Facets of Human-Centered Design: The Evolution of Designing by, with, and for People

Chapter · September 2022

DOI: 10.1007/978-3-031-09297-8_12

4 authors, including:

Jan Auernhammer
University of Technology Sydney
36 PUBLICATIONS **378** CITATIONS
SEE PROFILE

Matteo Zallio
University of Cambridge
39 PUBLICATIONS **163** CITATIONS
SEE PROFILE

Larry John Leifer
Stanford University
302 PUBLICATIONS **9,443** CITATIONS
SEE PROFILE

Facets of Human-centered Design:
The Evolution of Designing by, with, and for People

Auernhammer, Jan, ME Design Group, Center for Design Research, Stanford University

Zallio, Matteo, Inclusive Design Group, Engineering Design Center, University of Cambridge

Domingo, Lawrence, ME Design Group, Center for Design Research, Stanford University

Leifer, Larry, ME Design Group, Center for Design Research, Stanford University

Corresponding author: jan.auernhammer@stanford.edu

"[…] We have developed speed, but we have shut ourselves in, machinery that gives us abundance, has left us in want. Our knowledge has made us cynical, our cleverness hard and unkind. We think too much and feel too little. More than machinery, we need humanity. More than cleverness, we need kindness and gentleness. Without these qualities, life will be violent, and all will be lost. […] You, the people, have the power - the power to create machines. The power to create happiness! You, the people, have the power to make this life free and beautiful, to make this life a wonderful adventure." - Charlie Chaplin 1940 in The Great Dictator.

Abstract

The book chapter outlines different facets of Human-centered Design, which evolved over half a century. These facets have different foundational influences that lead to Design by, with, and for people. Designing for people, including Ergonomics and Human Factors and Interactions Design, originated from early developments in experimental psychology. Similarly, designing for people with specific needs emerged from developments in medicine and rehabilitation, which resulted in design approaches, such as Universal Design and Inclusive Design. Designing with people, including Participatory Design, developed from communal architecture. Designing by people is grounded in psychology on creativity, resulting in design approaches, such as Creative Engineering and Design Thinking. Early developments in social psychology developed over time into Social Design and Design by Society. These approaches emerged as designers responded to socio-material and socio-economic challenges with new Human-centered Design approaches. This book chapter aims to raise awareness of the contextual evolution of different Human-centered Design approaches and the need to continuously respond creatively to these challenges with new design solutions and adequate design approaches.

Keywords: Human-centered Design, Design approach, History, Evolution

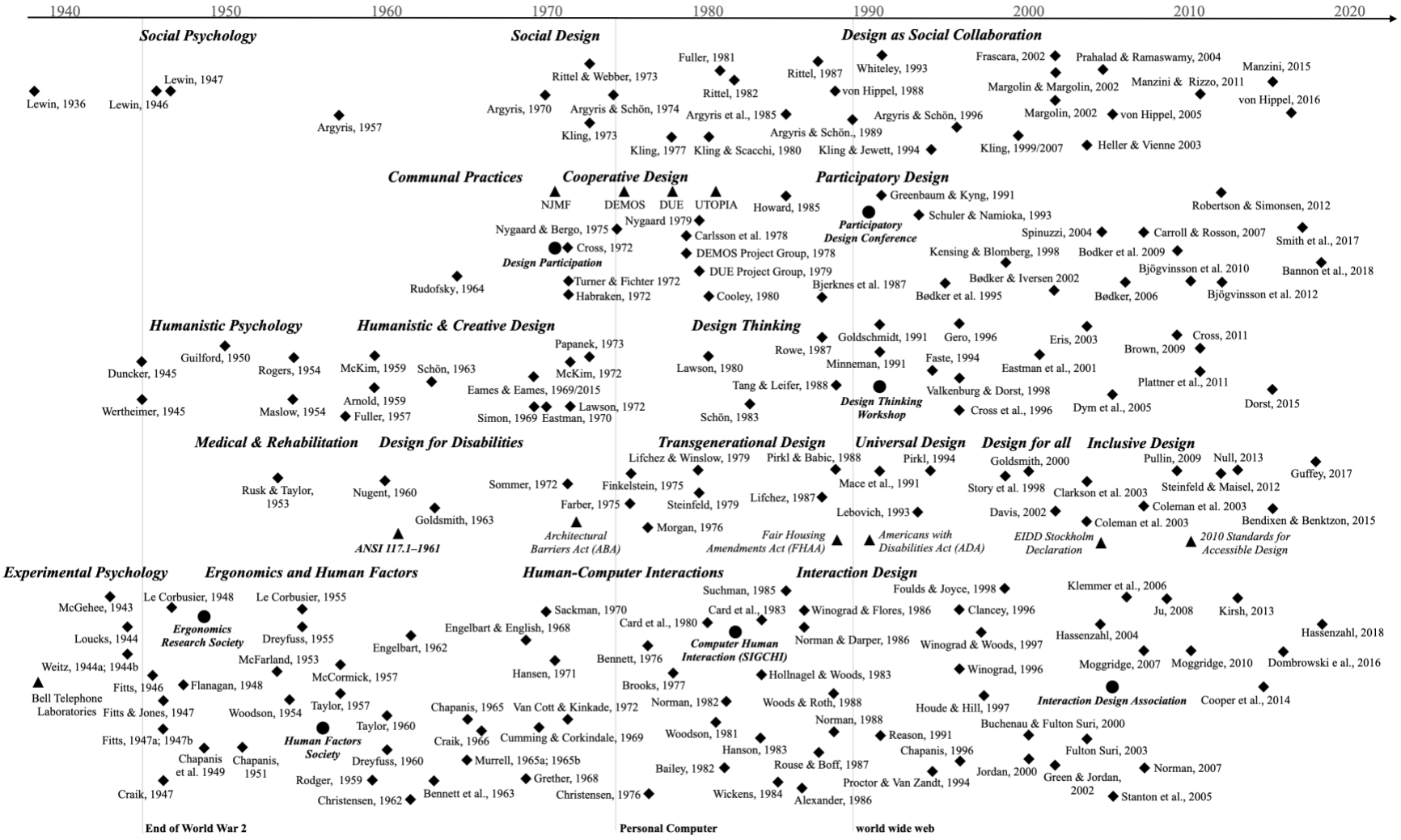
To cite: Auernhammer J., Zallio M., Domingo L., Leifer L. (2022) Facets of Human-Centered Design: The Evolution of Designing by, with, and for People. In Design Thinking Research, Springer International Publishing, ISBN: 978-3-031-09297-8 DOI: https://doi.org/10.1007/978-3-031-09297-8_12

1 Introduction

Over the last century, Design evolved from form-giving to the design and development of technology, interactions, experiences, and organizations (Archer, 1965; Buchanan, 2015; Fulton Suri, 2003; Moggridge, 2007). These developments emerged as new challenges required new design approaches. For example, Archer (1965, p. 57) expressed: "[…] there has been a world-wide shift in emphasis from the sculptural to the technological. Ways have had to be found to incorporate knowledge of ergonomics, cybernetics, marketing, and management science into design thinking. As with most technology, there has been a trend towards the adoption of a systems approach as distinct from an artifact approach." A similar shift is the development of *Human-centered Design* that emphasizes people and the living world rather than artifacts and systems. Over the last half-century, various contextual challenges and developments resulted in approaches, such as Ergonomics and Human Factors, Participatory Design, Inclusive Design, Creative Engineering, and Social Design (e.g., Arnold, 1959; Carlsson, Ehn, Erlander, Perby, & Sandberg, 1978; Chapanis, Garner, & Morgan, 1949; Clarkson, Coleman, Keates, & Lebbon, 2013; Rittel, 1987).

Early *Experimental Psychologists* developed approaches to assessing the psychological fitness for operating airplanes (Benary, Kronfeld, Stern, & Selz, 1919; Koonce, 1984). These psychological developments changed from assessing people's qualifications to designing technology for people, resulting in Ergonomics and Human Factors (Christensen, 1962; Edholm & Murrell, 1973). A similar development for designing for specific needs of people resulted from developments in *Medicine and Rehabilitation* (Rusk & Taylor, 1953). Including non-designers in the design project in *Communal Architecture* resulted from the opportunities provided by insights from various stakeholders, such as urban dwellers and craftspeople (Rudofsky, 1964). *Humanistic Psychology* developments of creativity and human values influenced humanistic and creative design practices (Auernhammer & Roth, 2021; Christensen, 1976; Maslow, 1954, 1956). Similarly, developments in *Social Psychology* resulted in dialectic design approaches to resolve social tensions (Lewin, 1936, 1946, 1947; Rittel, 1987). Figure 1 outlines the evolution of these diverse Human-centered Design approaches.

Figure 1. Several diverse evolutions of Human-centered Design



2 Experimental Psychology in Design

One of the first professional practices that considered people's behavioral capabilities and limitations was aviation psychology (Koonce, 1984). In the 1910s, psychologists examined people's abilities to identify their suitability for operating airplanes (Benary et al., 1919). These developments shifted from assuring people's fitness to use technology to designing technology suitable for people.

2.1 Ergonomics and Human Factors

As early as the 1920s, laboratories focused on studying people's behavior when using designed solutions, and one of the first Human Factor laboratories in the United States was the Bell Telephone Laboratories in 1938 (Christensen, 1976). Researchers and designers utilized experimental psychology to design for people's physiological and psychological abilities in defense-related systems (e.g., Fitts, 1946; Fitts, 1947a, 1947b; Fitts & Jones, 1947; Flanagan, 1947; Loucks, 1944; McFarland, 1946; McGehee, 1943; Weitz, 1944a, 1944b). These experimental psychology approaches were utilized to design artifacts in everyday life (Chapanis, 1951; Chapanis et al., 1949). In 1949, these developments resulted in establishing the *Ergonomics* research society in the United Kingdom and, in 1957, the *Human Factors* society in the United States (Christensen, 1976; Edholm & Murrell, 1973). These societies brought together interdisciplinary researchers, who started developing new methodologies to investigate psychological and physiological aspects of people in the interaction with machines and within work environments (Chapanis, 1965; Craik, 1947, 1966; McCormick, 1957; Murrell, 1965a, 1965b; Rodger, 1959; Taylor, 1957; Taylor & Garvey, 1959; Woodson, 1954). The fundamental doctrine of Ergonomics and Human Factors was to design solutions that allowed people to accomplish a specified task in the way it meets the characteristics of those who use it. Le Corbusier (1948, 1955) and Henry Dreyfuss (1960) developed anthropometry of people to design for people's physiology. Over the decades, Ergonomics and Human Factors advanced as a systematic and interdisciplinary approach to designing for people and society (Bennett, Degan, & Spiegel, 1963; Christensen, 1962; Cumming & Corkindale, 1969; Grether, 1968; Hanson, 1983; Van Cott & Kinkade, 1972). Many interdisciplinary scholars developed practices, tools, methods, models, and theories to design for people's psychological and physiological attributes

(e.g., Alexander, 1986; Bailey, 1982; Chapanis, 1996; Proctor & Van Zandt, 1994; Reason, 1990; Rouse & Boff, 1987; Stanton, Salmon, Walker, & Baber, 2005; Wickens, 1984; Woodson, 1981). These Human-centered Design approaches developed further through new technological advancements, such as computer systems.

2.2 Human-computer Interactions

In the 1970s, the design approach and community in *Human-Computing Interaction* emerged under various names, such as human or user engineering and cognitive systems engineering (Bennett, 1976; Brooks, 1977; Card, Moran, & Newell, 1980, 1983; Hansen, 1972; Hollnagel & Woods, 1983; Norman, 1982, 1986). For example, Engelbart (1962), interested in developing means to support people in complex problem solving, developed a design approach to 'augmenting human intellect,' resulting in developments of personal computing. He and his team presented means, such as the computer mouse, command input, video conferencing, and word processing, for enabling people's abilities at the "Mother of all Demos" (Engelbart & English, 1968). The focus changed from analog to interactive digital systems (Hansen, 1972). New psychological approaches were required to design for people's interactions with digital systems with a focus on storing or retrieving information (Sackman, 1970). In the 1970s, designers at Stanford Research Institute and Xerox PARC introduced psychological research to examine and design human interaction with computers, resulting in the field of Human-Computer Interactions (Card et al., 1983; Cooper, Reimann, Cronin, & Noessel, 2014). In the late 1970s, the ACM community became more concerned about human interaction with computer systems towards people-orientated systems (Borman, 1996). They established in 1982 the Computer-Human Interaction group (ACM SIGCHI), focusing on cognitive and psychological aspects of people when interacting with digital systems (Card et al., 1983; Clancey, 1997; Foulds & Joyce, 1998; Hollnagel & Woods, 1983; Norman, 1982, 1986; Suchman, 1983, 1985; Winograd & Flores, 1986; Woods & Roth, 1988).

2.3 Interaction Design

The approaches developed for digital system design found their way back to the industrial design-side integrating objects, media, and software under the term *Interaction Design* (Houde & Hill, 1997; Moggridge, 2007, 2010; Norman, 1988; Winograd, 1996). Bill Moggridge and Bill

Verplank, who worked on the first laptop computer, coined the term Interaction Design in the 1980s. Several decades later, in 2005, the Interaction Design Association was incorporated (Cooper, Reimann, & Cronin, 2007). Designers and scholars focused on non-utilitarian aspects of design, such as people's pleasure, emotions, and experiences (e.g., Buchenau & Fulton Suri, 2000; Fulton Suri, 2003; Green & Jordan, 2002; Hassenzahl, 2004, 2018; Houde & Hill, 1997; Jordan, 2000; Norman, 2007). The focus expanded to designing for embodied cognitive approaches and implicit interactions (Ju, 2008; Kirsh, 2013; Klemmer, Hartmann, & Takayama, 2006).

3 Medicine and Rehabilitation in Design

Another Human-centered Design approach emerged from developments in *Medicine and Rehabilitation* and the concern of people with diverse needs (Rusk & Taylor, 1953).

3.1 Design for People with Disabilities

In the 1950s, institutions, such as the Institute of Physical Medicine and Rehabilitation in New York, started developing a coordinated approach for the dissemination of information concerning self-help devices that might aid disabled persons in the performance of the daily activities of life and work (Rusk & Taylor, 1953). This approach advanced and popularized out of the argument that despite the scientific and medical technological advancements, problems increased for people with disabilities (Nugent, 1961). This movement resulted in the first building standard that addressed disability, the ANSI 117.1–1961, and the first federal law requiring accessibility in government buildings, the Architectural Barriers Act (American National Standards Institute, 1980; Farber, 1975). Designers started evaluating existing design solutions concerning people's specific needs and abilities and utilized these insights to redesign solutions for people with disabilities and towards a barrier-free environment (Goldsmith, 1963; Morgan, 1976; Sommer, 1972; Steinfeld, 1979). The human values and concern for people with different needs resulted in *Designing for People with Disabilities*. In 1978, Larry Leifer created an interdisciplinary design program and practice at Stanford's Rehabilitation Engineering Research and Development Center at the Palo Alto VA.

In 1972, scholars at the University of California, Berkeley, established the Center for Independent Living (Zukas, 1975). This center was a grassroots organization to design environments for people's independence, empowering them to perform their daily routines. The emphasis shifted from disability to independent living, without discrimination of ethnicity, gender, age, and immigrant status (Lifchez, 1987; Lifchez & Winslow, 1979). Scholars argued that such collaborative design between designers and people with disabilities leads to designers' essential attitudes for designing for people (Finkelstein, 1975).

3.2 Transgenerational Design

The increased attention from institutions and the growth of public interest resulted in focusing on diverse groups. Design approaches matching the needs of people with physical and sensory disabilities resulted in *Transgenerational Design* (Pirkl & Babic, 1988). Designers consider the broadest spectrum of individuals, such as young, old, able, and disabled people, without disadvantaging a specific group (Pirkl, 1994).

3.3 Universal Design

Shortly after, the 1990 American with Disabilities Act was established with the emphasis on considering all people in the design process ("Americans with Disabilities Act (ADA) of 1990," ; Lebovich, 1993). This act resulted in the emergence of *Universal Design* (Mace, Hardie, & Place, 1991). The Disabilities Act and Universal Design profoundly contributed to reducing discrimination against people with disabilities in all areas of public life. Designers are obligated to consider the entire life span of people, including temporary disability and future use, when designing spaces and products (Mace et al., 1991; Story, Mueller, & Mace, 1998). Universal Design became the precursor of a new wave of approaches in which products must be universally accommodating and cater conveniently for all people (Goldsmith, 2000). The spectrum of specific needs became the new prism through which postmodernity examines and defines itself (Davis, 2002).

3.4 Design for all

In Ireland, the European Institute for Design and Disability was founded to foster the practice of designing for people of all abilities, which resulted in the *Design for All* (Coleman, Bendixen,

& Tahkokallio, 2003). In 2004, the institute passed "The Stockholm Declaration," which emphasized the design for human diversity, social inclusion, and equality (Bendixen & Benktzon, 2015).

3.5 Inclusive Design

In a similar disposition, the core value proposition of *Inclusive Design* is optimizing the design and development of solutions for individuals with specific needs (Clarkson, Coleman, Keates, & Lebbon, 2003; Coleman, Clarkson, Cassim, & Dong, 2007). Design for all People emphasizes the importance of accommodating and empowering all people. Commercial design and design for disability can inspire each other through a more playful, creative approach (Pullin, 2009). Many designers and design scholars developed practices and methods to create inclusive solutions, systems, and environments (Guffey, 2017; Null, 2013; Steinfeld & Maisel, 2012).

4 Humanistic Psychology in Design

The evolution with the emphasis on the designers' values, attitudes, abilities, and activities to design for people emerged in the 1950s. Christensen (1976) suggested that the emphasis on human values reflects the perceived movement up Maslow's (1954) scale towards self-fulfillment. Humanistic psychology on creativity informed designers in their approach (Auernhammer & Roth, 2021).

4.1 Humanistic and creative Design

Designers, including John Arnold (1959) and Bob McKim (1959), developed a humanistic and creative design approach. Both collaborated with psychologists, such as Abraham Maslow and J.P. Guilford. Insights from gestalt and creativity psychology, including Wertheimer (1945), Duncker (1945), Maslow (1954, 1962), Guilford (1950, 1959), and Rogers (1954), informed the creative design practices. This approach focuses on creatively satisfying people's physical, intellectual, and emotional needs (Adams, 1974; Arnold, 1959; Fuller, 1957; McKim, 1959, 1980). These creative practices aimed to creatively design for impact in the real world (Papanek, 1973). Such design works with conviction and enthusiasm in the intersection of designers' and clients' interests and profound considerations for society (Eames & Eames, 2015).

4.2 Design Thinking

These design practices developed into *Design Thinking* (Buchanan, 1992; Cross, 2011; Lawson, 1972, 1980; Rowe, 1987). From a structuralist perspective, psychological theories of productive thinking resulted in developments in design science and design cognition (Eastman, 1970; Selz, 1922; Simon, 1969, 1981). Similarly, many design scholars build on Wertheimer's (1945) productive thinking to develop insights and approaches in design thinking (Goldschmidt, 1991; Lawson, 1972, 1980; McKim, 1980; Schön, 1963). In 1991, the research workshop in Design Thinking focused on design cognition and computational modeling of the design process, establishing the Design Thinking Research Symposium series (Cross, 2018). Many design scholars studied and developed design thinking practices and approaches (Dorst, 2015; Dym, Agogino, Eris, Frey, & Leifer, 2005; Eastman, Newstetter, & McCracken, 2001; Eris, 2003; Faste, 1994; Gero, 1996; Goldschmidt, 1991; Jung, 2011; Minneman, 1991; Plattner, Meinel, & Leifer, 2011; Schön, 1983; Tang & Leifer, 1988; Valkenburg & Dorst, 1998).

5 Communal Practices in Design

In the 1960s, another movement emerged that focused on designing with people as a source of inspiration and democratization in design (Rudofsky, 1964).

5.1 Design Participation

Early ideas of involving people in design resulted from the argument that architects and designers got out of touch with people's needs, and there is an untapped source of inspiration from the practical knowledge of the untutored builders and urban dwellers (Rudofsky, 1964; Turner & Fichter, 1972). Design is emergent from different people in society, and participation in design allows tapping into this source of emerging perspectives and ideas. A similar idea was developed in the 1960s in the Netherlands based on Habraken's (1972) "support and infill" concept, incorporating different stakeholders (Carp, 1986). In 1971, these ideas were brought together in The Design Research Society conference with the primary theme *Design Participation* (Cross, 1972).

5.2 Cooperative Design

In Scandinavia, projects such as NJMF, DEMOS, DUE, and UTOPIA emphasized the participation of people in the design activities (Carlsson et al., 1978; Ehn & Kyng, 1987; Group, 1979; Howard, 1989; Nygaard, 1979; Nygaard & Terje Bergo, 1975; "The DEMOS Project: A Short Presentation," 1978). These projects, in collaboration with workers unions, emerged as computer mainframe systems impacted the work environment. These projects led to *Cooperative Design*, in which designers collaborated with non-designers to develop computerized tools and systems in the workplace (Sundblad, 2011). These developments gave rise to the term *Human-centered Design* (Cooley, 1980, pp. 76-77). Cooley (1980, p. 77) emphasized that people have to decide to fight for the right to be the architects of the future or allow a tiny minority to reduce them to bee-like responses. This design approach considers the broader socioeconomic and socio-technical context and its impact on people through participation.

5.3 Participatory Design

The collaborative design approaches popularized under the term *Participatory Design*. In 1990, the international Participatory Design research community gathered at the first Participatory Design Conference (Bødker, Grønbæk, & Kyng, 1995; Robertson & Simonsen, 2012). Participatory Design democratizes the design practices and embraces the politics involved in a design project (Björgvinsson, Ehn, & Hillgren, 2010; Kensing & Blomberg, 1998). However, there are several challenges in providing the conditions for designing with people, such as considering who is participating, the time frame of continuous participation, power-structures involved in decision-making, compensations for participation, and social dynamic where no social community exists and no consensus seems to be possible (Bjögvinsson, Ehn, & Hillgren, 2012; Bødker 1996; Robertson & Simonsen, 2012). Several designers and scholars developed techniques and practices to design with people (e.g., Bjerknes, Ehn, & Kyng, 1987; Greenbaum & Kyng, 1991; Schuler & Namioka, 1993). Participation in information system design became common practice (Bannon, Bardzell, & Bødker, 2018; Bodker, Kensing, & Simonsen, 2009; Carroll & Rosson, 2007; Smith, Bossen, & Kanstrup, 2017).

6 Social Psychology in Design

Research in *Social Psychology* established action research practices to resolve societal tensions (Lewin, 1936, 1946, 1947). This development provided a social practice to resolve social tensions emergent in the interactions of people with the artificial, cultural, and natural environment.

6.1 Social Design

The practices developed in social psychology evolved into action science and organizational learning, emphasizing the conflict between the individual and the designed organizational system (Argyris, 1957, 1970; Argyris, Putnam, & Smith, 1985; Argyris & Schön, 1989, 1992, 1996). (1957). Resolving social tensions requires dialogue and action. In architecture and urban planning, similar ideas emerged, requiring dialectic reasoning to tame wicked problems inherent in a pluralistic society (Rittel, 1987; Rittel & Webber, 1973). In a similar disposition, social informatics focuses on designing information systems and technology to enable social systems, such as organizations (Kling, 1973, 1977; Kling & Scacchi, 1980, 1982; Kling & Star, 1998). Socio-political dynamics influence the design practices and projects, and the design outcome impacts society (Frascara, 2002; Margolin, 2002; Margolin & Margolin, 2002). Designing is a socially constructed and political effort, requiring considering many diverse groups who do not have the economic or political means to generate a formal design demand (Manzini, 2015; Margolin, 2002; Rittel & Webber, 1973; Whiteley, 1997).

6.2 Design as Social Collaboration

From a birds-eye view, design solutions are created collaboratively by, with, and for many people. A design culture in which many people contribute results in open, free, distributed, and shared innovation (von Hippel, 1988, 2005, 2016). In management, the term *Co-design* emerged with the emphasis on co-creating value between customers and organizations. The meaning and creation of value shifted from a product and a firm-centric approach to personalized consumer experiences (Prahalad, 2004; Prahalad & Ramaswamy, 2004). Co-design is a network of informed, empowered, and active people who co-design valuable solutions with organizations, resulting in entire distributed communities of people co-designing solutions. It is also a force for social and political change (Heller & Vienne, 2003). Such *Social Collaboration* of designing is

an ongoing social activity that requires people with attitudes, values, attributes, and abilities within a supportive environment, allowing design for various needs and tensions collaboratively (Auernhammer & Roth, 2021).

7 Conclusion

Different cultural, socio-economical, and other contextual developments in specific periods led to the evolution of diverse Human-centered Design approaches. Experimental psychology informed designers in the practices to design for the physiological and psychological needs of people. This approach developed further into Human-Computer Interactions and Interaction Design. New developments in experimental psychology and new technological advancements, such as the personal computer, resulting in new Human-centered Design approaches. Today, global pandemics and climate changes require designers to respond with new design approaches. For example, collaboration in design is impacted by remote settings and the use of technology, influencing the abilities of design teams to respond to these challenges. Designers need to develop new design approaches to tackle the many challenges, such as inequality in society and ecological sustainability, creatively. This book chapter illustrated the interrelations between emergent situations and developments of design approaches and highlights the importance of developing new design approaches to tackle the many societal, economic, and ecological challenges of today and tomorrow.

References

Adams, J. L. (1974). *Conceptual blockbusting: A guide to better ideas*. Stanford, California: Stanford Alumni Association.

Alexander, D. C. (1986). *The Practice and Management of Industrial Ergonomics*: Prentice-Hall.

American National Standards Institute. (1980). *American National Standard Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People*: American National Standards Institute.

Americans with Disabilities Act (ADA) of 1990. Retrieved from https://www.access-board.gov/the-board/laws/americans-with-disabilities-act-intro

Archer, B. L. (1965). *Systematic Method for Designers*: Council of Industrial Design.

Argyris, C. (1957). *Personality and organization; the conflict between system and the individual*. Oxford, England: Harpers.

Argyris, C. (1970). *Intervention theory and method: A behavioral science view*. Oxford, England: Addison-Wesley.

Argyris, C., Putnam, R., & Smith, D. M. L. (1985). *Action science*: Jossey-Bass.
Argyris, C., & Schön, D. A. (1989). Participatory Action Research and Action Science Compared - A Commentary. *American Behavioral Scientist, 32*(5), 612-623. doi:10.1177/0002764289032005008
Argyris, C., & Schön, D. A. (1992). *Theory in Practice: Increasing Professional Effectiveness*: Wiley.
Argyris, C., & Schön, D. A. (1996). *Organizational Learning II: Theory, Method, and Practice*: Addison-Wesley Publishing Company.
Arnold, J. E. (1959). *Creative engineering seminar, 1959*. Stanford, CA: Stanford, University.
Auernhammer, J. M., & Roth, B. (2021). The Origin and Evolution of Stanford University's Design Thinking: From Product Design to Design Thinking in Innovation Management. *Journal of Product Innovation Management, n/a*(n/a). doi:https://doi.org/10.1111/jpim.12594
Bailey, R. W. (1982). *Human Performance Engineering: A Guide for System Designers*: Prentice-Hall.
Bannon, L., Bardzell, J., & Bødker, S. (2018). Reimagining participatory design. *interactions, 26*(1), 26–32. doi:10.1145/3292015
Benary, W., Kronfeld, A., Stern, E., & Selz, O. (1919). *Untersuchungen über die psychische Eignung zum Flugdienst*. Leipzig: Johann Ambronus Barth.
Bendixen, K., & Benktzon, M. (2015). Design for All in Scandinavia – A strong concept. *Applied Ergonomics, 46*, 248-257. doi:https://doi.org/10.1016/j.apergo.2013.03.004
Bennett, E., Degan, J., & Spiegel, J. (1963). *Human Factors in Technology*: San Francisco, Toronto.
Bennett, J. L. (1976). *User-oriented graphics systems for decision support in unstructured tasks*. Paper presented at the Proceedings of the ACM/SIGGRAPH Workshop on User-oriented Design of Interactive Graphics Systems, Pittsburgh, PA. https://doi-org.stanford.idm.oclc.org/10.1145/1024273.1024275
Bjerknes, G., Ehn, P., & Kyng, M. (1987). *Computers and Democracy - A Scandinavian Challenge*. Aldershot, England: Avebury.
Bjögvinsson, E., Ehn, P., & Hillgren, P.-A. (2012). Design Things and Design Thinking: Contemporary Participatory Design Challenges. *Design Issues, 28*(3), 101-116. doi:10.1162/DESI_a_00165
Björgvinsson, E., Ehn, P., & Hillgren, P. (2010). *Participatory design and "democratizing innovation"*. Paper presented at the Proceedings of the 11th Biennial Participatory Design Conference, Sydney, Australia. https://doi.org/10.1145/1900441.1900448
Bodker, K., Kensing, F., & Simonsen, J. (2009). *Participatory IT Design: Designing for Business and Workplace Realities*: MIT Press.
Borman, L. (1996). SIGCHI: the early years. *SIGCHI Bull., 28*(1), 4–6. doi:10.1145/249170.249172
Brooks, R. (1977). Towards a theory of the cognitive processes in computer programming. *International Journal of Man-Machine Studies, 9*(2), 737-751. doi:https://doi.org/10.1006/ijhc.1977.0306
Buchanan, R. (1992). Wicked Problems in Design Thinking. *Design Issues, 8*(2), 5-21. doi:10.2307/1511637

Buchanan, R. (2015). Worlds in the Making: Design, Management, and the Reform of Organizational Culture. *She Ji: The Journal of Design, Economics, and Innovation, 1*(1), 5-21. doi:https://doi.org/10.1016/j.sheji.2015.09.003

Buchenau, M., & Fulton Suri, J. (2000). *Experience prototyping*. Paper presented at the Proceedings of the 3rd conference on Designing interactive systems: processes, practices, methods, and techniques, New York City, New York, USA.

Bødker , S. (1996). Creating Conditions for Participation: Conflicts and Resources in Systems Development. *Human–Computer Interaction, 11*(3), 215-236. doi:10.1207/s15327051hci1103_2

Bødker, S., Grønbæk, K., & Kyng, M. (1995). Cooperative Design: Techniques and Experiences From the Scandinavian Scene. In R. M. Baecker, J. Grudin, W. A. S. Buxton, & S. Greenberg (Eds.), *Readings in Human–Computer Interaction* (pp. 215-224): Morgan Kaufmann.

Card, S. K., Moran, T. P., & Newell, A. (1980). The keystroke-level model for user performance time with interactive systems. *Commun. ACM, 23*(7), 396–410. doi:10.1145/358886.358895

Card, S. K., Moran, T. P., & Newell, A. (1983). *The psychology of human-computer interaction*: L. Erlbaum Associates.

Carlsson, J., Ehn, P., Erlander, B., Perby, M.-L., & Sandberg, Å. (1978). Planning and control from the perspective of labour: A short presentation of the demos project. *Accounting, Organizations and Society, 3*(3), 249-260. doi:https://doi.org/10.1016/0361-3682(78)90016-8

Carp, J. C. (1986). Design participation: new roles, new tools. *Design Studies, 7*(3), 125-132. doi:https://doi.org/10.1016/0142-694X(86)90048-7

Carroll, J. M., & Rosson, M. B. (2007). Participatory design in community informatics. *Design Studies, 28*(3), 243-261. doi:https://doi.org/10.1016/j.destud.2007.02.007

Chapanis, A. (1951). Theory and methods for analyzing errors in man-machine systems. *Annals of the New York Academy of Sciences, 51*, 1179-1203. doi:10.1111/j.1749-6632.1951.tb27345.x

Chapanis, A. (1965). *Man-machine Engineering*: Wadsworth Publishing Company.

Chapanis, A. (1996). *Human Factors in Systems Engineering*: Wiley.

Chapanis, A., Garner, W. R., & Morgan, C. T. (1949). *Applied experimental psychology: Human factors in engineering design*. Hoboken, NJ, US: John Wiley & Sons Inc.

Christensen, J. M. (1962). The Evolution of the Systems Approach in Human Factors Engineering: From the Viewpoint of an Engineering Psychologist. *Human Factors, 4*(1), 7-16. doi:10.1177/001872086200400104

Christensen, J. M. (1976). Ergonomics: Where Have We Been and Where Are We Going: II. *Ergonomics, 19*(3), 287-300. doi:10.1080/00140137608931544

Clancey, W. J. (1997). *Situated Cognition: On Human Knowledge and Computer Representations*: Cambridge University Press.

Clarkson, P. J., Coleman, R., Keates, S., & Lebbon, C. (2003). *Inclusive Design: Design for the Whole Population*: Springer London.

Clarkson, P. J., Coleman, R., Keates, S., & Lebbon, C. (2013). *Inclusive Design: Design for the Whole Population*: Springer London.

Coleman, R., Bendixen, K., & Tahkokallio, P. (2003). A European perspective. In J. Clarkson, S. Keates, R. Coleman, & C. Lebbon (Eds.), *Inclusive Design: Design for the Whole Population* (pp. 288-307). London: Springer London.
Coleman, R., Clarkson, J., Cassim, J., & Dong, H. (2007). *Design for Inclusivity: A Practical Guide to Accessible, Innovative and User-centred Design*: Gower.
Cooley, M. (1980). *Architect or Bee? The Human / Technology Relationship*. Langley Technical Services.
Cooper, A., Reimann, R., & Cronin, D. (2007). *About Face 3: The Essentials of Interaction Design*: Wiley.
Cooper, A., Reimann, R., Cronin, D., & Noessel, C. (2014). *About Face: The Essentials of Interaction Design*: Wiley.
Corbusier, L. (1948). *The Modulor: A Harmonious Measure to the Human Scale Universally Applicable to Architecture and Mechanics*: Harvard University Press.
Corbusier, L. (1955). *Modulor 2, 1955: (let the User Speak Next) : Continuation of "The Modulor" 1948*: Harvard University Press.
Craik, K. J. W. (1947). THEORY OF THE HUMAN OPERATOR IN CONTROL SYSTEMS1. *British Journal of Psychology. General Section, 38*(2), 56-61. doi:10.1111/j.2044-8295.1947.tb01141.x
Craik, K. J. W. (1966). *The nature of psychology: A selection of papers, essays, and other writings. [Ed. Stephen L. Sherwood.]*. Oxford, England: Cambridge Univ. Press.
Cross, N. (1972). *Design Participation: Proceedings of the Design Research Society's Conference, Manchester, September 1971*: Academy Editions.
Cross, N. (2011). *Design Thinking: Understanding How Designers Think and Work*: Bloomsbury Publishing.
Cross, N. (2018). A brief history of the Design Thinking Research Symposium series. *Design Studies, 57*, 160-164. doi:https://doi.org/10.1016/j.destud.2018.03.007
Cumming, G., & Corkindale, K. (1969). Human Factors in the United Kingdom. *Human Factors, 11*(1), 75-79. doi:10.1177/001872086901100110
Davis, L. J. (2002). *Bending Over Backwards: Disability, Dismodernism, and Other Difficult Positions*: NYU Press.
Dorst, K. (2015). *Frame Innovation: Create New Thinking by Design*: MIT Press.
Dreyfuss, H. (1960). *The Measure of Man: Human Factors in Design*: Whitney Library of Design.
Duncker, K. (1945). *On Problem-solving*: American Psychological Association.
Dym, C. L., Agogino, A. M., Eris, O., Frey, D. D., & Leifer, L. J. (2005). Engineering design thinking, teaching, and learning. *Journal of Engineering Education, 94*(1), 103-120. doi:10.1002/j.2168-9830.2005.tb00832.x
Eames, C., & Eames, R. (2015). *An Eames Anthology: Articles, Film Scripts, Interviews, Letters, Notes, Speeches*. New Haven: Yale University Press.
Eastman, C. (1970). On the analysis of intuitive design processes. In G. T. Moore (Ed.), *Emerging methods in environmental design and planning*. Cambridge, MA.: MIT Press.
Eastman, C., Newstetter, W., & McCracken, M. (2001). *Design Knowing and Learning: Cognition in Design Education*: Elsevier Science.
Edholm, O. G., & Murrell, K. F. H. (1973). *History of the Ergonomics Research Society*: Taylor & Francis.

Ehn, P., & Kyng, M. (1987). The Collective Resource Approach to Systems Design. In G. Bjerknes, P. Ehn, & M. Kyn (Eds.), *Computers and Democracy - a Scandinavian Challenge* (pp. 17-58). Aarhus: Gower Publishing.
Engelbart, D. C. (1962). Augmenting human intellect: A conceptual framework. *Menlo Park, CA*.
Engelbart, D. C., & English, W. K. (1968). *A research center for augmenting human intellect*. Paper presented at the Proceedings of the December 9-11, 1968, fall joint computer conference, part I, San Francisco, California. https://doi.org/10.1145/1476589.1476645
Eris, O. (2003). Asking generative design questions: A fundamental cognitive mechanism in design thinking. *Procedure International Conference Eng. Design, ICED Proceedings of the International Conference on Engineering Design, ICED, DS 31*.
Farber, A. J. (1975). The Handicapped Plead for Entrance--Will Anyone Answer? *Kentucky Law Journal, 64*(1).
Faste, R. A. (1994). Ambidextrous thinking. In *Innovations in Mechanical Engineering Curricula for the 1990s*: American Society of Mechanical Engineers.
Finkelstein, V. (1975). Discovering the Person in Disability. *Magic Carpe, 26*, 31–38.
Fitts, P. M. (1946). German applied psychology during World War II. *American Psychologist, 1*(5), 151-161. doi:10.1037/h0059674
Fitts, P. M. (1947a). *Psychological Research on Equipment Design*: U.S. Government Printing Office.
Fitts, P. M. (1947b). Psychological research on equipment designs in the AAF. *American Psychologist, 2*(3), 93-98. doi:10.1037/h0053785
Fitts, P. M., & Jones, R. E. (1947). *Analysis of Factors Contributing to 460 "pilot-error" Experiences in Operating Aircraft Controls*: Army Air Forces Headquarters, Air Material Command, Engineering Division.
Flanagan, J. C. (1947). *The Aviation Psychology Program in the Army Air Forces*: Army Air Forces.
Foulds, R. A., & Joyce, A. W. (1998). *Expanded interactions: broadening human-centered computing*. Paper presented at the Proceedings of the third international ACM conference on Assistive technologies, Marina del Rey, California, USA. https://doi.org/10.1145/274497.274508
Frascara, J. (2002). *Design and the Social Sciences: Making Connections*: CRC Press.
Fuller, R. B. (1957). A Comprehensive Anticipatory Design Science. *Royal Architectural Institute of Canada Journal . 34*(9), 357–361.
Fulton Suri, J. (2003). The Experience of Evolution: Developments in Design Practice. *The Design Journal, 6*(2), 39-48. doi:10.2752/146069203789355471
Gero, J. S. (1996). Creativity, emergence and evolution in design. *Knowledge-Based Systems, 9*(7), 435-448. doi:https://doi.org/10.1016/S0950-7051(96)01054-4
Goldschmidt, G. (1991). The dialectics of sketching. *Creativity Research Journal, 4*(2), 123-143. doi:10.1080/10400419109534381
Goldsmith, S. (1963). *Designing for the Disabled: A Manual of Technical Information*. London: Royal Institute of British Architects, Technical Information Service.
Goldsmith, S. (2000). *Universal Design: A Manual of Practical Guidance for Architects*: Architectural Press.
Green, W. S., & Jordan, P. W. (2002). *Pleasure With Products: Beyond Usability*: CRC Press.

Greenbaum, J., & Kyng, M. (1991). *Design at Work: Cooperative Design of Computer Systems*: Taylor & Francis.
Grether, W. F. (1968). Engineering psychology in the United States. *American Psychologist, 23*(10), 743-751. doi:10.1037/h0026850
Group, D. P. (1979). The Project DUE: Democracy, Development, and EDP. In Å. Sandberg (Ed.), *Computers Dividing Man and Work.* (pp. 122–130). Malmö: Utbildningsproduktion.
Guffey, E. (2017). *Designing Disability: Symbols, Space, and Society*: Bloomsbury Publishing.
Guilford, J. P. (1950). Creativity. *American Psychologist, 5*(9), 444–454. doi:https://doi-org.stanford.idm.oclc.org/10.1037/h0063487
Guilford, J. P. (1959). The Psychology of Thinking. In J. E. Arnold (Ed.), *Creative engineering seminar, 1959*. Stanford, CA: Stanford University.
Habraken, N. J. (1972). *Supports, an Alternative to Mass Housing*: Architectural Press.
Hansen, W. J. (1972). *User engineering principles for interactive systems*. Paper presented at the Proceedings of the November 16-18, 1971, fall joint computer conference, Las Vegas, Nevada. https://doi-org.stanford.idm.oclc.org/10.1145/1479064.1479159
Hanson, B. L. (1983). Human Factors and Behavioral Science: A Brief History of Applied Behavioral Science at Bell Laboratories. *Bell System Technical Journal, 62*(6), 1571-1590. doi:10.1002/j.1538-7305.1983.tb03499.x
Hassenzahl, M. (2004). The Interplay of Beauty, Goodness, and Usability in Interactive Products. *Human–Computer Interaction, 19*(4), 319-349. doi:10.1207/s15327051hci1904_2
Hassenzahl, M. (2018). The Thing and I: Understanding the Relationship Between User and Product. In M. Blythe & A. Monk (Eds.), *Funology 2: From Usability to Enjoyment* (pp. 301-313). Cham: Springer International Publishing.
Heller, S., & Vienne, V. (2003). *Citizen Designer: Perspectives on Design Responsibility*: Allworth.
Hollnagel, E., & Woods, D. D. (1983). Cognitive Systems Engineering: New wine in new bottles. *International Journal of Man-Machine Studies, 18*(6), 583-600. doi:https://doi.org/10.1016/S0020-7373(83)80034-0
Houde, S., & Hill, C. (1997). Chapter 16 - What do Prototypes Prototype? In M. G. Helander, T. K. Landauer, & P. V. Prabhu (Eds.), *Handbook of Human-Computer Interaction (Second Edition)* (pp. 367-381). Amsterdam: North-Holland.
Howard, R. (1989). Utopia: where workers craft new technology (1985). In *Perspectives on the computer revolution* (pp. 341–349): Ablex Publishing Corp.
Jordan, P. W. (2000). *Designing Pleasurable Products: An Introduction to the New Human Factors*: Taylor & Francis.
Ju, W. G. (2008). *The design of implicit interactions.* Stanford University,
Jung, M. F. (2011). Engineering team performance and emotion: Affective interaction dynamics as indicators of design team performance.
Kensing, F., & Blomberg, J. (1998). Participatory Design: Issues and Concerns. *Computer Supported Cooperative Work (CSCW), 7*(3), 167-185. doi:10.1023/A:1008689307411
Kirsh, D. (2013). Embodied cognition and the magical future of interaction design. *ACM Trans. Comput.-Hum. Interact., 20*(1), Article 3. doi:10.1145/2442106.2442109
Klemmer, S. R., Hartmann, B., & Takayama, L. (2006). *How bodies matter: five themes for interaction design*. Paper presented at the Proceedings of the 6th conference on

Designing Interactive systems, University Park, PA, USA. https://doi-org.stanford.idm.oclc.org/10.1145/1142405.1142429
Kling, R. (1973). *Toward a person-centered computer technology.* Paper presented at the ACM National Conference, Atlanta, Ga.
Kling, R. (1977). The Organizational Context of User-Centered Software Designs. *MIS Quarterly*, *1*(4), 41-52. doi:10.2307/249021
Kling, R., & Scacchi, W. (1980). Computing as Social Action: The Social Dynamics of Computing in Complex Organizations. In M. C. Yovits (Ed.), *Advances in Computers* (Vol. 19, pp. 249-327): Elsevier.
Kling, R., & Scacchi, W. (1982). The Web of Computing: Computer Technology as Social Organization. In M. C. Yovits (Ed.), *Advances in Computers* (Vol. 21, pp. 1-90): Elsevier.
Kling, R., & Star, S. L. (1998). Human centered systems in the perspective of organizational and social informatics. *SIGCAS Comput. Soc.*, *28*(1), 22-29. doi:10.1145/277351.277356
Koonce, J. M. (1984). A Brief History of Aviation Psychology. *Human Factors, 26*(5), 499-508. doi:10.1177/001872088402600502
Lawson, B. (1972). *Problem solving in architectural design.* (Ph.D.). Aston University, Birmingham.
Lawson, B. (1980). *How designers think*: Architectural Press.
Lebovich, W. L. (1993). *Design for Dignity: Studies in Accessibility*: Wiley.
Lewin, K. (1936). *Principles of Topological Psychology*. New York McGraw-Hill book Company.
Lewin, K. (1946). Action Research and Minority Problems. *Journal of Social Issues, 2*(4), 34-46. doi:10.1111/j.1540-4560.1946.tb02295.x
Lewin, K. (1947). Frontiers in Group Dynamics: Concept, Method and Reality in Social Science; Social Equilibria and Social Change. *Human Relations*, *1*(1), 5-41. doi:10.1177/001872674700100103
Lifchez, R. (1987). *Rethinking Architecture: Design Students and Physically Disabled People*: University of California Press.
Lifchez, R., & Winslow, B. (1979). *Design for Independent Living: The Environment and Physically Disabled People*: Whitney Library of Design.
Loucks, R. B. (1944). *Legibility of Aircraft Instrument Dials: The relative legibility of techometer dials*. Retrieved from
Mace, R. L., Hardie, G. J., & Place, J. P. (1991). Accessible Environments: Toward Universal Design. In W. F. E. Preiser, J. C. Vischer, & E. T. White (Eds.), *Design Intervention: Toward a More Humane Architecture* . New York: Van Nostrand Reinhold.
Manzini, E. (2015). *Design, When Everybody Designs: An Introduction to Design for Social Innovation*: MIT Press.
Margolin, V. (2002). *The Politics of the Artificial: Essays on Design and Design Studies*: University of Chicago Press.
Margolin, V., & Margolin, S. (2002). A "Social Model" of Design: Issues of Practice and Research. *Design Issues, 18*(4), 24-30. doi:10.1162/074793602320827406
Maslow, A. H. (1954). *Motivation and Personality*. New York, NY: Harper &. Brothers.
Maslow, A. H. (1956). Toward a Humanistic Psychology. *ETC: A Review of General Semantics, 14*(1), 10-22.

Maslow, A. H. (1962). Emotional Blocks to Creativity. In S. J. Parnes & H. F. Harding (Eds.), *A source book for creative thinking* (pp. 93-103). New York: Charles Scribner's Sons.
McCormick, E. J. (1957). *Human engineering*. New York, NY, US: McGraw-Hill Book Company.
McFarland, R. A. (1946). *Human Factors in Air Transport Design*: McGraw-Hill Book Company, Incorporated.
McGehee, W. (1943). *Comparative Study of Pilot Fatigue Resulting from Extended Instrument Flights Using the Standard AAF and British Instrument Panels.* . Retrieved from
McKim, R. H. (1959). Designing for the Whole Man. In J. E. Arnold (Ed.), *Creative engineering seminar, 1959*. Stanford, CA: Stanford University.
McKim, R. H. (1980). *Experiences in Visual Thinking*: Brooks/Cole Publishing Company.
Minneman, S. L. (1991). *The social construction of a technical reality: Empirical studies of group engineering design practice* . (Ph.D.). Stanford University, Stanford.
Moggridge, B. (2007). *Designing Interactions*: MIT Press.
Moggridge, B. (2010). *Designing Media*: MIT Press.
Morgan, M. (1976). Beyond Disability: A Broader Definition of Architectural Barriers. *AIA Journal, 65*(5), 50–53.
Murrell, K. F. H. (1965a). *Ergonomics: Man in His Working Environment*: Chapman and Hall.
Murrell, K. F. H. (1965b). *Human Performance in Industry*: Reinhold Publishing Corporation.
Norman, D. A. (1982). *Steps toward a cognitive engineering: Design rules based on analyses of human error*. Paper presented at the Proceedings of the 1982 Conference on Human Factors in Computing Systems, Gaithersburg, Maryland, USA. https://doi.org/10.1145/800049.801815
Norman, D. A. (1986). Cognitive Engineering. In D. A. Norman & S. W. Draper (Eds.), *User Centered System Design: New Perspectives on Human-computer Interaction* (pp. 31-61): Taylor & Francis.
Norman, D. A. (1988). *The Psychology of Everyday Things*: Basic Books.
Norman, D. A. (2007). *Emotional Design: Why We Love (or Hate) Everyday Things*: Basic Books.
Nugent, T. J. (1961). *Design of Buildings to Permit Their Use by the Physically Handicapped [microform] / Timothy J. Nugent*. [Washington, D.C.]: Distributed by ERIC Clearinghouse.
Null, R. (2013). *Universal Design: Principles and Models*: Taylor & Francis.
Nygaard, K. (1979). The 'Iron and Metal Project': Trade Union Participation. In Å. Sandberg (Ed.), *Computers dividing man and work.* (pp. 94-107). Malmö: Utbildningsproduktion,.
Nygaard, K., & Terje Bergo, O. (1975). The Trade Unions - New users of research. *Personnel Review, 4*(2), 5-10. doi:10.1108/eb055278
Papanek, V. (1973). *Design for the Real World*. Bantam Books.
Pirkl, J. J. (1994). *Transgenerational Design: Products for an Aging Population*: Van Nostrand Reinhold.
Pirkl, J. J., & Babic, A. L. (1988). *Guidelines and Strategies for Designing Transgenerational Products: A Resource Manual for Industrial Design Professionals*: Copley Publishing Group.
Plattner, H., Meinel, C., & Leifer, L. (Eds.). (2011). *Design Thinking Understand - Improve - Apply*. Berlin Heidelberg: Springer-Verlag.

Prahalad, C. K. (2004). Co-creating unique value with customers. *Strategy & Leadership, 32*(3), 4-9. doi:10.1108/10878570410699249
Prahalad, C. K., & Ramaswamy, V. (2004). *The Future of Competition: Co-Creating Unique Value With Customers*: Harvard Business Review Press.
Proctor, R. W., & Van Zandt, T. (1994). *Human Factors in Simple and Complex Systems*: Allyn and Bacon.
Pullin, G. (2009). *Design Meets Disability*: MIT Press.
Reason, J. (1990). *Human Error*: Cambridge University Press.
Rittel, H. (1987). *The reasoning of designers: delivered at the International Congress on Planning and Design Theory*. Boston: IGP.
Rittel, H., & Webber, M. (1973). Dilemmas in a general theory of planning. *Policy Sciences, 4*(2), 155-169. doi:10.1007/BF01405730
Robertson, T., & Simonsen, J. (2012). Challenges and Opportunities in Contemporary Participatory Design. *Design Issues, 28*(3), 3-9. doi:10.1162/DESI_a_00157
Rodger, A. (1959). Ten Years of Ergonomics. *Nature, 184*(4688), BA20-BA22. doi:10.1038/184020a0
Rogers, C. R. (1954). Toward a Theory of Creativity. *ETC: A Review of General Semantics, 11*(4), 249-260.
Rouse, W. B., & Boff, K. R. (1987). *System Design: Behavioral Perspectives on Designers, Tools, and Organizations*: North-Holland.
Rowe, P. G. (1987). *Design Thinking*: MIT Press.
Rudofsky, B. (1964). *Architecture Without Architects: A Short Introduction to Non-pedigreed Architecture : [exhibition, New York, Museum of Modern Art, November 9, 1964-February 7, 1965*: Doubleday, Incorporated.
Rusk, H. A., & Taylor, E. J. (1953). *Living with a Disability*. New York: Blakiston.
Sackman, H. (1970). *Man-computer Problem Solving: Experimental Evaluation of Time-sharing and Batch Processing*: Auerbach.
Schuler, D., & Namioka, A. (1993). *Participatory Design: Principles and Practices*: Taylor & Francis.
Schön, D. A. (1963). *Displacement of Concepts*. London: Tavistock Publications.
Schön, D. A. (1983). *The reflective practitioner: how professionals think in action*. New York: Basic Books.
Selz, O. (1922). *Über die gesetze des geordneten denkverlaufs: eine experimentelleuntersuchung*: W. Spemann.
Simon, H. A. (1969). *The sciences of the artificial*. Cambridge, MA: MIT Press.
Simon, H. A. (1981). Otto Selz and Information-Processing Psychology. In N. H. Frijda & A. D. d. Groot (Eds.), *Otto Selz: His Contribution to Psychology* (pp. 147-163). The Hague: De Gruyter Mouton.
Smith, R. C., Bossen, C., & Kanstrup, A. M. (2017). Participatory design in an era of participation. *CoDesign, 13*(2), 65-69. doi:10.1080/15710882.2017.1310466
Sommer, R. (1972). *Design awareness*. Oxford, England: Rinehart.
Stanton, N. A., Salmon, P. M., Walker, G. H., & Baber, C. (2005). *Human Factors Methods: A Practical Guide for Engineering and Design*: Ashgate Publishing Company.
Steinfeld, E. (1979). *Access to the Built Environment: A Review of the Literature*: Department of Housing and Urban Development, Office of Policy Development and Research.
Steinfeld, E., & Maisel, J. (2012). *Universal Design: Creating Inclusive Environments*: Wiley.

Story, M. F., Mueller, J., & Mace, R. L. (1998). *The Universal Design File: Designing for People of All Ages and Abilities*: NC State University, Center for Universal Design.
Suchman, L. A. (1983). Office procedure as practical action: models of work and system design. *1*(4), 320–328. doi:10.1145/357442.357445
Suchman, L. A. (1985). *Plans and situated actions: The problem of human-machine communication*: Xerox.
Sundblad, Y. (2011, 2011//). *UTOPIA: Participatory Design from Scandinavia to the World.* Paper presented at the History of Nordic Computing 3, Berlin, Heidelberg.
Tang, J. C., & Leifer, L. J. (1988). *A framework for understanding the workspace activity of design teams*. Paper presented at the Proceedings of the 1988 ACM conference on Computer-supported cooperative work, Portland, Oregon, USA.
Taylor, F. V. (1957). Psychology and the design of machines. *American Psychologist, 12*(5), 249-258. doi:10.1037/h0042194
Taylor, F. V., & Garvey, W. D. (1959). THE LIMITATIONS OF A ' PROCRUSTEAN ' APPROACH TO THE OPTIMIZATION OF MAN-MACHINE SYSTEMS. *Ergonomics, 2*(2), 187-194. doi:10.1080/00140135908930424
The DEMOS Project: A Short Presentation. (1978). *Acta Sociologica, 21*(3), 273-276.
Turner, J. F. C., & Fichter, R. (1972). *Freedom to Build: Dweller Control of the Housing Process*: Macmillan.
Valkenburg, R., & Dorst, K. (1998). The reflective practice of design teams. *Design Studies, 19*(3), 249–271.
Van Cott, H. P., & Kinkade, R. G. (1972). *Human Engineering Guide to Equipment Design*: Department of Defense.
von Hippel, E. (1988). *The Sources of Innovation*: Oxford University Press.
von Hippel, E. (2005). *Democratizing Innovation*: MIT Press.
von Hippel, E. (2016). *Free Innovation*: MIT Press.
Weitz, J. (1944a). *Effect of shaped color coding of airplane controls one speed and accuracy of performance.* Retrieved from Randolph Field, Texas:
Weitz, J. (1944b). *Effect of the shapes of handles and position of controls on speed and accuracy of performance.* Retrieved from Randolph Field, Texas:
Wertheimer, M. (1945). *Productive Thinking*: Harper.
Whiteley, N. (1997). *Design for Society*: Reaktion Books.
Wickens, C. D. (1984). *Engineering Psychology and Human Performance*: Merrill.
Winograd, T. (1996). *Bringing Design to Software*: ACM Press.
Winograd, T., & Flores, F. (1986). *Understanding Computers and Cognition: A New Foundation for Design*: Ablex Publishing Corporation.
Woods, D. D., & Roth, E. M. (1988). Cognitive Engineering: Human Problem Solving with Tools. *Human Factors, 30*(4), 415-430. doi:10.1177/001872088803000404
Woodson, W. E. (1954). *Human engineering guide for equipment designers*. Berkeley, CA, US: University of California Press.
Woodson, W. E. (1981). *Human Factors Design Handbook: Information and Guidelines for the Design of Systems, Facilities, Equipment, and Products for Human Use*: McGraw-Hill.
Zukas, H. (1975). The History of the Berkeley Center for Independent Living (CIL). Retrieved from https://www.independentliving.org/docs3/zukas.html