcome to the post-industrial society«, in: *Physics Today* 29:2, pp. 46–49.
 - 38 Haraway, Donna J. (1988): »Situated Knowledges. The Science Question in Feminism and the Privilege of Partial Perspective«, in: *Feminist Studies* 14:3, pp. 575–599.
 - 39 Ritzer et al. (2024): »McDonaldization and Artificial Intelligence«, in: *Postdigital Science and Education* 6:12, pp. 1320–1333, here p. 1323.

not only text but additionally prompts be what is published and exchanged, made observable as the sites where knowledge is being negotiated? Argumentation needs lines to follow, but if we engage in dialogue with LLMs (large language models), we need to set up other traces for readers, too. Most importantly: The virtual university should stay a place where writing and reading are a happy place, a place of creativity, with or without GenAI, thus understanding virtual universities knowledge to be situated, i.e. intertwined with the specific socio-historic conditions of its (re)production.⁴⁰ Any knowledge can only be related to some-things, some-where,⁴¹ just as much as it is necessarily entangled with, dependent on and indebted to the non-knowledge of no-thing and no-where. This tension generates virtual knowledge that is both observable and performative while speculative and as-if. Aside from the demand for economically lucrative knowledge or AI-generated non-knowledge, the virtual university, itself being situated, is bound to oscillate between synaesthetics and proximity. This way it is able to simultaneously counter and engage with an age where truth is questioned. Synaesthetics facilitate the virtual university's ability to speculate and to envision the as-if,⁴² while proximity situates and roots university endeavours in its own institution. It works with its own proximities, which means across administration, research and studies; on campus and within the realms of its infrastructure. It leaves behind the idea that administration is neutral and working in the background and turns administration itself into a research object.⁴³ The synaesthetics of virtual universities call for new imaginations and the envisioning of practices, values and rules through experiences, sound, atmospheres, colours; it is a call for »dreaming out loud while already engaging in a profession of faith«.⁴⁴

40 Haraway: *Situated Knowledges*, pp. 575–599.

41 cf. Haraway, Donna J. (2016): *Staying with the Trouble. Making Kin in the Chthulucene*, Durham, NC: Duke University Press

42 Derrida, Jaques (2002): »The future of the profession or the university without condition (thanks to the »Humanities«, what could take place tomorrow)«, in: Tom Cohen (ed.), *Jaques Derrida and the Humanities. A Critical Reader*, Cambridge et al.: Cambridge University Press, pp. 24–57.

43 Sørensen, Estrid (2026): »Die Als-ob, die Langsame und die Planetare Universität: Drei Formen möglicher Universitäten«, in: Patrizia Breil/Florian Sprenger (eds.): *Virtuelle Universität. Geistes- und gesellschaftswissenschaftliche Zugänge*, Bielefeld: transcript, pp. 493–500.

44 Derrida: *The future of the profession or the university without condition*, p. 35. The need for new imaginings at the virtual university, possibly, here, as a follow-up of the GenAI academy, mirrors Alfred North Whitehead's call for imaginative methods at the brand new Harvard business school, when he said that »the proper function of a university is the imaginative acquisition of knowledge« (Whitehead, Alfred North (1929): *The Aims of Education and Other Essays*, New York: The Macmillan Company). Similarly Lyotard, when he found himself confronted with good-old ICTs with fast copying capabilities, argued as follows: »Given equal competence (no longer in the acquisition of knowledge, but in its production), what extra performativity depends on in the final analysis is ›imagination‹, which allows one either to

Virtual universities are faithful in their loyalty to knowledge, albeit counteracting relativist or universalist notions by means of situatedness and imagination. The virtual university to be dreamt of is an »optimistic university« that rethinks university into the future.⁴⁵ As such, it envisages future universities based on its current situation; its speculations are rooted in its lifeworld while projecting the as-if and the »not yet«. While addressing pressing issues of our time and reflecting on its own situatedness, the virtual university shifts social epistemological demands away from universal claims towards a future-oriented kind of university that remains situated; born in the mode of as-if, and operating as both a performance and a speculation.

5. Virtual universities, why now?

Virtual universities are maybe the core infrastructures to imagine in an age when truth is in question; it calls for synaesthetic and proximities—physically as much as in the so-called cyberspace. The pandemic—a planetary horror—gave a big push towards virtual universities, it allowed for normalizing the use of ICTs, it loosened the grip of print on administration, it calls for new modes of communication and teaching, new ways of getting-together. We will need a de-centred university that is creating, administering, teaching and researching on platforms that belong to ourselves, that protect researchers and those who are researched (human and non-human). This infrastructure can be built with the help of AI, but it should not serve AI or LLMs as a marketplace. This virtual university needs to be built and develop an alternative capital theory, a theory that gracefully attributes gift-values in addition and/or in contrast to the existing logics of valorisation.

Universities are part of and exposed to market forces, at the same time what they are seeking is exempt from an unbound digital market economy. To escape the binding of market powers, the virtual university requires us to do the right politics and imagine the right constitution(s). It calls for exploring norms and laws, systems and the critique of those. It treats the knowledge taught and researched at the university with grace. It asks to care for and protect us, our communities and our surroundings in a planetary collective, to not only research those »outside« the university. Universities have always been nuclei for new theories, ideas and methods, they have always been trans-generational and even trans-species places: Now, as university is becoming a place for those escaping powers, we need to protect it from the pursuit of de-naturalizing conditions of (self)-alienation. The virtual university is a place of

make a new move or change the rules of the game.« (Lyotard, *The Postmodern Condition*, p. 52).

45 Barnett, Ronald/Bengtson, Søren (2017): »Universities and Epistemology. From a Dissolution of Knowledge to the Emergence of a New Thinking«, in: *Education Sciences* 7:1.

inspiration and invites others beyond institutional boundaries to experience with grace for all that is and to create with respect for everything that has been and will be. The virtual university might be not a safe space, but it can be a caring base for today and also for the day after tomorrow.

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Fig. 1: Calabi-Yau Manifold. Source: Floriang (2011): »Ein Schnitt durch eine Calabi-Yau, die Quintik«, in: [wikipedia.org](https://de.wikipedia.org/wiki/Calabi-Yau-Mannigfaltigkeit#/media/Datei:Quintic_1.png) (03.02.2011). Online: https://de.wikipedia.org/wiki/Calabi-Yau-Mannigfaltigkeit#/media/Datei:Quintic_1.png (last access: 02.07.2025).

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