

Performative Materiality and Theoretical Approaches to Interface

Johanna Drucker <drucker_at_gseis_dot_ucla_dot_edu>, UCLA

Abstract

This article outlines a critical framework for a theory of performative materiality and its potential application to interface design from a humanistic perspective. Discussions of the materiality of digital media have become richer and more complex in the last decade, calling the literal, physical, and networked qualities of digital artifacts and systems to attention. This article extends those discussions by reconnecting them to a longer history of investigations of materiality and the specificity of media in critical theory and aesthetics. In addition, it introduces the concept of performative materiality, the enacted and event-based character of digital activity supported by those literal, physical conditions, and introduces the theoretical concerns that attach to that rubric. **Performative materiality is based on the conviction that a system should be understood by what it does, not only how it is structured.** As digital humanities matures, it can benefit from a re-engagement with the mainstream principles of critical theory on which a model of performative materiality is based. The article takes these ideas into a more focused look at how we might move towards integrating this model and critical principles into a model of humanistic interface design.

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Introduction

Three agendas intertwine in this piece: the desire to shift discussions of materiality towards a performative model while building on recent work on the topic; a recuperation into digital humanities of mainstream principles of critical theory on which this model is based; and some thoughts on how we might move towards integrating this model and critical principles into a model of humanistic interface design.

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Performative Materiality

In the mid-1990s, Matt Kirschenbaum rescued discussions of digital media from a major misconception rampant in then popular characterizations of electronic technology as *immaterial*. By calling attention to the material substrates of computing — its drives, tracks, disks, and fundamental physical supports — he made an argument for materiality as essential to the operation and identity of digital media.

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In the 1990s, “electronic” writing and digital media studies were still relatively new, and a hyperbolic rhetoric based on a dubious binarism had come into play. Inscriptional technologies were being divided into “old” media (print, ink, manuscript) and “new” electronic and digital ones without careful examination of the bases of these distinctions.^[2] As a by-product of these binarisms, theorists and practitioners of hypertext and electronic writing had enthusiastically proclaimed the immaterial condition of the digital in what seemed a holy grail of *différance*, as if digital inscription were the demonstration of “pure” differentiation existing only as an abstract binary flux.^[3] In a misfire of analysis, the capacity of electrical charge to create code through positive and negative values, the foundation of *digital* technology, had been described as *immaterial*. Many writers, including theoreticians schooled in the differential play central to deconstructive philosophy, simply described fungible, fluid, rapidly re-inscribable digital code as an immaterial medium, ignoring the physical realities that Kirschenbaum’s nicely termed distinctions of *forensic* and *formal* materiality have put back into

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play [Paul 2007].

Not only are digital formats material, they are persistently and fundamentally so, as summed up in Kirschenbaum's phrase, "Every contact leaves a trace." Kirschenbaum's argument is organized around two aspects of materiality, forensic and formal. These are useful categories, and though they do not exhaust the discussion of material features and properties, summarizing his terms is a good place to begin. In Kirschenbaum's definitions, *forensic* materiality refers to evidence, while *formal* materiality refers to the codes and structures of human expression. The forensic elements of a document might include ink, paper, stains, fingerprints, other physical traces, while the formal elements would be the organization of the layout, design, or the style of literary composition, relations between image and text and so on. Both are available to description and analysis; neither is self-evident, each would have to be interpreted and placed in a continuum of other evidence or read in relation to other texts, images, documents and the cultural codes of their composition. This distinction is excellent as far as it goes, and useful for reminding us that digital media have these basic dimensions. But his description is grounded in ontology rather than performance, in a sense that the identity of material things resides in their properties and capacities, in *what they are* rather than *what they do*. My emphasis on the *performative* dimension of materiality is meant to extend, rather than replace, this understanding. Performative materiality suggests that what something *is* has to be understood in terms of what it *does*, how it works within machinic, systemic, and cultural domains.

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The history of approaches to materiality is long and complex, with basic discussions of matter and form, substance and essence, traceable to earliest antiquity in many strains of philosophy in the west and the east, and these wait in the wings to be called back onstage in any longer discussion of the topic ([Drucker 1994], [Drucker 2009], [Bynum 2011], [Bearsley 1966], [McGann 2003]). But Kirschenbaum's useful intervention came at a crucial moment, and was well positioned to shift the terms of debates about digital technology back towards attention to materiality in an approach informed by interpretative disciplines such as bibliography, critical studies, and theoretical dimensions of English literature.

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Jean-François Blanchette, whose work I first encountered in 2008, draws on a very different disciplinary background for his criticism of "immateriality." Trained in informatics, encryption, and the theoretical study of digital code from a technical and legal perspective, he was extending the study of digital materiality to the analysis of elaborate systems and their interdependent modular components. By adding the concept of *distributed materiality* to our inventory, he provides language to describe the co-dependent, layered contingencies on which the functions of drive, storage, software, hardware, systems, and networks depend. Not only are all of these elements material, but they are locked into relations with each other that are governed by their material design and constraints in ways that have an effect on the costs and efficient operation of the system.

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Attention to the material components of hardware, software, and their processes provides a point of departure for the investigation of larger systemic relations in which multiple materialities are at play. But even the fullest account of physical features supplies only a partial framework for understanding how digital materiality works, whether it is operating inside exchanges that are exclusively those of the technology or interacting with human users and operators.

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Distributed materiality, though still focused on entities and their relations, edges towards an event-based model, with its roots in systems theory and suggestive connections to new materialisms.

Performative materiality draws on studies in cognition, perception, reader-response, textual hermeneutics, interface design, and curiously, it is supported by empirical and theoretical approaches. It shifts the emphasis from acknowledgement of and attention to material conditions and structures towards analysis of the production of a text, program, or other interpretative event. After all, no matter how detailed a description of material substrates or systems we have, their use is performative whether this is a reading by an individual, the processing of code, the transmission of signals through a system, the viewing of a film, performance of a play, or a musical work and so on. Material conditions provide an inscriptional base, a score, a point of departure, a provocation, from which a work is produced as an event. The materiality of the system, no matter how stable, bears only a probabilistic relation to the event of production, which always occurs only in real time and is distinct in each instance.

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If every reading produces a text anew then the production of a text is the fundamental work of reading — this is a truism of every theoretical development since New Criticism. Eye-tracking software and studies of user experience support this assertion just as surely as the deconstructionist theoretical approaches to text, in a curious meeting of empirical and theoretical investigations from very different parts of the intellectual universe. Steve Krug's *Don't Make Me Think* [Krug 2000], diagramming the ways individuals hop around on a web page in accord with motivations and whims, meets Stanley Fish's *Is there a text in the class* [Fish 1980], in the weird science hybrid analysis of readerly work. In each case, the performance constructs meaning as a result of engagement, the text is performed, rather than received. Materiality provokes the performance, and this is true whether we are talking about the workings of distributed systems in which resistance, voltage, and allocation of resources perform in accord with other processes and decisions, or whether we are referring to the reading of a poem.

The point here is to bring the concept of performative materiality to bear as a criticism of literal materiality and its tendency to assign intrinsic and inherent values to material properties in the analysis of digital artifacts as an extension of literary and critical studies. Because if materiality was overlooked in the vertigo of new media fantasies of a disembodied or un-embodied existence, then attention to materiality has been equally ill-served by a literal approach that resembles the naive techniques of pre-psychoanalytic dream studies — in which inventories of dream images were linked to their meanings in a published key, as if the icons and images of the unconscious might be spelled out and the dream deciphered and read according to a mechanistic process of reading equivalences. A dream of crossing water would be interpreted as a sign of a coming separation, a dream of an owl taking flight predicted death, and so on in a one-to-one relation of symbol to value. Sigmund Freud showed that the unconscious is structured like a language, and that its displacements and associations form a system of dynamic relations. Concepts of co-dependencies, contingencies, and syntactic relations replaced the lists of keys and images in old dream books, which lost favor except among fortune tellers and carnival psychics.

The same change happened across other humanistic and social science fields and disciplines in the late 19th and early 20th centuries as similar structuralist moves undermined the idea of intrinsic value, replacing it with relative value in anthropology, economics, linguistics, and cultural studies, a crucial point of departure in our discussion, though far from its endpoint. Structuralism put the relativistic, systems-dependent approach to meaning production into play more than a hundred years ago. Meaning is use, as Ludwig Wittgenstein famously said, to which we can add, such use is always circumstantial and situational. This shift from an approach grounded in what something *is* to how something *works* changes the analysis of material evidence from iconographic reading to indexical reading, leading us into the lifecycle of production, use, control, resource consumption, labor, cost, environmental impact and so on — so that an artifact's materiality is read as a snapshot moment within continuous interdependent systems. Classic structuralism, as exemplified by Saussurean linguistics, de-essentialized and systematized the understanding of meaning as value, and performative materiality builds on that basic shift into the post-structuralist engagement with readerly production of texts, and beyond, to a probabilistic perspective that synthesizes these critical traditions with those of user experience. In addition, the fields of code studies, software, and platform studies are permeated with theoretical insights into the performative dimension of digital processing. Algorithms are instructions for processes, for performances, whose outcomes may usually be predictable, but of course, are as open to error and random uncertainties in their execution as they are to uncertain outcomes in their use at the higher level of their operation and use. To these approaches we can add certain strains of “new” materialisms, the emergent systems-thinking approaches coming from ecologies of semiotics and information, though not all of these share a performative dimension.

By re-engaging with the intellectual traditions of critical theory from structuralism to post-structuralism, deconstructivism, cultural and critical studies, and complex systems grounded in ecological approaches that posit emergent properties, we can bring an analytical framework for approaching the materiality of digital activity into focus. In this framework, we chart the shift from a concept of things as entities to a concept of them as events, from a notion of *what is* to that *which is always in flux*, from a *literal* to a *contingent* materiality that is exposed by the performative dimension of use. But oddly, perversely, reification seems to have run rampant in approaches to the description of screen space and digital media, even if the iterative character of digital forensics should have long ago infused the theoretical impulse with a profoundly Heraclitan view of artifacts before us. Some of the media archaeology approaches to studying in an *archaeography*,

to use Wolfgang Ernst's term, reinscribe digital media in an entity-driven approach that is both literal (code as inscription) and virtual (code as model) [Parikka 2011]. These counteract the model of *immateriality*, though they do not replace it with a concept of digital flux, or of material as an illusion of stability constituted across instabilities, one whose complexities could inform critical engagement with other material artifacts in more traditional media. Perhaps it is not too late.

The many dimensions of performative materiality, then, touch on each layer of digital media — in an analysis of the co-dependencies and contingencies of the material substrate, in a description of the production of display from code through processing as a performative act, in the engagement of users with the generative experience of viewing, and in the mutability and reinscribability of files in the mutable substrate of digital technology. While such a description sounds like a characterization of the essential qualities of digital media, it is meant as a description of the ways these qualities are always operating within contingent fields, flows, and relations that reconstitute them.

In finishing this discussion of fundamental frameworks, I want to make it clear that I am distinguishing *literal* materiality (which I take to be a naïve if well-intentioned focus on the properties of entities) from both the *forensic*, which is evidentiary, and *formal*, which is encoded and conventionalized. **Literal materiality is based on a mechanistic model that suggests that the specific properties of material artifacts or media can be read as if meaning were a self-evident product of form, as if some universal key, paralleling those guides to dreams, existed for all physical objects and material elements, as if the cultural world were turned into a natural world and could be “read” with empirical, positivist methods, as if the detailed, minute, and careful description of physical properties reveals inherent or self-evident values (and as if a century or more of critical thinking had not occurred).**

Not even the most naïve forensic expert would suggest this. Certainly materials have properties. Brittle cast iron will never have the tensile strength of tempered steel. A blood stain is not a coffee stain. But the value of evidence is not a fixed entity, revealed by empirical methods. For example, identifying a typeface or font and the date, place, or producer of origin does not automatically reveal a “meaning” of a font. A font does not have a meaning, it has a set of associations and relative values. Description of material properties puts in play a series of interpretative events in which the performative dimensions of these properties are actualized in complex inter-relations, dependencies, contingencies, and circumstances.

If avoiding the pitfall of naïve, literal materiality is important, a corollary principle is the need to keep from assigning value to media on the basis of their “specificity” — as if the properties of a particular medium determined the forms of discourse or expression of which it was capable (e.g. the “linear” qualities of print text). Media specificity is often literal materiality, as if a substrate's characteristics determined the forms of expression it supports. Changes in technology create changed conditions for design in buildings just as they do in media environments, but materials do not determine design or aesthetic developments. For instance, the technical qualities of print media necessary for avant-garde approaches to typographic design — using diagonals, mixed fonts, and so on — were part of letterpress from the time of the invention of movable type in the 15th century. But they were not conceptually in view until the 20th. Why? Because the aesthetic language on which they were based had not been invented. **The innovation was conceptual, not technical.** Media may have specific properties at the forensic level that contribute to their expressive, aesthetic capacities. When attention to media specificity slips into a literal approach to the interpretation of materiality it falls short of providing an adequate basis for critical analysis of the ways materiality works. It offers some necessary techniques for description, as a start point, but not for analysis as an interpretative process. Literal approaches are modeled on a mechanistic approach that presumes objects of perception are self-identical and observer-independent. **Performative approaches are modeled on a probabilistic premise that suggests an object is produced as an effect of a dynamic relation between provocation of the object's characteristics and an interpretative process.**

In a model of materiality as fundamentally performative, we can show how forensic, evidentiary materiality and formal organization serve as a provocation for the creation of a reading as a constitutive interpretative act. The specific structures and forms, substrates and organizational features, are **probability conditions** for production of an interpretation. **Knowledge creates the objects of its discourses, it does not “discover” them.** Constructivist epistemology shifts our attention from knowledge to knowing, from objects that are observer-independent to the recognition of

observer-dependent process, or events. We recognize our readings as the production of effect, not a recovery of cause or an original thing. **Objects exist in the world but their meaning and value are the result of a performative act of interpretation provoked by their specific qualities.** To say that is merely to remind ourselves of what we already know: that we need to recover the lineage of critical theory that transformed the humanities from structuralism onward to understand digital objects and to design them. Without these intellectual strains, our thinking about digital matters proceeds as if the last century had not existed, and we were merely late 19th century naturalists on the trail of a new species of inscriptional and medial artifacts.

Recuperating the full apparatus of humanist critical theory for our understanding of digital materiality brings a host of methodologies into our analysis, and combines it with newer developments in code studies, complexity, and new materialisms. While it may seem flat-footed and pedestrian to march through these frameworks one after another, the exercise is meant to have the benefit of demonstrating the value of our critical heritage. After this summary review, I will turn my second agenda, to address ways in which the insights from critical theory could lead to a humanistic interface design, formulating an interface grounded in probabilistic and performative approaches.

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So, touching on each of these critical approaches in turn, I will try to show their usefulness and relevance for critical study and design of digital media.

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Forensic materiality draws on traditions of descriptive and analytic bibliography as well as physical and chemical analyses and investigations. It uses these techniques to attend to the specific properties of digital inscription. Forensic studies, literally speaking, are those concerned with the evidence used in legal arguments. Thus materiality at this level is concrete, subject to scrutiny, and available to observation through empirical methods. For a humanist, the extension of such a positivist approach to material has to be tempered with the recognition that no matter how self-evident a material artifact may be within the descriptive frames offered by forensics, the value of a text, even its content and meaning, is always a product of a reading within specific circumstances. And the value of forensic materiality depends on the same web of cultural associations and historically situated values as any other interpretative act. That an artifact has specific properties may be incontrovertible, just as in the contrast above between iron and steel. But what those properties *mean* is very different from what we may imagine those properties *are*. In fact, the entire “is-ness” of materiality, grounded in assumptions of self-evident identity, is always subject to humanist critique, or should be, if critical methods are to prevail. Forensic analysis provides a foundation for other work, as does formal analysis of a text, image, situation, or event. But the caveat that nothing is self-evident and no value is intrinsic has to be kept in play. Expanded forensic analysis of digital artifacts allows access to the lifecycle of production. We can track the resources used, labor involved, shipping, transportation, manufacture, as well as providing a foundation for media-specific description and analysis [Bowers 1964], [Culler 1997].^[4]

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Distributed materiality focuses on the complex of interdependencies on which any digital artifact depends for its basic existence. In a distributed approach, any digital “entity” is dependent on servers, networks, software, hosting environments and the relations among them just as surely as a biological entity depends upon atmospheric and climatic conditions. An extension of forensic approaches, the distributed concept requires attention to the many layers and relationships of hardware, software, bandwidth, processing, storage, memory, and other factors. **The distributed approach registers a shift from materiality grounded in a single feature or factor to an approach based on multiple systems of interrelated activity. Each of these is supported by technical *things* — substrates, wiring, chips, circuits, etc. — and *relations*.** By its very character, distributed-ness disturbs assumptions of singularity or stability. A quality, materiality, whose identity depends on contingencies cannot be mistaken for a self-evident object. For instance, we understand the production of a play as a distributed material event, rather than as a fixed or static thing. We can understand all textual and material production in the same way — as dependent upon interrelated systems and conditions.^[5]

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Performative materiality emphasizes the production of a work as an interpretative event. While Kirschenbaum, following generations of textual critics, refers to such formal properties of a work as its apparent organization, composition, use of media and materials, he knows full well that we don’t absorb a work in a mechanistic way. No text is “transferred” wholesale, like a bucket of coal being moved along a conveyor. The text of a book is not ingested by a sequential

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processing of its ascii string or by literal reading of each item on a page and each page in turn. Nor is a web page. Every person produces a work as an individual experience, according to their disposition and capacity. This should be obvious, but the mechanistic methods — such as eye tracking — used to analyze user experiences of websites seem to be premised on forgetting everything we ever learned from textual studies. The worlds of engineering and humanistic thought need integration.

At the formal level, a work is a set of encoded instructions for reading, viewing, listening, or experiencing. In a performative approach, the cognitive capacities of the reader make the work through an encounter. The humanist inventory of critical methods appropriate to such analysis is long and rich: textual studies in the traditional and more radical modes, from close reading and new criticism through the Derridian and DeManian deconstruction and poststructural play. Cultural studies has its role here as well, introducing that decentering that shifts the ground from under the certainties of a single worldview, faceting any object of study along lines of inquiry that relativize all judgments and values. Exposing the ideological assumptions of digital materialities and the strategies on which they claim and gain cultural authority is essential. The performance of a work provoked by a material substrate is always situated within historical and cultural circumstances and particulars and expresses ideology at every level of production, consumption, implementation and design.

The performative dimension also invokes cognitive studies, including radical constructivist approaches to knowledge. Here phenomenology, embodied-ness, and features of psychoanalytic insight have their role, demonstrating the unique and particular qualities of individual experience in their tensions with drives, desires, denials, and other qualities of mind. The cognitive production of experience is ephemeral, temporal, specific, but provoked by the formal, material properties that provide stimulation. The notion of cues and triggers, rather than structures of meaning, informs this approach, and explains the force of performativity as enactment. We can think about the corrective introduced by Mary Carruthers into the description of memory theaters that, based on Frances Yates' understanding, had persisted for decades. Carruthers created a model of dynamic cues, rather than memory of structures, that is being borne out by new studies of memory and internet use.

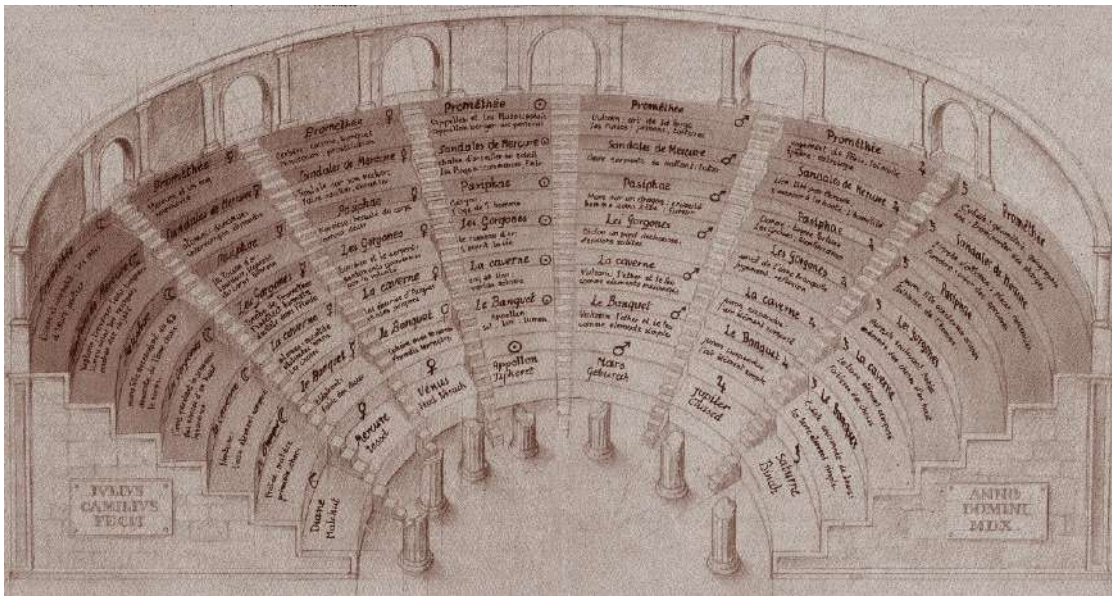


Figure 1. Giulio Camillo, Memory Theater, *L'idea del Teatro*, 1550

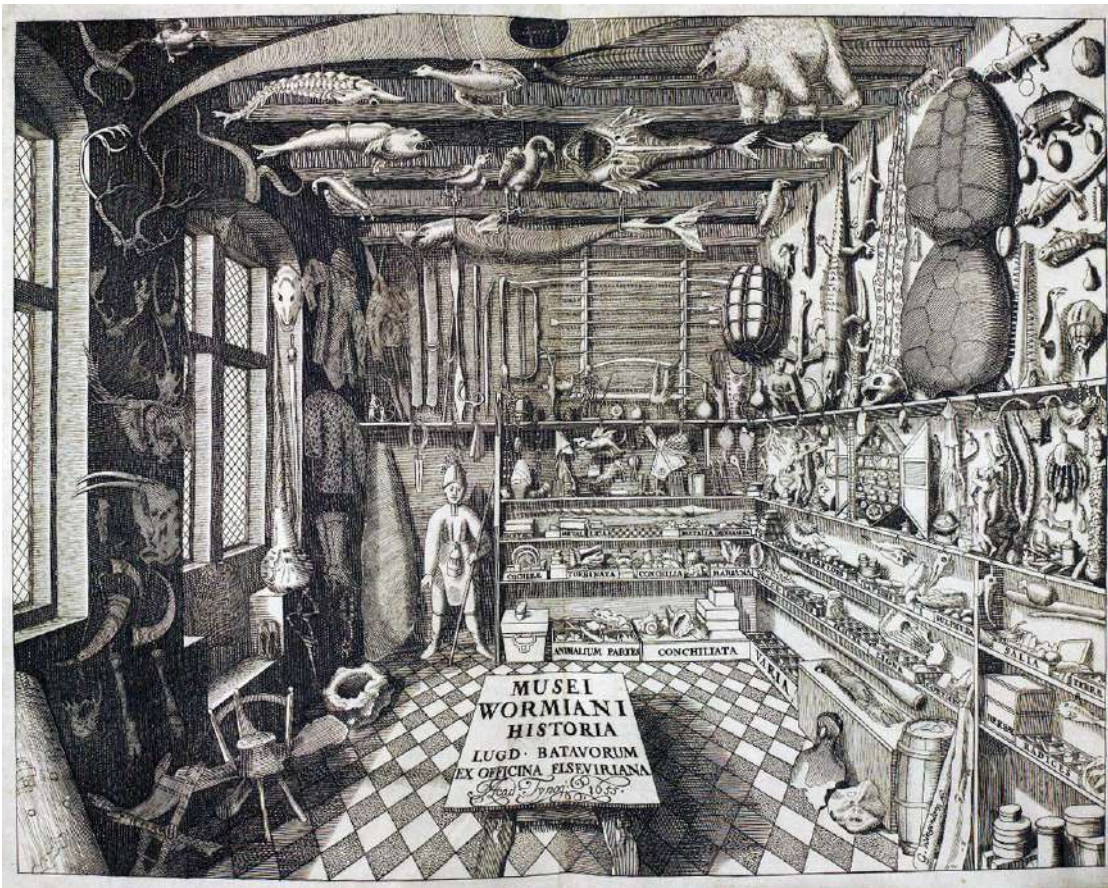


Figure 2. Ole Worm, Cabinet of Curiosities, *Musei Wormiani Historia*, c. 1650

We remember where and how to find or look for information, rather than remembering information itself. Thus performative materiality is always probabilistic, since it demonstrates the fact that material forms are only the site of potential for meaning production, not for transfer. Media are constitutive of meaning, they do not serve as a conduit or pipeline. Performative concepts of materiality engage this constitutive principle and the cognitive conditions of production through acts of reading or other embodied individual experience ([Carruthers 1998], [Carruthers 1990], [Austin 1962], [Butler 1999], [Glaserfeld 1995], [Maturana and Varela 1987]).

Non-representational approaches make a strong case for the impossibility that language, or any other symbolic code — graphical, visual, audible — ever represents a preexisting entity. “Representations” are presentations, rhetorical arguments expressed in graphical, textual, visual form. Cultural geographers, annoyed with the assumption that a map could represent a spatial experience, pushed for a non-representational approach that is particularly germane to virtual environments. The concept pushes attention squarely towards the codes and formal structures of those artifacts. This emphasizes the understanding that material forms create the mediating expressions that are transactional objects of meaning production. *In such a framework, objects don’t represent, they perform.* Our critical focus attends to the expressions, not their presumed referent, since the relation between sign and referent is tentative in any case. The emphasis on understanding artifacts as constitutive, rather than representational, forces us to look at them, to see how they work. As in looking at a cabinet of curiosities, we are well aware that the organization and layout creates a world view, it does not correspond to any order of things in the world (where dolphins are fishes, mermaids exist, and unicorn horns can be displayed next to those of goats). We can invoke Charles Peirce, and the notion of inference without causality, or abduction mentioned above, as one of the central tenets of this critical approach ([Thrift 2007], [Anderson and Harrison 2010], [Buchler 1940], [Gell 1992]).

Theories of enunciation are drawn primarily from linguistics. They got purchase early on in visual studies and film as ways to analyze modes of address and point of view systems. They pinpoint assumptions about who is speaking to whom and for what purpose in any act of articulation (verbal, visual, demonstrative, etc.). Enunciative theories engage

power relations immediately. They show how the subjected and the spoken, the positioned and placed, the subordinate and the super-regulatory are dimensions of all speech acts — and by extension, all coded acts of cultural expression. Enunciative systems describe the spoken and speaking subject of language. What is it *to be spoken*? How is one's subject position created by a system of articulation? The return to the Foucauldian paradigm of the panopticon, and of other disciplinary regimes, provides one concrete example. But so does Barthes' study of mythologies and semiotic systems — the spoken subject of the fashion system, for instance, or the gendering system of cultural norms, all organize subject positions from which it is difficult to break. The “you” and “I” of speaking, now shifting in part towards the “we” of the hive mind, are indicative of change in the enunciative apparatus of the digital. They call all the more acutely for a critical approach rooted in humanities training, if only to adequately describe the unfolding phenomena. Theories of enunciation distinguish modes of discourse by attending to markers of identity, the use of first, second, or third person, various shifters and diectics, and other features of linguistic systems that identify and position speaking and spoken subjects.^[6]

Interface theory is culled from interface design, behavioral cognition, and ergonomics, approaches to reading and human processing. It also draws on the history of graphic design and communication with a specific attention to the semantics of visual form. Diagrammatic analysis becomes particularly useful in looking at interface, since information organization and structures are keyed to the navigational functions these enable. The study of the relational features of any material artifact and system puts us squarely into the realm of diagrams and the study of the semantics of relations. Graphical expressions are particularly tractable as diagrams, but the diagrammatic dimension does not rely on graphical forms. Relations can be specified logically, mathematically, or socially and anthropologically, as well as spatially or temporally.^[7]

Systems ecology and new materialisms assert that matter is not inert, that the traditional approach that characterized matter as that which is bounded, finite, has dimension and extension should be qualified by recognizing the emergent properties of material. Even stopping short of attributing sentience or agency to material systems, understanding them as part of ecologies with principles of self-organization, equilibrium, and self-regulating or adaptive capacities changes our view of material from inert to dynamic. The concept of flux and change, of fundamental instability in all material systems, offers the possibility of transformation and modification in codependent or emergent materialities. Work in complex adaptive systems, in cybernetics, in anthropology and sociology of knowledge, and in chaos theory all pertain to the study of new materialisms. In systems theory the aggregate is more than the sum of the parts, and a system has properties that neither inhere in individual components, nor exist independent of the system. While not strictly speaking, the domain of humanists, this theoretical apparatus has come into discussion through the positing of post-human conditions and an a-humanist philosophy, two strains of late 20th century critical thought. Again the flux and change of material conditions requires that we shed our atavistic attachment to the notion of things and shift into a realization that all apparent things are events.^[8]

Media archaeology brings the study of inscriptional technologies into an analytic frame based on the “real” (as opposed to the symbolic or imaginary regimes of critical theory). Its methods focus on the object-ness of things outside of human perception or engagement, in the conviction that this substrate in digital media is computational, mathematical, and process-driven, fundamentally both algorithmic and encoded. Familiar from early theories of digital communication, particularly the work of Claude Shannon and Warren Weaver, this approach has gained traction in part because of its insistence on attention to the specificity of code, platforms, software, and systems in their autonomy. The “archaeology” of the approach stresses analysis of quantifiable characteristics rather than interpretative cycles of production, eschewing narratives of history in favor of descriptions of sites and artifacts. While extreme in its embrace of observer-independent premises, the tenets of media archaeology acknowledge a temporal dimension to the activities of algorithmic production, the constant cycles of reiteration that are one of the crucial and distinctive qualities of code.

This outline of principles and critical approaches, though sketchy, is meant to prompt our collective memories towards reengagement with the critical apparatus of theory relevant to work with digital humanities. Engagement with digital media changes when we conceptualize our projects and problems in accord with these critical tenets. Not only is our view of digital objects changed, but we see the possibilities for using the digital environment to take apart the “is-ness”

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of things. We can shift from an entity-based to an event-based conception of media and demonstrate the radically constitutive, co-dependent relations of complexity we overlook when we take a web of contingencies for a static, fixed, object of intellectual thought. Putting theoretical interpretation into dialogue with digital technology, we engage the opportunity for exposing the very processes by which its reification and reification through its means and media are taking place. We constitute our objects of knowledge through the acts of interpretation that pretend to be observations of what already is, though, perversely, the very act of putting humanists into digital projects seemed to bracket critical thinking from the design process (and take design out of the critical process). Here is where the challenge lies — not merely in critical analysis for the benefits of insight, but for the rethinking of design premises. How to bring these conceptions of materiality into the design of digital humanities projects? The answer is not to reinvent humanities theory, or critical epistemology, but to call it back into play in the design process.

Thinking about the latent potential in interface design is a good starting point. If we turn our attention to specific concrete examples, a Google search results page, the Chicago Encyclopedia, and Stanford's Spatial History Project site and projects to see how a generative relation between critical analysis and design possibilities could arise. Interface lends itself particularly well to this re-engagement since the whole notion of interface as a "thing" rather than as a space of constitutive production demonstrates the reifying effects of display and media in the digital environment. Interfaces are ubiquitous — in plumbing, appliances, vehicles, dashboards, and any device in which human actions have to be mediated in and through a space of exchange. A book is an interface, for instance, though its reified condition is equally pernicious, persistent and difficult to dislodge. We are aware that digital interface seems more mutable and flexible than that of a book, but is this really true? **The interface is not an object. Interface is a space of affordances and possibilities structured into organization for use. An interface is a set of conditions, structured relations, that allow certain behaviors, actions, readings, events to occur. This generalized theory of interface applies to any technological device created with certain assumptions about the body, hand, eye, coordination, and other capabilities.**

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Approaches to interface design arose within the HCI community, with its emphasis on maximum efficiency in the user-centered experience. Since virtual cockpits to train soldiers using simulated combat missions and flight experience were first designed (some as early as 1929), or the earliest experiments for real time interaction with digital media in the days of Douglas Engelbart and Ivan Sutherland's experiments with head sets, pedals, mice, and screens, the dominant paradigm in the human-machine relationship has come from the engineering community.

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Figure 3. Douglas Engelbart, Workstation, 1966 http://www.livinginternet.com/w/wi_engelbart.htm



Figure 4. Ivan Sutherland, Sketchpad, 1963. <http://en.wikipedia.org/wiki/Sketchpad>

Leading practitioners in the field of visualization, such as Jakob Nielsen, Stuart Card, and Ben Shneiderman, have defined basic principles for design methodology and display that are premised on a pragmatic, but highly mechanistic, analysis of a user's abilities to process information effectively.

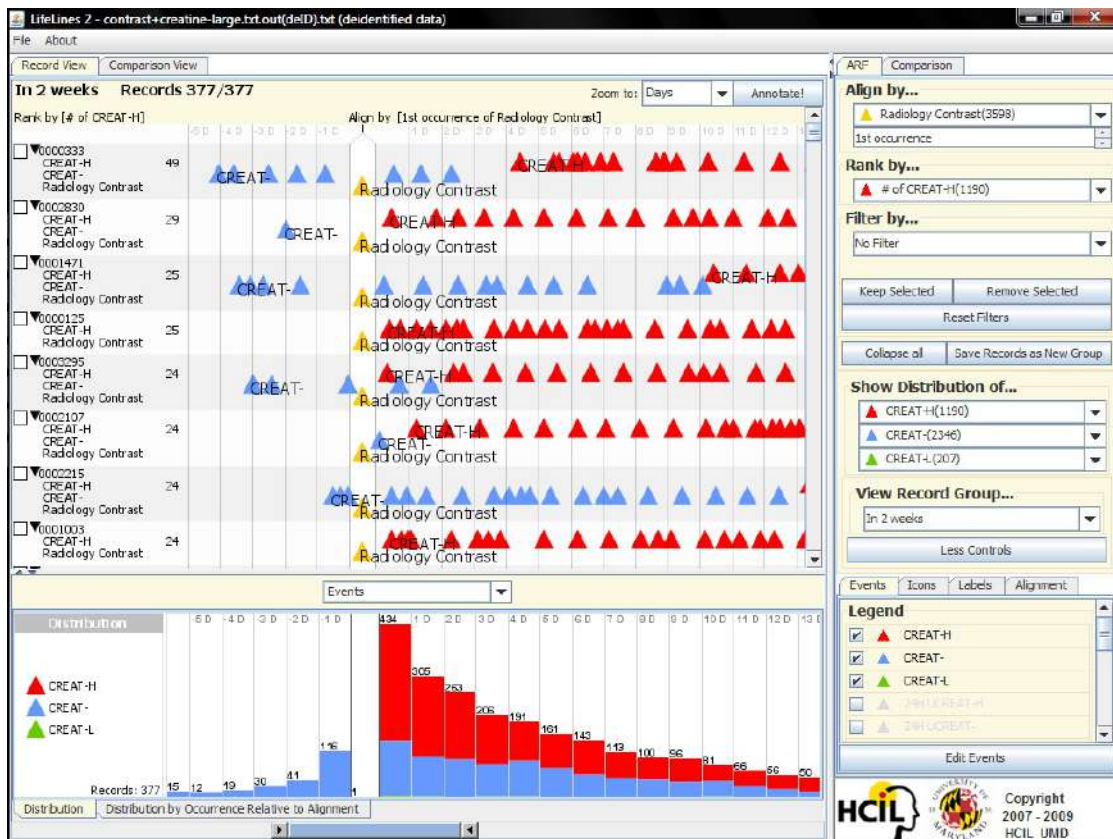


Figure 5. Ben Shneiderman, Lifelines, Graphical user interface for faceted query. <http://www.cs.umd.edu/hcil/lifelines2/>

Their approach, applied to the vast numbers of tasks for searching, navigating, buying, and communicating online, is grounded in a user-as-consumer model, the assumptions of which do not match those appropriate to analysis of a humanities-based experience (where goals of distraction, engagement, flow experience and pleasure-driven activity are not goal-oriented, but motivated by the process). Criticisms from inside that community, such as the work of Jesse James Garrett (showing the confusion between an approach to interface design based on information versus tasks) or Aaron Marcus's group (analyzing cultural differences and their connection to interface functionality) have provided useful insights and pushed design principles to be more nuanced.



Figure 6. Geert Hofstede's Dimensions used by Aaron Marcus in cross-cultural interface design <http://www.amanda.com/> and also: www.iwips.org/iwips2002/.../AMA_XCult_13Jul02.ppt

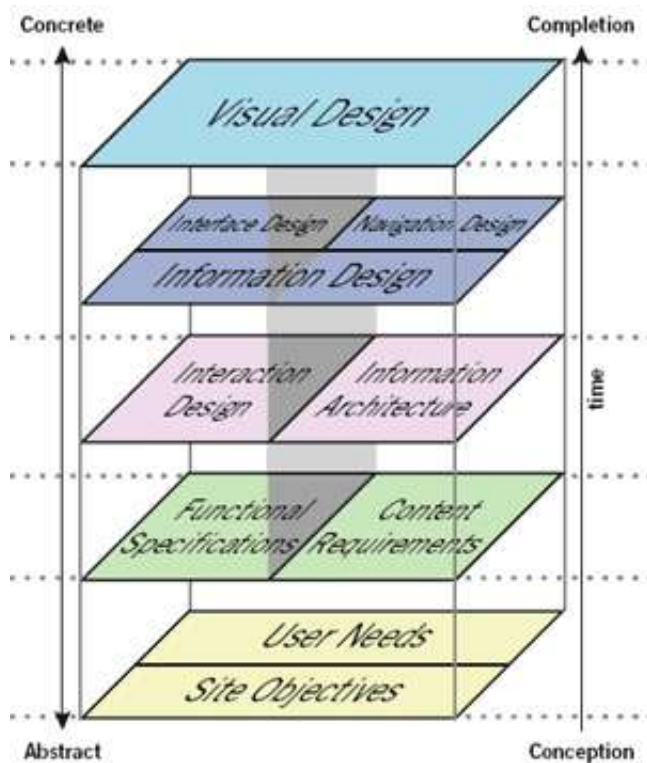


Figure 7. Jesse James Garrett, *The Elements of User Experience*, 2002. <http://www.acidlabs.org/2007/06/22/elements-and-forces-in-ia/>

But the basic model of the user-centered, task-driven, goal-oriented approach to interface design remains. This approach has been adopted by humanists, particularly when the resources to do so are available, and this is the missed opportunity. The situation arises in part because the dominant vocabulary (graphical and conceptual) for interface

design has come from the engineering community. The responsibility lies with the digital humanities community to invent graphical language suited to its critical principles, not with the HCI labs.

The same critique leveled by post-structuralists against New Criticism is pertinent to the critique of a formal structure that reifies behaviors and tasks in interface designs. The “text” of an interface is not a thing, stable and self-evident, whose meaning can be fixed simply by a detailed reading of its elements. **An interface is a space in which a subject, not a user, is invoked.** **Interface is an enunciative system.** Texts and speakers are situated within pragmatic circumstances of use, ritual, exchange, and communities of practice. They are affected by it, and so is what they “read” or “receive” through an interface. How can the community of digital humanists take critical insights from literary, cultural, and gender studies into our current practice? If the object is merely to demonstrate that one may read an interface with the same techniques we used to read *Young Mr. Lincoln* or to follow old psychoanalytic or literary arguments into a new realm of semiotic analysis, a rather tedious and predictable path would lie ahead. This might have some value in the undergraduate classroom, as the unpacking of ideological subtexts fascinates the young.

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But for those of us concerned with the design of environments for digital humanities and its research agendas, the stakes of this critical encounter are quite different. **Can we conceive of models of interface that are genuine instruments for research?** That are not merely queries within pre-set data that search and sort according to an immutable agenda? How can we imagine an interface that allows content modeling, intellectual argument, rhetorical engagement? In such an approach, the formal, graphical materiality of the interface might register the performative dimensions as well as support them. Such approaches would be fundamentally distinct from those in the HCI community. In place of transparency and clarity, they would foreground ambiguity and uncertainty, unresolvable multiplicities in place of singularities and certainties. Sustained interpretative engagement, not efficient completion of tasks, would be the desired outcome. Grounded in principles of interpretation and a theory of subjectivity, such an approach to design has yet to be developed. But it would expose the process of thinking rather than display fixed results of intellectual activity as if they were products.

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This is not an argument in favor of bad, inefficient, or obstructive design. Nor is it a perverse justification for the ways in which under-resourced projects create confusion, as if that were a value for humanists. Quite the contrary. The challenge of creating an interface in which the performative character of interpretation can be supported and registered builds on demonstrable principles: multiple points of view, correlatable displays, aggregated data, social mediation and networking as a feature of scholarly work, and the qualities of games with emerging rule sets.

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The humanities embody a set of values and approaches to knowledge as interpretation that cannot be supported by a mechanistic approach to design. This is not just a semantic exercise, but a point of departure for implementation. The concept of performative materiality has a double meaning here. In the first sense, on which I have been concentrating, materiality is understood to produce meaning as a performance, just as any other “text” is constituted through a reading. That notion is fundamental to humanistic approaches to interpretation as situated, partial, non-repeatable. In the second sense, performative materiality suggests an approach to design in which use registers in the substrate and structure so that the content model and its expressions evolve. The “structure of knowledge” becomes a “scheme of knowing” that inscribes use as well as provoking it. The idea of a user-consumer is replaced by a maker-producer, a performer, whose performance changes the game. This takes us back to some of the earlier theory of games, to the work of Brenda Laurel and others, whose theoretical training brought notions of subjectivity and performance into the study of online environments.

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In suggesting directions for design, I do not claim to have a toolset of solutions, since that would put us right back into the HCI model and its problem-solving efficiency. Instead, my goal is to lay out some basic ideas on which to imagine a performative approach to materiality and the design of an interpretative interface. Such an interface supports acts of interpretation rather than simply returning selected results from a pre-existing data set. It should also be changed by acts of interpretation, and should morph and evolve. **Performative materiality and interpretative interface should embody emergent qualities.** **Their form would be co-dependent with use, rather than structured to constrain or model specific behaviors or tasks.** They should have the potential to be inflected — by subject positions, point of view, and acts of interpretation.

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We can apply these critical concepts to design as well as to analysis, as in the case of suggestions arising from discussion of this Google search page in contrast to the Encyclopedia of Chicago and the projects on the Stanford Spatial History site:

Forensic features: these are not self-evident. Code does not show itself, nor does the infrastructure, so to analyze them fully would require study of the devices and systems in which the sites are generated, stored, displayed, accessed, refreshed. Forensic analysis can also be used to track the lifecycle of production of digital technology and examine the connections between digital materials and resource issues, such as costs in ecological and human terms. A design challenge would be to have ways to show the history of the rewritable substrate and expose the palimpsest of traces held in memory. Google's forensic profile, with its data gathering analytics, would look very different from that of the Encyclopedia and Stanford sites, which are largely designed for passive use. The appearance of seamlessness that the GUI presents in each instance is an illusion that covers a historical field of user experiences, but the Stanford site, in particular, with its showcase of authors, is impervious to trace-making records by users. The Stanford site is social media, and not meant to support debate or commentary. If interfaces were designed to expose the history of user trails, reactions, comments, that might provide an interesting intervention. Where on the search or home pages would we see the other histories of similar searches, our own or that of others? How would this display associate with other histories of a search or profiles of use?

Distributed materiality: The interrelation of forensic levels and recognition of the many dependent contingencies on which we rely for a basic display and search pulls the study of search engines, information structures and organization into play. Google's offered ranking and ordering of results reveals only the tip of the machinations at work; the apparent simplicity of the display sits like a skin pulled over a mass of complexities; what are the contrasts? Alternatives? What are the terms of ranking and relations? How might they be altered or toggled in a meaningful way? The Stanford site offers display from a set of stored files with pre-packaged interactivity (the visualizations and faceted queries), but its relations are all structured by the content developers. The Encyclopedia draws on a repository whose combinatoric use is supported by dynamic, real-time APIs, but the files are probably all stored locally and well-protected by a fire wall. What contingencies shape the display, integration, operations? How will the efficiencies of these sites shift with changes in scale? How inter-operable are any of the Stanford site's elements with each other at the level of data, networking, or search? How might responsiveness emerge from use?

Performative acts seem to get tracked by mapping the way people read a page or site, but this gives only a partial indication of comprehension or of what was actually "read" on a page. The performance of a text that results in its being remade in each instance of use is not a mechanical act, but a cognitive one. The structure of a Google search page is organized to steer reading and presentation of results. The Stanford site merely moves one through scrolled arguments. The Encyclopedia's modular and elaborately cross-referenced data structure supports linked jumps from topic to topic, but lacks synthetic frameworks. The formal organizations designed for clear legibility, are also extensions of long traditions of western reading structures. The graphical languages build on familiar sidebar navigation and menu structures, as if gender, cultural codes, metaphoric use of terms and tropes, and their capacity to spin the message on the page were value neutral. But in fact, the graphical expressions organize hierarchy and structure dynamic relations and balances within the relations of the display. In the Google page, the flatfooted appearance belies its formal sophistication. The categories of everything (called "web" in the menu bar), images, videos, news, shopping conflate typologies of media, genres, activities. The more delimited domains of Stanford and the Chicago Encyclopedia are designed around content and institutional identity. Stanford's site privileges the institutional identity of the researchers and their place within that specific project's support, so all projects are menu items on its platform. The Chicago Encyclopedia leads with the design of its content in a manner meant to encourage cross-reference. The cues for performance are organized around thematic categories and points of reference, while Google presents its menus as if the universe of the Web were simply structured in the way its representation suggests.

Enunciative dimensions of a page identify who speaks to whom and in what orders of language and enunciative modalities; whose voice that says "everything" "images" "news" are the fundamental categories

of the Google-verse? The corporate entity of Google of course, but who or what does that mean? Who speaks the Encyclopedia? It addresses its audience with a civic voice, assuming a broad public whose differences are less important than its entitlement to access and education. The Stanford site brands its authors, each of whom is profiled in academic celebrity mode, and each of whom “speaks” their project in a voice that aggregates collective work and collaborative research into a text whose identity and position in the cultural universe assume a naturalized authority couched as discipline-specific expertise. The credentials of the “speakers” are visible, attached to the work, unlike those of the Google or Encyclopedia authors. The very notion of “authorship” in Google is usefully problematic. Tracking the processes of design in the corporate web would reveal many threads of power, pressure, contradiction. Porn, we notice, is not among the categories at the highest level of Google search pages, nor are games, gambling, or social networking. The “I” of Google who creates the “you” of the user of the search engine has already interpolated the subject into the structure of the page in such a way that certain desires and interests are subordinated, even stigmatized. Orders of graphic modality and enunciation organize and argument. The top menu bar frames the whole Google world under a set of searchable categories. The sidebar, with its chronological order, is a log, a history, in which the past disappears below and the present continually refreshes above the long tail of the past. A click on the “All results Timeline” for a current theme or topic in the news (last week it was the British phone hacking scandal) gives a bar chart. Who identified the data that is displayed? After the fact? When? How does the historical trajectory of what is online match attention offline, and where is the full iceberg of the unrevealed tale? The visual suggests a slow buildup to the present scandal, but what happens out of sight is not necessarily of lesser import or scale than the flurry of attention generated by the scandal. Because Google presumes to present access to the “everything” of the web, its enunciative modalities are markedly different from those of the delimited domains of the Encyclopedia or Stanford Spatial History. But how do their rhetorics of visualization and presentation express an ideology — who speaks for whom where and how in these graphical and textual expressions? What is not able to be said in their forms and formats? What is excluded, impossible, not present, not able to be articulated given these structures? How can menu categories be altered to contrast one group of users habits to that of others? How do we get perspective on our own view? Point of view is structured into interface design but never exposed or marked conspicuously.

Systemic ecologies: Systems of organization and information have their own self-organizing principles, and operate at a higher order than that of mere aggregation of disparate elements. Does information really swarm? Do language acts aggregate at some level within communication systems? Do media reconfigure along lines of ecological limits, adjusting their capacities to the pressures and forces on the system? The materiality of meta-informatics seems intractable, and yet, is a materialismembodied in those relations and exchanges that emerge from and constitute another order of organization. Analysis of this dimension of organization tracks distributed systems into emergent ones, looks at flows of energy (literally), capital, attention, and interconnection among these. These interfaces might be designed to show their participation in systemic activity and emergent fields of discourse at a higher level of scale and a lower, more granular, level of use.

The implications for design? Engage with a way to shift from the univocal to polyvocal, introduce point of view systems within the interface so that all views are from the position of an observer, not assumed to be independent, autonomous.

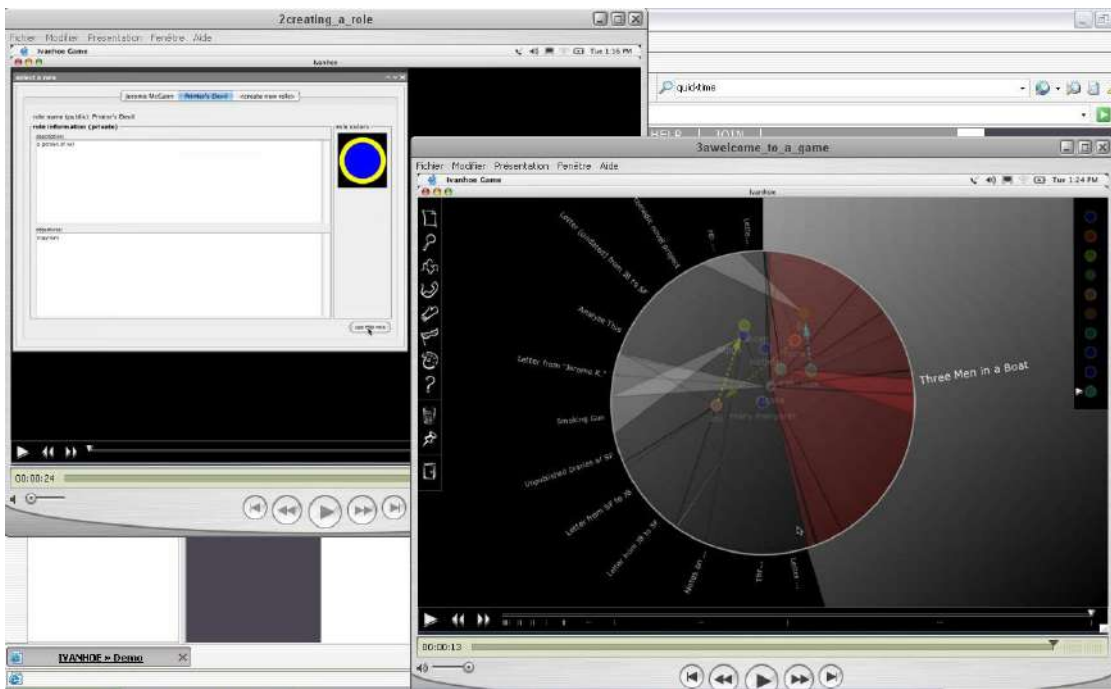


Figure 8. Ivanhoe Game Demonstration <http://www.ivanhoegame.org/>

Create fragmented and correlated points of view that resist self-evident reification. Create environments that are constellatory, so that diagrammatic relations can be used to re-order familiar conventions through acts of generative, performative engagement. We introduced these features into the first designs at SpecLab, into the now slider in Temporal Modeling, the more systematic integration of player point of view in the Ivanhoe design. Archaeologists concerned with the speculative nature of their models of reconstruction based on fragmentary evidence have been keen to find graphical conventions to show uncertainty in their digital models.

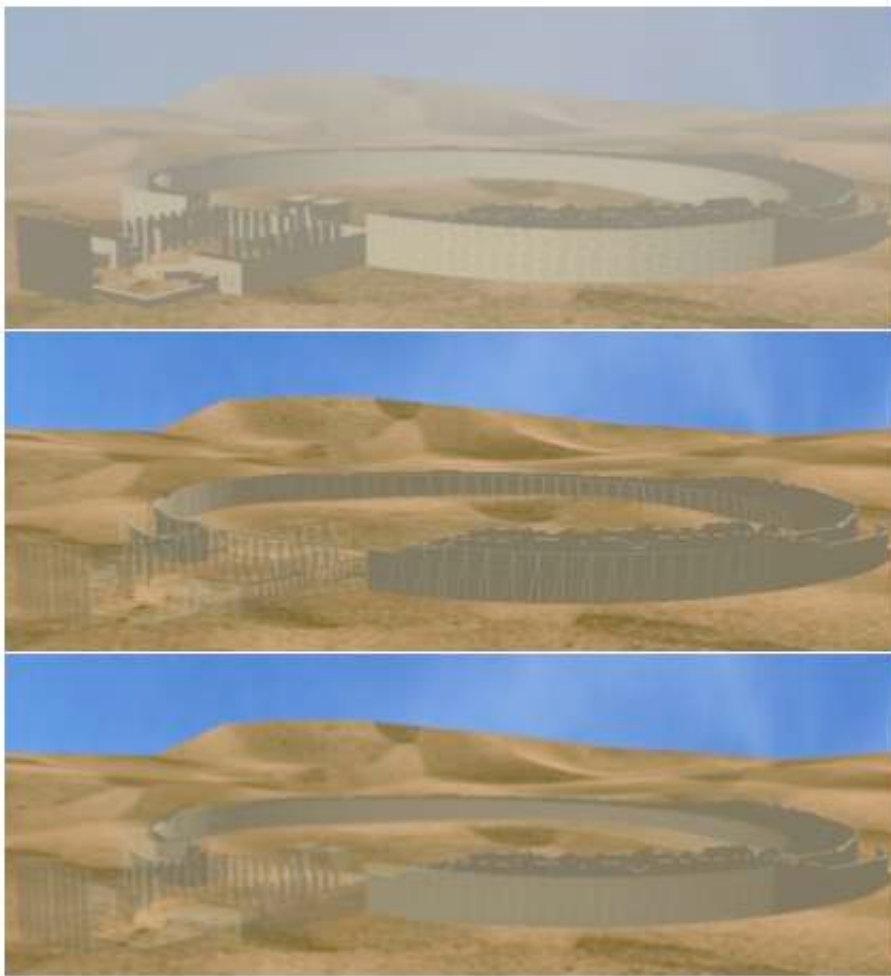


Figure 9. T. Zuk, S. Carpendale and W. D. Glanzman. "Visualizing Temporal Uncertainty in 3D Virtual Reconstructions." *Proceedings of the 6th International Symposium on Virtual Reality*. 2005. 99–106. <http://www.sci.utah.edu/~kpotter/library/papers/zuk:2005:VTUR/index.html>

Multiple imaging modes that create palimpsestic or parallax views of objects make it more difficult to imagine reading as an act of recovering truth, and render the interpretative act itself more visible. The task of modeling diversity, of exposing the differences among ontologies as ideologies, has a dramatic role to play in dislodging the centrism of western epistemologies, in particular those grounded in the administrative sensibility with its perverse attachment to control through standardization.

When we have humanist computer languages, interpretative interfaces, and information systems that can tolerate inconsistency among types of knowledge representation and organization of it, then the humanist dialogue with digital environments will have at the very least advanced beyond complete submission to the terms set by disciplines whose fundamental beliefs are antithetical to interpretation.

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The critical design of interpretative interface means that we understand the task not just as an arrangement of things or a structure for the organization of behaviors and actions, but as the mobilization of a critical network that exposes, calls to attention, its made-ness — and by extension, the constructed-ness of knowledge, its interpretative dimensions. This will orchestrate, at least a bit, the shift from conceptions of interface as things and entities to that of an event-space of interpretative activity.

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In summary, I am suggesting that we redress the odd amnesia that has come with the exigencies and tasks defined by digital media and recall our humanist commitment to interpretation. This means embracing ambiguity and uncertainty, contradictions and the lack of fixity or singularity. No file is ever self-identical, and certainly no file is ever the same twice. All expressions in human systems are constitutive, non-representational, and content models, forms of

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classification, taxonomy, or information organization embody ideology. Ontologies are ideologies, through and through, as naming, ordering, and parameterizing are interpretative acts that enact their view of knowledge, reality, and experience and give it form. All acts of migration from one medium to another, one state of instantiation to another, are mutations. The antidotes to the familiarity that blinds us is embrace of parallax, disaggregation of the illusion of singularity through comparatist and relativist approaches, and engagement with fragmentation and partial presentations of knowledge that expose the illusion of seamless wholeness. Veils of maya are replaced with other veils of maya, we know this, but at the very least, acknowledging that creates a restless engagement with the acts of knowing. More attention to acts of producing and less emphasis on product, the creation of an interface that is meant to expose and support the activity of interpretation, rather than to display finished forms, would be a good starting place.

What is at stake here is that the model of materiality we have in mind shapes the ways we approach the design and use of critical digital media.

Notes

[1] Originally presented a talk at DH 2011, this paper is still only a sketch for design work ahead, and is to be read more as a suggestive transcription of that presentation than as a formally finished work. Thus the scholarly apparatus is minimal here in terms of references and notes.

[2] Michael Heim's *Electric Language* was published in 1987, George Landow and Paul Delany's *Hypermedia and Literary Studies* (1991), George Landow's *Hyper/Text/Theory* (1994), and Jay David Bolter's *Writing Space* (1991), just to cite several milestone texts. Matthew Kirschenbaum, *Mechanisms: New Media and the Forensic Imagination* (2008); Kirschenbaum's citations are a richer index of these discussions.

[3] Why this should be a holy grail is another matter entirely, as if disembodiment and abstraction might fulfill some longstanding separation of mind and spirit from the sully conditions of corporeality.

[4] For a useful introduction and overview see [Abbott and Williams 2009] and [Hayles 2002].

[5] For more information on basic structuralism and after, see [Saussure 1959], [Lévi-Strauss 1956], [McGann 2001], and [McKenzie 1999].

[6] For basic semiotics, linguistics, and theories of the subject and enunciation, see [Genette 1980], [Benveniste 1971], [Cha 1981], [Baudry 1978], [Silverman 1983], [Coward and Ellis 1977], [Foucault 1972], [Barthes 1974].

[7] See [Wikipedia], [Card et al. 1999], [Garrett 2000], [Fuller 2003], [Wikipedia], [Card et al. 1999], [Garrett 2000], [Fuller 2003], [Laurel 1990], [Hoffman 1989].

[8] See [Coole and Frost 2010], [Gleick 1987], [Clarke and Hansen 2009], [Jenks and Smith 2006], [Waldrop 1992], [Holland 1996], [Holland 1999], [Byrne 1998], [Cilliers 1998].

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