

INDEX

Numbers

2- *vs.* 3-dimensional bar charts, 138
3-dimensional graphs, 142

A

Abilities (spatial), 449
Abstract concepts, 250–251,
257–258, 441
Abstract process
 representations, 297–299
Action flows, 233–237
 actions in context, 234–236
 animations, 233–234
 arrows, 233
 manuals, 236–237
 outcomes (learning), 234
 procedures, 232–233
 text, 233

Activation (prior knowledge), 88–103.

See also Prior knowledge
activation/awakening

Advance organizers, 91–97
 comparative advance
 organizers, 92–93, 442
 definitions, 441
 expository advance
 organizers, 92–97, 445
 overviews and
 summaries, 91–97,
 441–442
 prior knowledge activation/
 awakening, 91–97

Aids, 277–278, 447
 memory, 277–278
 performance, 228, 447

Alignments *vs.*
 disalignments, 62–63

- Analogies, 188–189, 257–258, 297–299,
 441–442
 definitions, 441–442
 visual analogies, 188–189, 257–258,
 297–299
- Analyses, 315–316, 447, 450
 case analyses (video-taped), 315–316
 performance analyses, 447
 task analyses, 450
- Animations, 85–87, 142, 233–234, 238,
 290–292, 442
 action flows, 233–234
 charts and graphs, 142
 definitions, 442
 management strategies, 238
 processes, 290–292
 as signals, 85–87
- Applications (principle), 414–438
 end-user system application
 training, 415–430
 investment club financial basics
 training, 430–438
 overviews and summaries, 324–328,
 414–415, 438–440
- Approach designs (visual),
 352–371. *See also* Visual
 approach designs
- Aptitude (spatial), 212–214
- Arbitrator roles, 376
- Arguments (visual), 64,
 108–110, 451
- Arrows, 233
- Art, 447–448
 modeled art, 447
 photographic art, 448
- Art director roles, 375
- Art staff roles, 375
- Artist roles, 393–395, 399, 408–411
- Asynchronous principle, 442
- Attention direction, 68–87, 442–445.
 See also under individual topics
 definitions, 87, 442
 divided attention, 70–71, 77, 444
 focused attention, 70–71, 75–76,
 296–297, 445
 influence factors, 70
 learning processes (psychological), 59
 management strategies, 237
 overviews and summaries, 46–49, 69,
 87, 216–219
 processes, 292–297
 reference resources, 87
 visualization guidelines, 71–87
 animation as signals, 85–87
 color and contrast, 75–77
 contiguity, 77–85
 cues (typographic), 71–75
 distracting visuals, 85–87
 job performance improvements,
 76–77
 motion communication, 86–87
 search tasks (high visual), 76–77
 signals (visual), 71–76, 85–87
 text-graphic proximities, 77–85
- Audio and auditory components, 57–58,
 113–114, 238
 cognitive memory load, 113–114
 management strategies, 238
 overviews and summaries, 57–58
- Automaticity, 268, 442
- Awakening (prior knowledge), 88–103.
 See also Prior knowledge
 activation/awakening
- B**
- Bar charts, 138–139
- Bar graphs, 136–138, 141–142
- Benefit-function ratios, 121
- Best practices. *See* Tips and best practices

- Bibliography, 453–463
- Brainstorming sessions, 354–368
- Briefs (design), 443
- Building scenarios, 88–103,
124–149. *See also under individual topics*
- mental models, 124–149
- prior knowledge activation/
 awakening, 88–103
- By-pass training, 228
- C**
- Capture tools, 382
- Carriers (story line), 359–362
- Case analyses (video-taped), 315–316
- Case-based learning
 (retrospective), 309
- Case studies. *See also under individual topics*
- communication scenarios, 408–411
- graphic plans, 408–411
- individual graphic visualizations,
 388–390
- overviews and summaries, 324–328,
 414–415, 438–440
- principle applications, 415–438
- end-user system application
 training, 415–430
- investment club financial basics
 training, 430–438
- visual approach designs, 368–369
- Cases (interactive *vs.* retrospective),
446–449
- Casual learning models, 288
- Cause-and-effect models, 65–66,
144–147, 287–288, 299–300
- CGM (Computer Graphics
 Metafiles), 348
- Changes (spatial *vs.* time), 141–143
- Charts and graphs, 134–142
- animation, 142
- bar graphs, 141–142
- chart junk, 442
- color elements, 142
- divided bar graphs, 141
- evidence-based guidelines, 141–142
- legends, 142
- line graphs, 141–142
- mental models, 140–141
- multiple displays, 141
- overviews and summaries, 134
- pie charts, 141
- scales, 142
- scatter plots, 141
- spatial features, 142
- tables, 141
- task-appropriate selections, 136–140
- bar charts *vs.* line graphs, 138–139
- line *vs.* bar graphs, 136–138
- overviews and summaries, 136
- two- *vs.* three-dimensional bar
 charts, 138
- text types, 142
- three-dimensional graphs, 142
- Chunking, 118–121
- Client roles, 393–394
- Cognitive memory load management,
104–122, 237–242
- concepts, 253
- definitions, 106–108, 442
- learning processes
 (psychological), 60
- minimization, 104–123
- overviews and summaries, 46–49,
 104–105, 216–219
- PCL (Problem-Centered Learning),
313–315
- principles, 313–315
- procedures, 237–242
- processes, 292–297

- Cognitive memory load (*continued*)
- reference resources, 122
 - sources, 106–108
 - content complexity, 107–108
 - expertise reversal effects, 107
 - novice *vs.* experienced learners, 107
 - overviews and summaries, 106
 - prior knowledge activation/awakening, 106–107
 - strategies, 237–242
 - animated demonstrations, 238
 - attention direction, 237
 - audio, 238
 - complex procedures, 237–242
 - diagrams, 240–241
 - extraneous details, 242
 - instructionally-paced materials, 237–242
 - memory support, 238
 - novice learners, 237–242
 - procedures, 237–242
 - spatial complexity, 240–241
 - text placements, 238–240
 - visual cues, 237
 - visualization guidelines, 108–121
 - audio and auditory elements, 113–114
 - chunking, 118–121
 - complexity, 110–114
 - consistency, 110–113
 - function-benefit ratios, 121
 - modality principle, 114
 - multimedia, 113–114
 - procedures, 110
 - redundancy principle, 114–116
 - self-explanatory information, 114–116
 - sequencing, 118–121
 - spatial content, 108–110
 - visual arguments, 108–110
- WM (working memory), 106–108
- Cognitive situational interest, 176–189
- definitions, 176–177, 442
 - vs.* emotional situational interest, 181–182
 - motivation (learning) techniques, 182–189
 - coherence principle, 184–187
 - content contexts, 188–189
 - language (concrete *vs.* vivid), 188
 - overviews and summaries, 182–184
 - understandability, 184–187
 - visual analogies, 188–189
 - overviews and summaries, 176–177
 - vs.* personal interest, 176–179
- Coherence principle, 99, 184–187, 443
- Collaborative roles, 376–377
- Color elements, 75–77, 142
- charts and graphs, 142
 - vs.* contrast, 75–77
- Combination visuals, 228–232
- Common mistakes, 246, 262–263, 282, 301
- concepts, 262–263
 - facts, 282
 - procedures, 246
 - processes, 301
- Communication, 12–23, 324–440.
- See also under individual topics*
 - functions, 12–17, 19–23
 - decorative graphics, 19
 - interpretive graphics, 22–23
 - mnemonic visuals, 20–21
 - motion, 86–87
 - organizational visuals, 21–22
 - overviews and summaries, 12–17, 19
 - relational visuals, 22
 - representational visuals, 19–20
 - transformational visuals, 22

- planning strategies, 324–440
 - communications functions, 12–17, 19–23
 - graphic plans, 392–413
 - individual graphic visualizations, 372–391
 - overviews and summaries, 324–329, 438–440
 - principle applications, 414–438
 - visual approach designs, 352–371
 - visual context definitions, 330–351
- Comparative advance
 - organizers, 92–93, 442
- Complexity, 107–114, 126–129, 240–241
 - cognitive memory load, 110–114
 - content, 107–108
 - mental models (schema), 126–129
 - procedures, 237–242
 - spatial, 240–241
- Comprehensives (comps), 442–443
- Computational efficiency, 62–63
- Computer Graphics Metafiles (CGM), 348
- Concepts (content type), 248–263
 - abstract concepts, 250–251, 257–258
 - cognitive memory load, 253
 - concrete concepts, 250–251
 - coordinate concepts, 251, 443
 - counterexamples, 251–253
 - definitions, 250, 443
 - hierarchically-related
 - concepts, 251
 - mistakes (common), 262–263
 - overviews and summaries, 220–223, 248–249, 321–323
 - reference resources, 263
 - related concepts, 251, 258–260
 - tangible concepts, 450
 - teaching strategies, 251–253
 - tips and best practices, 262
- visualization guidelines, 253–262
 - contiguity principle, 258–259
 - contiguous representational graphics, 253–254
 - counterexamples, 251–257
 - engagement (learner), 260–261
 - mental models, 251–257
 - organizational visuals, 257–258
 - overviews and summaries, 253
 - text definitions, 253–254
 - visual analogies, 257–258
- Concrete concepts, 250–251
- Concrete facts, 266–273, 443
- Concrete language, 188
- Congruency (text), 195–199
- Consistency principle, 110–113
- Constraint determinations, 37
- Content. *See also under individual topics*
 - complexity principle, 107–108
 - content types, 220–323
 - contexts, 188–189
 - main lesson content, 272–273
 - processes, 59, 387
 - creation processes (visuals *vs.* content), 387
 - learning processes (psychological), 59
 - visuals *vs.* content creation, 387
- Content types, 220–323. *See also under individual topics*
 - concepts, 248–263
 - facts, 264–283
 - individual graphic
 - visualizations, 383–385
 - overviews and summaries of, 220–223, 321–323
 - principles, 304–320
 - procedures, 224–247
 - processes, 284–303
 - spatial content, 108–110
 - tips and best practices, 383–385

- Contexts. *See also under individual topics*
 actions in context, 234–236
 content contexts, 188–189
 examples, 451
 influences, 27
 instructional visuals, 27
 job contexts, 268–273
 representational visuals, 268–273
 teaching in context, 267
 varied contexts, 451
 visual context definitions, 330–351
- Contiguity principle, 77–85, 258–259,
 273–275, 443
- Contiguous representational graphics,
 253–254
- Contiguous text, 242–245
 memory support, 244–245
 online practice, 242–245
 onscreen text, 242–245
 procedures, 242–245
- Contrast and color, 75–77
- Control (learner), 446
- Coordinate concepts, 251, 443
- Counterexamples, 251–257
 concepts (content type), 251–257
 definition of, 443
- Creation processes (visuals *vs.*
 content), 387
- Cues, 71–75, 237, 296–297, 443
 cueing techniques, 296–297
 definition of, 443
 management strategies, 237
 typographic cues, 71–75
 visual cues, 237
- D**
- Decomposition, 288
- Decorative graphics, 19, 443
- Deductive learning, 443
- Definitions. *See also under individual topics*
 attention direction, 87, 442
 cognitive memory load, 106–108, 442
 cognitive situational interest,
 176–177, 442
 concepts, 250, 443
 effectiveness, 11
 facts, 266–267, 445
 glossary, 441–452
 graphics, 9–11
 instructional visuals, 9–11
 mental models (schema), 125–129,
 446–447
 motivation (learning), 447
 principles, 306
 prior knowledge activation/awakening,
 90, 441
 processes, 285–287, 448
 real estate, 448
 situational interest, 449
 spatial aptitudes, 449
 storyboards, 450
 WM (working memory), 451
- Design briefs, 443
- Design models. *See also under
 individual topics*
 PCL (Problem-Centered Learning),
 307–309
 visual design models, 28–42
- Design team structures, 376–377
- Designers, 375–378, 393–395
 graphic designer, 375–377
 instructional designers, 375–378,
 393–395
 interface designers, 375
- Designs (visual approaches), 352–371.
See also Visual approach designs
- Details, 242, 382, 449
 capture tools, 382
 extraneous details, 242
 seductive details, 449

- Development processes, 382–383
 - Devices (graphic design), 313–315
 - Diagrams, 131–148, 240–241
 - management strategies, 240–241
 - visualization, 131–148
 - Differences (learner), 192–215. *See also*
 - Learner differences
 - Direction (attention), 68–87. *See also*
 - Attention direction
 - Directive instructions, 443–444
 - Disalignments *vs.* alignments, 62–63
 - Discovery learning, 278–280, 444–445
 - definitions, 444
 - guided discovery, 179–180, 445
 - numeric data, 278–280
 - relationships and
 - trends, 278–280
 - Discrete facts, 266–267, 273–277, 444
 - Displays (graphic), 141, 450
 - multiple displays, 141
 - successive displays, 450
 - synchronized displays, 450
 - Disruption effects, 100–103
 - Distracting visuals, 85–87
 - Divided attention, 444
 - Divided bar graphs, 141
 - Drawings (static), 290–292
 - Dual encoding, 62–63, 65, 129–131, 444. *See also* Encoding
 - Dummies, 444
 - Dynamic learning models, 288
 - Dynamic *vs.* static visuals, 143
- E**
- E-learning platforms, 341
 - Edutainment, 172–191, 444
 - definitions, 444
 - motivation (learning), 172–191.
 - See also* Motivation (learning)
 - Effectiveness, 11, 25–26
 - definitions, 11
 - functionality dependencies, 25–26
 - Efficiency (computational), 62–63
 - Emotional situational interest, 176–177, 181–182, 444
 - vs.* cognitive situational interest, 181–182
 - definitions, 444
 - overviews and summaries, 176–177, 181–182
 - Encoding, 60–65, 129–131, 444
 - definitions, 444
 - dual encoding, 62–63, 65, 129–131, 444
 - learning processes (psychological), 60–63
 - End-user system application training, 415–430
 - Engagement (learner). *See also under individual topics*
 - concepts, 260–261
 - facts, 280–282
 - principles, 316–319
 - processes, 299–300
 - Environment analyses, 335–337
 - Equipment requirements, 340–342
 - Event principles, 41–42
 - Evidence-based guidelines, 141–142
 - Examples, 251–253, 451
 - counterexamples, 251–257
 - varied context examples, 451
 - Experienced learners, 107
 - Expertise reversal effects, 107, 444
 - Explanatory graphics and visuals, 66, 126–131, 445
 - Exploratory lessons, 445

Expository advance organizers,
92–97, 445

Extraneous details, 242

F

Facts (content type), 264–283
concrete facts, 266–273, 443
definitions, 266–267, 445
discrete facts, 266–267,
273–277, 444
main lesson content, 272–273
mistakes (common), 282
multiple discrete facts, 275–277
overviews and summaries, 220–223,
264–265, 321–323

reference resources, 283
teaching strategies, 267–268
automaticity, 268
memory support, 267–268
overviews and summaries, 267
teaching in context, 267
tips and best practices, 282
visualization guidelines, 268–282
contiguity principle, 273–275
engagement (learner), 280–282
factual visuals, 280–282
job context representational
visuals, 268–273
memory aids (physical), 277–278
mnemonic visuals, 277–278
numeric data, 278–280
organizational visuals, 275–277
relational visuals, 278–280
relationship and trend
discovery, 278–280

Factual visuals, 280–282

Far-transfer tasks, 306, 445.

See also Principles
(content type)

Features (surface), 10–19, 450

Figures and tables (listings), 467–478

Flows (action), 233–237

actions in context, 234–236
animations, 233–234
arrows, 233
learning outcomes, 234
manuals, 236–237
procedures, 232–233
text, 233

Focus, 70–76, 296–297,
385–387, 445
attention focus, 70–76,
296–297, 445
overviews and summaries, 385–387

Formats, 342–346

Foundational concepts, 2–45. *See also*
under individual topics
instructional visuals, 6–27
overviews and summaries of, 2–5,
43–45
visual design models, 28–42

Functionality requirements, 367–368

Functions, 12–23, 121

cognitive memory load, 121. *See also*
Cognitive memory load
management
communication, 12–23
decorative graphics, 19
interpretive graphics, 22–23
mnemonic visuals, 20–21
motion, 86–87
organizational visuals, 21–22
overviews and summaries,
12–17, 19
relational visuals, 22
representational visuals, 19–20
transformational visuals, 22
function-benefit ratios, 121
instructional visuals, 12–19
psychological functions, 12–17

G

- Glossary, 441–452
- Goals and objectives, 17, 62–63
 - alignments *vs.* disalignments, 62–63
 - overviews and summaries, 17
- Graphic designer roles, 375–377
- Graphic development roles, 374–378
- Graphic displays (successive *vs.* synchronized), 450
- Graphic organizers, 131–134
- Graphic plans, 392–413
 - communication considerations, 393–411
 - artists, 393–395, 399, 408–411
 - case studies, 408–411
 - clients, 393–394
 - individual graphics (development), 398–399
 - instructional designers, 393–395
 - layout plans, 399–408
 - look and feel issues, 394–396
 - production staff, 393–395, 405–408
 - reviewers, 393–395
 - samples, 396–398
 - SMEs (subject matter experts), 393–394
 - standards documents, 396
 - storyboards *vs.* scripts, 399–408
 - style guides, 396
 - team members, 393–395
 - templates, 396
 - writers, 393–395
 - overviews and summaries, 324–328, 392–393, 438–440
 - reference resources, 412
 - visual design models, 28–42. *See also* Visual design models
- Graphic-text proximities, 77–85
- Graphic visualizations (individual), 372–391. *See also* Individual graphic visualizations
- Graphics for training materials. *See also under individual topics*
 - figures and tables (listing), 467–478
 - foundational concepts, 2–45
 - instructional visuals, 6–27
 - overviews and summaries, 2–5, 43–45
 - visual design models, 28–42
- glossary, 441–452
- lesson content types, 220–323
 - concepts, 248–263
 - facts, 264–283
 - overviews and summaries, 220–223, 321–323
 - principles, 304–320
 - procedures, 224–247
 - processes, 284–303
- overviews and summaries, xiii–xxvii
- planning and communication
 - strategies, 324–440
 - graphic plans, 392–413
 - individual graphic visualizations, 372–391
 - overviews and summaries, 324–329, 438–440
 - principle applications, 414–438
 - visual approach designs, 352–371
 - visual context definitions, 330–351
- psychological learning process
 - support, 46–219
 - attention direction, 68–87
 - learner differences, 192–215
 - learning processes, 50–67
 - memory load minimization, 104–123
 - mental models, 124–149
 - motivation (learning), 172–191

Graphics for training (*continued*)
 overviews and summaries, 46–48,
 216–219
 prior knowledge awakening,
 88–103
 transfer (learning), 150–171
 reference resources, 453–464

Graphics (types). *See also* Visuals (types)
 art graphics, 447–448
 decorative graphics, 443
 definitions, 445
 explanatory graphics, 126–131, 445
 interpretive graphics, 65–66, 446
 mnemonic graphics, 447
 organizational graphics, 447
 relational graphics, 448
 representational graphics, 65–66, 448
 transformational graphics, 451

Guided discovery, 179–180, 445

H

Hierarchically-related concepts, 251

High prior knowledge learners, 196,
 199–201

High situational *vs.* low personal interest,
 177–179

High visual search tasks, 76–77

I

Iconic visualizers, 208–212, 445

Identical elements principle, 445

Illustrations and tables (listings),
 467–478

Incorrect activation/
 awakening, 101

Individual graphic visualizations,
 372–391
 case studies, 388–390
 development processes, 398–399

graphic development roles, 374–378
 art directors, 375
 art staff, 375
 collaboration, 376–377
 design team structures, 376–377
 graphic designers, 375–377
 instructional designers, 375–378
 interface designers, 375
 overviews and summaries, 374–378
 production coordinators, 375
 production staff, 375
 sole arbitrators, 376
 writers, 276, 375

overviews and summaries, 324–328,
 372–373, 438–440

reference resources, 390

tips and best practices, 378–388
 content type considerations,
 383–385
 creation processes (visuals *vs.*
 content), 387
 detail capture tools, 382
 development processes, 382–383
 focus considerations, 385–387
 outside sources, 385
 overviews and summaries, 378–379
 sketching processes, 387
 testing processes, 387–388
 visual thinking processes,
 379–382

Inductive learning, 446

Influence factors, 70

Information spans, 206–207, 446

Instructional design models, 32

Instructional designer roles, 375–378,
 393–395

Instructional event principles, 41–42

Instructional graphics and visuals.
See also under individual topics
 figures and tables (listing), 467–478

- foundational concepts, 2–45
 - instructional visuals, 6–27
 - overviews and summaries, 2–5, 43–45
 - visual design models, 28–42
- glossary, 441–452
- lesson content types, 220–323
 - concepts, 248–263
 - facts, 264–283
 - overviews and summaries, 220–223, 321–323
 - principles, 304–320
 - procedures, 224–247
 - processes, 284–303
- overviews and summaries, xiii–xxvii
- planning and communication
 - strategies, 324–440
 - graphic plans, 392–413
 - individual graphic visualizations, 372–391
 - overviews and summaries, 324–329, 438–440
 - principle applications, 414–438
 - visual approach designs, 352–371
 - visual context definitions, 330–351
- psychological learning process
 - support, 46–219
 - attention direction, 68–87
 - learner differences, 192–215
 - learning processes, 50–67
 - memory load minimization, 104–123
 - mental models, 124–149
 - motivation (learning), 172–191
 - overviews and summaries, 46–48, 216–219
 - prior knowledge awakening, 88–103
 - transfer (learning), 150–171
 - reference resources for, 453–464
- Instructional landscapes, 25
- Instructional methods, 90, 446
- Instructional strategies, 355–359
 - directive instructional
 - strategies, 356–357
 - exploratory instructional
 - strategies, 356, 358
 - guided discovery, 356, 358
 - overviews and summaries, 355–356
 - receptive instructional strategies, 356–357
- Instructional system design (ISD), 333
- Instructional visuals, 6–27
 - graphics, 8–18
 - communication functions, 12–17, 19–23
 - definitions, 9–11
 - effectiveness, 11
 - functions, 12–19
 - goals, 17
 - learner differences, 17–18
 - lesson content, 17
 - psychological functions, 12–17
 - selection criteria, 11–18
 - surface features, 10–19
 - instructional landscapes, 25
 - overviews and summaries, 2–4, 6–7, 43–44
 - psychological learning support, 23–25
 - reference resources, 27
 - taxonomies, 18–19
 - unrealized potentials, 8–9
 - visualization guidelines, 25–27
 - context influences, 27
 - effectiveness-functionality dependencies, 25–26
 - overviews and summaries, 25
 - research evidence, 26–27
- Instructionally-paced materials, 237–242
- Interactive cases, 309, 446

Interest (learner), 174–177. *See also*
 Cognitive situational interest;
 Learner interest
 cognitive situational interest, 176–177,
 182–189, 442
 emotional situational interest,
 176–177, 181–182,
 444, 449
 overviews and summaries, 174–177

Interface designer roles, 375

Interpretive graphics and visuals, 22–23,
 65–66, 144–147, 446

Investment club financial basics
 training, 430–438

ISD (instructional system
 design), 333

J

Job performance improvements,
 76–77

Junk (chart), 442

L

Landscape assessments, 332–340
 delivery media determinations,
 336–340
 ISD (instructional system
 design), 333
 learner profiles, 332–335
 learning environment analyses,
 335–337
 overviews and summaries, 332
 visual context definitions, 332–340

Language (concrete *vs.* vivid), 188

Layouts, 364–368, 399–408, 446
 definitions, 446
 planning strategies, 364–368
 plans, 399–408

Learner control, 446

Learner differences, 192–215
 cognitive memory load, 107. *See also*
 Cognitive memory load
 management
 experienced learners, 107
 management strategies,
 237–242
 novice learners, 107, 237–242
 overviews and summaries, 46–49,
 192–193, 196–197, 214,
 216–219
 reference resources, 215
 visual *vs.* verbal learners, 194–195
 visualizations guidelines, 195–214
 high prior knowledge learners,
 196, 199–201
 iconic visualizers, 208–212
 information span, 206–207
 low prior knowledge learners,
 195–199
 low spatial aptitude
 learners, 212–214
 spatial aptitudes, 196–197,
 206–208
 spatial spans, 206–212
 spatial tasks, 212–214
 spatial visualizers, 208–212
 text congruency, 195–199
 visual literary, 197, 201–203
 visual processing, 201–203
 visual-spatial preferences, 196–197,
 203–208
 word-only *vs.* visual-only
 presentations, 199–201

Learner engagement. *See*
 Engagement (learner)

Learner interest, 174–177, 182–189
 cognitive situational interest,
 176–177, 182–189.
See also Cognitive situational
 interest

- emotional situational interest, 176–177, 181–182
- high situational *vs.* low personal interest, 177–179
- liking *vs.* learning, 175–176
- personal interest, 176–177, 477
- situational interest, 181
- Learner profiles, 332–335
- Learning Management Systems (LMSs), 347
- Learning motivation, 172–191. *See also* Motivation (learning)
- Learning outcomes, 234
- Learning process support (psychological), 46–219. *See also under individual topics*
 - attention direction, 68–87
 - learner differences, 192–215
 - learning processes, 50–67
 - memory load minimization, 104–123
 - mental models, 124–149
 - motivation (learning), 172–191
 - overviews and summaries, 46–48, 216–219
 - prior knowledge awakening, 88–103
 - transfer (learning), 150–171
- Learning processes (psychological), 50–67
 - attention, 59
 - auditory components, 57–58
 - cause-and-effect models, 65–66
 - cognitive load management, 60
 - computational efficiency, 62–63
 - content (new), 59
 - dual encoding, 62–63, 65
 - effectiveness (graphics and visuals), 51–54, 61–66
 - guidelines, 62–66
 - overviews and summaries, 51–54, 61–62
- encoding, 60–63
- explanatory visuals, 66
- goal alignments *vs.* disalignments, 62–63
- interpretive graphics, 65–66
- LTM (long-term memory), 54–58
- mental models, 60–61, 64–66
- metacognition, 54, 57, 66
- motivation (learning), 61, 172–191. *See also* Motivation (learning)
- overviews and summaries, 46–52, 216–219
- prior knowledge activation/awakening, 59–60
- reference resources, 67
- representational graphics, 65–66
- retrieval, 61
- spatial content displays, 64
- taxonomy, 66
- transfer, 61, 150–171. *See also* Transfer (learning)
- visual arguments, 64
- visual components, 57–58
- WM (working memory), 54–58
- Learning transfer, 150–171. *See also* Transfer (learning)
- Learning types, 175–176, 443–448
 - deductive learning, 443
 - discovery learning, 444
 - inductive learning, 446
 - vs.* liking, 175–176
 - problem-centered learning, 448
- Legends (charts and graphs), 142
- Lesson content types, 220–323, 445–448. *See also under individual topics*
 - concepts, 248–263
 - exploratory lessons, 445
 - facts, 264–283

- Lesson content types (*continued*)
 overviews and summaries, 220–223,
 321–323
 principles, 304–320, 448
 procedures, 224–247, 448
 processes, 284–303
- Liking *vs.* learning, 175–176
- Line graphs, 136–139, 141–142
- Lists (shot), 449
- Literacy (visual), 197, 201–203, 451
- LMSs (Learning Management Systems), 347
- Load (cognitive memory), 104–123.
See also Cognitive memory
 load management
- Long-term memory (LTM), 54–58,
 90, 446
- Look and feel issues, 394–396
- Low personal interest, 177–179
- Low prior knowledge learners, 195–199
- Low spatial aptitude learners, 212–214
- LTM (long-term memory), 54–58,
 90, 446
 definitions, 446
 learning processes (psychological),
 54–58
 prior knowledge activation/
 awakening, 90
- M**
- Main lesson content, 272–273
- Management strategies, 237–242
 animated demonstrations, 238
 attention direction, 237
 audios, 238
 cognitive memory load, 237–242
 complex procedures, 237–242
 diagrams, 240–241
 extraneous details, 242
 instructionally-paced materials,
 237–242
 memory support, 238
 novice learners, 237–242
 procedures, 237–242
 spatial complexity, 240–241
 text placements, 238–240
 visual cues, 237
- Maps (mind), 447
- Measurements (mental models), 129
- Media definitions, 446
- Memory. *See also under individual topics*
 cognitive memory load, 104–123
 LTM (long-term memory), 54–58,
 90, 446
 definitions, 446
 learning processes (psychological),
 54–58
 prior knowledge activation/
 awakening, 90
 memory structures (schema),
 124–149
 physical memory aids, 277–278
 support, 238–268
 contiguous text, 244–245
 facts, 267–268
 management strategies, 238
 teaching strategies, 267–268
- WM (working memory), 54–58, 90,
 106–108, 451
 cognitive memory load, 106–108
 definitions, 451
 learning processes
 (psychological), 54–58
 prior knowledge activation/
 awakening, 90
- Mental models (schema), 124–149
 cause-and-effect models, 126. *See also*
 Cause-and-effect models

- charts and graphs, 140–141
- complex mental models, 126–129
- concepts, 251–257
- definitions, 125–129, 446–447
- dual encoding, 129–131
- explanatory graphics and visuals, 126–131
- learning processes (psychological), 60–61, 64–66
- measurements, 129
- overviews and summaries, 46–49, 124–126, 216–219
- principles, 316–319
- recall and recognition, 129
- reference resources, 148
- static mental models, 288
- visualization guidelines, 131–147
 - cause-and-effect models, 144–147
 - charts and graphs, 134–141.
 - See also* Charts and graphs
 - graphic organizers, 131–134
 - interpretive visuals, 144–147
 - qualitative relationships, 131–141
 - simulations, 144–147
 - spatial changes, 141–143
 - static *vs.* dynamic visuals, 143
 - time changes, 141–143
 - transformational visuals, 141–143
 - visualization diagrams, 131–148
- Metacognition, 54, 57, 66, 91, 447
- Methods (instructional), 90, 446
- Mind maps, 447
- Minimization (cognitive memory load), 104–123
- Mistakes (common), 246, 262–263, 282, 301
 - concepts, 262–263
 - facts, 282
 - procedures, 246
 - processes, 301
- Mnemonic graphics and visuals, 20–21, 447
- Modality principle, 114
- Models. *See also under individual topics*
 - casual learning models, 288
 - cause-and-effect models, 65–66, 144–147, 287–288, 299–300
 - design, 307–309
 - dynamic learning models, 288
 - mental models, 124–149
 - modeled art, 447
 - PCL (Problem-Centered Learning), 307–309
 - psychological learning models, 287–288
 - static mental models, 288
 - visual design models, 28–42
- Motion communication, 86–87
- Motivation (learning), 172–191
 - cognitive situational interest, 182–189. *See also* Cognitive situational interest
 - definitions, 447
 - edutainment, 172–174
 - learner interest, 174–177
 - liking *vs.* learning, 175–176
 - overviews and summaries, 174–175
 - personal interest, 176–177
 - types, 176–177
- overviews and summaries, 46–49, 172–173, 216–219
- reference resources, 190
- visualization guidelines, 177–184
 - cognitive situational interest, 176–177, 182–189. *See also* Cognitive situational interest
 - emotional situational interest, 176–177, 181–182

Motivation (Learning) (*continued*)
 guided discovery, 179–180
 high situational *vs.* low personal
 interest, 177–179
 relevance, 179–181
 situational interest, 181

Multimedia, 113–114

Multiple discrete facts, 275–277

Multiple displays, 141

N

Navigational requirements, 367–368

Near-transfer tasks, 226–227, 447

Novice learners, 107, 237–242

Numeric data discovery, 278–280

O

Online practice, 242–245

Onscreen contiguous text, 242–245
 memory support, 244–245
 online practice, 242–245
 procedures, 242–245
 simulation feedback, 244

Organizational graphics and visuals,
 21–22, 257–258,
 275–277, 447

Organizers. *See also under*
individual topics
 advance organizers, 91–97,
 441–442, 445
 comparative advance organizers, 442
 expository advance organizers, 445
 graphic organizers, 131–134
 visual context definitions, 349–350

Orientation and size determinations,
 362–363

Outcomes (learning), 234

Outside sources, 385

Overviews and summaries. *See also under*
individual topics
 advance organizers, 91–97, 441–442
 attention direction, 46–49, 69, 87,
 216–219
 charts and graphs, 134
 cognitive memory load, 46–49,
 104–105, 216–219
 communication functions, 12–17, 19
 concepts, 220–223, 248–249,
 321–323
 emotional situational interest,
 176–177, 181–182
 facts, 220–223, 264–265,
 321–323
 focus, 385–387
 goals and objectives, 17
 graphic development roles, 374–378
 graphics and visuals for training
 materials (general), xiii–xxvii
 individual graphic visualizations,
 324–328, 372–373,
 438–440
 instructional visuals, 2–4,
 6–7, 43–44
 interest (learner), 174–177
 landscape assessments, 332
 learner differences, 46–49, 192–193,
 196–197, 214, 216–219
 learning processes (psychological),
 46–52, 216–219
 mental models (schema), 46–49,
 124–126, 216–219
 motivation (learning), 46–49,
 172–173, 182–184, 216–219

PCL (Problem-Centered
 Learning), 305, 307

planning strategies, 353–354

principle applications, 324–328,
 414–415, 438–440

principles, 220–223, 304–305,
 321–323

- prior knowledge activation/
 - awakening, 46–49, 88–90, 216–219
 - procedures, 222–225, 321–323
 - processes, 220–223, 284–285, 321–323
 - production considerations, 340
 - situational interest, 181
 - sources, 106
 - spatial aptitudes, 196–197, 206–208
 - teaching strategies, 267
 - tips and best practices, 378–379
 - visual approach designs, 353–354
 - visual context definitions, 324–328, 330–331, 439–440
- P**
- Paced materials, 237–242
 - PCL (Problem-Centered Learning), 305–315, 448
 - cognitive load management, 313–315
 - definitions, 448
 - design models, 307–309
 - graphic design devices, 313–315
 - interactive *vs.* retrospective cases, 309
 - overviews and summaries, 305, 307
 - principles, 305–315. *See also* Principles (content type)
 - realistic visuals, 311–313
 - representational visuals, 310–313
 - retrospective case-based learning, 309
 - Performers and performances, 233–237, 447
 - performance aids, 228, 447
 - performance analyses, 447
 - performer perspective action flows, 233–237
 - actions in context and, 234–236
 - animations, 233–234
 - arrows, 233
 - learning outcomes, 234
 - manuals, 236–237
 - procedures, 232–233
 - text, 233
 - Personal interest, 176–177, 447, 477
 - Photographic art, 448
 - Physical memory aids, 277–278
 - Pie charts, 141
 - Planning and communication
 - strategies, 324–440. *See also under individual topics*
 - graphic plans, 392–413
 - individual graphic visualizations, 372–391
 - overviews and summaries, 324–329, 438–440
 - principle applications, 414–438
 - visual approach designs, 352–371
 - visual context definitions, 330–351
 - Platforms (e-learning), 341
 - Plots (scatter), 141
 - Potentials (unrealized), 8–9
 - Practice (online), 242–245
 - Practices (best). *See* Tips and best practices
 - Principle applications, 414–438
 - end-user system application training, 415–430
 - investment club financial basics training, 430–438
 - overviews and summaries, 324–328, 414–415, 438–440
 - Principles (content type), 304–320
 - definitions, 306
 - far-transfer tasks, 306
 - mistakes (common), 320
 - overviews and summaries, 220–223, 304–305, 321–323
 - PCL (Problem-Centered Learning), 305–315

Principles (*continued*)

- cognitive load management, 313–315
 - design models, 307–309
 - graphic design devices, 313–315
 - interactive *vs.* retrospective cases, 309
 - overviews and summaries, 305, 307
 - realistic visuals, 311–313
 - representational visuals, 310–313
 - retrospective case-based learning, 309
 - principle-based lessons, 448
 - reference resources, 321
 - teaching strategies, 309–310
 - tips and best practices, 319
 - transfer challenges, 306
 - visualization guidelines, 310–319
 - case analyses (video-taped), 315–316
 - cognitive load management, 313–315
 - engagement (learner), 316–319
 - explanatory visuals, 316–319
 - graphic design devices, 313–315
 - interpersonal skills, 315–316
 - interpretive visuals (simple), 316–319
 - job environments, 310–313
 - mental models (schema), 316–319
 - overviews and summaries, 310
 - realistic visuals, 311–313
 - representational visuals, 310–313
- Prior knowledge activation/
awakening, 88–103
- advance organizers, 91–97
 - comparative advance organizers, 92–93
 - expository advance organizers, 92–97
 - overviews and summaries, 91–97
- cognitive memory load, 106–107.
See also Cognitive memory load management
- definitions, 90, 441
- high prior knowledge learners, 196, 199–201
- instructional methods, 90
- learning processes (psychological), 59–60
- low prior knowledge learners, 195–199
- LTM (long-term memory), 90
- metacognition, 91
- overviews and summaries, 46–49, 88–90, 216–219
- reference resources, 103
- visualization guidelines, 92–103
 - advance organizers (comparative), 92–93
 - advance organizers (expository), 93–97
 - coherence effects, 99
 - disruption effects, 100–103
 - distraction, 101
 - incorrect activation/awakening, 101
 - seductive visuals and details, 97–103
- WM (working memory), 90
- Problem-Centered Learning (PCL), 307–315, 448. *See also* PCL (Problem-Centered Learning)
- Problem prevention, 349
- Procedures (content type), 224–247, 448
 - action flows, 232–233
 - by-pass training, 228
 - cognitive memory load, 110. *See also* Cognitive memory load management
 - complex procedures, 237–242

- contiguous text, 242–245
- definitions, 226, 448
- management strategies, 237–242
- mistakes (common), 246
- near-transfer tasks, 226–227
- overviews and summaries, 222–225, 321–323
- performance aids, 228
- procedural lessons, 448
- reference resources, 247
- teaching strategies, 226–228
- tips and best practices, 245–246
- visualization guidelines, 228–246
 - cognitive memory load
 - management, 237–242
 - combination visuals, 228–232
 - onscreen contiguous text, 242–245
 - performer perspective action
 - flows, 232–233
 - warnings, 242
- Process support (psychological learning), 46–219. *See also under individual topics*
 - attention direction, 68–87
 - learning differences, 192–215
 - learning processes, 50–67
 - memory load minimization, 104–123
 - mental models, 124–149
 - motivation (learning), 172–191
 - overviews and summaries, 46–48, 216–219
 - prior knowledge awakening, 88–103
 - transfer (learning), 150–171
- Processes (content type), 284–303
 - creation processes
 - (visuals *vs.* content), 387
 - definitions, 285–287, 448
 - development processes, 382–383, 398–399
 - mistakes (common), 301
 - overviews and summaries, 220–223, 284–285, 321–323
 - process knowledge needs, 286–287
 - reference resources, 302
 - sketching processes, 387
 - teaching strategies, 287–288
 - casual learning models, 288
 - cause-and-effect models, 287–288, 299–300
 - decomposition, 288
 - dynamic learning models, 288
 - overviews and summaries, 287–288
 - psychological learning models, 287–288
 - static mental models, 288
 - testing processes, 387–388
 - tips and best practices, 300–301
 - visual processing, 201–203
 - visual thinking processes, 379–382
 - visualization guidelines, 289–300
 - abstract process
 - representations, 297–299
 - animations, 290–292
 - attention direction, 292–297
 - attention focus, 296–297
 - audio *vs.* text in
 - multimedia, 294–296
 - cognitive load
 - management, 292–297
 - cueing techniques, 296–297
 - engagement (learner), 299–300
 - interpretive visuals, 297–299
 - overviews and summaries, 289
 - processes state changes, 289–292
 - static drawings, 290–292
 - system component *vs.* entire system
 - presentations, 293–294
 - transformational visuals, 289–292
 - visual analogies, 297–299

Production considerations, 340–348
 CGM (Computer Graphics Metafiles), 348
 e-learning platforms, 341
 equipment requirements, 340–342
 formats, 342–346
 LMSs (Learning Management Systems), 347
 overviews and summaries, 340
 programming requirements, 347–348
 schedules, 347
 SCORM (Sharable Content Object Reference Model), 347–348
 visual context definitions, 340–348

Production coordinator roles, 375

Production staff roles, 375, 393–395, 405–408

Programming requirements, 347–348

Proximities (text-graphic), 77–85

Psychological functions, 12–17

Psychological instructional event principles, 41–42

Psychological learning process support, 46–219, 287–288. *See also under individual topics*
 attention direction, 68–87
 learner differences and, 192–215
 learning processes, 50–67
 memory load minimization, 104–123
 mental models, 124–149
 models, 287–288
 motivation (learning), 172–191
 overviews and summaries of, 46–48, 216–219
 prior knowledge activation/awakening, 88–103
 transfer (learning), 150–171

Q

Qualitative relationships, 131–141

R

Real estate availability, 365–367, 448

Realistic visuals, 311–313

Realities (virtual), 451

Recall and recognition, 129

Receptive instructions, 448

Recognition and recall, 129

Redundancy principle, 114–116, 448

Reference resources. *See also under individual topics*
 attention direction, 87
 cognitive memory load, 122
 concepts, 263
 facts, 283
 graphics and visuals for training materials (general), 453–464
 individual graphic visualizations, 390
 instructional visuals, 27
 learner differences, 215
 learning processes (psychological), 67
 mental models (schema), 148
 motivation (learning), 190
 principles, 321
 prior knowledge activation/awakening, 103
 procedures, 247
 processes, 302
 visual approach designs, 370
 visual context definitions, 349–350

Rehearsals, 448

Related concepts, 251, 258–260

Relational graphics and visuals, 22, 278–280, 448

Relationships, 131–141, 278–280
 discovery relationships, 278–280
 qualitative relationships, 131–141

- Relevance principle, 179–181
- Representational graphics and
 - visuals, 19–20, 65–66, 228–232, 253–254, 268–273, 310–313, 448
- Research evidence, 26–27
- Retrieval, 61, 449
- Retrospective *vs.* interactive cases, 309, 449
- Reversal effects, 107, 444
- Reviewers, 393–395
- Roles, 276, 374–411
 - art director roles, 375
 - art staff roles, 375
 - artist roles, 393–395, 399, 408–411
 - client roles, 393–394
 - collaborative roles, 376–377
 - design team structures, 376–377
 - graphic designer roles, 375–377
 - graphic development roles, 374–378
 - instructional designer roles, 375–378, 393–395
 - interface designer roles, 375
 - overviews and summaries, 374–378
 - production coordinator roles, 375
 - production staff roles, 375, 393–395, 405–408
 - reviewer roles, 393–395
 - SME (subject matter expert) roles, 393–394
 - sole arbitrator roles, 376
 - team member roles, 393–395
 - writer roles, 276, 375, 393–395
- Roughs, 449
- S**
- Samples (graphic plans), 396–398
- Scales (charts and graphs), 142
- Scatter plots, 141
- Schedules, 347
- Schema (mental models), 124–149.
 - See also* Mental models (schema)
- SCORM (Sharable Content Object Reference Model), 347–348, 449
- Scripts, 399–408, 449
 - definitions, 449
 - vs.* storyboards, 399–408
- Search tasks (high visual), 76–77
- Seductive details, 97–103, 449
- Selection criteria, 11–18
- Self-explanatory information, 114–116
- Sequencing, 118–121
- Sharable Content Object Reference Model (SCORM), 347–348, 449
- Shot lists, 449
- Signals, 71–76, 85–87, 449
- Simulations, 144–147, 449
- Situational interest, 174–177, 181–182.
 - See also under individual topics*
 - cognitive situational interest, 174–177
 - definitions, 449
 - emotional situational interest, 176–177, 181–182
 - overviews and summaries, 181
- Size and orientation determinations, 362–363, 444
- Sizzle management, 172–191. *See also* Motivation (learning)
- Sketching processes, 387
- SME (subject matter expert) roles, 393–394
- Sole arbitrator roles, 376
- Sources, 106–108, 385
 - cognitive memory load, 106–108
 - outside sources, 385

- Spans, 206–212, 446, 450
 - information spans, 206–207, 446
 - spatial spans, 206–212, 450
 - Spatial aptitudes, 196–197, 206–214, 449
 - definitions, 449
 - low spatial aptitude learners, 212–214
 - overviews and summaries, 196–197, 206–208
 - Spatial changes, 141–143
 - Spatial complexity, 240–241
 - Spatial content, 108–110
 - Spatial features, 142
 - Spatial preferences, 450
 - Spatial spans, 206–212, 450
 - Spatial tasks, 212–214
 - Spatial-visual preferences, 196–197, 203–208, 451
 - Spatial visualizers, 208–212, 450
 - Standards documents, 396
 - Static drawings, 290–292
 - Static mental models, 288
 - Static *vs.* dynamic visuals, 143
 - Story line carriers, 359–362
 - Storyboards, 399–408, 450
 - definitions, 450
 - vs.* scripts, 399–408
 - Strategies, 237–268. *See also under individual topics*
 - management, 237–242
 - teaching strategies
 - concepts, 251–253
 - facts, 267–268
 - Structures, 32–42
 - constraint determinations, 37
 - design team structures, 376–377
 - memory structures, 124–149. *See also* Mental models (schema)
 - visual design models, 32–42
 - Style considerations, 364–365
 - Style guides, 396
 - Subject matter expert (SME) roles, 393–394
 - Successive graphic displays, 450
 - Surface features, 10–19, 450
 - Synchronized graphic displays, 450
 - Synchronous principle, 450
- T**
- Tables and figures (listings), 467–478
 - Tables (graphic type), 141
 - Tangible concepts, 450
 - Tasks. *See also under individual topics*
 - analyses, 450
 - search tasks (high visual), 76–77
 - spatial tasks, 212–214
 - task-appropriate selections, 136–140
 - charts and graphs, 136–140
 - overviews and summaries, 136
 - transfer tasks, 136–140, 226–227, 306, 445–447
 - far-transfer tasks, 306, 445
 - near-transfer tasks, 226–227, 447
 - Taxonomies, 18–19, 450
 - Teaching in context principle, 267
 - Teaching strategies. *See also under individual topics*
 - automaticity, 268
 - concepts, 251–253
 - facts, 267–268
 - memory support (schema), 267–268
 - overviews and summaries, 267
 - processes, 287–288
 - teaching in context, 267
 - Team member roles, 393–395
 - Technical decisions, 331–332
 - Templates, 396

- Terminology, 441–452
- Testing processes, 387–388
- Text, 77–85, 142, 195–199, 233–254
 - action flows, 233
 - congruency, 195–199
 - contiguous text, 242–245
 - management strategies, 238–240
 - onscreen text, 242–245
 - placements, 238–240
 - procedures, 242–245
 - proximities (text-graphic), 77–85
 - text definitions, 253–254
 - types, 142
- Thinking (visual) processes, 379–382
- Three-dimensional graphs, 142
- Time changes, 141–143
- Tips and best practices. *See also under individual topics*
 - concepts, 262
 - content types, 383–385
 - facts, 282
 - individual graphic visualizations, 378–388
 - principles, 319
 - procedures, 245–246
 - processes, 300–301
- Training material graphics and visuals. *See also under individual topics*
 - figures and tables for (listing), 467–478
 - foundational concepts, 2–45
 - instructional visuals, 6–27
 - overviews and summaries, 2–5, 43–45
 - visual design models, 28–42
 - glossary, 441–452
 - lesson content types, 220–323
 - concepts, 248–263
 - facts, 264–283
 - overviews and summaries, 220–223, 321–323
 - principles, 304–320
 - procedures, 224–247
 - processes, 284–303
 - overviews and summaries, xiii–xxvii
 - planning and communication
 - strategies, 324–440
 - graphic plans, 392–413
 - individual graphic visualizations, 372–391
 - overviews and summaries, 324–329, 438–440
 - principle applications, 414–438
 - visual approach designs, 352–371
 - visual context definitions, 330–351
- psychological learning process
 - support, 46–219
 - attention direction, 68–87
 - learner differences, 192–215
 - learning processes, 50–67
 - memory load minimization, 104–123
 - mental models, 124–149
 - motivation (learning), 172–191
 - overviews and summaries, 46–48, 216–219
 - prior knowledge awakening, 88–103
 - transfer (learning), 150–171
 - reference resources, 453–464
- Transfer (learning), 150–171
 - challenges, 306
 - definitions, 450
 - failure (transfer), 152
 - identical elements, 154
 - LTM (long-term memory), 152–153
 - overviews and summaries, 46–49, 150–151, 216–219
 - principles (content type), 306

- Transfer (learning) (*continued*)
 reference resources, 171
 transfer tasks, 153–160. *See also*
 Transfer tasks
 visualization guidelines, 155–170
 abstract ideas, 162–166
 discovery learning, 168–169
 guided discovery learning, 168–169
 inductive learning, 168–169
 interpretive visuals, 161–162
 memory support, 169–170
 process understanding, 160–162
 representational visuals, 155–160
 simulations, 169
 transformational visual
 communication, 160–162
 varied context visuals, 166–167
 visual mnemonics, 169–170
 work performance issues, 152–153
- Transfer tasks, 136–140, 226–227, 306, 445–447
 far-transfer tasks, 306, 445. *See also*
 Principles (content type)
 near-transfer tasks, 226–227, 447
 task-appropriate selections, 136–140
- Transformational graphics and
 visuals, 22, 141–143, 228–232, 451
- Treatment meetings, 354–368
- Trend and relationship discovery, 278–280
- Two- *vs.* three-dimensional bar charts, 138
- U**
- Understandability, 184–187
- Unrealized potentials, 8–9
- V**
- Varied context examples, 451
- Verbal *vs.* visual learners, 194–195
- Video-taped case analyses, 315–316
- Views (visual), 6–27. *See also*
 Instructional visuals
- Virtual realities, 451
- Visual analogies, 188–189, 257–258
 concepts, 257–258
 motivation (learning) techniques, 188–189
 processes, 297–299
- Visual approach designs, 352–371
 case studies, 368–369
 overviews and summaries, 324–328, 352–353, 438–440
 planning strategies, 353–368
 brainstorming sessions, 354–368
 functionality requirements, 367–368
 graphics-dominant *vs.*
 text-dominant media, 359–362
 instructional strategy
 determinations, 355–358.
 See also Instructional strategies
 layouts, 364–368
 navigational requirements, 367–368
 overviews and summaries, 353–354
 real estate availability, 365–367
 size and orientation determinations, 362–363
 story line carriers, 359–362
 style considerations, 364–365
 treatment meetings, 354–368
 reference resources, 370
- Visual arguments, 64, 108–110, 451
 cognitive memory load, 108–110
 definitions, 451
 learning processes (psychological), 64
- Visual context definitions, 330–351
 design decisions, 331–332
 landscape assessments, 332–340
 delivery media determinations, 336–340

- ISD (instructional system design), 333
- learner profiles, 332–335
- learning environment
 - analyses, 335–337
 - overviews and summaries, 332
- organizations, 349–350
- overviews and summaries, 324–328, 330–331, 439–440
- problem prevention, 349
- production considerations, 340–348
 - CGM (Computer Graphics Metafiles), 348
 - e-learning platforms, 341
 - equipment requirements, 340–342
 - formats, 342–346
 - LMSs (Learning Management Systems), 347
 - overviews and summaries, 340
 - programming requirements, 347–348
 - schedules, 347
 - SCORM (Sharable Content Object Reference Model), 347–348
 - visual context definitions, 340–348
- reference resources, 349–350
- technical decisions, 331–332
- Visual cues, 237
- Visual design models, 28–42
 - functions *vs.* content types, 41
 - vs.* instructional design models, 32
 - overviews and summaries, 2–4, 28–30, 43–44
 - psychological instructional event principles, 41–42
 - structures, 32–42
 - constraint determinations, 37
 - delivery mediums, 37
 - goal definitions, 34–35
 - learner determinations, 36
 - learning environment determinations, 36–37
 - overviews and summaries, 32–34
 - package image, 38–39
 - preliminary graphic content assessments, 38
 - visual approach determinations, 37–40
 - visual context definitions, 35–37
 - systematic approaches, 30–33
 - successes, 31–33
- Visual literacy, 197, 201–203, 451
- Visual-only *vs.* word-only presentations, 199–201
- Visual processing, 201–203
- Visual-spatial preferences, 196–197, 203–208, 451
- Visual thinking processes, 379–382
- Visual views, 6–27. *See also* Instructional visuals
- Visual *vs.* verbal learners, 194–195
- Visualization guidelines. *See also under individual topics*
 - attention direction, 71–87
 - charts and graphs, 141–142
 - cognitive memory load, 108–121
 - concepts, 253–262
 - evidence-based guidelines, 141–142
 - facts, 268–282
 - instructional visuals, 25–27
 - learner differences, 195–214
 - mental models (schema), 131–147
 - motivation (learning), 177–184
 - principles, 310–319
 - prior knowledge activation/awakening, 92–103
 - procedures, 228–246
 - processes, 289–300
- Visualizers, 208–212, 445, 450
 - iconic visualizers, 208–212, 445
 - spatial visualizers, 208–212, 450

- Visuals and graphics for training materials. *See also under individual topics*
- figures and tables (listing), 467–478
 - foundational concepts, 2–45
 - instructional visuals, 6–27
 - overviews and summaries, 2–5, 43–45
 - visual design models, 28–42
 - glossary, 441–452
 - lesson content types, 220–323
 - concepts, 248–263
 - facts, 264–283
 - overviews and summaries, 220–223, 321–323
 - principles, 304–320
 - procedures, 224–247
 - processes, 284–303
 - overviews and summaries, xiii–xxvii
 - planning and communication
 - strategies, 324–440
 - graphic plans, 392–413
 - individual graphic visualizations, 372–391
 - overviews and summaries, 324–329, 438–440
 - principle applications, 414–438
 - visual approach designs, 352–371
 - visual context definitions, 330–351
 - psychological learning process
 - support, 46–219
 - attention direction, 68–87
 - learner differences and, 192–215
 - learning processes, 50–67
 - memory load minimization, 104–123
 - mental models, 124–149
 - motivation (learning), 172–191
 - overviews and summaries, 46–48, 216–219
 - prior knowledge awakening, 88–103
 - transfer (learning), 150–171
 - reference resources for, 453–464
- Visuals (types). *See also* Graphics (types)
- art, 447–448
 - creation processes
 - (visuals *vs.* content), 387
 - explanatory visuals, 66, 126–131
 - factual visuals, 280–282
 - individual graphic visualizations, 372–391. *See also* Individual graphic visualizations
 - interpretive visuals, 144–147
 - mnemonic visuals, 20–21
 - organizational visuals, 21–22, 257–258, 275–277
 - relational visuals, 22, 278–280
 - representational visuals, 19–20, 268–273
 - static *vs.* dynamic visuals, 143
 - transformational visuals, 22, 141–143
- Vivid language, 188
- W**
- Warnings (procedures), 242
 - WM (working memory), 54–58, 90, 106–108, 451
 - cognitive memory load, 106–108
 - definitions, 451
 - learning processes (psychological), 54–58
 - prior knowledge activation/awakening, 90
 - Word-only *vs.* visual-only presentations, 199–201
 - Writer roles, 276, 375, 393–395