A Design Philosophy From the View of Creation:

Design vs. Research

Fred Y. Ye
European Academy of Sciences and Arts
International Joint Informatics Laboratory (IJIL), Nanjing University–University of Illinois, Nanjing–Champaign, China–USA

Mankind holds creation as a special human property contributing knowledge and culture. Both design and research belong to creative activities. While research focuses on new findings following the rule of truth, design pays more attention to new designed works following the rule of beauty. Three philosophical principles for design are suggested as ABC principles: A. Design approaches beauty; B. Design balances science and art; C. Design concerns culture. Three types of design are practically discussed, including 2D art or symbol design, 3D engineering or product design, and nD program or form design.

Keywords: research, design, 2D design, 3D design, art design, engineering design, hard design, soft design, creation

Introduction

Both design and research belong to creative activities of mankind, in which ones apply their knowledge and skills to create new knowledge and culture. Differentiating from science research, where scientists hold scientific methodology to create objective knowledge (Popper, 1972), design especially art design possesses independent features for describing and reflecting civilization combining subjective thinking and objective conditions. Comparing with science research, we can probe into design philosophy under the view of creation (Dorst & Cross, 2001).

While research focuses on new findings following the rule of truth, design pays more attention to new designed works following the rule of beauty. As research methodology has been studied well, we will discuss design methodology along with design thoughts and experiences (Cross, 2006; Dorst, 2006; Brooks, 2010; Pressman, 2019). Here, art, engineering and software designs provide us useful references for the studies.

Comparable Methodology

A comparable methodology between design and research starts from the methodological procedure, where we characterize research procedure as 2S2R diagram and design procedure as DESIGN diagram as shown in following Figure 1.
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In the procedure of research (2S2R), the first step will select a topic (S1), and the second step will check and judge the reasonability and feasibility of selected topic by searching (S2), so that the link A between S1 and S2 will process information retrieval and produce a review. If the selected topic is not feasible, we must return to adjust the topic. If it is feasible, we can go on the research process. Then the third step is the core step called research (R1), where researchers do real research with using research methodology and obtain findings, and the link B between S2 and R1 addresses research design and determines research methods. The last step outputs result (R2), including papers, patents, books, etc., and the link C will complete real research with outputting the results.

Similarly, in the procedure of design (DESIGN), the first step starts at a designing idea (DE), and the second step is searching (S) for judging the reasonability and feasibility of the idea, so that the link A between DE and S will check and judge whether the idea is new or old. If it is old, we must return to adjust the idea. If it is new, we can go on the design process. Then the third step is the core step called idea-designing (IG), where designers do real design with using design methodology and obtain new design, and the link B between S and IG will determine how to design. The last step produces new design (N), including 2D or 3D designed cases, and the link C will complete real design with contributing the new design. This is just a DESIGN process.

Therefore, we saw similar methodology in design and research. Both 2S2R and DESIGN procedures formulate creative working processes for research and design respectively.

Meanwhile, both design and research can also provide comparable methodology within basic elements, for approaching new finding or new design respectively, a comparable pattern is shown as Figure 2.

The research is based on present data and knowledge, and design will consider past old design and cultural difference. While data-driven research and model-driven research are characterized by algorithm and statistics for finding new findings, the culture elements and science elements are characterized by cultural taboos and scientific symbols for designing new designs. The design and research are consistency, as they all belong to creation.
Philosophical Principles of Design

Philosophically, it is necessary to set up some principles for design. Here, it is suggested to introduce following three principles.

(A) The first principle: Design approaches beauty

Any design will approach beauty by using various elements, including words, colors, symbols, graphs, and so on. A new element can be integrated into a design to strengthen its effects of design requirement. Different designs face different applications, where beauty will be found by visual and auditory senses or other feelings, through which ones would understand the role of the design.

(B) The second principle: Design balances science and art

The design covers both sides of science and art. In science side, a design will abide natural laws, social rules, as well as multidisciplinary objective constrains. In art side, a design will apply individual or subjective images to reflect the world. A good design needs to balance science and art, where both science and art contribute important functions in the design.

(C) The third principle: Design concerns culture

Both cultural tradition and cultural taboos would be considered in design. There are many differences between ancient and modern culture, Eastern and Western culture, even in the era of globalization. The cultural differences maintain importance in human communication, since culture integrates not only ancient civilization and modern civilization, but also the values of “rule by morality” in Eastern cultural traditions and the values of “rule by law” in Western cultural traditions.

Although the three principles guide design to different directions, all principles require to approach the beauty. This is just basic aesthetic principle or rule in design.

Three Design Types

In practice, we provide three representative design types as applications as follows.

(1) 2D art or symbol design

The first type of design can be two-dimensional (2D) art and symbol design. We give an integrated example as shown in Figure 3.
In Figure 3, the left side is famous drawings by Leonardo da Vinci and the left side belongs to natural photo (top) and artificial image (bottom). They all show art beauty. This is a fundamental kind of design that we can 2D art or symbol design, where the first principle focuses on harmonic and visual beauty, the second principle combines perspective rule with image element, and the third principle sets in the background of the history and reality.

The focus of art or symbol design is layout and composition. In art layout, 0.618 layout could be an important rule. In symbol composition, the color distribution is also a key to approach beauty.

(2) 3D engineering or product design.

The 3D engineering or product design covers most industrial products, including mobiles and computers even airplanes, as shown in Figure 4.
Whatever the products are computers or mobiles, they need perfect design for good feeling from users. We may call 3D engineering or product design as hard design, where the first principle focuses on symmetry and feeling beauty, the second principle combines scientific feasibility with art practicality, and the third principle considers the environment of the world business.

The focus of engineering or product design is structure and function. In structure design, the symmetric stability should be a key element. In function design, the practical utility would be the most important consideration.

(3) nD program or form design.

We can also provide a non-dimensional or n-dimensional (nD, \( n \geq 0 \)) program or form design as shown in Figure 5, where the left chart as an example came from open picture and the right pseudo-coding programming cited from Brooks (2010).

![Figure 5. A programming design in chart and Pseudo-coding.](image)

We may call nD program or form design as soft design, where the first principle focuses on concise beauty, the second principle combines computation feasibility with procedure smooth, and the third principle integrates running environment of the programming.

The focus of program or form design is architecture and procedure. In architecture, the process chart reveals a demand. In procedure, the programming resembles main formulation.

The features of above three types of design can be concluded as Table 1.

Some designs may belong to cross-types, such as applied design in trademarks and patents, where designed elements might meantime cover 2D and 3D, visual beauty and feeling beauty, harmony and symmetry, and so on. Therefore, a real design will become a complex process with integrating complicated elements.
Table 1

| Design type         | 2D art /Symbol | 3D engineering/Product | nD program/Form |
|---------------------|----------------|-------------------------|-----------------|
| Key beauty          | Visual beauty  | Feeling beauty          | Concise beauty  |
| Key element         | Harmony        | Symmetry                | Procedure       |
| Important consideration | Beauty      | Utility                 | Operation feasibility |
| Applied field       | Art etc.       | Engineering etc.        | Programming etc. |

Discussion and Extension

Design is an interdisciplinary or multidisciplinary creative process, where designers’ subjective thinking and users’ objective appraisement act each other, to approach a matching cognition. Users’ appraisement is important, but it is not deterministic. This is different from business, where all rules set around users-centered. In design, the designers may insist on their creative ideas to get their ideal states, and users contribute their appraisements as references. However, sometimes, users may be right to choose correct design. Particularly, when the design is based on users’ demand, users’ idea and need become key. A typical example can be trademark, which integrates symbol beauty and business utility, so that a trademark represents a unity of art beauty and economic value, where users’ cognition and acceptance become key important considerations.

Although it is difficult to design a perfect design, it is possible to discuss what perfect design is and how to design the perfect design according to above mentioned design principles. As both design and research belong to creative activities, some common rules exist in design and research. But it is also obvious that there are differences between design and research. One of key features focuses on that the design adopts the rule of beauty while the research follows the rule of truth.

It will be possible to extend above design system, based on design principles as well as design philosophy. As there are many complicated factors affecting design, an ideal design will consider complex elements with their optimal combinations. In more generalized senses, any new idea can be concluded into design field, as synthetical case, including dynamic situation such as audio, video or movie. Only when one had a new idea, one could realize it in practice. Therefore, we could say that every work would begin at new design.

Conclusion

Under the view of creation, design resembles similar with research. The three philosophical principles for design are suggested as ABCs: A. Design approaches beauty; B. Design balances science and art; C. Design concerns culture. This is just a design philosophy, which may guide the design applications, where we classify design as three types: 2D art or symbol design, 3D engineering or product design, and nD program or form design, for approaching art design, engineering design and programming design respectively. When art design aims at visual beauty and harmony, engineering/product design does so on feeling beauty and symmetry/utility, and programming focuses on concise beauty and operation procedure. The basic rules abide with three principles under the aesthetic rule, which contributes a design philosophy for design applications. Both design and research belong to creative activities. While research focuses on new findings following the rule of truth, design pays more attention to new designed works following the rule of beauty. Hopefully this is a valuable exploration for benefiting design philosophy.
References

Brooks, F. P. (2010). *Design of design: Essays from a computer scientist*. Boston: Addison-Wesley.

Cross, N. (2006). *Designerly ways of knowing*. London: Springer.

Dorst, K., & Cross, N. (2001). Creativity in the design process: Coevolution of problem-solution. *Design Studies*, 22(5), 425-437.

Dorst, K. (2006). Design problems and design paradoxes. *Design Issues*, 22, 4-17.

Lewrick, M., Link, P., & Leifer, L. J. (2018). *The design thinking playbook: Mindful digital transformation of teams, products, services, businesses and ecosystems*. Hoboken: John Wiley & Sons.

Popper, K. R. (1972). *Objective knowledge: An evolutionary approach*. Oxford: Oxford University Press.

Pressman, A. (2019). *Design thinking: A guide to creative problem solving for everyone*. New York: Routledge.