From Surface to Depth – Exploring the Nature of Design

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Product Design, by Arthur Eger, Maarten Bonnema, Eric Lutters, and Mascha van der Voort, 1st edition, 2012, Eleven International Publishing, 294 pages including index, softcover. The book was first published in 2004, in Dutch. After six years of experience with the original content, the authors chose to change both content and layout of the book in 2010. The English version of the book is based on the 4th Dutch edition. *Product Design* is the fruit of theoretical knowledge developed at the University of Twente, and the authors' practical experience. It contains case studies, with illustrations in color and b&w.

Is design an art or a science? While reading *Product Design*, you will find that "more often, design is more of a science, involving the entire design trajectory and consisting of a series of more or less independent activities that lead to the final product."

The book gives a complete description of product design, and consists of three sections: Basis, Broadening and Exploration, covering topics ranging from product phases to creative thinking and oral presentation in detail. The first section contains an introduction to basic issues concerning product design, including information about formulating a product idea, requirement specifications, market research for product design, styling and attribution of meaning, user interaction and ergonomics as well as product evaluation. The second section goes deeper, and covers product function analysis, lifestyle, packaging, intellectual property, success factors and working with an agent. The third section bears the title Exploration and is a discussion about design method, project management and project documentation, creativity techniques as well as presentation and substantiation.

The authors of the book – Professor Dr Ir Arthur O. Eger, Dr Ir G. Maarten Bonnema, Professor Dr Ir Eric Lutters and Dr Ir Mascha van der Voort – work at the University of Twente in the Netherlands. They all have an engineering background, namely industrial engineering, electro-technical engineering, mechanical engineering and civil engineering, respectively. The team's background is embodied in the organization and style of the book, and technical function is always emphasized. Take for example Packaging in Chapter 15. The discussion begins with the reason for packaging, and a list covering the details of the function of packaging: creating a volume unit, protecting the contents from mechanical influences, weather and theft, preserving the contents from factors such as decay and corrosion, communicating about contents, sender and destination, being suitable for the packaging conveyor belt, being easy to handle, being easy to transport, being easy to empty, being suitable for storage, and being economically as well as ecologically sound.

The structure of the book is logical. The reader may feel that the book itself is a well planned and well designed product, reflected in for instance the order of appearance of certain concepts and how they evolve. When talking about the product life cycle in the third section (Exploration), the authors remind the reader not to confuse this with the economic life cycle discussed in Chapter 1, which spans all phases of the product's life from the very first concept to the final disposal or recycling of the product. Although the full life cycle contains many aspects that will influence and are influenced

by the design trajectory, the two concepts are explained in detail, avoiding the misunderstanding and connecting information from different chapters. Something similar goes for the concept "requirement specification" which appears three times in Chapters 2, 3 and 12 respectively; it is also elaborated under "product function analysis". The experience of reading this book compares to being in the classroom with a teacher explaining everything clearly and patiently.

In Chapter 6 (Product Phases), the authors use the development of the bicycle to explain the six stages of product development, namely performance, optimization, itemization, segmentation, individualization and awareness. At times, the comparison between a successful product and a failed product is used to give the reader an opposite angle to view the problem. Under the heading of Optimization, ten aspects are listed as important, such as "The product is new to the market or little is known among the target buyers' group; often, the product is the result of a technology push", "Developments are aimed at improving functionality" and "There are several but not many-competitors".

As a book of many words, it is never boring to read, first because of the writing style with its precise use of language and the way the content is organized. Also, the data and well-designed charts play an important role in supporting and clarifying description and analysis. Another element bringing a lot of "fun" to reading this book are the case studies, which can help the reader to understand theoretical concepts and so become an organic part of the book.

In Chapter 17 (Success Factors), the case studies of Senseo Crema and the Roulandt Reclining Bicycle are juxtaposed, with a detailed analysis of the reasons for their success and failure. Senseo Crema is the coffee machine launched by Philips and Douwe Egberts in the spring of 2001 with the ambition to "eventually replace the filter coffee machine". It had a highly successful introduction in Europe and later in the United States; at the start of 2008, twenty million machines had been sold. The book lists the reasons why Senseo Crema is so successful such as the thorough preparation of its introduction, and the continuing marketing campaign in which special offers and competitions were geared toward keeping customers involved in the product on a regular basis. Also, as Philips and Douwe Egberts are large and successful enterprises, they could afford to produce models for smaller consumer groups: approximately twenty different types of Senseo were developed and marketed. By contrast, the Roulandt Reclining Bicycle failed first of all because of the mistake of defining it as a bicycle instead of as an alternative for the bicycle, followed by a lack of funding. Another reason was that the Roulandt producers were unable to recruit external expertise. This case study contains a strong analysis of the whole procedure of how a product survives in the market.

The level of detail in the book is impressive and helps the reader understand the success of product design, regardless of whether the product is a shaver consisting of 50 parts, a car of 10,000 parts or an airplane of 100,000 parts. The book also offers information that can be used to deal with the design problem in the real world. Chapter 21 (Creativity Techniques) contains the forty so-called TRIZ principles. The following question is used as an example in this chapter. In order to produce a faster car, the manufacturer may make the engine bigger, which has the drawback of making the car heavier and requiring the extra weight also to be accelerated. The reader can develop the method for solving this problem from the TRIZ principles.

While introducing all these methods, the authors point out at the same time that a systematic approach may hinder creativity. After listing product, marketing, organization, market, method, investment options and disciplines as factors for success, the authors switch to the question “Will Practice Follow Theory?” They explain that all this knowledge definitely does not guarantee a successful market introduction in Chapter 17 (Success Factors). This objective attitude is present throughout the book, reminding the reader that designing is based on a process of trial and errors.

While all authors carry out research at the university, some of the authors also have a rich practical experience. Professor Eger spent a number of years working for different organizations including the Van Dijk/Eger/Associates design agency, which was co-founded by him. He was the general manager of Space Expo in Noordwijk, the Netherlands, which is an astronautical museum and the official visitors center of the European Space Agency ESA. He has published books on product design and he has been editor in chief of *Product* since 2000. Some of the authors are involved in designing and implementing the curriculum at the university. All of this partly explains why there is such a good balance – integration – between practice and theory in the book and that ensures that the reader will find useful information that helps understand the real market.

Product Design is not a closed system of knowledge, but an open search process, providing insight into the design process and offering the reader a manual for product design with a minimum of errors. The authors estimate that about 70% of all Dutch undergraduate students in Industrial Design Engineering use the Dutch version of this book to learn product design. The English version is of equal importance for Chinese design students and designers. Reading this book constitutes a serious training experience, not only focused on gaining professional knowledge in the field but also on taking a scientific approach to design.