PRODUCT TELEOSEMANTICS: THE NEXT STAGE IN THE EVOLUTION OF PRODUCT SEMANTICS

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ABSTRACT:

Back in the early '90s the term 'Product Semantics' coined by Klaus Krippendorf and Reinhart Butter helped to define the meaning of information transferred by product designers through product forms. They state that the mantra of product semantics is not "form follows function" but rather "form follows meaning" and that designers are part of a two-part equation of designer and user. One of the obvious problems with Product Semantics theory is that there can never be a truly one-to-one direct translation from the designer's intended meanings and the meanings interpreted by users.

The term 'teleosemantics' comes from information theories in genetic research. Teleosemantic theory generally serves as a means to elucidate an involvement relationship between organisms and their environments. This paper proposes the argument that the process of designing is 'teleosemantic' by nature paralleling teleosemantic theories of DNA as information systems and that the inner workings within the gene parallels the relationship between designers and users. When looking at product design through a Product

Teleosemantic lens, a designer's intentions would no longer be seen as invalidated by misinterpretation but rather validated by reinterpretations that lead to new ways of product usage.

INTRODUCTION

In the early 1990s the term 'Product Semantics' coined by Klaus Krippendorf and Reinhart Butter helped to define the meaning of information transferred by product designers through product form. Krippendorf and Butter state that the mantra of product semantics is not "form follows function" but rather "form follows meaning" and that a designer is inexorably bound to the user in their relationship. One of the obvious criticisms of Product Semantics theory is that there can never be a truly one-to-one direct translation from the designer's intended meanings and the meanings interpreted by users.

> The term 'teleosemantics' comes from information theories in genetic research. Teleosemantic theory generally serves as a means to elucidate an involvement relationship between organisms and their environments. This research proposes the argument that the process of designing is 'teleosemantic' by nature paralleling the teleosemantic theories of DNA as information systems and that the inner workings within the gene parallels the relationship between designers and users. The aim of this research is not an effort to eliminate the critical problems faced by Product Semantics in terms of a one-to-one relationship between intended and interpreted meanings, but rather to offer an alternate conceptual framework and interaction model that takes benefit from both the interpretation and misinterpretation of the intended meanings imbued into product form attributes through design.

Product Semantics

Krippendorff and Butter in their 1993 Design Management Journal article entitled Where Meaning Escapes Function state that;

> "In the language of product semantics, meanings are said to arise when we see something in the context of its possible uses, when we place our sensations (of what designers may call form) into the context of the cognitive models we have constructed to cope with similar situations. Meanings inform us of what we could do and whether we can do what we are disposed to do."

Krippendorff and Butter go on to describe the method of "semantic transfer" and that through an analysis of verbal images the designer is able to create "objects that express word meanings without alluding to [the] functional aspects of a desired product." The notion of the semantic transfer of information in product design is not unlike the transfer of information within an organism.

DNA as an Information System

There is much debate in genetic research regarding DNA and the information contained within it. Information concepts are broken down into the two general categories of *causal* and *intentional* information (Griffiths 2001). Causal information concepts are based on mathematical information theories in which only the quantity of information within a system is measured (Griffiths 2001). According to Griffiths (2001);

> "Information flows over a channel connecting two systems, a receiver that contains the information and a sender, the system that the information is about. There is a channel between two systems when the state of the sender can be discovered by observing the state of affairs with which it reliably correlates at the other end of the channel." (pp. 396 – 397)

Giffiths (2001, p. 396) states that, "[t]he quantity of information in a system can be understood roughly as the amount of order in that system, or the inverse of the entropy (disorder) that all closed physical systems accumulate over time." Various articles and books have been written about the causal informational aspects of DNA. Rifkin (1998) quotes French biologist Pierre Grassè regarding his view of DNA as the "depository and distributor of the information" in which he contends that its "code" represents the "intelligence of the species." Rifkin goes on to write;

> "Grassè concludes that the living organism, like the computer, has 'to be programmed and fed with external information in order for novelties to emerge.' The picture he sketches is a cybernetic model of life; a circular process in which the genes, the organism, and the environment continually feed information back and forth, allowing the organism to regulate itself in response to changing external cues."(p.189)

Rifkin (1998, p. 184) elaborates on the cybernetic organism and states that it is an "integrated system" marked by "[t]he constant feedback of new information from the environment and the continual readjustment of the system to the environment…" Rifkin (1998) goes on to refer to the field of bioinformatics and states that researchers are only now compiling what he calls 'biological databanks' filled with genetic information from millions of years of evolution. Both Rifkin and Grassè represent what Griffiths refers to as the "conventional" view of causal information aspects of DNA in which only the quantitative state of information within the system is of concern.

The second rough category of information concepts is intentional information (Griffiths 2001). Intentional information concepts are concepts based on semantic information (Griffiths 2001, Godfrey-Smith 1999a,b). Intentional information concepts generally concern themselves with the content or meaning of the information (Griffiths 2001). The specific distinction of intentional information is that it can misrepresent information (Griffiths 2001, Millikan 2004). According to Griffiths (2001, p. 397), "Genetic information is usually described as if it made sense to speak of a phenotype misinterpreting the message in the gene and hence appears to be

intentional information." Griffiths (2001, p. 397) goes on to state that, "The most promising attempts to give a naturalistic account of intentional information [in genetics] are the so-called 'teleosemantic' theories…according to which a sign represents whatever evolution designed it to represent."

Teleological Theory and Teleosemantics

The American Heritage Dictionary of the English Language, Fourth Edition Copyright 2000 defines 'teleology' as "The use of ultimate purpose or design as a means of explaining phenomena." Ruth Millikan, noted philosopher of biology and author of *Varieties of Meaning*, applies information theory in the study of genes in order to build her case for a teleological theory of intentional representation. Theories for intentional information or signs are frequently considered teleological theories of content (Milikan 2004). Neander (2004, paragraph 4) states, "Teleological theories can also be informational theories. The notion of information is variously defined, but roughly speaking a type of state (event, etc.) is said to carry information about some other state (event, etc.) when it is caused by it or corresponds to it." According to Neander (2004, paragraph 1), "Teleological theories of mental content try to explain the contents of mental representations by appealing to a teleological notion of function." Neander (2004) goes on to state;

> "According to teleological theories of content, what a representation represents depends on the functions of the systems that use or…produce the representation. The relevant notion of function is said to be the one that is used in biology and neurobiology in attributing functions to components of organisms…Proponents of teleological theories of content generally understand this notion to be the notion of what something was selected for, either by ordinary natural selection or by some other natural process of selection." (Paragraph 2)

Neander (2004) points out that representations or intentional information depend on the functions of the systems that produce and use such information. Teleological theory, as it applies to design, has to do with the design process and its functions. Jonas (2001) states that;

> "A hypothetical abstract definition might describe design as a permanent sequence of decisions to reduce contingency at the individual, organizational, and social levels. The function of each decision is to define and, subsequently, to eliminate alternatives and absorb uncertainty in order to create novelty. In order to do this on a rational, meaningful basis, it is necessary to have feedback cycles established between theory and practice, and between the forward and backward perspectives. This really is not new, but known as forecasting (deterministic), planning/backcasting (teleologic), scenario-building (prospective) or, more generally, learning." (p. 67)

Jonas (2001) makes reference to the necessity of "feedback" cycles and defines design planning and backcasting as teleological activities. Neander (2004) references product design in her explanation of teleological theory and the "function" of intentional information. Neander (2004) states;

"Teleological contexts are ones in which there is reference to ends or goals, and relevant talk of functions seems to be teleological in this sense, because, for example, when we say that it is the function of the heart to pump blood, this seems equivalent to saying that hearts are for pumping blood or are there to pump blood…Crucially, however, the relevant concept of function is not purposive. Purposes are intentional phenomena, so such a concept would not serve in a naturalistic theory of content if it were. There is a closely related concept of an artifact's function that is purposive: for example, when we say that moving the cursor is the function of the mouse, we seem to mean that this is what its designers designed it or intended it to do." (Paragraph 15)

With regards to teleological theory, Neander (2004) makes the case that "functions" are "purposive" when explaining designed artifacts. In other words teleological theories have at their core the notion that functional standards can derive semantic standards.

In essence, teleological theories in genetic research aim at making 'intentional' the vast amounts of information expressed by the gene into the physical characteristics or phenotypes of an organism (Griffiths 2001, Milikan 2004, Neander 2004). In design, teleological theories deal with the teleologic function of design theory in practice through feedback cycles (Jonas 2001) and the teleological notion of function and purpose of designed artifacts (Neander 2004).

According to Neander (2004, paragraph 33), "The term "teleosemantics" is used to refer to the class of theories of mental content that use a teleological notion of function." Neander (2004, paragraph 33) goes to state that, "Teleosemantics is best understood as a general strategy for underwriting the normative nature of content, rather than any particular theory." Millikan (2004) writes;

"Teleosemantics,' as it is sometimes called, is a theory only of how representations can be false or mistaken…Teleosemantic theories are piggyback theories. They must ride on more basic theories of representation, perhaps causal theories, or picture theories, or informational theories, or some combination of these." (Chapter 5, p. 1)

Teleosemantic theory generally serves as a means to elucidate an "involvement" relationship between organisms and their environments (Godfrey-Smith 2003) within the framework of what Millikan (2003) refers to as information "intentionality" or what Godfrey-Smith (2003) refers to as the "basic representational model." Godfrey-Smith (2003) references and elaborates on Millikan's teleosemantic theory and states;

"… that an indicative intentional icon is a structure that 'stands midway' between producer and consumer mechanisms that can both be characterized in terms of biological function. The consumer mechanisms modify their activities in response to the state of the icon in a way that only leads systematically to the

performance of the consumers' biological functions if a particular state of the world obtains. That state is (roughly) the content of the icon." (p. 23)

Millikan refers to an "indicative intentional icon" which Godfrey-Smith (2003, p. 22) defines as any number of "semantically evaluable phenomena" such as bee dances, language sentences and human beliefs. According to Godfrey-Smith (2003, p. 23) what teleosemantic theory involves "in abstract terms, is a combination of the basic representational model plus a feedback process, in which relations between actions produced and the state of the world can shape the representation-using mechanisms." In other words, representational or intentional information is communicated through the gene (producers) and is expressed by the organism or parts of the organism (consumers) through phenotypes that are then selected by natural selection (environmental influences) hence modifying the organism over time in a feedback process. This notion of a "producer/consumer" relationship and their "feedback process" that Millikan and Godfrey-Smith refer to in the explanation of teleosemantic theory parallels the producer (designer) and consumer (user) relationship in designing and the planning/backasting teleologic feedback cycles presented by Jonas (2001).

Millikan (2003) goes on to use product design in explaining the natural selection of intentional information or "representations" within a system;

> "Compare the design of a camera or of a calculator. The camera is not designed, specifically, to take any particular picture that it takes, nor is the calculator designed, specifically, to make one particular calculation rather than another. Still, when the camera is working right, it was designed to turn out each picture that it turns out given its input. And the calculator that is working right gives each individual result in accordance with design, again, depending on its input. An explicit intention does what intentions were designed to do when it initiates its own fulfillment." (Chapter 1, p. 4)

In other words an explicit intention is fulfilled when, through design, the explicit intention is initiated. One possible interpretation could be that design fulfills explicit intentions in a kind of self-fulfilling prophecy whereby the designer embeds intentional information (meanings) into product attributes and it is those attributes that end up fulfilling the original intentions through their interpretation and use by consumers. Although clearly debatable, this interpretation of design intention and the embedding of meaning is an area in which the application of teleosemantics could further understanding of the product designer's role in the brand design process. Teleosemantics theory offers a plausible framework and interaction model through which the product design field can more clearly express an involvement relationship with the user hence leading to the next stage in the development and evolution of product semantics.

From Product Semantics to Product Teleosemantics

Millikan's description of a "producer/consumer" relationship and their "feedback process" in her explanation of teleosemantic theory in genetic research directly parallels the producer and consumer relationship in designing and the planning / backasting teleologic feedback cycles presented by Jonas. Here we can see a common usage of terminology in both genetic research and design. Perhaps Products Semantics can evolve into a type of Product Teleosemantics in which designers' intents are set forth but remain open to interpretation and later manifestation through their use not unlike genes and how misinterpretations of genetic information sometimes lead to unexpected new traits. When looking at product design through a Product Teleosemantic lens, a designer's intentions would no longer be seen as invalidated by misinterpretation but rather validated by reinterpretations that lead to new ways of product usage. The designing of products in a Product Teleosemantic world would not consider semantic transfer a one-to-one transfer from sender to receiver but a transfer of information in a kind of sequence of messages that build and change over time from re-interpretation as well as misinterpretation ultimately leading to new meanings.

Conclusion

Teleosemantics theory provides a lens through which to see product design as a cyclical relationship founded on a teleological feedback loop between producer (designer) and consumer (user). The 'teleosemantic' theories that reference the relationship between producers and consumers in the gene parallel the designer and user relationship in product design. The notion of the intentional brand information imbued into product through design can be likened to the teleosemantic or intentional information theorized in genetic research. Product design transfers the belief systems of brands to consumers through the production of products imbued with cultural meanings in a kind of teleosemantic framework. This transfer of information utilizes the teleological feedback systems that designers already employ to understand and change cultural values that ultimately lead to socio-economic change. Teleosemantic theory as applied to product design will aid designers with a more dynamic way of understanding their role in the design process as well as their specific influence and impact on material culture.
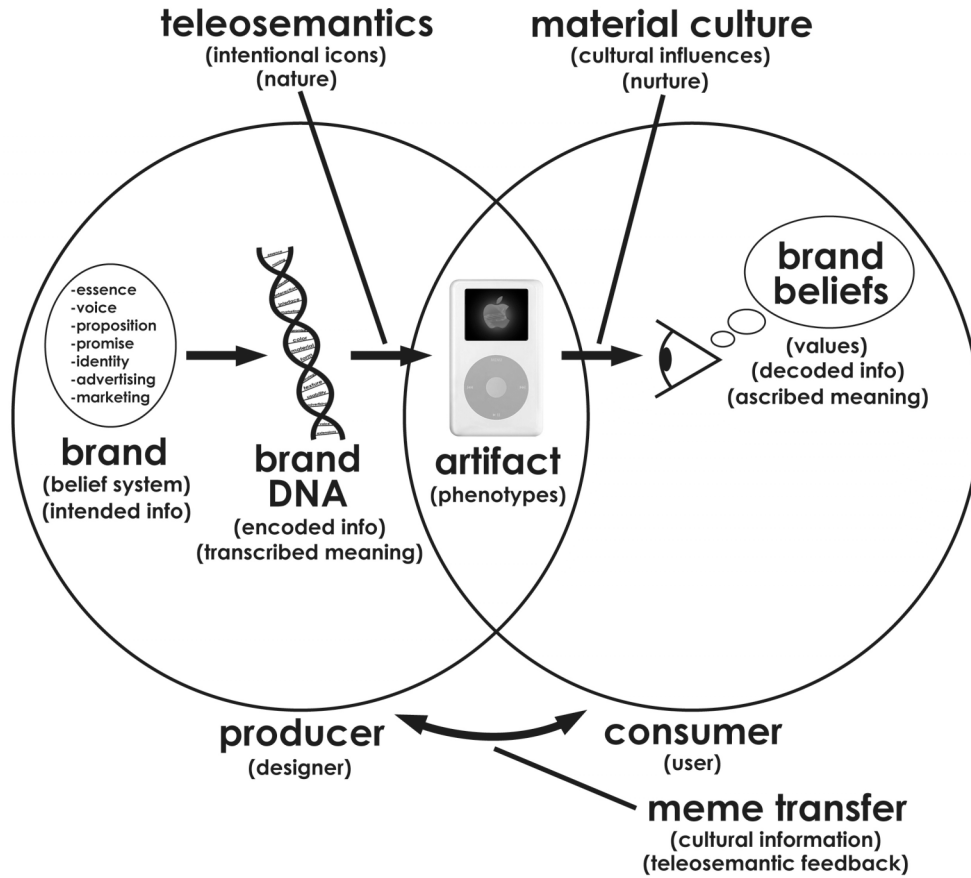
teleosemantics
(intentional icons)
(nature)

material culture
(cultural influences)
(nurture)

-essence
-voice
-proposition
-promise
-identity
-advertising
-marketing

brand
(belief system)
(intended info)

brand
DNA
(encoded info)
(transcribed meaning)

artifact
(phenotypes)

brand
beliefs
(values)
(decoded info)
(ascribed meaning)

producer
(designer)

consumer
(user)

meme transfer
(cultural information)
(teleosemantic feedback)

Figure 1.0 *Teleosemantics as Interaction Model for Product Design*

The conceptual framework of teleosemantics theory also has a prescriptive function as a model for the designer/user interaction. The process illustrated in diagram 1.0 parallels Millikan's producer-consumer approach used in the understanding of the transfer of genetic information within organisms. Here the DNA metaphor describes the nature of the relationship between the core attributes of a brand and the resulting consumer beliefs through the interaction with artifacts and the transfer of memes. This interaction model underscores product design as an integral agent responsible for the altering of consumer perceptions that lead to cultural change within a socio-economic framework. Further investigation and application of teleosemantics theory in product design will help evolve the field ultimately leading to the next stage in the evolution of product semantics.

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