

Centre stage

Human-centred design is becoming a buzz term, but what does it mean exactly? Based on research and expert interviews Ting Zhang and Dr Hua Dong report

Human-centred design is an emerging topic that has affected design thinking, philosophy and methodologies for more than 20 years. However, the term has many synonyms including user-centred design, user-oriented design and people-centred design. Some people argue that there is a difference between human-centred design and these various synonyms stressing that designers should be looking at 'people' as a whole rather than just regarding them as 'users'. The consensus of the newly established Brunel Human-Centred Design Institute - which is based at Brunel University and brings together a wide range of expertise including psychology, engineering, human factors, industrial design, graphic design, computer science and design management - is that human-centred design is an approach that integrates multidisciplinary expertise towards enhancing human well-being and empowering people. It leads to systems, machines, products, services and processes that are physically, cognitively and emotionally intuitive to use.

Investigating human-centred design from a historical viewpoint, it has been discovered, consciously or not, that it is a humanistic concept. Ancient craftsmen in Egypt and China made

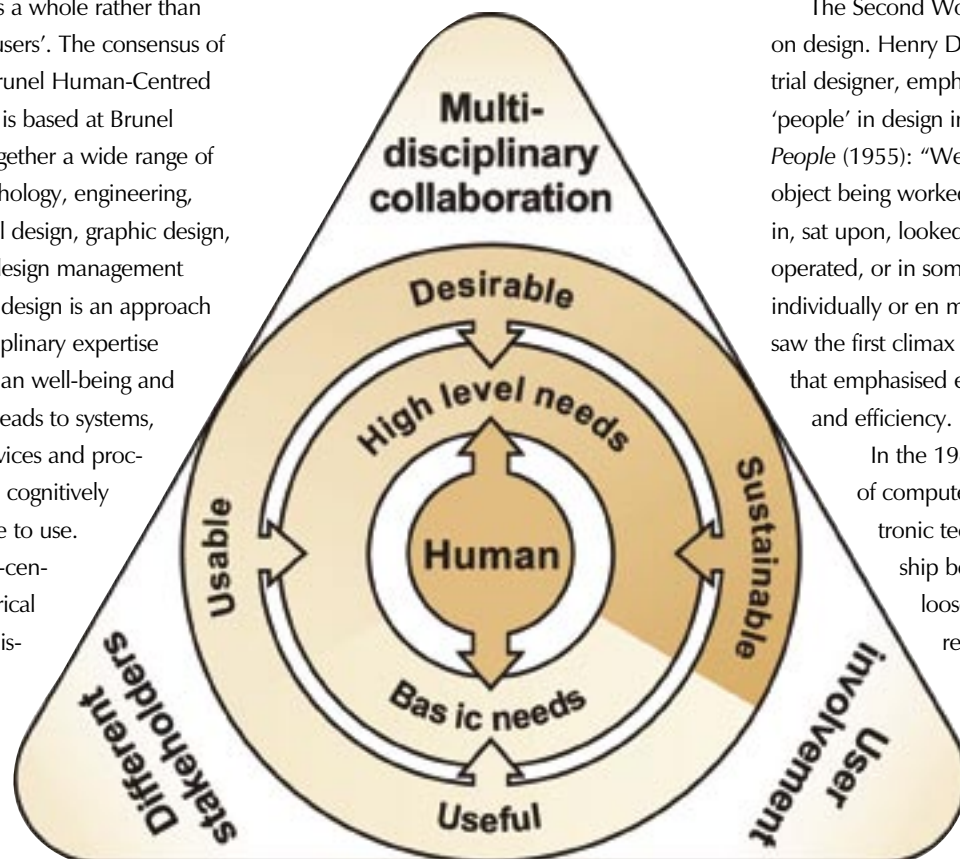
earthware and tools in different shapes according to their utilities. However, such human-focused thoughts in craftsmen's production only became self-conscious as formal design principles in the modernist period.

Functionalism, originating in the late 19th Century, propagandises a function-focused principle. Who could forget the famous statement

by the American architect and the so called 'Father of Modernism' - Louis Sullivan - that "form ever follows function"? Functionalists at that time tried to get rid of useless and complex ornaments. Austrian architect Adolf Loos even criticises ornament as crime and in that period, 'human-centredness' simply meant usefulness. In other words, once a product meets functional requirements, it met human needs.

The Second World War had a great impact on design. Henry Dreyfuss, an American industrial designer, emphasised the importance of 'people' in design in his book *Designing for People* (1955): "We bear in mind that the object being worked on is going to be ridden in, sat upon, looked at, talked into, activated, operated, or in some other way used by people individually or en masse." As a result, the 1960s saw the first climax of human-centred design that emphasised ease of use, safety of use, and efficiency.

In the 1980s, with the development of computer science and microelectronic technology, the firm relationship between form and function loosened. The maturity of research on ergonomics and usability led to an abundance of well-designed products on the market, which indicated that good function no



OPPOSITE | An emerging conceptual model of human-centred design. BELOW | The rain curtain - a semi-permeable space divider of dripping water.



Designers should not merely view people as physical and cognitive processors

longer guaranteed success in the marketplace. 'Semantics' became a catch word and human-centred design started to tackle not only issues about 'usability' but also 'desirability'.

Nowadays a product can hardly outshine others on the market solely for its good function and usability. As a result, designers should not merely view people as physical and cognitive processors as they also have to consider their hopes, fears, dreams, values and aspirations.

Based on literature review and expert interviews, the characteristics of human-centred design include:

The central place of human

In the 2008 'Design Futures' conference that was held at Brunel University, Anna White,

the head of human factors at IDEO London, introduced IDEO's perspective of 'human-centredness' as "applying human factors techniques to people across the ecosystem, not just end users/consumers; putting people at the heart of the process; getting inspired by the outside world; making things 'useful, usable and desirable' for people."

Holistic understanding of human needs

Traditional usability-centred approaches mainly see the basic physiological needs and security needs, whereas human-centred approaches take account of all the levels of human needs ranging from basic needs to higher level needs such as social needs and emotional needs.

Consideration of a broader context

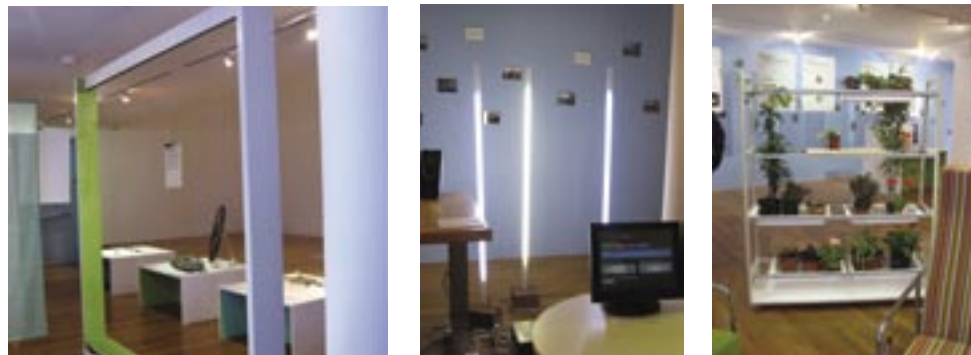
Usability-centred approaches only see part of a person and user-centred approaches add a context whereas, in contrast to these two, human-centred approaches try to see a person holistically in different contexts. Daniel Stracey, research manager at the Design Council, suggests adding 'sustainability' as the overall context, and making design "useful, usable, desirable, sustainable."

Involvement of the end-users throughout the design process

The process of human-centred design features the involvement of end-users throughout. Interviews and observations at the early design stage helps designers to obtain inspiration and

human-centred design

RIGHT | The 'Living Roof' exhibition that took place during the London Design Festival 2008. BELOW | Demonstrating the rain curtain, sit-stand adjustable desk and a mobile plant shelf.



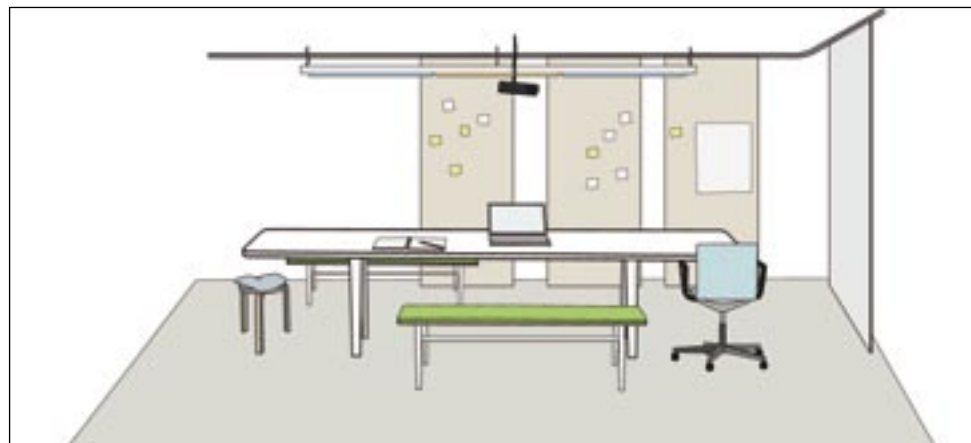
user evaluation in the consequent design stages is also necessary for making the right design decisions. The Helen Hamlyn Centre (HHC) at the Royal College of Art (RCA) extends its user base to include people of all ages who are technologically, culturally or economically excluded. It finds that involving 'critical users' (such as people with severe disabilities) in the design process could help designers think out of the box and beyond conventional comfort zones, thus resulting in novel design solutions.

Balance of all stakeholders' interests

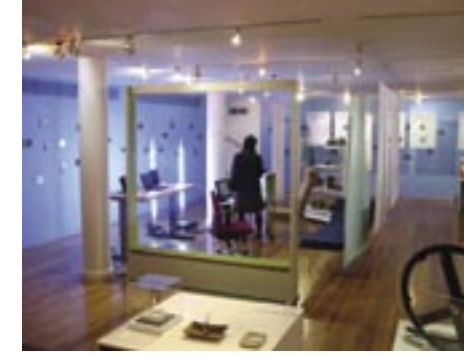
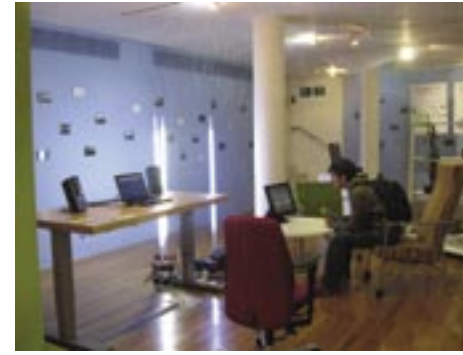
The stakeholders of a typical design project include end-users, customers, evaluators, regulators, service personnel, and so on. Considering and balancing the concerns, values, and perceptions of such a broad range of people is often a difficult challenge. In his book *Strategies for Innovation*, William Rouse stated that "the human-centred design philosophy has far-reaching implications" and it does not only "contribute to successful products and systems" but also "provide a basis for human-centred design of organisations."

Appreciation of multidisciplinary collaboration

Multidisciplinary collaboration inspires innovation, improves user understanding, and helps to achieve reasonable and efficient design solutions. As Tim Brown of IDEO states in a recent article 'Design Thinking' that appeared in the Harvard Business Review, "no matter where we look, we see problems that can be solved



human-centred design



only through innovation: unaffordable health care, billions of people trying to live on just a few dollars a day, energy usage that outpaces the planet's ability to support it, education systems that fail many students, companies whose traditional markets are disrupted by new technologies or demographic shifts. These problems all have people at their heart. They require a human-centred, creative, iterative, and practical approach to finding the best idea and ultimate solutions."

An emerging conceptual model of human-centred design

The characteristics of human-centered design are illustrated in a model (page 34) and in the centre is the human. "Useful, usable, desirable and sustainable" designs respond to the different levels of human needs; and they are realised through the involvement of users and stakeholders, and the deployment of multidisciplinary collaboration.

A very good 'live' example of human-centred design is the 'Welcoming Workplace', a user-friendly workspace for the ageing worker. This two year design research project carried out at the HHC and led by Professor Jeremy Myerson addresses ways in which the office environment can be redesigned to offer greater levels of comfort and flexibility in the new age of the older knowledge worker. The project is a good example of human centred design for a number of reasons:

- The central place of human: this project

rethinks workplace for ageing people.

- Understanding the full range of human needs: ergonomics consideration, as well as the understanding of the target users' emotional and subtle feelings, was considered in the design process to meet different levels of human needs.

- Involving users throughout the design process: users (a group of knowledge workers aged over 50) were involved at each stage of the process. They were interviewed for design inspirations and design solution evaluations.

- Providing 'useful, usable, desirable and sustainable' solutions: the usefulness and the usability of the designs were assured by the study of user needs and tests with the target users. Introducing nature and personal customisation to the workplace is highly desirable, and the design aims to address the future needs of the ageing workers in knowledge organisations.

- Consideration of the stakeholders' interests: the stakeholders included older workers, manufacturers who supply furniture and lighting to offices, workplace architects, technology experts, property companies and public sector organisations. All these stakeholders' interests were taken into consideration through working with them as research partners.

- Mutidisciplinary collaboration: The project involves international collaborations with the User Science Institute at Kyushu University, Japan; and the Faculty of Architecture Building and Planning at the University of Melbourne, Australia. It was also informed by

the i-work consortium which includes UK partners from a number of interdisciplinary research centres.

Displayed at the RCA's 'Living Proof' exhibition, which took place during the London Design Festival in September 2008, the 'Welcoming Workplace' project produced a range of conceptual designs:

- Rain curtain: a semi-permeable space divider of dripping water, which provides a peaceful sound and helps people to concentrate. Water also has a purifying and humidifying effect on air quality.

- Sit-stand adjustable desk: a height adjustable desk that encourages people to use a healthy posture while working, and offers an alternative for those who are seated all day.

- Future acoustic: an intelligent noise-masking system that hides distracting noise in the office.

- Dynamic lighting: an adjustable lighting system varying in colour and brightness, which can be programmed by users in order to relax, concentrate or wake up.

- A mobile plant shelf: it allows people to stay close to the nature and relax themselves while working. |

Ting Zhang, a PhD student at Tongji University in China, conducted a one-year visiting study at Brunel University from Oct 2007 to October 2008. **Hua Dong** is a lecturer in Design at Brunel University. She is also a founding member of the Human-Centred Design Institute and an editor of the book 'Design for Inclusivity' (Ashgate 2007).