

Concept Combination and Inter-Transformation of Semiotics and Semantic Learning in Design

Xiaohong Lin ^{a,b,1} and Nurul 'Ayn Ahmad Sayuti ^a

^aCollege of Creative Arts, Universiti Teknologi MARA, Malaysia

^bInstitute for Design and Art, Hebei Academy of Fine Arts, China

Abstract. Purpose - This paper discusses the learning concepts of Semiotics and Semantics by identifying the differences between both images and the inter-transformation of both in the design field. **Design/methodology/approach**- This study uses a content analysis method to investigate the application and the differences between Semiotics and semantics in different types of product designs. Furthermore, this study also analyses the combination of both concepts in the design process. To build up the narrative for the content analysis, 390 different semiotics and semantics designs are collected and compared. **Findings**- In the Design, the extraction of symbols is one of the most commonly used means in the design methods. However, in the process of refining the symbols, the meaning symbols are added and then transformed into semantics. In this process, different symbols represent different styles and meanings. At the same time, according to the different feelings of symbols, it leads to different cognition of this Design. **Practical implications**- The results documented the conceptual distinction based on Semiotics and semantics. Thus, it defines the transformation of semiotics and semantics by providing essential insights into how symbolism and design expressions can be effectively applied to the communication between Design and consumers. **Originality/value**- There needs to be more knowledge on how specific semiotics and semantics are used to motivate the consumer's desire to buy any designed products. The authors have analyzed 390 semiotics and semantic-related product designs in this study. This study helps to promote the theoretical and practical significance of Semiotics by revealing the differences between Semiotics and Semantics concepts and the inter-conversion between them and facilitating the application of this design method of symbol extraction.

Keywords. Digital technology; rural construction; challenges

1. Introduction

In many fields, the Design of products meets the essential functions of life, providing emerging and future intelligent services while improving the quality of our life, and the Design of symbols is one of the essential design means in product design[1]. Communication is a part of social life And is also an essential part of the Design; Design is an important bridge between products and consumers; design products need to have

¹ Corresponding Author, Xiaohong Lin, College of Creative Arts, Universiti Teknologi MARA, Malaysia; Institute for Design and Art, Hebei Academy of Fine Arts, China. E-mail: linxiaohonghb@163.com.

information communication significance. At the same time, in daily life, the products can effectively communicate with consumers through their form. In developing the design form, designers need to consider what kind of symbols can let consumers understand the definition of this product and attract consumers to the desire to buy. Therefore, the correlation symbol design study becomes more important. However, in many surveys, there are few studies on the relationship between symbols, product design, and consumer purchase behavior, which is the fundamental purpose of this research.

Semiotics provides analysis and enables the product to communicate effectively with consumers. Semiotics and semantic approaches are essential in sensory perception and how products are interpreted. In semiotics, the symbols chosen vary depending on the object. If the target audience is children, the form and language of the expression are determined according to the child population[2]. Symbols are used to convey information in a clear and understandable manner without using written language. Used to directly express its function, culture, symbol, and other meanings to consumers. The Design of a product's appearance is a visual symbol defined as an abstract and concrete expression.

This study discusses the learning concepts of semiotics and semantics by identifying differences between design domains and the inter-conversion of the two. And we use content analysis to study the application and differences between different types of product designs in Semiotics and Semantics. Furthermore, this study also analyzed the combination of these two concepts during the design process. We collected and compared 390 different semantics and semantics designs to establish a narrative for content analysis.

2. Theoretical background

Through this literature review, the researchers found gaps in the study, which provided the basis and rationale for this research project. As shown in Figure 1 below, for 777 articles related to this study in the Web of Science Core Collection, it can be seen that symbols, origin, culture, education, and so on are the keywords that have been studied more in recent years. However, in many documents, there needs to be more research on the process of semiotics and how it is finally presented in Design rather than just a symbol.

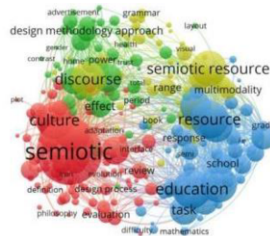


Figure 1. Network diagram of keywords in the titles and abstracts of 777 articles(Source: VOSviewer software analysis)

2.1 Design Semiotics Theory

Design semiotics is controversial historical semiotics [3][4]: Since the late 1930s, inspired by Morris, designers have applied this field to design(1938) than semioticians [5][6][7].(Tomás Maldonado introduced Semiotics courses in the mid-50s at the

Hochschule für Gestaltung in Ulm.). Since then, Although the number of studies on semiotics has now increased, the academic contributions to the field are sporadic rather than systematic [8][9]; Only in a few cases have the semantics of the design project been studied accurately[10][11].

The concept of semiotics was first brought by Saussure, a Swiss linguist, and Peirce, an American philosopher, in the early 20th century. However, semiotics itself has been on the verge of academic circles. In the 1960s, Saussure's semiotics took off in the name of structuralism, and semiotics and structuralism were almost the same items with two names. From the 1970s to the 1980s, structuralism broke through itself and became the after-structuralism, in which Semiotics played a significant role. Pierce's model replaced Saussure's as the foundation of modern semiotics. As shown in Figure 2, Three conceptual systems of semiotics.

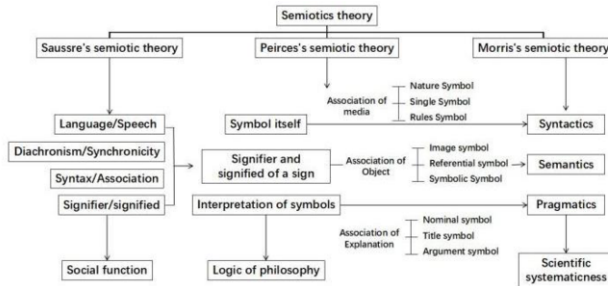


Figure 2. The theoretical framework of Semiotics (Source: Author's drawing)

However, most of the above literature touches on the dimension of hermeneutics, and cognitive psychology, not sum up or lack of design research in detailed and applied design methods. Design semiotics literature is more limited than Semiotics design, and the relationship between the literature, on the whole, could have revealed the research process of interdisciplinarity. The time-progressive research relationship and the connection between the transverse mainly focused on the instance analysis, semiotics thoughts application, etc., and did not explore product design methodology. Especially in the design process, how to convert the semiotics into the final design effect, and how to get the final effect without analyzing the design process. All these are the key points and the meaning of this research.

2.2 Product Design Semantics

The original meaning of Semantics is the meaning of language, while Semantics is the study of the meaning of language. The design community applies research language to product design, resulting in "Product semantics." Its theoretical structure began with the theory of the design notation of Ulm University in Germany, which can be traced back to Charles and Morris of the New Bauhaus School in Chicago.

The concept of "product meaning" officially appeared in 1983 by Klaus Krippendorf and R.Butter, and in the Cranbrook Academy of Art by the American Association of industrial designers IDSA "semantic product seminar" was put forward, and give the definition: product Semantic is the symbol of the use of human form features, and apply this in the Design.

In essence, product meaning is a kind of communication between people and things, namely through the product material, form, structure, color, texture, and other visual

languages to reveal or suggest the internal structure of the product, make the product function clear, make the man-machine interface simple, easy to understand, thus remove the user for the product operation, with a more precise visual image and more symbolic form design, convey to the user more cultural connotation, at the same time produce the rich, exciting way of life, achieve people, machine, environment harmony.

The meaning of product semantics includes two aspects: Epitaxial meaning and Connotation meaning.

Epitaxial meaning is the product's certain, obvious, or common sense meaning, which is the "obvious" relationship directly expressed in the history of the product culture; that is, the product form directly explains the product content itself. It is also a simple-to-understand, more direct semantic expression through the form, structural characteristics, and other elements to express the use of the purpose, operation, function, and other content, which is the basis of the existence of products. Product characterization is a practical spirit. Its fundamental purpose is to use product modeling as a means so that people can quickly understand "what product this is, ""what to do," "how to use," and other issues through the shape design of the product.

Connotation meaning usually refers to the social culture and personal associations (such as ideology, emotion, etc.) contained in the product. These are closely related to the user's class status, age, gender, race, etc. It is a kind of perceptual cognition that is more related to the generation of the product form. It is a potential relationship that cannot be directly expressed in the product context. Usually, it indirectly explains the content beyond the material attribute of the product, that is, the psychological, social, and cultural symbolic values displayed by the product in the use environment.

2.3 Differences Between Semiotics and Semantics

According to Henrik Sunde (Department of Design, Norwegian University of Science and Technology), "Semiotics is the study of symbols, while semantics is the study of the meaning of symbols." In the product semantics, the concept of the semantic is used to describe the design. In terms of the design process, the product is a "symbol", which is how the designer can apply the coding of meaning to the product design and can communicate effectively with the user. The ultimate goal of the design is to describe the functionality of the product, to express the desired attributes or features, or to direct the behavior of certain users. On the other hand, product semantics is very important for designing a product with a higher usability and popularity to increase its chances of success.[12].

Semiotics usually uses the following forms: symbols; patterns; sets of signs; images; colors. Semiotics helps designers understand how to create easy explanations in multiple communication systems. It is then able to help designers develop a system to deliver some specific information that is very easy to understand. – for example, red for enthusiasm, green for environmental protection, etc. [12].

Semantics uses words to define and express a brand of values; mission; typography; guidelines for logo usage[12].

Semantics is a branch of linguistics and logic that deals with meaning. It is the theory of language that studies the meaning of words. The theory holds that the meaning of a word is entirely reflected in its context. Steve Jobs said that despite all the theories, "design is not just what it looks and feels like. Design is how it works." [12].

2.4 Product Semantics and Symbolic Relationship

Product semiotics is a design theory based on Semiotics. The object of its study is symbol, which is an abstract concept. It is usually produced by visual experiences and visual associations generated by visual stimuli to convey the content of its form. As a medium for conveying information, symbols can store and remember information, transmit certain emotions, and enable associations to convey information in symbols. Therefore, relying on the role of symbols, people can complete the transmission and interaction of information. In general, people's perception of symbols is a process of forming habits and then developing norms based on life experience. The design concept of product semantics is to understand the cognitive process and operational behavior characteristics of users, as well as the knowledge and experience level of users from the perspective of users.[13].

3. Research Methodology

This study mainly uses the following steps, as shown in Figure 3. Here, the arrow points from the last step to the first step, indicating that the research question or objective can be re-elaborated in a separate study or subsequent study. The researchers will discuss each step carefully.

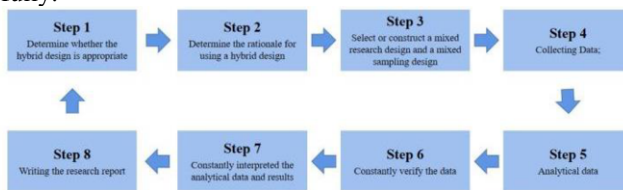


Figure 3. Essential steps in hybrid studies (Source: Author's drawing)

Note: Although each step has been numbered, the researcher can multidirectional loop in this step circle, especially from step 4 to step 7.

4. Analysis and findings

After the literature review of the semiotics theory and semantics theory studies, the preliminary observation was made by collecting design-relevant books and images with symbolic significance on design websites. At least 240 symbolic designs and 150 semantic designs were collected and recorded in taxonomic tables/typology.

Through the classification, investigation, and analysis of symbols and semantics, this study can finally determine which type of symbols to choose in different fields, effectively reducing the design and development cycle and extending the final product's survival cycle in the market. Although many relevant studies have been found in other fields, only some studies on Semiotics are conducted in the design field and, more specifically, in product design. The new findings encourage researchers on the current product design trends; at the same time, the researchers found a series of new designs, including the symbol design related to symbol design. To determine the type of product symbol design, researchers review hundreds of design sources, including some successful, classic cases, in some design books or design teaching, in the design process

of symbols, usually in the "bionic design" application. By searching and classifying these keywords, the researchers classify these kinds of symbolic products into the following categories from the perspective of symbol design: animal, plant, and other symbols. From the perspective of semantics is divided into the following categories: furniture design, automobile design, and daily necessities Design. Through the above classification, we can contribute to the inductive analysis of the existing symbol design products, which is one of the main contributions to the knowledge of this research project.

4.1 Semiotics and Semantics classification

In this study, 240 symbols were classified, mainly based on animal and plant symbols, such as Figure 4(a), and then 150 semantic aspects, mainly based on furniture design, automobile design, and commodity design, such as Figure 4(b). Finally, the relationship between symbols and semantics is summarized, such as in Figure 4(c). For example, the chair of "hedgehog bionic" first determines the design style as "Fun" at the beginning of the Design, then looks for exciting elements, and finally determines the symbol "hedgehog" and then applies it in the final Design.

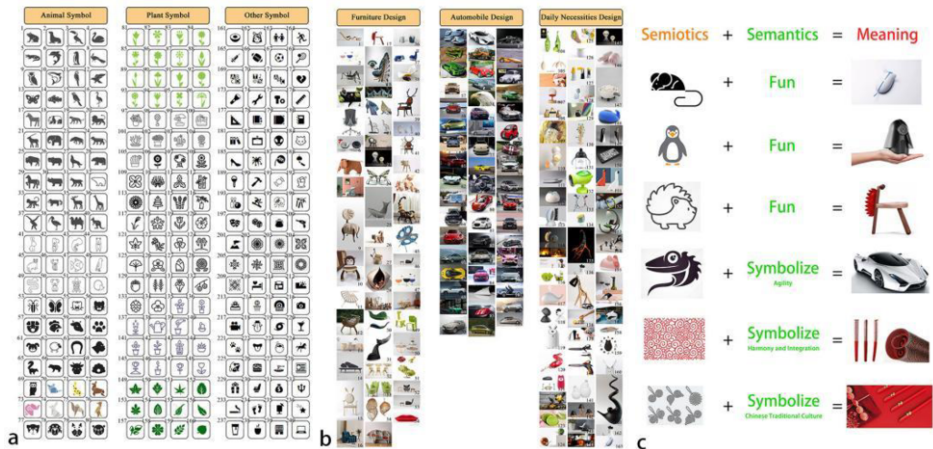


Figure 4(a). The examples of Symbol classification taken from the internet (Source: Author's drawing)

Figure 4(b). Semantic classification (Source: Author's drawing)

Figure 4(c). The relationship between Semiotics and Semantics (Source: Author's drawing)

5. Conclusion

Despite considering the study's objectives, we developed the coding of "Semiotics - Semantics" interconversion based on the existing literature. The coding schemes are then applied to determine how designers use symbols in different product designs to give the product semantic meaning. In addition, the ultimate purpose of the products designed by designers is to put the products into the market for circulation, and consumers are the most important group of buyers. The more consumers buy them, the more successful the product design is. Then, the method of symbol refining is a standard method in Design. Under what kind of environment, what type of products, and what type of symbols to choose to stimulate consumers' desire to buy? Can it be a successful product? Reverse reasoning, such as the classic case of Beetle car design, produced in 1938 and continues to this day, is still popular with the public. How do the designers of the Volkswagen

Beetle car use the way of symbol extraction to carry out the classic Design? How to choose the symbols to make the Design? These are important to solve the problem; in product design, symbol refining is a kind of Design that means, at the same time, need to define the concept of Semiotics and semantics; put, semantics is more like a product and consumer communication languages, such as door handles, such as a button or rotating twist, tell consumers how to use, or an exciting product, convey interesting information, make consumers feel interesting. In product design, Semiotics is more of a means in the design process, refining symbols (concrete or abstract) from animals, plants, geometry, etc. Semiotics is the foundation of semantics, and semantics are developed based on compliance, such as when people use electronic products, the brain is through words to use or operation process communication with electronic products; when you use the radio, you will think: "connect the power... looking for the central radio station... the voice is too small, amplify the voice...", so the Design of these new electronic products should start from the words and products, with the design basis. Therefore, the definition and connection between the two concepts are significant in studying product conformity design.

References

- [1] Michela D.,Salvatore Z. Semiotics in Design Education. *Semiotics by Design. The Design Journal*, 2017 Aug:S1293-S1303.
- [2] Aciı, FK, Bal, HB. Understanding Design Through Semiotic Analysis: On Rocking Horse. *Art-Sanat*. 2020,13: 293-312.
- [3] Deni, M. For a History of Semiotics of Design Projects. *The Value of Design Research*, 11th European Academy Conference, 2015: 22-24.
- [4] Anceschi, G. L'oggetto della raffigurazione. *Etaslibri*.1992:190-195.
- [5] Nina M.Milena M.Georgios H. How do international advertisers use consumer culture positioning strategies? A cross-national, cross-category approach. *Consumer culture positioning strategies*. 2020 Jul:0265-1335.
- [6] Ying C., Biying L., and Jiaxin L. Research on Interface Design of Venue Monitoring System Based on Product Semantics. *Advances in Usability and User Experience*,2019: 333-342.
- [7] Huang, W.; Li, J.; Alem, L. Towards Preventative Healthcare: A Review of Wearable and Mobile Applications.*Stud. Health Technol. Inform*, 2018: 251, 1114.
- [8] Zinna, A. Avez-vous dit "allumer l' ordinateur". In M. Deni (Ed.), *La semiotica degli oggetti*. Versus, 2002: 91-92.
- [9] Ali E. Akgün, Halit K., Ipek K., and Cemal Z. The Relationship Among Organizational Symbols, Firm Absorptive Capacity, and Product Innovativeness.*Engineering Management Journal*. 2019 Jul:1-19.
- [10] Ling Z. and Joungyung, C. new method of design based on genetic algorithm analysis of the application of traditional cultural symbols in visual communication design. *Journal of Intelligent & Fuzzy Systems* 37 (2019): 3401-3408.
- [11] Beatriz F., Lana V., Mavra A.1, Angela O., and Mary R. Consumers' Implicit and Explicit Recall, Understanding and Perceptions of Products with Nutrition-Related Messages: An Online Survey. *Int. J. Environ. Res. Public Health*. 2020 Oct:8213.
- [12] <https://www.linkedin.com/pulse/relationship-between-semiotics-semantics-creating-visual-janet-odgis>
- [13] <https://www.techtarget.com/whatis/definition/semiotics>