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Abstract

The following explores the artificiality of human artifacts. To talk of artifacts, we must avoid ontologizing. Ontology ignores human participation in its construction and describing artifacts as if their descriptions had nothing to do with it contradicts the idea of their artificiality. Instead, I will explore the nature of artifacts from the perspective of human-centered design and with culture-sensitive conceptions in mind. Exploring artifacts from this perspective offers scholars and practitioners a fascinating field of inquiry. Following are six closely connected mini essays about artifacts, starting with the use of the word “artifact” and ending with the virtual worlds that artifacts can bring forth.

Disciplines

Communication | Social and Behavioral Sciences

An Exploration of Artificiality

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Introduction

The following explores the artificiality of human artifacts. To talk of artifacts, we must avoid ontologizing. Ontology ignores human participation in its construction and describing artifacts as if their descriptions had nothing to do with it contradicts the idea of their artificiality. Instead, I will explore the nature of artifacts from the perspective of human-centered design and with culture-sensitive conceptions in mind. Exploring artifacts from this perspective offers scholars and practitioners a fascinating field of inquiry. Following are six closely connected mini essays about artifacts, starting with the use of the word “artifact” and ending with the virtual worlds that artifacts can bring forth.

We define artifacts in the stories of their making

By dictionary definitions, *art-i-fact* is a noun, composed of *art* = Latin for skill + *factum* = made; a product of skillful human activity. Thus, when we call something an “artifact,” we are not concerned with its materiality or how it works, but with its human origin and we search for stories to tell about how, by whom, and why something was made. It is the presumption of such stories that renders something as an artifact. The natural sciences, are not concerned with stories, of course, and therefore cannot possibly say anything about artificiality. Natural scientists are concerned with products of nature, with explaining observed phenomena in terms of physical causes, chemical reactions, or biological processes, which are not at issue as far as artificiality goes. By contrast, archeology, a discipline that searches for artifacts of past cultures in order to understand what life was like in these cultures, is fundamentally concerned with the validity of the stories of their makers. To decide whether such stories are warranted, archeologists employ well-established decision criteria. They start by testing for the natural origin of their finds. Only when natural explanations fail do they consider themselves justified to search for narratives of their human origin. Their criterion has it right. Artificiality begins where physics stops. Explanations of the human origin of artifacts are cultural. The definition of the word “artifact,” and only that, leaves us to conclude that artifacts cannot exist outside a story of their making, however simple this story may be. Since stories rely on their tellers’ use of language, the artificiality of artifacts cannot be separated from the language used to describe it.

We experience present artifacts as interfaces

Clearly, artifacts have always been and still are designed for use. However, designing, inventing, and producing artifacts is one thing, using them is quite another. The two activities involve very different kinds of understandings. The makers of artifacts know how to shape them, assemble them from available parts, and bring them to where they are needed. The users

of artifacts may have a sense of their origin and knowing their makers' intentions may well inform users of what to do with them in ways natural objects cannot, but to be able to use an artifact, there is no compelling reason for users to understand its history, material composition and inner workings – save for trivial artifacts, like drinking glasses or scissors, whose mechanisms are trivial. The make-up of non-trivial machines like computers, electronic artifacts like browsers in the Internet, and large social artifacts like governments typically escapes their user's understanding, without, however, impeding their use. In use, the distinction between artifacts and objects of nature is not relevant.

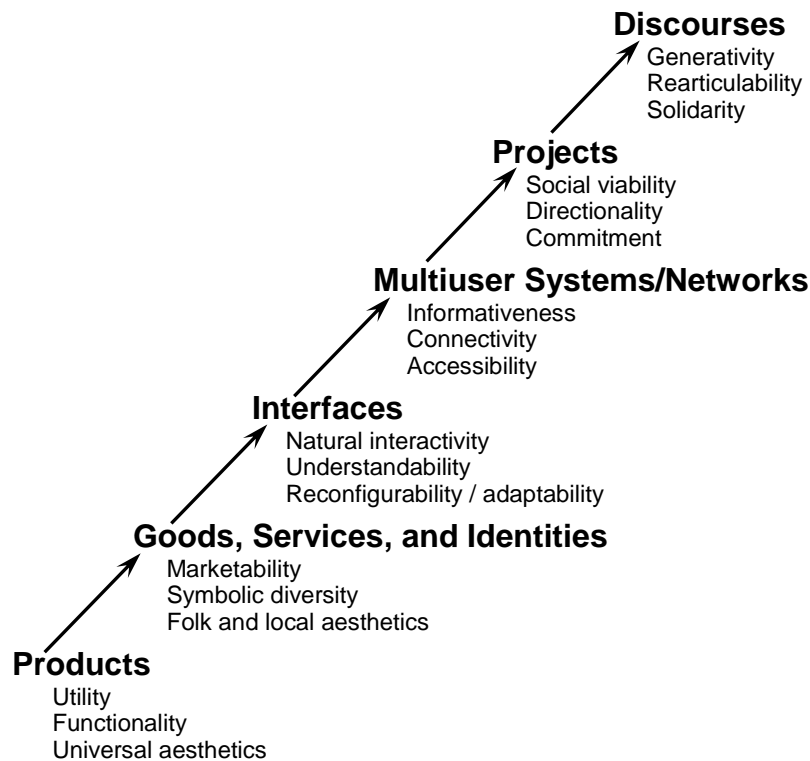
In use, artifacts become interfaces. Interfaces arise when users enact their conception of what they are facing and the latter in turn conforms to these conceptions. Interfaces should not be confused with the components of artifacts that support them: handles, computer screens, or keyboards, for example. Such components participate in an interface, but so do their users. Interfaces reside *between* artifacts and their users. They consist of *interactions* and they play out dynamic *relationships*.

Interfaces are artifacts in their own right, viable where human participants' understanding is interactively sustained, and non-viable where their understanding does not work out and the interface breaks down. From a user-centered perspective, designers cannot limit themselves to considerations of the materiality, functionality, and form of artifacts. They must assure that interfaces are possible, effective, and fun. From the design of human computer interfaces, we have learned that users' conceptions of what they are interacting with may have little to do with the mechanism that supports these interactions. There is no need to force users to know what designers know about an artifact, but there are good reasons for designers to know the conceptions that users have available to approach the artifact they are asked to design.

The artifacts we design increasingly become language like

The history of design started with the design of industrial products for mass production, distribution, use, consumption, or entertainment. Advances in technology, – digitalization – changes in the way artifacts are dispersed, – by market mechanisms – and the growing confidence in design thinking, – our prevailing belief in being able to shape virtually all aspects of our world – has encouraged designers to broaden the range of artifacts from that conceived during the industrial era. To make these challenges transparent, I proposed a trajectory of artificiality¹ that leads us into new empirical domains and the adoption of appropriate design criteria.

¹ Klaus Krippendorff. A Trajectory of Artificiality and New Principles of Design for the Information Age. Pages 91-96 in K. Krippendorff (Ed.). *Design in the Age of Information, A Report to the National Science Foundation (NSF)*. Raleigh, NC: School of Design, North Carolina State University, 1997.



I am suggesting that the original preoccupation of designers with functional, utilitarian, and universally attractive products describes only a fraction of what designers must face today and that the design criteria of the industrial era prevent us from moving on to more challenging design tasks. Let me briefly follow this trajectory:

- By definition, *products* are the end products of processes of production, and equating artifacts with products limits product design to industrially manufactured artifacts.
- *Goods, services, and corporate or individual identities*, by contrast, are artifacts that are designed for sales, to have social significance, or to create consumption. Such artifacts are not entirely physical. They constitutively involve individual minds in ways products do not: memories or attitudes favoring particular service providers, for example, or brands. The advent of styling and marketing made the creation of exchange values a priority and a universalist aesthetics had to be abandoned in favor of statistically distributed preferences.
- As suggested above, *interfaces* are artifacts that reside between humans and machines including objects of nature. They consist of interactions, rudimentarily resembling human dialogue, not dead matter. Designing interfaces involves criteria that relate users' interactive understanding to what artifacts can afford.
- The artifacts residing in *multiuser systems* tend to be even more dematerialized: books, emails, electronic files, web pages, Internet discussion groups, computer simulations, and electronic money. Typically, such artifacts must survive in a medium that many people can access, and their reality depends on the coordinated practices of their users: creating, sharing, storing, modifying, or discarding them, often in view of other users. Trusting

their authenticity is a major issue in the use of multiuser systems, which shows the embeddedness of these artifacts in cultural contingencies.

- *Projects* are primarily social artifacts. They involve people as stakeholders who cooperate in bringing something of joint interest to fruition. To the extent that projects are self-organizing, they are not entirely controllable from their outside. Designers may influence a project by participation. They may enroll stakeholders into their vision. But they may not be able to control how projects proceed and determine their outcome.

Evidentially, the artifacts in this trajectory can be seen to become progressively more virtual, more fluid, more dependent on humans to keep them alive, more interactive, and more language like. Naturally, the final kind of artifact in the trajectory is

- *Discourse*, institutionalized communication, a constrained way of languaging. In discourse, particular ways of languaging dominate reality constructions and direct the practices of the members of a discourse community. We can distinguish public discourse, scientific discourse, legal discourse, and design discourse, among many, by the distinct vocabularies they employ in accounting for the realities they respectively construct. Inventing productive metaphors, introducing new vocabularies, and starting to talk differently are ways to direct the social construction of alternative worlds and the artifacts therein.

These are fascinating artifacts.

All artifacts grow in a webs of prior artifacts

When designers speak of what they are designing, they tend to give the impression of being the sole source of a product. Such accounts are unfortunate as they fail to give credit to the stakeholders in a design who will have to bring it to fruition. Designers rarely ever produce what they say they are designing. They produce *designs*, i.e., drawings, models, computer representations, slide presentations, and arguments, all of which are to convince others of the virtues of their ideas. These intermediate forms, unquestionably are artifacts in that they are made, not found, and can be seen, touched, played with, and discussed – without, however, being confused with what designers hope to ultimately achieve. Designs are rhetorical devices, *proposals*, that, ideally, compel interested stakeholders to act in ways called for by the design. As a proposal, a design must be understood, actionable, realizable in concrete stages, have virtue, and enroll stakeholders to proceed. So conceived, a design is but one albeit intermediate form of what a proposed artifact could become.

In our current culture, all, even rather simple artifacts, must be able to turn up in diverse intermediate forms. A meal, ordered in a restaurant, for example, may need to appear on a menu, in the form of a chef's recipe, on the order written by the waiter, in the practices of the cooks, served on the table – appetizing/tasty/palatable – and result in a monetary transaction. Each of these forms is handled differently, by different kinds of stakeholders. Jointly, they account for what is being realized – not only the meal. What is a final product to one stakeholder may be an intermediate artifact for another. Intermediacy and finality are relative to where one stands.

Virtually all artifacts emerge in transitions from one form to another. A designer's computer model may be followed by a client's feasibility study, an engineer's production drawings, a manufacturer's assembly line setup, a sales person's promotional material, a shipping company's boxes on a delivery truck, a buyer's conversation piece, a user's interface, a repair person's

headache, a recycler's opportunity for scavenging valuable components, and perhaps, finally, a post design report of how the design traveled through all of its intermediate forms.

Cultures organize the production of their artifacts in different ways. In our own culture the customary web of artifacts has become institutionalized. It involves a system of professional differentiations – the design profession being part of it – conventions, codes, and laws governing the transitions from one form to another. What designers may have targeted as final artifact typically reenters the web of intermediate artifacts and changes it. Digitalization, for example, has speeded up the transitions from one artifact to the next and radically changed how these artifacts hang together. This web of artifacts is constructed by what we call technology; an always-growing logic of coordinated techniques for creating artifacts that operates in this web and expands it.

The point of these observations is that artifacts cannot emerge in isolation of each other. They appear distributed over variously connected forms and are supported by a network of specialized stakeholders. One may liken the transitions through such a web to the travels of chain letters. Receivers contribute what they know, erase what is irrelevant, replace what can be improved upon, rearticulate it in terms that successors can understand, and pass it on to those believed to have the ability and interest in keeping something of it in circulation. The artifacts that designers tend to propose are on the tip of an iceberg, the result of the illusion that the artifacts they say they are conceptualizing as final are all that matter, while it is that web of prior artifacts that designers must set in motion, change with each new design.

By conceiving artifacts in stable categories, we blind us to their dynamics

Contrary to the above observation that artifacts are always in processes of being rearticulated from one form to another, we tend to conceptualize artifacts, once realized, as tangible objects, enduring entities, of stable materiality, composition, and function, and as indisputable members of linguistic categories. The artifacts that archeologists dig up seem to encourage the conception of their durability and in everyday life we expect our tools to remain workable for an indefinitely long time. But what survives in time is only the above-mentioned tip of the iceberg, the more durable products of a culture. Archeologists typically scramble to create plausible stories of the origins and uses of their finds, largely because the intermediate artifacts that can be assumed to have supported them have not endured.

One can say that all artifacts, from the moment they are created, always are en route to their retirement, changing their category along the way. At least five processes may account for this:

- The statistical version of the second law of thermodynamics has it that all matter decays in time when unattended. Paper disintegrates, causing old newsprint to crumble and books to fall apart. Noise enters a communication channel, corrupting the signal. Cities decay and their houses become first empty shells, then ruins, heaps of rubble, and ultimately sand and dirt made indistinguishable by vegetation growing over it – think of what happened to the ancient Mayan cities.
- Wear, tear, and accidental breakage while in use can render artifacts increasingly dysfunctional. Cars have accidents or are driven to the point at which they are no longer repairable whereupon they end up in junkyards or in a shredded form ready for recycling.
- The context in which artifacts were designed to function no longer exists, has changed, perhaps surreptitiously, forcing that artifact to become of a different kind. The mask that

an African dancer wore during a ritual now becomes a decoration in the home of a traveler, or the armor of a medieval knight, used in tournaments, sequentially becomes an heirloom, a trophy, an antique, and a museum's piece that is admired (i.e., used) for its typicality by visitors.²

- Consumption amounts to an intended decomposition of one kind of artifact into another, burning coal to ashes, converting food into waste products, taking medication, and on a larger scale, using our natural oil reserves to construct a desirable but not sustainable world, not addressing the unintended consequences of such decompositions.
- Artifacts may also go out of fashion and be superseded by better ones.

The first of these processes demonstrates how nature undermines human categorizations. Physics theorizes the direction of decay, from a more organized to a less organized state, but it cannot determine when and how the category of an artifact changes, say, from a useful tool to one that can no longer serve that function. While the increase of entropy proceeds separate from human involvement, the human use of artifacts can speed up the process. Wear, tear, and breakage are unintended as well, but can change the category of artifacts faster than by natural decay. Only anti-entropic (neg-entropic) human efforts can prevent artifacts from leaving a desirable category. Some such efforts are simple, like sharpening a knife; others are enormous, like maintaining a city's constantly decaying infrastructure. The third kind of change may well be deliberate, taking an artifact from where it was into a perhaps more appealing context. Whether deliberate or by default, recontextualizations tend to go against designers' intentions. What ends up in museums was not made for being there. A knight's armor was not manufactured to become a trophy. When artifacts are consumed/transformed, we take advantage of their change in categories, for example, of the energy generated by transforming fuel into waste. Their unintended side effects, by definition not addressed by design, hound us later as new categories of problems to be solved by new kinds of artifacts. The fifth and final process listed above, individually sensible and deliberate, accounts for the collective advances in technology, including of the growth and refinement of technological complexes, like that of the automobile with its system of roads, refineries and gas stations, institutions for licensing drivers. Replacing artifacts by better ones creates an ecology of cooperating or competing species of artifacts that a user culture keeps in motion.

The point is that artifacts are far from stable, as popular conceptions of tangible objects have it. Artifacts change, sometimes within the conceptual categories of their users, often and ultimately into other categories, mostly useless or problematic ones. The underlying dynamics – inevitable destiny, problematic breakdowns, or unintended consequences – are not addressed when designers focus their attention on designing final artifacts of a certain kind or category.

We see artifacts in virtual worlds

Artifacts are tied to their past through stories of their human origins but their present meanings link them to not yet existing futures. This is because artifacts are always designed to enable their users to bring forth something otherwise unobtainable and make a difference in their lives. This is not to deny that artifacts can provide room for play and sheer enjoyment, but for artifacts to be purposefully employed, the differences they can make in the lives of their users need to be

² See: Klaus Krippendorff. The Dialogical Reality of Meaning; *The American Journal of SEMIOTICS* 18.4, (in press 2006).

anticipated by their users. Designing artifacts that users can read for what they enable and that guide them through enjoyable interfaces is the aim of design semantics.³ Semantics is the study of meaning and design semantics aids the design of artifacts that are meaningful to their users.

What do artifacts mean when in use? Marketing researchers take meanings to be what their users *value*⁴ in the artifacts they face, what it is they are willing to pay for. Intermediate artifacts, such as designs, might be valued for their ideas, the information they provide, or the permission they grant to producers. Artifacts conceived of as final, might be valued for what their users can accomplish with them (extrinsic motivation), or the pleasures they generate (intrinsic motivation). James J. Gibson writes of meanings in terms of *affordances*,⁵ the totality of human actions that the artifact can support, what it enables the user to do. Ludwig Wittgenstein, speaking of words, *equates meaning with use*,⁶ the role they play in their users' lives. I have argued for equating the meanings of artifacts with the set of their possible uses, both imaginable by someone and afforded by the artifacts.⁷ So, what we call a chair affords sitting, obviously, but it also affords storing objects on its surface, stepping up on it to reach for something otherwise beyond reach, stacking them to save space, preventing the casual use of a door, not to enumerate the very imaginative uses that children tend to engage chairs in, together with blankets and toys. In language, artifacts mean everything that their users can tell us about them, about their past as well as about their futures. In practice, artifacts mean everything one can imagine doing with them or fears could happen. For observers, artifacts mean the set of all contexts in which they are seen to work.

Surely, artifacts are real only in the present, as concrete experiences, and at any one moment of interfacing with them. But what we respond to is the meanings they have for us, what they permit us to do with them, the paths they lay out in front of us, and the possibilities they offer us. Artifacts are of human origin, reside in the present, but, most importantly, they let us control a not yet existing future. So, what matters most in the design and use of artifacts is their virtuality – virtual in the dual sense of not yet real, pregnant with a future, and having virtues.

The meaning of the word “virtual” – originally “pretending something to be real when it is not” – is shifting due to the popularity of so-called “virtual reality” technologies. These are computer simulations of artifacts (airplanes to be piloted, surgeries to be performed, or architectural spaces to be visited) that respond to human actions with digitally generated multi-sensory stimuli that closely resemble real environments. Virtual reality technologies have revolutionized training where errors can have expensive consequences. They also enable explorations of proposed artifacts in dimensions that are not readily observable, and when used in design, before they are realized. However, digital imagery is not the only source of virtuality. I am suggesting that all artifacts – tangible, digital, interactive, informative, and aesthetic – to the extent they allow us to anticipate their or our own futures, entail virtuality, a future that has not yet arrived but can be expected to be brought forth.

Designers are always entangled in a *double virtuality*: Creating inspiring proposals for artifacts they envision as mere possibility, and finding ways to assure the users of these artifacts that the realities they could bring forth with them are desirable, have unquestionable virtues for them.

³ Klaus Krippendorff. *The semantic Turn, A New Foundation for Design*. Boca Raton, FL: Taylor& Francis, 2006.

⁴ Helene Karamasin. *Cultural Theory*. Vienna, Austria: Linde, 1997.

⁵ James J. Gibson. *The ecological Approach to Visual Perception*. Boston, MA: Houghton Mifflin, 1979.

⁶ Ludwig Wittgenstein. *Philosophical Investigations*. Oxford: Blackwell, 1953.

⁷ *The Semantic Turn*, Op. Cit.

Design can succeed only if these two conditions are satisfied. A design that is not inspiring is not a viable proposal, and an artifact whose possibilities cannot be recognized has no meaning. The virtual worlds we come to see in artifacts should not be pretended but realizable and virtuous.