

Index

Note: Page numbers followed by “n” indicate notes.

- Abductive logic, 13, 136
- Abductive reasoning, 136
- Abductive thinking, 136–137
- Abstraction underpinning algorithmic processing, 25
- Accenture asserts, 7
- Actantial Model, 164, 166
- Actants, 164, 166–168
- Actor–network relationships, visualizing, 178–179
- Actor–Network Theory (ANT), 15, 162–163, 165–166
- Actors, 166–168
- “Acute stress response”, 207n8
- Adobe software, 11
- Advanced audio augmentation, 89
- Advanced computation networks, 17
- Advanced computer-aided EEG analysis, 106
- Advanced positive stage, 52
- Advanced Research Projects Agency (ARPA), 54
- Affective computing, 71–73
- AffectiveWear* project, 74
- Affordances, 64
- Age of social engineering, 87–88
- Agency, ownership to, 65–66
- Air conditioning systems, 80
- ALGOL-60 programming language, 58–59
- Algorithmic thinking, 62
- AlphaGo*, 1–2
- Amazon, 198
- American Psychological Association (APA), 47
- Amygdala, 67
- Android smartphones, 5
- Anger, 74
- Anthropocene, 10
- Anthropocene age, 183
- Anxiety disorders, 3
- Aporetics*, 48
- Aporia*, 111, 116
- Apple company, 4, 79
- Arthur, W. Brian, 3
- Artificial designing
 - “0100” kinds of people who make XR world go round, 121–122
 - abductive thinking, 136–137
 - circle of empathy, 129–132
 - data without face, 129
 - design as meta-discipline of purposeful transformation, 122–124
 - design mindfulness, 126–127
 - design thinking, 111–112
 - designing purposeful strategic proposals, 138–139
 - desire, desirability, and social viability, 140–144
 - H+C ID logic model, 146–149
 - hypothetico-deductive approach, 114–117
 - interpretive research paradigm, 117–118
 - liberal humanist turn in design, 124
 - on paradigmatic incommensurability, 112–113
 - participatory design, 139–140

- perspective taking, 127–129
- phenomenology and
 - intersubjectivity, 118
- pragmatism, 137–138
- reflection and reflexivity, 119
- systems thinking, 132–134
- T-shaped people, 124–126
- teleology, 144–146
- unsettled territory of legitimate
 - knowledge production, 113–114
- wickedness and complexity, 134–136
- Artificial general intelligence (AGI), 18*n*1
- Artificial intelligence (AI), 1–2, 17, 53
- Artificial life (AL), 22, 63
- As We May Think* (Bush), 54
- Association for Computing Machinery (ACM), 77
- Atomic constraints, 61
- Attention deficit hyperactivity disorder (ADHD), 3
- Augmentation, 93
- Augmented mind
 - actors and actants, 166–168
 - building universes, 155
 - content and relationship in
 - communication systems, 170–172
 - designing digital objects as actants
 - within network, 163–166
 - disciplined process of thinking and deciding, 177–178
 - feedback and equifinality, 172–173
 - figure-ground, 178–179
 - foundational premises of H+C
 - immersion as framework for system design, 158–160
- H+C networks as communication
 - behavior spaces, 157–158
- H+C networks as systems of
 - communication behaviors, 169–170
 - immersion, behavior, and play, 155–157
- information bonding in
 - multiminded systems, 168–169
- life phases of H+C systems, 179–181
- meta-level position, 152–153
- mixing humans and non-humans, 160–163
- relationships, 173
- Schismogenesis, 173–174
- self-leadership, 175–177
- sociotechnical system design, 151
- system iteration and regulation, 174–175
- Augmented mind, ecology of, 37–38
- Augmented reality (AR), 3, 72, 78–80
- Augmented Reality: A Class of Displays on the Reality-Virtuality Continuum*, 79
- Augmented virtuality (AV), 82
- Augmenting minds, 48–49
- Authority, 201
- Authorship model, 184
- Auto-CAD software, 62
- Axis of Desire, 164
- Axis of Knowledge (*see* Axis of transmission)
- Axis of Power, 164
- Axis of transmission, 164
- Back to the Real World*, 77
- Bateson's fifth criteria, 19–20
- Bateson's third criteria, 19
- Behavior(al), 71, 94–96, 155–157
 - approach, 174
 - change, 96
 - as product without choice, 101–103
 - to program, 68–70
- Behaviorism, 95–96
- Beta waves, 106
- Billinghamurst, Mark, 71
- Bioaugmentation, 3

- Biofeedback mechanisms, 103–5
- Biomarkers, honest signaling of, 105–6
- “Bipartite form”, 94
- Birth rule, 36
- Black-body radiation, 116
- Blaming, 212*n*9
- Body Keeps the Score, The* (van der Kolk), 7, 80
- Body-budgeting regions, 141
- Bottom-up complexity of cellular automata, 59
- Brain and Cognitive Sciences (BCS), 29
- Brain-imaging studies of trauma, 67
- Brain–computer interface (BCI), 108
- Brains, 29–32
- Brains, swarms and, 39–42
- Bravemind*, 82
- Bravemind VR*, 82
- Breitenberg, Valentino, 68
- Build–Measure–Learn feedback loops, 147*n*7

- C++ programming language, 2
- Catastrophic anxiety, 114
- Caterpillar, 4
- CATIA system, 62
- Cellular automata (CA), 35–37, 59
- Centering, 193
- Channeling, 193–194
- Chronic PTSD, 105
- Circle of empathy, 129–132
- Classical cognitive science, 30
- Classical scientific paradigm, 37
- Cognitive empathy, 130
- Cognitive sciences, 17, 29, 196
- Cognitive therapy, 51
- Collateral energy of Anthropogenic Universe, 33
- Collective intelligence, 43
- Combiner, 80
- Communication behaviors
 - H+C networks as systems of, 169–170
 - interactions as patterns of, 173–174
- Communication systems, content and relationship in, 170–172
- Complex cognitive states, 72
- Complexity, 37, 134–136
- Compulsions, 46
- Computational neuroscience, 2
- Computational theory of mind (CTM), 29
- Computer as medium, 58–59
- Computer Machinery and Intelligence*, 27
- Computer science (CS), 11
- Computer simulations, 100
- Computer-aided design (CAD), 61
- Computers, 29–32
- Comtean world, 52–53
- Conceiving of emotion, 74
- Conceptual Background, game constraint, 157
- Conscious intelligence, 51
- Conscious selfhood, 65–66
- Consciousness, 33, 53
- Consistency, 201
- Constructive reification, 56
- Contact des esprits*, 195
- Contemporary DT, 123
- Conversational AI, 4
- Creatura* (non-living things), 47
- Critical research approach, 13
- Critical visual information, 89
- Cultural DNAs, 168
- Cultural layer, 179
- Cultural mind, 37
- Cybernetic(s), 37, 102, 145, 172
 - mechanisms, 70
 - movement, 55
- Cybernetics of Cybernetics*, 55

- Death rule, 36
- Deciding, disciplined process of, 177–178
- Decision-making process, 42
- “Decomposing Systems into Modules”, 63

- Deep Mind Technologies, 1
- Default mode network (DMN), 127
- Defense Advanced Research Projects Agency (DARPA), 97
- Delta waves, 106
- Democratic practices, principle of, 140
- Democratic social engineering, 87
- Design
 - design-by-doing methods, 140
 - as ecological practice, 132–134
 - liberal humanist turn in, 124
 - as meta-discipline of purposeful transformation, 122–124
 - as meta-level purposive activity, 144–146
 - mindfulness, 126–127
 - rhetorical power of, 10–12
- Design knowledge system to guide US, 119–121
- Design Participation Conference (1971), 139
- Design thinking (DT), 11, 108, 110–112
- Designerly*, 12*n*3
- Desirability, 102, 140–144
- Desire, 140–144
- Deterministic chaos, 116
- Dewey's model, 13–14
- Dialectic of innovation, 35
- Digital computing
 - mechanical platonic foundations of, 22–25
 - paradigm, 26
- Digital game, 185
 - design, 156
- Digitization, 57, 196
- Disciplined process of thinking and deciding, 177–178
- Discursive chain to non-discursive network of ideas, 195
- Disgust, 74
- Disk Operating System (DOS), 64
- Disruptive innovation process, 4
- Dissociative identity disorder (DID), 46
- Domain, 3–4
- “Double conscience”, 9
- Dynamic layer, 179
- Dynamical system theory, 152–153
- Earth sciences, 37
- Ecology
 - of action, 37
 - of augmented mind, 37–38
 - of mind, 37–38
- “Educated guessing” heuristics, 62
- Effective arousal modulation, 105
- Efficiency, 209
- Ego, 45
- Ego Tunnel, The* (Metzinger), 38
- Ego-Logical thinking, 110
- Einstein's theories, 113
- Electroencephalography (EEG), 94
- Embodied cognition, 80
- Embodied human cognition, 51
- Embodied selves, internal landscapes of, 66–68
- Embodied Simulation Theory, 39*n*10
- Embodied virtuality, 77
- Embodiment, 68
- Emotion(al), 48, 51, 70
 - AI field, 72
 - empathy, 130
 - fingerprinting, 74–76
 - imbalance, 8
 - operationalizing, 71–73
 - reasoning, 103
- Empathic computing, 71
- Empathic Design, 124
- Empathy, circle of, 129–132
- Engagement, 97–98, 209
- Entscheidungsproblem*, 61
- Environment, 94–96
- Environmental affordances, 64
- Equalization of power relations, 139
- Equifinality, 172–173
- Equivalent decision-making process, 40

- Ericksonian diamond, 103
 Ericksonian model, 104
 Esthetics, rhetorical lens of, 205–208
Evolving Ourselves, 63
 Exaptation, 39n11
 Expanded mediation, 85–86
 Exploratory design process, 61
 Extended reality (XR), 3, 5–6, 183
 design paradigm, 110
 designing, 6–10
 healing, 82
 immersion design knowledge
 system, 111, 120
 technologies, 88
 transformation, 5
 Extended reality experience design
 (XRX design), 16, 151,
 188
 behavioral rhetorical lens, 208–209
 conversations with network,
 184–185
 design-level affordances, 183–184
 discursive chain to non-discursive
 network of ideas, 195
 evolved human capacity, 202–203
 game mechanics, 198–200
 H+C immersion design as act
 of rhetorical persuasion,
 196–197
 image-based communication,
 195–196
 immersive persuasion, 185–188
 jobs-to-be-done, 204–205
 multimodal rhetorical framework
 for, 203–204
 participatory media environments,
 188–190
 reflective rhetorical lens, 211–213
 rhetoric and informed choice,
 192–193
 rhetorical canons as phases of
 design process, 197–198
 rhetorical conflict resolution,
 193–194
 rules of pre-suasion, 201–202
 six principles of persuasion,
 200–201
 social rhetorical lens, 209–211
 survival value of beauty and
 pleasure, 205–208
 transformative potential of
 rhetorical design, 190–192
- Facebook, 79, 151
 Family therapy, 51
 Fear, 70, 71, 74
Fear and Aggression, 69
 Feedback, 172–173
 Feedforward, 137
*Finding Form: Towards an Architecture
 of the Minimal*, 63
 Fingerprinting emotions, 74–76
 First-order knowledge, 113, 152
 Five design affordances of immersion,
 83–5
 5Es approach, 209
 “Flight or fight” response, 207n8
 Food Simulator, 90
 Ford company, 4
 Formal, dramatic, and dynamic
 elements (FDD), 179
 4Cs model, 193–194
 Fourth-order knowledge, 152
 Frankl, Viktor (founder of Third
 Viennese School of
 Psychotherapy), 144
 Freud, Sigmund, 44
 Frontal eye field (FEF), 40
 Full body augmentation, 93
 Functional imaging (fMRI), 94
- Gambling, 8
 Game as Designed, game constraint,
 157
 Game as Encountered, game
 constraint, 157
 Game as Understood, game
 constraint, 157

- Game mechanics, 198–200
Game of Life, The, 36
Games People Play, 46
 Gamification, 198–199
 Gaming, 155
 General Problem Solver (GPS), 60, 69n2
 General Systems Theory, 37
 Geneva Foundation, 93
 Gestalt psychology, 179
 Gift Wrapping, 103
 Glad, 11
 Glucose, 90
 Go games, 18
Gödel, Escher, Bach: An Eternal Golden Braid, 36
 Gödel's theorem, 100
 Gödel–Herbrand–Kleene recursive functions, 61
 Google, 4, 151
 algorithm, 189
 Graphical user interface (GUI), 4, 55, 64
 “Graspable interfaces”, 65
 Gravitational waves, 53
 Great Value, 11
 Greimas' actantial model, 15
 Greimas' analysis framework, 164
 Grid-like thinking, 58
 Grouping of things, 153
 Gustatory system, 90

 H+C immersion, 51–52, 184
 design as act of rhetorical persuasion, 196–197
 as framework for system design, 158–160
 H+C networks, 122, 131
 as communication behavior spaces, 157–158
 as systems of communication behaviors, 169–170
Habitus, 98–101
 Happiness, 74

HCI Remixed, 63
 Head-referenced displays, 93
 Head-related transfer function (HRTF), 89
 Heads-up displays (HUD), 80
 Heart rate variability (HRV), 105–6
 Hebb synapses (*see* Synapses)
 Hermeneutic circle, 117
 Hive mind, 38–39
Homo Ludens, 156
Homo sapiens, 38, 156
 Honest signaling of biomarkers, 105–6
Honeybee Democracy (Seeley), 39
 Hormone production, 48
 HTC Vive, 5
 Human + computer systems (H+C systems), 2, 6, 8, 10, 111, 185
 H+C ID logic model, 146–149, 202
 life phases of, 179–181
 Human behavior, 99
 Human capacity, evolving, 202–203
 Human cognition, 203
 Human decision-making, 141
 Human desire, 141
 Human emotions, 72
 Human experience, operationalizing, 56–58
 Human intelligence, 18, 122
 Human judgment, 141
 Human perceptual mechanisms, 76
 Human-centered design (HCD), 112
 Human–computer interaction (HCI), 2, 14, 16, 17, 51–52, 117, 156
 human-centered turn in, 55–56
 paradigm, 22
 Human–computer interface, 60
 Human–computer symbiosis, 54–55
 Hypothesis testing cycles, 191
 Hypothetico-deductive approach, 114–117

- IBM's 360 line of computers, 63
- Id, 45
- Idea generation, 43
- Idealism, 13
- Image-based communication, 195–196
- Imitation game, 27–28
- Immersion, 155–157
 - augmented reality, 78–80
 - from behavior to program, 68–70
 - body keeps score, 80–82
 - Bravemind*, 82
 - computer as medium, 58–59
 - Comtean world, 52–53
 - crossing line, 82–83
 - designing for eight sensory channels, 88–94
 - emergence of virtual reality, 76–77
 - fingerprinting emotions, 74–76
 - five design affordances of, 83–85
 - honest signaling of biomarkers, 105–106
 - human + computer immersion, 51–52
 - human-centered turn in HCI, 55–56
 - human–computer symbiosis, 54–55
 - immersive media environments
 - as sophisticated bio- and neurofeedback mechanisms, 103–105
 - integration + decomposition, 63–64
 - integrative thinking, 110
 - internal landscapes of embodied selves, 66–68
 - layer, 181
 - media environments, 85–86
 - mobile brain/body imaging, 108–110
 - multiminded systems, 101–103
 - neurofeedback, 106–108
 - non-random mutations of parametric design, 60–63
 - object orientation, 59–60
 - operationalizing emotion, 71–73
 - operationalizing human experience, 56–58
 - from ownership to agency, 65–66
 - pathetic fallacies, 70–71
 - procedurality, control, and creative choice, 98–101
 - reality mining, 96–98
 - rise of machines, 53–54
 - shattering black mirror, 64–65
 - social physics, 94–96
 - spatial computing, 77–78
 - system-level control, 87–88
 - unnatural selection of parametric design, 63
- Immersion design (ID), 111
- Immersive Exposure Therapy, 82
- Immersive H+C mind augmentation, 111
- Immersive H+C systems, 60, 85
- Immersive human + computer symbiosis, 127
- Immersive media, 3, 85
 - environments, 152
 - experiments, 65
 - as sophisticated bio- and neurofeedback mechanisms, 103–105
 - technologies, 200
- Immersive networks, 85
- Immersive persuasion, 185–188
- Immersive systems
 - creating, 152–153
 - power to transform, 153–155
- Imperfect-information games, 18
- Incommensurability, 112
- Information architecture (IA), 55, 152
- Information Theory, 37
- Information, 97
 - bonding in multiminded systems, 168–169
 - information-processing paradigm, 73
- Innovation, 4

- Inscribed layer, 179–180
 Insula, 68
 Integration + decomposition, 63–64
 Integrative thinking, 110
 Intellect-augmenting technologies, 53, 54
 Intelligence, 22
 as product of hunks of matter, 29
 Intelligent agents, 17–18
 “Intelligent” machines, 17
 Interaction design (ID), 10, 55, 140
 Internal landscapes of embodied selves, 66–68
 Internal leadership skills, 46
 Interoception, 93
 Interoceptive awareness process (IA process), 7
 Interoceptive network, 127
 Interpersonal skills, 203
 Interpretive research paradigm, 117–118
 Intersubjectivity, 118
 iPhone smartphones, 5
 Iteration layer, 181
- JackIn* project, 73
 Jobs, Steve, 56
 Jobs-to-be-done, 204–205
 Julia (programming languages), 2
- Kay’s chosen model of computation, 59
 Kinesthetic feedback, 91
 Knowledge-plus-skill-plus-tools, 213
 Kopin (AR-focused companies), 80
 Kraft, 11
 Kuhnian crisis, 10
- Lambda calculus, 61
 Language processing, 89
 Lateral intraparietal area (LIP area), 40
 Latour, Bruno, 6–7
 Law of three stages, 52
- Layered H+C ID model, 15
 Layered H+C System Design
 framework, 151, 180
 Layered Tetrad framework, 179
 Leadership of uniminded systems, 102
 Lean Startup methodology, 147
 Legitimate knowledge production,
 unsettled territory of,
 113–114
 Leveraging social engagement, 97
 Liberal humanist turn in design, 124
Libraries of the Future (Licklider), 54
 Liking, 201
 Logic models, 146–147
 Logical positivism, 52
 Love, 69–70, 71
 Ludology, 155–156
- Machine
 mind as, 34–35
 rise of, 53–54
 self-replicating, 35
Marble Answering Machine (Bishop), 65
 Mass media, 87
 Mathematical demon, 26–27
 MATLAB, 108*n*9
 Mechanical platonic foundations of digital computing, 22–25
 Mechanical procedure, 23
 Mechanics, dynamics, and esthetics (MDA), 179
 Media environments, 85–86
 Memory, 48
 Mental function, 19
 Mental models, 86, 114
 Meta Cookie prototype, 90
 Meta-awareness, 127
 Meta-level position
 creating immersive systems,
 152–153
 power to transform immersive systems, 153–155

- Meta-level purposive activity, design as, 144–146
- Metaphysics stage (philosophy), 52
- Microcosmic indeterminacy, 48
- Microsoft, 4
HoloLens, 89
- Middle temporal area (MT area), 40
- Mind, 19–21, 53
augmentation, 18, 48
augmenting, 48–49
battlefield, 44–47
brains or computers, 29–32
cellular automata, 35–37
consciousness, 33
ecology of augmented mind, 37–38
hive, 38–39
imitation game, 27–28
as machine, 34–35
mathematical demon, 26–27
mind-as-machine approach, 34
mind–body connection, 66
mixing humans and non-humans, 47–48
swarms and brains, 39–42
theory of, 17
Turing machine and mechanical platonic foundations of digital computing, 22–25
uniminded honeybee democracy, 42–44
- Mind and Nature*, 19
- Mind and Nature: A Necessary Unity* (Bateson), 70–71
- Mindfulness, design, 126–127
- Mirror neurons, 38n10, 130
mirror neuron-based empathy, 39
- Mixed reality (MR), 3, 79
- Mixing humans, 47–48, 160–163, 166–168
- MoBILAB toolbox, 108
- Mobile brain/body imaging (MoBI), 2, 108–110
- Mobile phones, 6
- Modern critical theory, 13
- Modern neurofeedback systems, 107
- Modern quantum theory, 116
- Modularity, 59–60, 64
- Modules, 60
- Motion sickness, 92
- Motor empathy, 130
“Motor vocabulary”, 38
- MS-DOS operating system, 4
- Multifaceted notion of personality, 44
- Multimedia storytellers, 88
- Multiminded sociocultural systems, 187
- Multiminded systems, 101–103
information bonding in, 168–169
- Multimodal rhetorical composition, 185–188
- Multimodal rhetorical framework for XRX design, 203–204
- Multiple personality disorder (*see* Dissociative identity disorder (DID))
- Mutual learning, 140
- Narcissism, 32n9
- Narrative, 213
- Natural sciences, 17
- Natural-Born Cyborgs* (Clark), 160
- Naval Medical Center-San Diego (NMC-SD), 93
- Neuralink, 1
- Neurofeedback, 103–105, 106–8
- Neuroimaging, 66
- Neuroplasticity, 100
- Neuroscience, 8, 51, 196
- Neurotherapy, 106
- Newton’s theory of motion, 75
- Newtonian mechanics, 112
- Newtonian physics, 19
- Niantic (AR-focused companies), 80
- Nissan (global auto makers), 198
- Non-Darwinian rules, 63
- Non-discursive network of ideas, 195
- Non-humans, 47–48, 160–163, 166–168

- agents, 59–60
- Non-linear systems, 116n5
- Non-random mutations of parametric design, 60–63
- Nucleus accumbens, 142

- Object orientation, 59–60
- Obsessions, 46
- Oculus Rift, 4, 5
- Olfactory bulb, 90
- On Message Structure* (Rommetveit), 118
- On the Very Idea of a Conceptual Scheme*, 113
- Open Society and Its Enemies, The*, 87
- Open Web Platform, 3
- Operationalizability, 70
- Operationalization, 56
- Operationalizing concepts, 115
- Operationalizing human experience, 56–58
- Orders of knowledge, 113
- Ownership to agency, 65–66

- Pain, 3
- Palo Alto Research Center (PARC), 11, 55
- Panic attacks, 46
- Paradigm, 112
 - shift, 110
- Paradigmatic incommensurability, 112–113
- Parametric Architecture*, 61
- Parametric design
 - non-random mutations of, 60–63
 - unnatural selection of, 63
- Parasympathetic nervous systems (PNS), 105
- Participatory culture, 44
- Participatory design, 139–140
 - framework, 144
 - practitioners, 140
- Participatory media environments, 188–190

- Participatory-design-based knowledge system, 10
- Pathetic fallacies, 70–71
- Perspective taking, 127–129
- Persuasion
 - rules of, 201–202
 - six principles of, 200–201
- Persuasive technology, 199
- Pharmacology, 108, 110
- Phénoménologie de la perception* (Merleau-Ponty), 118
- Phenomenology, 118
- Phenotypic traits, 31n8
- Phylogeny, 31n8
- Physical layer, 180–181
- Physics: The Elements* (Campbell), 56
- Physiological needs, 98
- Play, 155–157
- Pleroma*, 47
- Pokémon Go*, 4
- Pong*, 1
- Positivism, 53
- Post-Comtean world, 110
- Post-Human design, 18
- Post-human-centered argument, 99n6
- Post-Promethean theory, 7
- Post-traumatic stress (PTS), 82
- Post-traumatic stress disorder (PTSD), 3, 7, 46
- Pouvoir*, 192
- Pragmatism, 13, 137–138
- Principle of alternative visions of technology, 140
- Problem-solving, 123
- Procedural rhetoric, 100
 - composition, 185–188
- Proceduralism, 186
- Procedurality, 185–186
- Process underpinning disruptive innovation, 108
- Programming languages, 2
- Project Syria*, 72–73
- Projector, 80
- Prometheus, 9

- Propositional statements, 136–137
 Proprioception, 92–93
 Psychiatry, 19
 Psychology, 19, 51
 of Persuasion model, 199
 Psychomotor therapy, 68, 81
 Psychoses, 3
 Purposefulness, 144–145
 Purposiveness, 146
Pygmalion: A Creative Programming Environment, 56
 Python, 2
- qEEG, 106, 200
 Quantum mechanics, 116, 188n2
 Quantum physics, 57, 115
 Quantum theory, 19, 120
 Quorum sensing, 41
- R (programming language), 2
 Rationality, 202
 Realism, 116
 Reality, 83
 mining, 96–98
 Realms, 113
 Reciprocation, 201
 Red, green, and blue color scheme
 (RGB color scheme), 58
 Reductionism, 53
 Reductionist strategy, 34
 Reflection, 119
 Reflective rationality, 203
 Reflective rhetorical lens, 211–213
 Reflexivity, 119
 Regulation by calibration, 174
 Relatability, 201
 Reliability, 136
 Research Through Design (RTD), 10, 110, 111
 “Respectful awareness”, 104
 Rhetorical canons as phases of design process, 197–198
 Rhetorical conflict resolution, 193–194
- Rhetorical design, transformative potential of, 190–192
 Rhetorical lens
 of esthetics, 205–208
 of utility, 204–205
 Rhetorical power of design, 10–12
- Sadness, 74
 Scarcity, 201
 Schismogenesis, 173–174, 184
 Schrödinger equation, 33
 Science, 9
 Science and technology studies (STS), 162
 Second-order knowledge, 114, 152
 Self-aware assessment, 70
 Self-leadership, 175–177
 Self-model, 65–66
 Self-replicating machines, 35
 Semantics, 66
 Semi-circular pairs of canals (SCCs), 92
 Semicircular canal system, 91
 Sensorama simulator, 90
 Sensory exploration, 89
 Sensory integration approach (SI approach), 68
 Sensory Processing Disorder (SPD), 88
 Sentience, 47
 Serious games, 185n1
Serious Games (Abt), 185n1
 Seven Dimensions of H+C
 Immersion Design, 151, 161
 Shattering black mirror, 64–65
 Silicon Valley, 55
Simula-67, 58
 Singularity, 18
 Situation-based action, 139–140
Sketchpad, 59
 Skilled UX design practitioners, 173
 SmallTalk, 59–60
 Smartphone, 6

- Social engineering, age of, 87–88
 Social influence, 98, 210
 Social layer, 181
 Social learning, 96
 Social logic, 211
 Social media design, 184
 “Social network incentive”, 98
 Social networks, idea flows run, 209–211
 Social neuroscience, 38
Social Neuroscience of Empathy, The, 130
 Social norm, 98
 Social physics, 94–96, 210
 intervention, 97
 Social pressure, 98
 Social proof, 201
 Social rationality, 203
 Social rhetorical lens, 209–211
 Social viability, 140–144
Society of Mind, 34
 Society, 98
 Sociology, 19
 Sociotechnical system design, 151
 “Space”, 19
Spacewar! (Russel), 58
 Spatial computing, 77–78
Speculative Instruments, 137
 “Spreadability” of media content, 210
 Stanford Research Institute (SRI), 54
 Step-function, 174
Steps to an Ecology of Mind, 37
 Stochastic games, 21n5
 Strategic design thinkers, 8
 Strategy, 98
Studies in Ethnomethodology (Garfinkel), 118
 Superego, 45
 Superior colliculus (SC), 40
 Support Vector Machine (SVM), 74
 Surprise, 74
 Survival, 36
 Sustainable gamification, 200
 Swarms and brains, 39–42
 Sympathetic nervous systems (SNS), 105
 Synapses, 100
 Synthetic psychology, 71
 experiments in, 68–70
 System dynamics, defining
 characteristic of, 173
 System-level control, 87–88
 Systems thinking, 132–134, 151
 T-shaped people, 124–126
 Tactile information, 91
 Tangible user interfaces, 64–65
Taxonomy of Mixed Reality Visual Displays, A, 79
 Technological domains, 5
 “Technological samba school”, 63
 Technology, 9, 11, 53
 TechSee (AR-focused companies), 80
 Teleology, 144–146
 Temporary proprioceptive impairment, 93
 Tesler, Larry, 18
 Thalamus controls, 92
 Theological stage (religious), 52
 Theory of constructed emotions, 74
 Theory of Groups, 153–154
 Theory of logical types, 154
 Theory of mind, 17
 Thinking, 22
 disciplined process of, 177–178
 Third-order knowledge, 152
 Third-order premises, 114
 “Three Laws of Robotics”, 119
 Threshold sensing mechanism, 42
 Time, 175
 “Top-down” information, 90
 Torso-referenced displays, 93
Total Package, The, 11
 Touch feedback, 91
 Toyota (global auto makers), 198
 Trans-disciplinary research paradigm, 124–126
 Transactional analysis (TA), 45, 193

- Transdisciplinarity approach, 114
 Transformative potential of rhetorical design, 190–192
 Transformative power of design, 183
 Traumatic stresses, 7
 “Trust”, 98
 Turing, Alan, 22
 Turing machine, 22–25
 Twitter, 151
- Ubiquitous Computing (UbiComp), 77
Ultimate Display, The, 77
 Unconscious response, 208
 Uniminded honeybee democracy, 42–44
 Unique-to-the-individual modeling strategy, 104
 “Universe-as-a-machine” mental model, 101
 University of Southern California’s Institute of Creative Technologies (USC/ICT), 93
 Unnatural selection of parametric design, 63
 Unsettled territory of legitimate knowledge production, 113–114
 User behavior, 94
 User experience (UX), 2, 10, 56, 122, 185
 User interface (UI), 199
 User-centered design approach, 10
 Utopian social engineering, 87
- Validity, 136
 “Value”, 98
Values and Special Tastes, 69
Vehicles: Experiments in Synthetic Psychology, 68–69
- Verifiability, 53
 Vestibular system, 91
 Viciousness of politics, 43–44
 Video-generation computer, 80
 Virtual bodies, 65–66
 “Virtual continuum”, 82
 Virtual environment, 82
 Virtual reality (VR), 3, 65
 emergence of, 76–77
 Virtual reality exposure therapy (VRET), 92
 Virtual spaces, 76
 Virtuality, 83
 Virtually Better Inc., 93
 Visceral design, 207
Vision 65 conference, 85
 Visual communication, 57
 Visual system, 89
- Wearable Cognitive Enhancements, 6
 Wearable haptic displays, 91
 Wearable technologies, 91
Wechselverständnis, 118
 Weiser, Mark (XEROX computer scientist), 77
 “Weiser’s Continuum”, 77
 What you See is what you get (WYSIWYG), 55
 “Wicked” problems, 12
 Wickedness, 134–136
 Windows, icons, menus, and pointing devices (WIMP), 4
 “Wisdom of crowds” model, 189
- XYZ coordinates of virtual spaces, 58
- Zone System, 58
 Zuckerberg, Mark, 4