

*SPECIAL SECTION:*

**MATERIALITIES  
OF THE  
INTERFACE**

Usually, the relationship between user interfaces and materiality is addressed via a problematisation of differences. Whereas user interfaces are often considered 'surfaces' which hide the 'materiality' of the 'deep' technological structures in order to establish a more 'intuitive' or 'fluid' user experience, critical perspectives on user interface analyses such processes as a form of 'concealment' of the material side of these technologies. Breaking with common perceptions, user interfaces are considered to be technologies which implement an artificial 'naturalness' of their use and consequently their use as a consumer product. Yet, to criticise the, much quoted, 'invisibility' or 'transparency' of interface-materialities is in turn committed to dualistic assumptions such as 'frontend/backend' or 'human/machine.' By now, it is generally accepted that user interfaces cannot be primarily regarded as technologies of controlling a computer, but as networked configurations which enable complex human-machine interactions. In consequence, challenges to this kind of 'critical' thinking have emerged. Critical interface theory has to take into account the fact that the materiality of interfaces has changed considerably (and is constantly changing). With the rise of the internet of things, the rapid development of machine learning and the subsequent proliferation of 'smart devices' and their respective 'medialities,' it is no longer enough for a critical approach to uncover a materiality 'behind' the interface. For example, in the era of so-called 'Natural User Interfaces' it is necessary to transform old distinctions like those between 'semiotic' and 'material' structures. The user inter-

faces of today are technologies in which semiotic, cognitive and material aspects of digital media technologies converge in habitualised practices ('interactions'), e. g. now ubiquitous gestures like 'pinch-to-zoom'. Hence, to engage in a critical interface-theoretical discussion leads almost necessarily to a discussion on the status of materiality in media theory in general. A critical perspective on interfaces must discuss theoretical notions of materiality with regard to everyday practices as well as with regard to highly specific forms of interface use. This includes a consideration of the materiality of practices and media that are usually not part of the core area of the paradigm of the traditional GUI (Graphical User Interface). Interesting theoretical notions can be found e. g. in specific media theories such as film theory or general media theory and media philosophy.

The following essays address this issue by giving insights into the contemporary discussion about the materiality of interfaces. In the first article Christoph Ernst discusses the concept of "material metaphors" as it is proposed by Marianne van den Boomen. For Ernst, van den Boomens concept of material metaphor ignores the boundary between non-discursive and discursive aspects of the production of meaning in interfaces. Although the idea of material metaphors is problematic, insofar the 'materiality' of interface metaphors is positioned against a more traditional view of the semantics of interfaces, van den Boomens idea is on the right track giving interface theory a powerful concept to rethink the materiality of interfaces. In the second essay, Konstantin Haensch uses the example of smart speak-

ers to show how these technologies fit into everyday life as “strategic media objects.” Based on the fact that the transformation of everyday objects represents a “new” way of interfacing with material culture, the essay shows to what extent new interface regimes are implemented. The essay calls for a critical analysis of these objects as visible “things” (and not invisible “objects”), drawing on ideas derived from media philosophy and discourse analysis. In the third and final text, Elisa Linseisen discusses the epistemic practice of zooming with regard to its interface-theoretical aspects. In contrast to the old distinction between “surface” and “depth” high-resolution interfaces represent a new media culture in which practices of interaction, change and creation of objects are in the foreground. Using a case study covering a period from 1958–2020, Linseisen argues that zooming can be used to grasp a media culture in which differences arise from the materiality of high-resolution digital images.

The three essays of this special section are based on a panel of the German Society for Media Studies (GfM) working group on Interfaces that took place during the annual conference of the GfM at the University of Köln in September 2019. The authors are grateful to the other panelists, Till Heilmann (Bonn) and Sabine Wirth (Marburg), for their contributions to the panel and its conception, and Karoline Kozłowski, for her great help during the finalization of the manuscript.

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# ARE THERE MATERIAL METAPHORS? A COMMENT ON MARIANNE VAN DEN BOOMEN'S INTERFACE THEORY

By Christoph Ernst

*“The question of how practices are configured in interfaces is undoubtedly a key question in interface theory. But are we doing ourselves a favour by explaining interface arrangements or interface processes as material metaphors?”*

Suggested citation:

Christoph Ernst, Are there material metaphors? A comment on Marianne van den Boomen's interface theory. *Interface Critique* 3 (2021), pp. 277–284.

DOI: [10.11588/ic.2021.3.81318](https://doi.org/10.11588/ic.2021.3.81318).

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# Materiality and media theory

In interface theory, Marianne van den Boomen's concept of "material metaphor" brings together two things that for many do not belong together, namely semantics and materiality. With the relation between semantics and materiality a key issue of media theory is touched. The history of media theory is also the history of tracing meaning, which was for a long time primarily regarded as exclusively an issue of semiotics, back to its material foundations.<sup>1</sup> Traditionally this is expressed in an argument consisting of two premises: First, the thesis of 'invisibilisation through immaterialisation' is put forward. According to this thesis, media can be described historically as technological entities which carry a double promise of immaterialisation. On the one hand, photography, telegraphy, television, digital media all 'immaterialise' the reference to the world, on the other hand they do this in an almost 'invisible' way. The immaterialisation is not recognised as such. Second, in media studies this thesis is linked to the claim, that the main task of media theory is to clarify the material conditions of this process. With critical intent, media theory attempts to remind us of the 'materiality' of the medium and to reveal specific socio-cultural circumstances and contexts that are in-

corporated into the constitution of meaning. User interfaces of digital media are a paradigmatic example of this dual perspective. On the one hand, user interfaces can be understood historically as an attempt to render material conditions of the medium invisible. Within media theory, on the other hand, this puts interface theory in the position to 'reveal' the arrangement and embedding of interfaces in their material context. Such an attempt is made by the concept of the material metaphor by Marianne van den Boomen. In the following remarks, I would like to reconstruct this concept of the material metaphor in van den Boomen's work and provide a brief comment.<sup>2</sup>

## The concept of "material metaphors"

Van den Boomen speaks of material metaphors in order to describe "digital-material transcodings by metaphors," which are paradigmatically formed in user interfaces: "[...] material metaphors not only organize ways of reading, referring, and interpreting, but they also configure social and cultural praxis."<sup>3</sup> Material metaphors thus 'configure' digital practices. In order to think of this

<sup>2</sup> I'm grateful to Jan Distelmeyer for introducing me to the works of Marianne van den Boomen.

<sup>3</sup> Marianne van den Boomen, *Transcoding the digital. How metaphors matter in new media* (Amsterdam 2014), p. 22

<sup>1</sup> Hans Ulrich Gumbrecht and Karl Ludwig Pfeiffer (eds.), *Materialities of communication* (Stanford, CA 1994).

configuration of practices, a concept of metaphor is put forth that goes beyond a cognitive definition of the metaphor as it is first and foremost developed in cognitive linguistics.<sup>4</sup> This transgression is indicated by using the term ‘materiality.’ Metaphors are regarded to be entities in the material world of things which structure social and cultural practices of using an interface.

In order to substantiate this rather usual view on metaphor, van den Boomen reinterprets the traditional metaphorical relationship between “source-” and “target-domain.”<sup>5</sup> She postulates that this fundamental relationship actually consists of two relations that can be understood as “representation” and “performativity.” According to her argument, representation means that in a metaphorical relation ‘something stands for something else.’ Metaphorical performativity, on the other hand, means that the metaphor is an active vehicle that mediates and organizes in a network of meanings. This is what van den Boomen is getting at when she writes that metaphor is a “productive and performative material-semiotic-device”:<sup>6</sup> “[...] material metaphors indicate a general way of mediating and organizing a network of traffic between words and world.”<sup>7</sup> And in all clarity:

*Decisive is the traffic they [the metaphors, C.E.] enable, conduct, or invoke between the symbolic and the material, thereby constituting what can be known, imagined, and narrated, and how it can be addressed, appropriated, and enacted. These material metaphors do not just signify and represent – as all metaphors do – they are also able to evoke acts in the material world with their mobilization of particular physical-material attributes.*<sup>8</sup>

This consideration leads to the assumption that metaphorical relations exist not only between two separate *semantic* domains, but also between two separate *ontological* domains: “What is needed is a theory of metaphor which not only maps transferences between different semantic domains [...] but also between different ontological domains: from concepts to objects, from software instructions to visual icons, from signs to tools [...]”<sup>9</sup> Thus, relations carrying meaning should not only be thought of in terms of a “conceptual reference” to the world of human drawing practices, but also be understood on the level of material indexical references.<sup>10</sup> This is the only way to grasp the operability of characters processed in computers. However, the flip side is a very broad definition of metaphor: “Whenever an image or an object functions as a symbol and is able to entail a change of affairs when enacted

4 George Lakoff, and Mark Johnson, *Metaphors we live by. With a new afterword* (Chicago, IL and London, 2003).

5 Lakoff, The contemporary theory of metaphor, in: *Semiotics. Critical concepts in language studies. Vol. II: Linguistics*, ed. Frederik Stjernfelt & Peer F. Bundgaard (London [et. al], 2011 [1992]), pp. 264–311.

6 Boomen, *Transcoding the digital*, p. 187.

7 *Ibid.*, p. 54.

8 *Ibid.*, p. 55.

9 Boomen, Interfacing by material metaphors. How your mailbox may fool you, in: *Digital Material. Tracing new media in everyday life and technology*, ed. Marianne van den Boomen et al. (Amsterdam 2009), pp. 253–265, here 262.

10 *Ibid.*, p. 261.

in the proper context, it can be considered a material metaphor.<sup>11</sup>

At this point, it is useful to briefly introduce the theoretical premises of this reinterpretation of the metaphor by van den Boomen. Important are three premises regarding media aesthetics, cognitive theory and semiotics.

## Premise 1: Media aesthetics

As is well known, in interface design, metaphors serve as design-principles to make specific functions of digital media available to the user, e. g. the 'desktop metaphor' for file management in traditional personal computing. Van den Boomen, however, uses the example of traditional Graphical User Interfaces to remind us that this availability of certain functions of a medium also means, that machine processes are concealed systematically by the interface:

*The visual tools on our screen thus seem to work as metaphorical stand-ins for complex machine processes. After the metaphorical translation of machine code into human code, there seems to be no way back. Metaphorical sign-tools acquire a life of their own, cannibalizing everything else that might be there. By showing they hide, by translating they substitute.<sup>12</sup>*

What is going on here is an 'invisibilisation' of material processes:

*This concealment of software and hardware pro-*

*cesses cannot be seen as coincidental "non-representing"; it is a necessary and deliberate act against representation. I propose to call this act of deliberate concealing derepresentation. We could then say that computer icons do their work by representing an ontologized stable state, while derepresenting the procedural complexity.<sup>13</sup>*

In Graphical User Interfaces, the meanings derived from subjective human action contexts are reified, while material machine processes are disguised ("derepresentation").

## Premise 2: Cognitive Theory

Such an 'invisibilisation' of material processes at the level of symbols can be analysed by drawing on the cognitive theory of metaphor by Georg Lakoff and Mark Johnson. According to van den Boomen an exemplary "cross-domain mapping" for the metaphor "E-MAIL IS POSTAL MAIL" looks like this:<sup>14</sup>

Source Domain: postal mail	Target domain: e-mail
mailbox	inbox of mail program
letters, packets	messages, attachments
sending and receiving	send or get mail button
sorting, disposing	distribution to folders, deleting
[postal distribution system]	[mail-server network at ISPs]
[delivery by postman]	[consulting a mail server, fetch mail command]

<sup>13</sup> Ibid., p. 256.

<sup>14</sup> This table can be found in Boomen, *Interfacing by material metaphors*, p. 260.

<sup>11</sup> Ibid., p. 262.

<sup>12</sup> Ibid., p. 254.

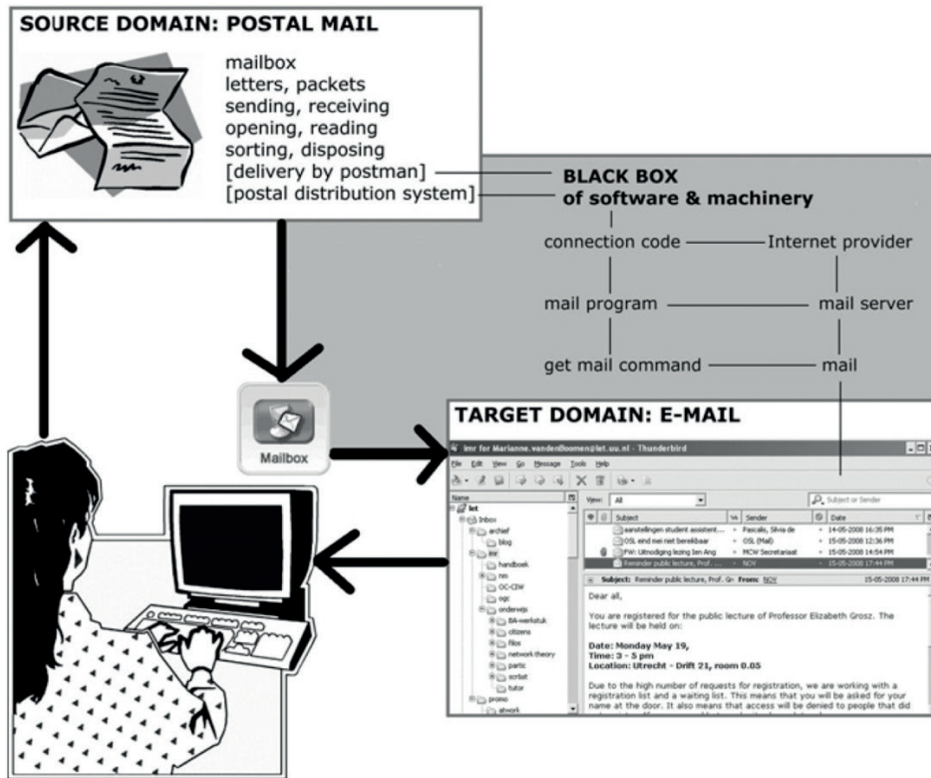


Figure 1: Input-output mechanism of the conceptual metaphor E-MAIL IS POSTAL MAIL

Fig 1: Diagram in Marianne van den Boomen, *Interfacing by material metaphors. How your mailbox may fool you*, in: *Digital material. Tracing new media in everyday life and technology*, ed. Marianne van den Boomen et al. (Amsterdam 2009), pp. 253–265, here 261.

Van den Boomen illustrates this with the diagram in fig. 1.

As it is typical for metaphors, a process of “highlighting and hiding” takes place.<sup>15</sup> The grey spaces of the diagram represent the hidden aspects of the machine processes. According to the diagram, objects that are accessible to the bodily actions (“Zuhandenheit”)<sup>16</sup> tend to be represented symbolically, while the structural material-indexical processes – which van den Boomen also considers metaphori-

cal – are concealed. This, in turn, is formulated through a recourse to a premise derived from semiotics.

## Premise 3: Semiotics

Van den Boomen grasps the “material indexicality”<sup>17</sup> with the help of Charles S. Peirce’s distinction between an “immediate” and a “dynamic object.” According

15 Lakoff, and Johnson, *Metaphors we live by*, pp. 10–13.

16 Boomen, *Transcending the Digital*, p. 40–42.

17 Ibid., p. 47.



to Peirce, in semiotic processes the relation of the “object” has two poles. Peirce writes in his famous *Prolegomena to an apology for pragmatism* from 1906:

*But it remains to point out that there are usually two Objects, and more than two Interpretants. Namely, we have to distinguish the Immediate Object, which is the Object as the Sign itself represents it, and whose Being is thus dependent upon the Representation of it in the Sign, from the Dynamical Object, which is the Reality which by some means contrives to determine the Sign to its Representation.*<sup>18</sup>

Van den Boomen claims that in a mailbox icon, for example, an immediate object constituted by the sign is represented as the source domain and the target domain of the metaphor. In this process, symbols are preferred which are integrated into situated contexts of bodily action (are ‘highlighted’). However, the indexical dimensions of “machine mediations” which tend to take on the role of what Peirce calls the dynamic object remain outside of this process (are ‘hidden’).

By using Peirce’s terminology van den Boomen tries to describe the fact that in interfaces ‘metaphorical immediate objects’ require – given the above-mentioned difference between representation and performativity – not only a “reading” (symbol), but an “action” in the sense of material indexicality, which is negotiated between user and networked machines. The processuality of this in-

dexical “action” is the really critical relation in user interfaces, because it is this relation through which human practices are correlated with the ‘invisibilised’ and machine-sided ‘scripted objects’, i. e. fixed algorithmic processes which gain their meaning as material metaphors.

## The broad concept of material metaphor

The consequence of the three premises is a very broad concept of “digital material metaphors”:

*Without metaphor, there are no boundaries, and no digital object. While non-digital material objects can exist without built-in metaphorical power (say, a stone or a table), there are no digital material objects (or spaces) without a metaphorical form and address. This even holds for seemingly abstract non-metaphorical concepts such as data table, logical address, or command line. These interfacial entities are also already metaphors, imported from other domains in order to construe manipulable material entities in the digital domain, on the edge of language and objects, enabling [...] the traffic between symbols and physical artifacts.*<sup>19</sup>

Where this leads to is finally made clear in this quotation:

*[...] the very thingness of digital objects consists of metaphors made material and operational.*

18 Charles S. Peirce, *The collected papers of Charles S. Peirce*, 8 Vol. (electronic edition), ed. by Charles Hartshorne, Paul Weiss & Arthur W. Burks (Cambridge, MA and London 1994), CP 4.536.

19 Boomen, *Transcoding the digital*, p. 69.

*Such digital-material metaphors go beyond mere representation and language. They act as signs and metaphors, but also as things and procedures.*<sup>20</sup>

This last quote illustrates the basic idea very clearly. Material metaphors in interfaces are explicitly defined as the *superseding category to a conventional notion of 'signs and metaphors' because they material metaphors include 'things and procedures.'* It thus can be said that material metaphors 'configure' the socio-cultural reality of the practical use of digital media.

## Comment – Metaphor ≠ Materiality

The question of how practices are configured in interfaces is undoubtedly a key question in interface theory. But are we doing ourselves a favour by explaining interface arrangements or interface processes as material metaphors? It seems that van den Boomen is right to point out that the metaphor is more than a dimension of meaning attached to linguistic representation. As is well known, there are "absolute metaphors" (Hans Blumenberg), "multimodal metaphors" (Charles Forceville), "visual metaphors" (Virgil Aldrich), "cinematic metaphors" (Trevor Whittock) – to name just a few. All of these are explored in detail in their re-

spective contexts of research. However, as far as I can see, all these notions and theories remain – and with good reason – within what van den Boomen calls a "conceptual reference" between two *semantic* domains.

Especially problematic is van den Boomen's attempt to locate metaphors via a "material indexical references" as relations between ontologically heterogeneous domains. One problem of van den Boomen's approach is that an *indexical* relation on the level of material causality cannot easily be reinterpreted into a semantic *metaphorical* relation. Peirce had already worked out that a distinction has to be made whether an indexical sign operates within a non-discursive material-causal relationship or whether this material-causal relationship is part of a conclusion in a discursive practice.<sup>21</sup> In the context of his inferential semantics Robert Brandom puts it this way: when a parrot expresses the sounds 'red' in response to a red object, it is an indexical relationship that can be traced back to its materiality. But it does not follow from this *existential* relationship that the parrot understands the meaning of 'red,' hence the parrot makes no meaningful *reference* by uttering the sounds. Thus, the essential condition to establish a metaphorical relation in the first place is not fulfilled. What the parrot lacks is an understanding of the holistic relationship of the articulated sound sequence

<sup>21</sup> See Peirce's distinction between "genuine" and "degenerate" indexicality, e. g. Peirce CP 2.283. See on the issue of indexicality also Jan Distelmeyer, *Machtzeichen*.

<sup>20</sup> Ibid., p. 188.

'red' to all other elements of language and the norms of its correct use, not to mention metaphors.<sup>22</sup> In short, to read "conceptual references" as "material-indexical references" ignores the difference between discursivity and non-discursivity.<sup>23</sup>

In van den Boomen's work, therefore, a very important question for interface theory is posed, but at the same time the possibility of an answer is obstructed by combination of metaphor with material conditions. From an ideology-critical perspective, it is certainly right, for example, to question processes of 'cloud computing' with regard to their metaphoricality. But does such a broad concept of "material metaphors" need to be applied in such an endeavour? An analysis of the relationship between machine semantics and human semantics can only be successful if the materiality of the interfaces and the semantics of the metaphor are *not* considered as one but are still understood as opposites. Given the involvement of the materiality of interfaces with human action, isn't it much more important to clarify how points of difference and rupture emerge in human-machine relations, through which technological attempts are made to align machine processes with the elementary processes of human semantics, for which 'metaphor' is, in turn, fundamental?

<sup>22</sup> Robert B. Brandom, *Articulating Reasons*, pp. 17, 48, 162.

<sup>23</sup> *Ibid.*, pp. 2–3, 14–15, 82–84.

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