

Full citation:

Zhang T and Dong H (2008) 'Human-centred design: an emergent conceptual model', Include2009, Royal College of Art, April 8-10, 2009, London
Include2009 proceedings (ISBN: 978-1-905000-80-7)
available from <http://www.hhc.rca.ac.uk/2084/all/1/proceedings.aspx>

Human-Centred Design: An Emergent Conceptual Model

Ting Zhang

College of Architecture and Urban Planning, Tongji University,
Siping Road, Shanghai, China, 200092

zhangting@mail.tongji.edu.cn

Hua Dong

School of Engineering and Design, Brunel University,
Uxbridge, UB8 3PH, UK

hua.dong@brunel.ac.uk

Abstract

Understanding human needs and how design responds to human needs are essential for human-centred design (HCD). By combining Maslow's hierarchy of needs model and Küthe's "design and society" model, this paper proposes a conceptual model of human-centred design which marries psychology and sociology in investigating the relationship between design and human needs. The study reveals a tendency that design evolution responds to the hierarchy of human needs. Nowadays design tends to care for more levels of human needs.

Keywords human-centred design, design evolution, human needs, design and society, motivation

1. Introduction: design and human needs

Good designers such as William Morris, Henry Dreyfuss, and Jonathan Ive, all care for people they design for. Nowadays, product design has become much less about hardware and more about user experiences [1]. According to Alastair Curtis [2], Nokia's Global Head of Design, "designers have to create new ideas for the future, things people don't even know they want or need today". User needs increasingly become a focus of design research.

A number of design researchers have investigated users' needs and aspirations, for example Forty (1986), Norman (1988), Jordan (2000) and Black (2006). Jordan [3] introduced Maslow's hierarchy of needs as a guide in understanding consumer's varying needs. Küthe's "design and society" model [4] provides a framework that illustrates design evolution within society. While Maslow's model explores human needs from a 'micro' angle (based on individual) and Küthe's model explores design from a 'macro' angle (design and society), little research has been done in combining the two approaches and obtaining a more comprehensive insight into design and human needs. This paper seeks to plug the research gap.

2. What is human-centred design?

Human-centred design (HCD) is also known as "people-centred design", "user-centred design (UCD)", 'person-centred design', and "user/client-oriented design", although Steen [5] and Walters [6] differentiate "user-centred design" and "human-centred design". They argue that "human-centred design" places more emphasis on different stakeholders' varying needs and broader contexts.

The research on HCD started in the fields of ergonomics and human-computer interaction (HCI). The ISO 13407 [7] offers a formal definition of HCD as "a systematic approach to interactive systems development that focuses specially on making systems usable". In the field of design, there are a number of definitions of UCD and HCD (Table 1)

Table 1. Definitions of human-centred design

Author	Terms	Definition
Norman (1988)	UCD	A philosophy based on the needs and interests of the user, with an emphasis on making products usable and understandable.
Jordan (2000)	Person-Centred Design	To take a wider view of person-centred design and look, in a more holistic context, both at product use and at those using and experiencing products.
McDonagh-Philp and Lebbon (2002)	UCD	A design methodology utilising users as a designing resource, to increase the involvement of the user.
Brusberg (2003)	UCD	UCD aims to expand the designers' knowledge, understanding and empathy of users.
Walters (2005)	HCD	A creative exploration of human needs, knowledge and experience which aims to extend human capabilities and improve quality of life.
Alison Black (2006)	UCD	User-centred designers engage actively with end-users to gather insights that drive design from the earliest stages of product and service development, right through the design process.
IDEO	Human factors	<ul style="list-style-type: none"> • Applying human factors techniques to people across the ecosystem, not just end users / consumers; • Putting people at the heart of the process; • Making things "useful, usable and desirable" for people.
HCDI, Brunel	HCD	HCD is all about putting the human user at the heart of a

University		product, system, or process. Human-centred designers use knowledge of human capabilities and limitations across a variety of methods, combining biomechanics, psychology and engineering, to produce a solution which is safe, efficient, and satisfying to use.
------------	--	--

Based on the above definitions, the characteristics of HCD in the field of product design can be summarised as follows:

- The central place of human beings
- Understanding people holistically
- Multi-disciplinary collaboration
- Involving users throughout the design process
- Making products or services useful, usable, and desirable

3. Understanding human needs

“Human needs” are regarded by economists, sociologists, philosophers and other social critics as a subjective and culturally relative concept. Black [8] claims “the central premise of user-centred design is that the best-designed products and services result from understanding the needs of the people who will use them.” The best known model of human needs is the one proposed by Abraham Maslow in his paper “A Theory of Human Motivation” (1945).

Maslow [9] describes human needs as a pyramid including five levels and they are hierarchically organized: physiological needs are on the bottom of the hierarchy followed by safety needs, social needs, and esteem needs. They are deficiency needs (D-Needs). The top level is self-actualization. It is growth needs (G-Needs). Maslow [10] later divides the growth needs of self-actualization, specially add two lower-level growth needs—cognitive needs and aesthetic needs—prior to general level of self-actualization and one beyond that level, that is self-transcendence, which is sometimes referred to as spiritual needs (Figure 1).

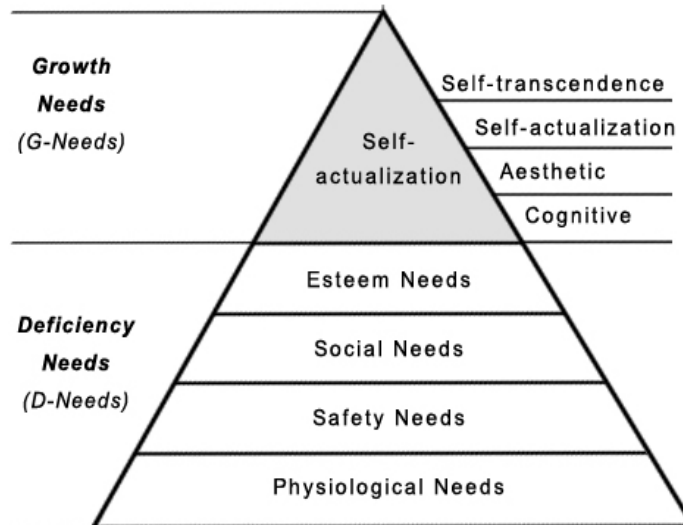


Figure 1. Maslow's hierarchy of needs model

Based on Maslow’s model, Jordan [3] proposed a simple consumer needs model which includes three hierarchy levels of needs: functionality, usability, and pleasure. IDEO also adopts a product pyramid model—useful (bottom), usable, and desirable (top).

4. Design evolution: a design and society model

Küthe divided the design history of the second half of the 20th century into five periods. Each period has its own characteristics and design tendencies [4].

- **1950s – growing society:** styling was the main design tendency;
- **1960s – mature society:** design focused on function and use worth;
- **1970s – saturated society:** aesthetics was the keyword of design;
- **1980s – society of superfluity:** design explored semantics;
- **1990s – society of satiety:** design was about self-presentation and experiential design.

Figure 3 shows how the ‘design and society’ model proposed by Küthe could be used as a framework in explaining human-centred design thinking.

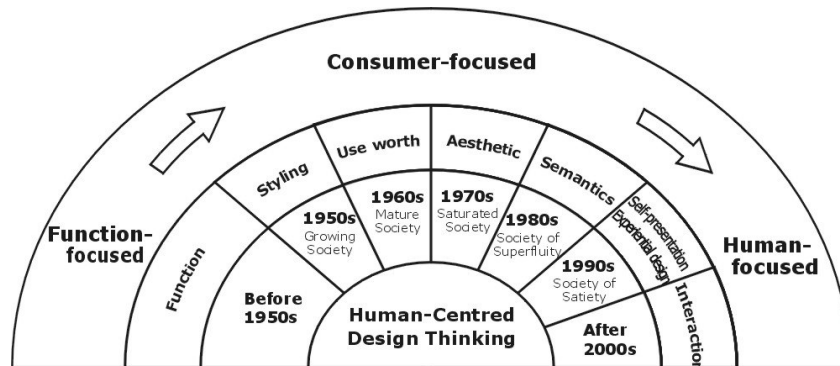


Figure 3. Modified “design and society” model

As Figure 3 suggests, HCD has always been a concern of designers, but it has different meaning in different contexts.

- **Before 1950s:** design focused more on function. HCD in this period means if functioned well, a product would be considered meeting human needs. “Form follows function” is a typical slogan reflecting such design thinking.
- **1950s-1980s:** during these industrialization and commercialization periods, design appeared to be consumer-focused. The main design tendencies were: styling, use worth, aesthetic, and semantics. Although some phenomena like “planned obsolescence” focused on consumption, consumers’ needs and aspiration drove human-centred thinking in this period.
- **1990s-nowadays:** design pays more attention to the “human”, not just as consumers or users. Since the 1990s, products have increasingly become smarter and smaller, sometimes making them difficult to understand or interact

with. Consequently, the research on usability and human-centred design emerged in ergonomics and human-computer interaction, and started influencing other design areas. The implication of HCD is becoming broader. Companies like IDEO, P&G, and Apple have adopted HCD approaches in their design process.

5. An emergent conceptual model of HCD

The Maslow's model is from a micro and psychological angle. The Kütke's model is from a macro and social angle. By combining the two models, a conceptual model has been developed which bridges human needs and design evolution (Figure 4).

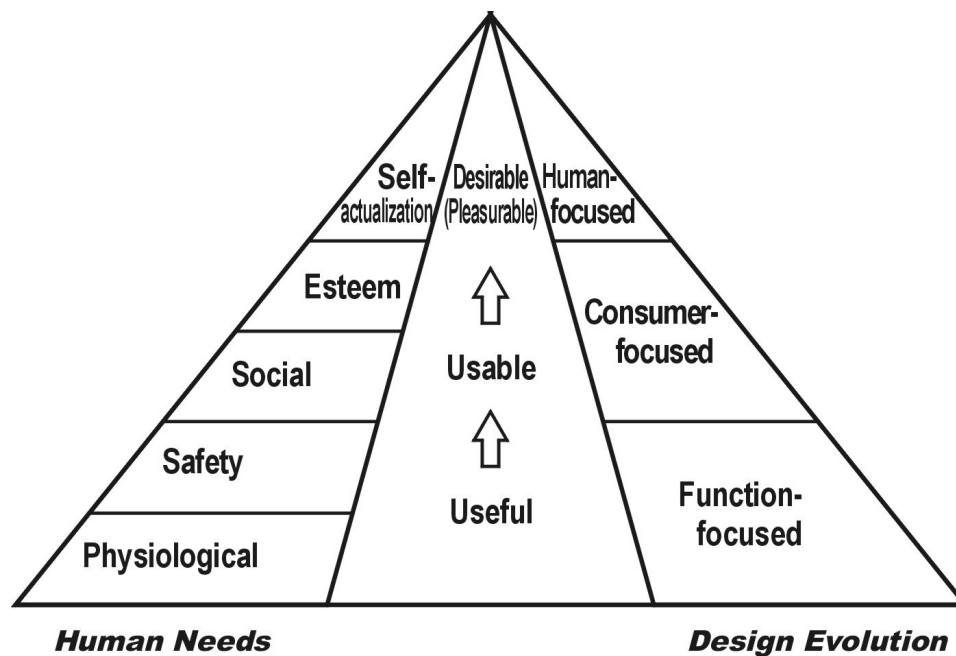


Figure 4. A conceptual model of human-centred design

On the left of the model is a hierarchy pyramid of human needs which includes physiological needs, safety needs, social needs, esteem needs and self-actualization needs. In the middle is the IDEO's pyramid model of design. On the right of the model is the main focus of design evolution:

- In the function-focused period, design sought to produce “useful” products and services which mainly met the fundamental levels of needs—physiological and safety needs.
- In the consumer-focused period, design moved on to find “usable” as well as useful solutions. Social needs and esteem needs were considered when designers made decisions.
- In the human-focused period, design tends to satisfy higher levels of needs. Nowadays, it is not enough if a product's function and usability are well thought-out. It should also meet higher-levels of human needs. The needs of self-

actualization comprising cognitive, aesthetic, self-actualization and self-transcendence, reveal the tendencies which future design is likely to care for.

6 Concluding remarks

This paper has proposed a conceptual model of human-centred design. The model makes links between design, human needs and design evolution. It shows a new way of thinking when studying human needs and design history. It suggests several new possibilities for design research.

- Industrial design always cares for “human needs”, but in different contexts, it caters different needs. Before 1950s, design focused more on function. From 1950s to 1980s, design appeared to be consumer-focused. After 1990s, design pays more attention to human’s different levels of needs.
- The integrated model reveals that design evolution, from functionality and usability to desirability, responds to the hierarchy of human needs. Future design will satisfy a wide range of human needs, even subtle needs which users have not recognized. As put by Paola Antonelli, curator of architecture and design, Museum of Modern Art, “Good design is a renaissance attitude that combines technology, cognitive science, human need, and beauty to produce something that the world didn’t know it was missing.” (Pink, 2008) Maslow’s hierarchy of needs can be a thread when exploring users’ hidden higher-level aspiration.

To conclude, this emerging conceptual model can be used to understand human-centred design in a historical context. It is a tool for design researchers to investigate the relationship between design evolution and human needs.

References

1. **Kelley, D** (2002). The Future of Design is Human-Centered. Available from: <http://www.ted.com/index.php/talks/view/id/122> (Accessed on 31st March 2008)
2. **Alastair Curtis** (2007). Available from: http://www.time.com/time/specials/2007/style_design/article/0,28804,1609195_1609020_1608650,00.html (Accessed on 22nd February 2009)
3. **Jordan, P** (2000). Designing Pleasurable Products: An Introduction to the New Human Factors. London: Taylor and Francis
4. **Hauffe, T** (1998). Design: A Concise History. London: Laurence King
5. **Steen, A, et al.** (2004). Exploring Human Centred Approaches in Market Research and Product Development - Three Case Studies. ACM International Conference Proceeding Series, vol 65
6. **Walters, P** (2005). Knowledge in the Making: Prototyping and human-centred design practice, Sheffield Hallam University
7. **Jokela, T, et al.** (2003) The standard of User-Centered Design and the Standard Definition of Usability: Analyzing ISO 13407 against ISO 9241-11. ACM International Conference Proceeding Series, vol 46
8. **Black, A** (2006). User-Centred Design. Available from: <http://www.designcouncil.org.uk/en/About-Design/Design-Techniques/User-centred-design/> (Accessed on 4th June 2008)

9. **Maslow, A** (1943). A Theory of Human Motivation. *Psychological Review*, vol 50, 370-396
10. **Maslow, A and Lowery, R** (1998). *Toward a Psychology of Being*. New York: Wiley and Sons