Beyond the Product-Centered Design Culture

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Abstract

Artificial Intelligence is ushering in a new era of design culture, redefining the traditional pursuit of harmonizing form and function. Historically, design has been constrained by structural necessities and usability requirements, negotiating aesthetics with functionality. However, as AI promises to liberate function from its physical embodiment, aesthetics itself becomes a new kind of function. Design evolves into "functional art," drifting away from the historical concept of "applied art" that originally paved the way for the later rise of design as a discipline. This evolution is so profound that the very disciplinary status of design may need to be radically rethought. This paper explores the shift from functional design to functional art, where the aesthetic definition of the designed object, freed from traditional functional constraints, acquires a new cultural mission—one that, following Arthur C. Clarke's principle that "any sufficiently advanced technology is indistinguishable from magic," also reclaims to retrieve the ancestral, mystical relationship between humans and their environment. AI may mark the end of the first history of design and inaugurate its second history, where function and aesthetics merge into an immaterial yet "dense" (simultaneously aesthetic and functional) experience. This transition calls for moving beyond a product-centered design culture toward an era of "living" objects, endowed with AI-driven, magic-like capabilities, thus reminiscent of ancient magical metaphors that once helped humans navigate a seemingly supernatural world. Whereas design once managed objects' bodies, it must now manage their souls.

Keywords: artificial intelligence, design culture, product aesthetic, affordance, design art

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Introduction: Beyond the Product-Centered Design Culture

The progressive diffusion of Artificial Intelligence (AI) across everyday technologies suggests that its integration into product and furniture design is not a remote hypothesis but an emerging inevitability (Langley et al., 2022; Mitchell, 2023). While AI currently operates mainly through digital assistants such as Alexa, Siri, or Google Assistant, its gradual incorporation into tangible design domains signals a paradigm shift.

For over a century, design has been defined by the negotiation between form and function—a balance that secured its disciplinary identity within modernity. Yet, as AI assumes operational tasks once mediated by physical affordances, this relationship changes. Actions traditionally performed manually—switching a light, opening a drawer, adjusting temperature—are now delegated to systems capable of interpreting intentions and anticipating needs (Gibson, 1979; Norman, 1988).

This shift entails a cognitive transformation: the user–object relationship evolves from *proximal* (based on direct touch and manipulation) to *distal* (based on interaction at a distance). The object becomes an interlocutor rather than an instrument, responding not to action but to inference. As Verbeek (2011) observes, technologies no longer merely extend the body—they mediate perception and intention. Consequently, the aesthetic dimension of the object emerges as the new operational field of interaction, embodying trust and intelligibility.

Affordance, once understood as the material reference for usability on the product's body, now operates primarily on the cognitive level. Users no longer recognize functionality through form but infer artificial intelligence from expressive cues that signal agency. Aesthetics thus supplants ergonomics as the perceptual interface of interaction, transforming sensory appeal into a vehicle of interpretive intelligibility—a new kind of aesthetic form grounded in meaning rather than function.

From Manipulation to Delegation: The Cognitive Shift in Human—Object Interaction

From Proximal Manipulation to Distal Mediation

Traditional product interaction was defined by manual gestures—grasping, pressing, or adjusting. These actions embodied the logic of affordance (Norman, 1988), in which physical form conveyed function. Design mediated between user and mechanism, making use self-evident.

AI displaces this paradigm. Interaction becomes distal—mediated by voice or gesture, often performed at a distance and detected through motion and proximity sensors, as exemplified by the Volee lamp designed by Odoardo Fioravanti for Fontana Arte. The user no longer manipulates but communicates; the object interprets rather than reacts.

This relocation of agency transforms the object into a perceptual and cognitive partner. The site of interaction shifts from the tactile to the semantic level, where meaning rather than mechanics governs the exchange. As Flusser (1999) anticipated, design moves from shaping things to shaping relations of meaning—an evolution that redefines the role of aesthetics.

Affordance as Aesthetic Mediation

As interaction becomes interpretive, the expressive qualities of the object acquire operational relevance. Form no longer communicates usability through physical cues but through perceptual and cognitive signals that express intelligence, intention, and responsiveness. In this context, aesthetics emerges as an *aesthetic affordance*—an invitation to understanding and trust rather than physical action.

The aesthetic experience thus becomes an act of cognition: users interpret visual and material cues as manifestations of underlying intelligence. The object, in turn, is perceived not as a static artifact but as an intentional agent engaged in a dialogue of sense-making. Through its aesthetic language, the object communicates its own logic of operation, enabling a form of understanding that precedes and structures functional engagement.

This evolution redefines the very notion of the object as "actant" (Latour, 1991). Since performance is no longer activated through direct use but through mediated relation, the form of affordance becomes less determined by the action it invites and increasingly shaped by perceptual and cognitive motivations. At the extreme of this tendency, what semiotically corresponds to the indexical sign of usability—the "invitation to act," in Peirce's (1931–1958) typology—recedes, giving way to the purely formal valorization of perception at a distance. The design object thus transforms into a design art object: no longer an index of use, but an autonomous symbol of meaning. In semiotic terms, it ceases to point to action and begins to engage users in an *interpretative cooperation* (Eco, 1979), where meaning is co-constructed through perception and inference.

The Cognitive Transition: From Doing to Believing

If aesthetics becomes a new kind of affordance, it also redefines functionality. What was once an attribute of mechanical efficiency now extends to the perceptual and cognitive performance of the object. Functionality is no longer limited to what the product *does*, but to how it *makes itself understood*. The expressive coherence of the object—its capacity to signal intelligence, reliability, and emotional tone—thus becomes part of its operational behavior.

In semiotic terms, this shift marks a passage from indexicality to symbolicity (Peirce, 1931–1958). Traditional design relied on indexical forms—signs that pointed directly to possible actions. In AI-augmented design, by contrast, the object communicates through symbolic cues that invite interpretation rather than execution. Functionality, once grounded in mechanics, becomes grounded in meaning. The user's engagement turns from manipulation to inference, and interaction succeeds through interpretive cooperation (Eco, 1979) rather than ergonomic immediacy.

Aesthetic functionality thus mediates between algorithmic processes and human cognition. It translates invisible operations into perceptible form, allowing users to read intention and reliability in behavior and appearance. The aesthetic surface becomes a semantic interface—a layer of intelligibility where technology becomes humanly accessible.

At this stage, aesthetics no longer decorates function but constitutes it. Beauty lies in epistemic clarity—the ability to render complexity understandable and intelligence perceptible. Through aesthetic functionality, design reconciles the experiential and the cognitive, transforming perception into understanding and interaction into dialogue.

A New Era of Functional Art

Traditionally, "functional art" referred to applied art: utilitarian objects embellished with decoration, where aesthetics played an ornamental role secondary to function. Today, AI-mediated interaction redefines this relationship. As function becomes distal—activated through mediated signals rather than direct manipulation—it unfolds as a cognitive process rather than a physical one.

In this mediated ecology, functionality is no longer a separate layer but an aesthetic one. Once the pragmatic dimension of use shifts into intelligent responsiveness, operation and expression converge. The functional act becomes an aesthetic act: perception becomes performance, appearance becomes affordance.

A new era of functional art emerges, where "function" denotes relational intelligence—systems of response and adaptation fully integrated within the aesthetic field. Freed from mechanical constraint, aesthetics becomes the medium through which function is perceived and enacted. The object reveals its expressive autonomy not by negating function but by absorbing it into a unified aesthetic experience.

Functional art thus marks the culmination of a long cultural trajectory: the point where technology allows aesthetics to act autonomously while granting functionality the subtlety of interpretation. Form and function, after a century of negotiation, no longer coexist in tension but fuse into a single cognitive and perceptual unity.

Theory of Mind and the Plausibility of Artificial Cognition

Plausible Cognition and the Intentional Stance

Human cognition is interpretive by nature. When faced with behavior that appears purposeful, the mind constructs an internal model of intention—a Theory of Mind (Dennett, 1987). Artificial intelligence exploits this mechanism through *plausible cognition*: the generation of coherent continuations that simulate understanding without possessing it (Bender et al., 2021).

Large language models operate by predicting probabilistic token sequences within vast multidimensional spaces (Mitchell, 2023). Though devoid of self-awareness, their linguistic coherence activates the user's interpretive apparatus, eliciting empathy and trust. The user's mind treats syntactic plausibility as a proxy for intentionality. This interaction is neither purely rational nor illusory—it is *aesthetic*, sustained by rhythm, tone, and expectation, much like the reading of a literary text.

Wittgenstein (1953, 1969) provides a relevant analogy: meaning arises from "language games" and "forms of life"—shared conventions that make communication intelligible. AI operates within a similar ecology: its output gains credibility not through understanding but by adhering to communal norms of linguistic plausibility. As in human dialogue, intelligibility is a social construct, not an ontological proof.

Cold and Hot Cognition

Contemporary cognitive science distinguishes between *cold* and *hot* forms of Theory of Mind (Baron-Cohen, 1995; Langley et al., 2022). The former involves logical inference about others'

beliefs; the latter includes affective attunement and empathy. Current AI excels in cold cognition—statistical reasoning without emotional grounding.

Design compensates for this absence. By shaping expressive form, it provides affective plausibility—bridging computational coldness and human warmth. Aesthetic coherence acts as emotional scaffolding, enabling social cognition to operate where genuine empathy cannot. The object inspires trust not by feeling, but by appearing capable of feeling.

Thus, cognition and aesthetics converge: the former becomes perceivable only through the latter. Just as empathy is triggered by expressive form in human interaction, AI relies on aesthetic mediation to render its intelligence socially legible.

Aesthetic Affordance as Cognitive Ground

Aesthetic affordance becomes the cognitive foundation of plausibility. Through perceptual and formal coherence, users attribute mind to the object. Visual balance, rhythm, and material sensitivity form the semiotic cues through which intelligence becomes believable.

This mechanism mirrors Wittgenstein's (1969) view of "certainty" as a communal criterion of meaning. In both human and AI communication, understanding is not verified internally but accepted intersubjectively within shared practices. What counts as "intelligence" is defined by fit within the game of plausible interaction—a collective calibration of expectation.

Design, therefore, becomes the syntax of plausibility: it orchestrates perceptual and symbolic parameters that make artificial cognition intelligible. Aesthetic affordance is not a supplement to intelligence but its enabling condition—the stage upon which cognition, real or simulated, becomes meaningful.

From Magical Thinking to Artistic Metaphor

The Persistence of Magical Cognition

The human tendency to attribute mind to non-human entities predates technology. As Cassirer (1944) and Descola (2013) note, early cultures interpreted the world through magical participation, perceiving continuity between symbol and reality. To name or depict something was to act upon it.

The scientific revolution replaced this worldview with causal rationality (Galilei, 1967), yet the symbolic impulse persisted—migrating into art, where metaphor re-enacted the cognitive structures of animism (Bateson, 1972; Gombrich, 1960). Artistic creation preserved the ancient belief that form could embody presence, maintaining the continuity between imagination and ontology that modern rationality had severed.

The Return of Animism Through AI

Artificial intelligence reactivates this cognitive pattern in a technological form. Intelligent systems behave *as if* animated, simulating agency and intention. The user's interaction reawakens symbolic participation—a renewed "digital animism" where algorithms acquire affective presence.

In this context, aesthetics regains its "magical" role: mediating between knowledge and belief, between the intelligible and the plausible. The designer shapes not only surfaces but the *metaphoric conditions* through which artificial systems become culturally and emotionally legible (Nannicelli, 2025; Oksanen, 2023).

The designed object thus becomes a ritual interface—a contemporary totem translating computation into experience. As early artifacts embodied the invisible forces of nature, AI-equipped objects embody the invisible logic of code, transforming data into aura. Through aesthetic mediation, design reinstates its ancient role as a cultural operator of meaning.

Beyond the Product-Centered Design Culture

The mediation of function through AI demands a redefinition of what design manages. Modern design shaped the bodies of objects, encoding use through visible form. In the AI age, function is performed by distributed systems—predictive models, adaptive environments, autonomous agents. The object no longer manifests mechanism but *behavior* (Borgmann, 1984).

Borgmann's "device paradigm" described how technology concealed complexity behind simplicity. With AI, this concealment becomes *ontological*: the user perceives responsiveness rather than process. Design therefore curates the *appearance of intelligence*, crafting mutual legibility between human and system (Flusser, 1999). The designer's agency shifts from shaping artifacts to composing relations of existence—between visible form and invisible computation, trust and intelligibility.

As objects acquire autonomy, designers orchestrate their expressive coherence, guiding the convergence of form and function into *phenomenological unity*. Beyond the product-centered paradigm, design resumes its ancestral role as mediator between matter and meaning—just as magical thinking once did in the ancient world, and art in the modern. Ultimately, design culture approaches its singularity, where form and function no longer stand in tension but reveal themselves as two dimensions of the same perceptual and cognitive phenomenon—a "densified" aesthetic body.

Conclusion: The Second History of Design

Artificial intelligence inaugurates not merely a technological phase but a new *epistemology* of design. The first history of design—from industrial modernity to the digital age—translated human intention into functional form. The second begins when function becomes invisible, executed by immaterial systems, and form reclaims expressive autonomy.

In this condition, design's task is no longer to reconcile aesthetics and utility but to synthesize cognition and perception. The aesthetic becomes functional because it enables understanding; the functional becomes aesthetic because it manifests intelligence.

As the designed object ceases to be a tool and becomes an operational metaphor, design enters its second history—a culture of *AI-functional art*, where beauty is not decorative but operational and meaning is not attributed but enacted. The modern designer shaped matter to embody use; the designer of this new era will shape experience to embody *perceived agency*.

Here, design reaches its singularity: the point at which form and function, long conceived as separate and opposing principles, converge and ultimately dissolve into one another. Their

mutual annihilation marks not an end but a transformation—an *ontological shift* in which aesthetics and utility become inseparable dimensions of the same design phenomenon. Far from disappearing, design thus fulfills its original vocation: to make sense—not metaphorically alone, but functionally and metaphorically at once—in the very act of making non-human intelligence visible and relatable to human understanding.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

The author used AI-assisted tools (OpenAI ChatGPT, GPT-5) exclusively to enhance language clarity and readability. All conceptual content, structure, and interpretations are entirely the author's own.

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