

# Index

Page references followed by *fig* indicate an illustrated figure; followed by *t* indicate a table.

## A

ActiveDen, 276, 277

Adobe Captivate authoring tool, 278

Adobe Cold Fusion, 302

Adobe Flash, 281

Advanced Distributed Learning (ADL)

Initiative, 119, 126

Affective learning domain: definitions of terms associated with, 47*t*; description of, 42; matching game activity to, 46

Affinity diagrams: description of, 186; on the wall of the conference room, 187*fig*

After-action review (AAR), 27

Age of Empires game, 44*t*

Allegories: definition of, 97; examples of, 97

Allocating resources games: brainstorming

ideas by playing, 181; description of, 39; matching the learning outcome with, 64*t*; revised Bloom's Taxonomy for analyzing matched with, 44*t*

Alpha game development phase, 163

Ambient noises, 94

Anderson, J. E., 124*t*

Anderson, Lorin, 43

Angry Birds mobile device game, 180, 181, 182

Animation software, 277

Apple's Keynote, 289

Arcade-style games, 276–278

Architecting story, 112–115*t*

Architecture. *See* Game architecture  
*The Art of Walt Disney* (Finch), 288

- Articulate Storyline authoring tool, 277–278
- Artificial intelligence (AI), 275
- Assassin's Creed game series, 41
- Assassin's Creed III game, 42
- Attributes scoring method, 97
- Audio narration script, 289
- Austin, Bryan, 347
- Authentic practice, 29–31
- Authoring tools, 276–278
- Avaya: background information on, 399–400; sales training game developed by, 400–404
- Avaya sales training game case study: background information on, 399–400; benefits and results of, 404; lessons learned during, 404; reasons for using a game-based simulation, 400; the sales training game simulation solution, 400–403*fig*
- Axonify (gamification platform), 281
- B**
- B. Braun Medical Inc. (B. Braun): background information on, 371–372; Introcan Safety IV Catheter case study on, 371–389; Introcan Safety IV Catheter product sold by, 372, 388–389
- Badges: adding, 283–284; collecting, 233*fig*; Mobile Cricket U, 342*fig*; structural gamification element of, 233*fig*–234
- Badgeville (gamification platform), 281
- Bailenson, J. N., 124*t*, 125*t*
- Barriers: control of story, 113, 115*t*; story, 113, 115*t*
- Baseline assessments: description and function of, 134, 136; single group pre-test/post-test study for, 136; two-group comparison study for, 136
- Baughman, S. L., 125*t*
- Beck, C. C., 191
- Bedwell, W. L., 121, 124*t*
- Behaviors: gamification used to influence, 57; ILE used to promote positive, 27–29; mobile devices and learner, 283; study findings on pro-social games influence pro-social, 28–29
- Bejeweled game, 181
- Bell, Robert, 319
- Beta game development phase, 163
- Bigham, Michelle, 404
- Bittner, Kristin, 9, 41, 120, 181, 186, 188, 221, 233, 253, 282
- Bloom, Benjamin S., 43, 122
- Bloom's Taxonomy: affective domain, 43, 46, 47*t*; cognitive domain, 42, 43; game activities matched with revised, 44*t*–45*t*; how simulations fit into, 251; original and revised cognitive taxonomy, 43*t*; psychomotor domain, 43, 46, 48*t*
- Boller, Sharon, 139, 305, 307, 317
- Bottom-Line Performance (BLP): background of, 305–306; College Hoops Guru free game by, 309; ExactTarget game of, 309, 316; The Knowledge Guru game developed by, 58, 276–277, 306–318; MobileConnect product of, 309
- Box2D-JS, 281
- Boyle, E., 121
- Boyle, J., 121
- Brainstorming ideas: playing games for, 180–183; playing simulations for, 183–184; techniques for, 184–191; things to keep in mind when, 184
- Brainstorming techniques: affinity diagram, 186–187*fig*; gamefest, 184–185; mind mapping, 185–186*fig*; paper prototyping, 187–191
- Branching storyline simulations: description of, 60; multiple-choice decisions used in, 260, 261*e*; multiple-select (of several choices) decisions used in, 260, 261*e*; ranking (ordering) decisions used in, 260, 261*e*; ranking (prioritizing) decisions used in, 260, 262*e*; tips for writing decisions for, 262–263

- British Journal of Surgery*, 119
- Building games: brainstorming ideas by playing, 182; description of, 40; revised Bloom's Taxonomy for creating matched with, 44*t*
- Bullseye Trainer arcade game, 209*fig*
- Bunchball (gamification platform), 281
- Burke, C. S., 121, 124*t*
- C**
- C3 Softworks' Bravo template, 277
- Call of Duty games, 180
- Capstone skill-based curriculum, 63
- Captain Marvel (comic book character), 191–192
- Captain Up, 281
- Capturing/collecting games: brainstorming ideas by playing, 181; description of, 39; matching learning outcomes with, 65*t*; revised Bloom's Taxonomy for remembering matched with, 45*t*
- Case studies: Avaya sales training game, 399–404; Financial Freedom Island Cruise online board game, 391–398; Introcán Safety IV Catheter simulation, 371–389; The Knowledge Guru, 305–318; Merchants serious game, 347–357; MindTickle structural gamification, 359–369; Mobile Cricket U, 333–345*fig*; MPE (managing people essentials), 319–331
- Caspian Thinking Worlds authoring tool, 280
- Cause-and-effect relationships, 96. *See also* Game mechanics
- CellCast Solution game engine, 340
- CellCast Solution platform, 341
- Challenge: content gamification, 241–242; definition and function of, 98; Learn-Gap learning, 252; strategies to create, 99; structural gamification and built-in, 227–228; turning a learning objective (LO) into a, 242
- Characters: chart to keep tracking of the, 240*t*; description of, 113, 115*t*; developing content gamification, 238–240, 243–244; don't make them talk like robots, 259; Merchants serious game's Carlo Vecchio, 351*fig*–354*fig*; sprite graphics used for animation of the, 275. *See also* Stories
- Chat Mapper, 257
- Cheating the system, 235–237
- A Checklist for Evaluating Gamification Platforms (Enterprise-Gamification.com), 284
- Chess game, 39, 44*t*
- Chief learning officers (CLOs), desire to create interactivity in learning delivery by, 21
- Chutes and Ladders board game, 182
- City Crisis game, 41
- Civilization V game, 44*t*, 182
- Cloud-based gamification platforms, 284
- Clue game, 40, 45*t*
- CodeBaby animation software, 276–277
- Cognitive behavioral theory, 96
- Cognitive learning domain: description of, 42; matching game activity to, 43
- Collecting/capturing games: brainstorming ideas by playing, 181; description of, 39; matching learning outcomes with, 65*t*; revised Bloom's Taxonomy for remembering matched with, 45*t*
- College Hoops Guru game, 309
- Collision detection, 275
- Comolli, Stacie, 250, 254
- ConAgra Foods, Inc.: background information on, 320; MPE (managing people essentials) case study on, 320–331
- Conflicts: control of story, 113, 115*t*; story, 113, 115*t*
- Conkey, C., 121, 124*t*
- Connolly, T., 121
- Content: best kind of simulation, 62; designing gamification, 55, 65*t*, 237–246

- Content gamification: challenge element of, 241–242; comparing structural and, 295; curiosity element of, 242–243; description of, 55, 237; feedback element of, 245; interactivity element of, 244; matching learning outcomes with use of, 65*t*; providing learners with the freedom to fail, 245–246; story and characters element of, 238–241, 243–244. *See also* Structural gamification
- Control group data: single group pre-test/post-test study, 137, 138*t*; two-group comparison study, 137, 138*t*
- Control of barriers and conflicts, 113, 115*t*
- Constructs: allegory, 97; description and function of, 95–96; game mechanics, 96–97; laws and rules, 98
- costs and benefits calculations, 137, 139*t*
- Course Games: modified scrum production model at, 162*fig*; production functions at, 144*fig*–145; Survival Master production at, 142–170
- CrazyTalk animation software, 277
- Cricket Communications: background information on, 334; Mobile Cricket U case study on, 333–345*fig*
- CSS3, 280
- Curiosity, 242–243
- Currency systems, 232–233
- D**
- Darfur Is Dying game, 29, 182
- Decision making: Decision Design Worksheet for simulation, 267–269; simulations to experience impacts of, 59
- Deloitte Leadership Academy (DLA): gamification justification evidence of, 123; gamification used to engage employees at, 23–26; used for motivation, 57; profile screen, 25*fig*; structural gamification used by, 281
- Demetriou, S., 124*t*
- Design documents: description and function of, 193; elements of a, 194*t*–195*t*; one-page, 193, 196*fig*–197, 211–212*fig*, 213*fig*; writing the full, 216
- Designing Digitally, Inc.: background information on, 391–392; Financial Freedom Island Cruise online board game case study on, 391–398
- Development process. *See* ILE development
- Devil’s Advocate game: PTSD treatment using, 96, 207; storyboard examples from, 215*fig*–216*fig*; 2-D stealth platform of, 208*fig*
- Diagram Designer, 257
- “Does Game-Based Learning Work? Results from Three Recent Studies” (Blunt), 119
- Dondlinger, M. J., 125*t*
- Dropbox, 292
- Duestenberg, Rhonda, 400, 404
- E**
- EaselJS, 281
- Edraw Flowchart, 257
- Educational game design: break down tasks into KSAs, 204–205; building skills by selecting game genre/type and game mechanics, 206–209*fig*; choosing game genre/type, 206–209*fig*; establishing learning objectives (LOs), 153*t*, 201, 202; keeping in mind your audience for, 203–205; learner outcomes-driven, 148–150, 153*t*, 200–203; themes or story included in the, 205
- Educational game production: full design document, 216; game design process, 200–209*fig*; one-page design document, 193, 196*fig*–197, 211–212*fig*, 213*fig*; order of tasks for, 207; paper prototyping, 187–191, 212–214; storyboards, 214–216*fig*; wireframing, 209–210*fig*
- Educational games: designing from start to finish, 200–209*fig*; establishing learning

- objectives (LOs) for, 153*t*, 201, 202; learner outcomes-driven development of, 148–150, 153*t*, 200–203; model for managing development of, 147*fig*; process required to produce, 142–145; production phases for, 145–146, 148; Survival Master production process, 150–170; tips for a first-time producer of, 170–175. *See also* Games
- eLearning Brothers, 276–277
- Eliahu, M., 125*t*
- Employee engagement: Deloitte Leadership Academy's gamification for, 23–25*fig*, 57, 123, 281; ILE development to increase, 22–26; during on-boarding process, 362–363
- Employees: Avaya sales training game, 399–404; The Knowledge Guru case study on training, 305–318; MindTickle for on-boarding new, 359–369; providing evidence-based training to, 118
- Employer value proposition (EVP), 361–362
- Enspire Learning, 319
- Enspire Studios, 323
- Enterprise resource planning (ERP) system, 60
- Episodic memory, 53–54
- Equipment/software simulations, 60
- “An Essay on Criticism” (Pope), 13
- Estock, J. L., 121, 124*t*
- EVE Online game, 40
- Evidence-based training, 118
- ExactTarget game, 309, 316
- Exaggerated story, 99–100
- Exploring games: brainstorming ideas by playing, 182; description and example of, 40, 41*fig*; matching learning outcomes with, 64*t*; revised Bloom's Taxonomy for understanding matched with, 45*t*
- Extrinsic feedback, 264
- Extrinsic motivation: brushing teeth good intrinsic motivation vs. bad, 220, 221*fig*; developing gamification for, 222; gamification design for co-existing intrinsic and, 223–224
- ## F
- Facilitator/peer feedback, 264
- Failure opportunities, 245–246
- Fantasy: a caution about using in games, 54; cognitive reasons for evoking, 53–54; emotional reasons for evoking, 54; matching learning outcomes with use of, 64*t*, 65*t*; research-based reasons for including in games, 53; structural gamification game, 65*t*. *See also* Stories
- Farmville-type games, 181
- Fawcett Comics, 191
- Feedback: comparing rewards to, 95; content gamification element of, 245; creating stimulation, 263–264; designer notes on designing, 92, 93, 94, 95; extrinsic, 264; feedback delivery methods, 92–95; function of feedback loops for players, 90, 307; intrinsic, 263; The Knowledge Guru screen showing immediate, 313*fig*; peer/facilitator, 264; structural gamification and real-time, 226; timing of feedback, 90–91; tone of feedback, 91–92. *See also* Learners
- Feedback delivery methods: designer notes on, 93, 94, 95; movement, 95; selecting, 92–93; touch or tactile stimulation, 95; visual, 93; visual and sound effects, 94
- Feedback tone: metric consideration of, 92; negative, 91; neutral, 91; positive, 91
- Financial Freedom Island Cruise case study: background information on, 391–392; benefits of the, 397; the challenge of providing financial training, 392; the Financial Freedom Island Cruise game as solution, 393–397; lessons learned during, 398; results of the, 398

Financial Freedom Island Cruise game:  
 activities of the, 393–395*fig*; calculator  
 to help determine savings goals, 395*fig*;  
 coaching provided by, 396–397; education  
 provided by, 393; using an island theme  
 for the game, 394*fig*; progressing on the  
 game board, 394*fig*; sample game question,  
 395*fig*

Flight simulator, 253*fig*

Flowcharts: overly complex simulation  
 storyline, 255*fig*; simulation, 256–257*fig*;  
 software tools for, 257

FoldIt! game, 57

Foundational questions: description of, 69;  
 summary of questions for matching learn-  
 ing needs and outcomes, 73*t*, 83*t*; what  
 are the learners not doing?, 71, 82*t*; what  
 are the tasks of the ILE?, 72, 83*t*; what is  
 needed to achieve success?, 71–72, 82*t*;  
 what is the desired outcome?, 71, 82*t*; what  
 is the real problem?, 69–70, 82*t*

Fox, J., 124*t*

Fruit Ninja mobile device game, 182

## G

Gadd, Robert, 333

Game activities: allocating resources, 39, 44*t*,  
 64*t*; Bloom's Taxonomy learning domains  
 matched with, 42–48*t*; building, 40,  
 44*t*, 64*t*; choosing genre/type to include  
 in game design, 206–209*fig*; collecting/  
 capturing, 39, 45*t*; exploring, 40, 41*fig*,  
 45*t*, 64*t*; fantasy, 53–54; helping, 41, 64*t*;  
 matching, 38, 45*t*, 64*t*, 65*t*; puzzle solving,  
 40; role playing, 41–42, 45*t*, 64*t*; strategiz-  
 ing, 39–40, 44*t*, 64*t*, 65*t*; type of knowl-  
 edge matched to appropriate, 49, 50*t*–52*t*.  
*See also specific game type*

Game architecture: architecting story,  
 112–115*t*; database model for initial  
 Survival Master project, 157*fig*; SMTE  
 prototype online multiplayer (circa 2008),

159*fig*; Survival Master alpha LAN multi-  
 player (circa 2011), 160*fig*; Survival Master  
 beta game enterprise (circa 2013), 161*fig*;  
 Survival Master example of iterations to,  
 160–161, 163

Game development: educational game,  
 142–148, 187–197, 200–216*fig*; factors  
 for ensuring successful, 31–33; the most  
 common wrong reasons for, 14–20; one-  
 page design used for, 193, 196*fig*–197,  
 211–212*fig*, 213*fig*; paper prototyping for,  
 187–191, 212–214; questions to ponder  
 during, 31, 32*t*; reasons for increase in, 3;  
 the right reasons for, 20–33; wireframing,  
 209–210*fig*. *See also* Game production  
 process

Game engines: criteria for selecting the best  
 for your purpose, 279–280; description  
 and function of, 278–279; selected 2-D,  
 279; selected 3-D, 279–280

Game literacy, 173

Game loop, 275

Game mechanics: attributes scoring, 97;  
 description of, 96; levels and experience  
 scoring, 97; Mobile Cricket U, 337*fig*,  
 339*fig*; resurrecting at a save point, 97; skill  
 building by selecting game genre/type and,  
 206–209*fig*; stealth, 96, 207, 208*fig*; time-  
 slowing, 96–97. *See also* Cause-and-effect  
 relationships

Game On! Learning: background informa-  
 tion on, 347–348; Merchants serious game  
 offered by, 347–357

Game-play questions: description of, 79; how  
 do you win or lose?, 80–81; summary of  
 “winning” and “losing” conditions, 81*t*;  
 what are the learners doing?, 79–80; what  
 are the learners during the ILE?, 85*t*

Game production process: architecture itera-  
 tions, 160–163; educational game, 142–  
 148, 187–197, 200–216*fig*; establishing  
 learning objectives, 153*t*, 201; instructional

- design definitions, 150–154; ISD to LDD checklist, 155*t*; learner outcomes-driven, 148; level design concept: Snow Shoe Race, 165*e*–170; level design documents, 154–155; master schedule Gantt and sprint burndown chart example of, 164*fig*–165; model for managing a game development project, 147*fig*; one-page design, 193, 196*fig*–197, 211–212*fig*, 213*fig*; pre-production documentation checklist, 151*t*–152*t*; pre-production planning checklist, 149*t*–150*t*; production functions at Course Games, 144*fig*–145; production highlights, 155–160; production schedule management, 163; schedule tools and formats for managing, 164*fig*–165; serious game, 145–148; tips for a first-time producer for managing the, 170–175. *See also* Game development; ILE development; Survival Master production
- Game production teams: assessing game literacy of members, 173; design document for sharing output, 193–197; learner's advocate team member on, 173; managing expectations of, 174–175; managing virtual, 171–172; playtesting by, 172–173, 189–191; pre-production management of, 172; Shazam session held by, 191–193
- Game production tips: on developing an appreciation for pre-production, 172; for a first-time producer, 170–175; on having a learner's advocate on the team, 173; on low game literacy of some of the team members, 173; on managing expectations, 174–175; on managing the virtual production team, 171–172; on playtesting, 172–173
- Gamefest: brainstorming ideas by holding a, 184–185; description of, 184
- Gamelearn S.L.: background information on, 347–348; Merchants serious game developed by, 347–357
- Games: activities used in, 38–54; arcade-style, 276–278; collision detection in, 275; comparing gamification to, 56; comparing simulations to, 61; definition of, 37; dollarizing performance metrics, 134, 135*t*; using fantasy in, 53–54; matching learning outcomes with use of, 64*t*–65*t*; moving from ideas to finishing, 181*fig*; performance-based justification for, 128–139*t*; performance metrics for, 133–134*t*; playing them in order to brainstorm ideas for new, 180–183; production of an educational, 142–176; research on learning value of, 119–127; selection criteria for justifying a, 130*t*; serious, 323–331, 347–357; simulation + simulation = game equation for, 90; teaching versus testing, 49, 52; 3-D, 275, 279–280; 2-D, 275, 279; why L&D professionals need skills related to, 2–5. *See also* Educational games; Interactive learning event (ILE)
- Gamification: avoid learners gaming the system, 235–237; comparing games to, 56; content, 55, 65*t*, 237–246, 295; controversial nature of, 220–224; definition of, 54; Deloitte Leadership Academy's engaging employees using, 23–26, 57, 123, 281; dollarizing performance metrics, 134, 135*t*; matching learning outcomes with use of, 65*t*; moving from ideas to finishing, 181*fig*; performance-based justification for, 128–139*t*; performance metrics for, 133–134*t*; research-based justification for, 123; selected gamification platforms, 281–282; selection criteria for justifying a, 130*t*; simulation + gamification = game equation, 90; storytelling in, 108; structural, 55, 65*t*, 224–235, 295, 359–369; T-haler, 4; when to use for learning, 56–58; why L&D professionals need skills related to, 2–5. *See also* Interactive learning event (ILE)

Gamification design: content, 55, 65*t*, 237–246; for extrinsic motivation, 222; for intrinsic motivation, 222–223; intrinsic versus extrinsic motivation issue of, 220–221*fig*; to minimize impact of cheating, 235–237; structural, 55, 65*t*, 224–235. *See also* ILE development

Gamification development: factors for ensuring successful, 31–33; the most common wrong reasons for, 14–20; questions to ponder for, 31, 32*t*; reasons for increase in, 3; the right reasons for, 20–33

*The Gamification of Learning and Instruction: Game-Based Methods and Strategies for Training and Education* (Kapp), 7, 26, 160

Gamification platforms: A Checklist for Evaluating Gamification Platforms (Enterprise-Gamification.com), 284; Cloud-based, 284; selected, 281–282

“Gaming the system,” 235–237

Gantt charts: design document on timeline using, 195*t*; production schedule using, 164*fig*–165

Garden Defense game, 207, 208*fig*

Garg, Mohit, 359

Gentil, Douglas A., 28

Glover, Kevin R., 371

“Go Fish” card game, 39

Goal-based scenario, 109–110

Goals: “In Order to” chain to achieve, 113–114, 115*t*; linking ILE to business unit and corporate, 131–132; matching ILE to sponsor’s, 132–133; as story performance objective, 113, 115*t*; structural gamification providing incremental rewards and, 225; structural gamification requiring clear, 224

*Gone with the Wind* (film), 288

Google Drive, 292

Google Glasses, 4–5

Gronstedt Group, 400

## H

Hailey, T., 121

Halo game series (Xbox), 41, 182

Hangman game, 38, 45*t*, 276

“Hardcore” game mode, 97

Harvard Business Publishing, 24

Heads-up display (HUD), 4–5

Helping games: brainstorming ideas by playing, 182; description of, 41; matching learning outcomes with, 64*t*

Holt, Henry, 288

Howard-Jones, P. A., 124*t*

HTML5 games, 276, 280–281, 283

Hughes, Andrew, 391

## I

Ideas: brainstorming techniques for coming up with, 184–191; design document for sharing, 193–197; how playing simulations can help brainstorm for, 183–184; moving toward finished game, gamification, or simulation from, 181*fig*; play games in order to come up with, 180–183; Shazam session to come up with, 191–193

ILE development: justification for, 117–140; keeping the scope within reason, 274; paper prototyping for, 187–191, 212–214; questions to ask about, 31, 32*t*, 69–85*t*; simulation, 14–20, 29–33, 252–269; terminology related to, 275; tools used for, 275–285; where to find ideas for, 179–198. *See also* Game production process; Gamification design

ILE development questions: foundational, 69–73*t*, 82*t*–83*t*; game-play, 79–81*t*, 85*t*; to ponder before beginning development, 31, 32*t*; practical, 73–75, 76*t*, 83*t*–85*t*; scoring and assessment, 75–78*t*, 85*t*

ILE development teams: assessing game literacy of members, 173; brainstorming techniques used by, 184–191; design document for sharing output, 193–197;



- learner's advocate team member on, 173;  
 managing expectations of, 174–175;  
 managing virtual, 171–172; playtesting  
 by, 172–173, 189–191; pre-production  
 management of, 172; Shazam session held  
 by, 191–193; who makes up the, 274
- ILE development tools: Adobe Flash, 281;  
 badges, 233*fig*–234, 283–284, 342*fig*;  
 game engines, 278–280; gamification plat-  
 forms, 281–282; HTML5, 276, 280–281,  
 283; leaderboards, 230–231, 283–284;  
 mobile games considerations, 282*fig*–283;  
 template-based authoring tools/arcade-style  
 games, 276–278
- ILE drivers: authentic practice, 29–31;  
 interactivity in learning delivery, 21–22;  
 opportunities for deep thought and  
 reflection, 26–27; overcoming employee  
 disengagement, 22–26; positively changing  
 behavior, 27–29
- ILE foundational elements: challenge, 98–99;  
 constructs, 95–98; feedback, 90–95; story,  
 99–100. *See also specific element*
- ILE (interactive learning event): definition of,  
 2; factors for ensuring successful, 31–33;  
 foundational elements of, 89–101; making  
 the case for justifying, 117–140; matching  
 learning needs to specific type of, 36*fig*–  
 65*t*; most common wrong reasons for  
 developing, 14–20; questions to ponder  
 when developing, 31, 32*t*, 69–81*t*; the  
 right reasons for developing, 20–33.  
*See also Games; Gamification; Simulations*
- “The illusion of complexity,” 107–108
- ImpactJS, 281
- “In Order to” chain, 113–114, 115*t*
- Innovative thinking, 57
- Intrinsic feedback, 263
- Instructional narrative, 289
- Instructional objectives, 194*t*
- Interactivity: content gamification, 244;  
 efforts to create learning delivery, 21–22
- International Institute for Management De-  
 velopment (IMD), 24
- Intrinsic motivation: brush teeth bad extrinsic  
 motivation vs. good, 220, 221*fig*; descrip-  
 tion of, 220; developing gamification for,  
 222–223; gamification design for co-exist-  
 ing extrinsic and, 223–224; self-determina-  
 tion theory (SDT) on, 222–223
- Introcan Safety IV Catheter case study:  
 background information on, 371–372;  
 the challenge of the, 372–375; Introcan  
 Safety IV Catheter image, 373*fig*; lessons  
 learned during, 388–389; making the case  
 during, 378; reason for using a simula-  
 tion as a solution, 375–378; the results of  
 the, 387–388; the simulation solution for,  
 379–387
- Introcan Safety IV Catheter simulation:  
 advanced four-vein venipuncture task train-  
 ing aid and SIMULATION adult injection  
 training arm, 377*fig*, 379, 383; Clinical  
 Venipuncture Certification program use of,  
 380, 382; consultative selling and presenta-  
 tion skills training (role-play simulation),  
 384; laerdal lhaptic (tactile feedback)  
 virtual IV trainer, 385*fig*; limbs and things  
 advanced venipuncture arms used with,  
 385*fig*; print-based self-study modules  
 supplemented with animations/videos,  
 380, 381*fig*, 382*fig*; reasons for deciding  
 to develop a, 357–378; simulation-based  
 IV mastery learning, 383–384; “teach  
 backs” (high-stakes role-play simulation),  
 386–387; videotaping of the simulated  
 performances, 386*fig*
- Iowa State University, 28
- Isaacs, G., 122
- J**
- JavaScript game libraries, 281
- JeLSIM Builder authoring tool, 278
- Jenga game, 40

Jeopardy Lab template, 276–277  
 Jeopardy-style game, 276  
 Johns Hopkins Medicine Simulation Center, 29–30  
*The Journal of Applied Educational Technology*, 119  
 Justifying ILEs arguments: performance-based justification, 128–139*t*; research-based, 118–127; return on investment, 127–139*t*; stealth, 139–140

## K

Kiggens, Jim, 141  
 Kirk, Captain James T. (*Star Trek*), 236  
 Knowledge: affective, 51*t*; conceptual, 50*t*; declarative, 50*t*; gamification used to acquire, 58; The Knowledge Guru case study on training employees for, 305–318; matching game activities to types, 49, 50*t*–52; procedural, 51*t*; psychomotor domain, 51*t*; rules-based, 50*t*; soft skills, 51*t*. *See also* Learning; Skills  
 The Knowledge Guru: detailed data provided for each learner, 315*fig*; gamification of, 58; incorrect answers receive immediate feedback screen, 313*fig*; login screen, 310*fig*; mountains in the game screen, 311*fig*; narrative screen, 311*fig*; score is reset to zero screen, 314*fig*; scores as players answer questions screen, 313*fig*; selecting a path for ascension screen, 312*fig*; template for, 277  
 The Knowledge Guru case study: background of the, 305–306; benefits and results of the, 316; Knowledge Guru development process, 309–316; lessons learned during, 317–318; making the case for development, 309; MobileConnect training challenge of the, 306–307; reasons for using a game format, 307–308  
 Knowledge, skills, and attitudes (KSAs):

breaking down game tasks into, 204–205; choosing game genre/type and game mechanics to build, 206–209*fig*; structural gamification providing affordances for learners to gain, 224. *See also* Skill building  
 Kobayashi Maru “cheat” (*Star Trek*), 236  
 Krathwohl, David, 43  
 Kumor, Alan, 250, 259

## L

Laws (game or simulation), 98  
 Lazzara, E. H., 121, 124*t*  
 Leadersboards: adding, 283–284; description and function of, 230–231; Mobile Cricket U, 341*fig*  
 Leadership development simulations, 63  
 Learn-Gap learning challenge, 252  
 Learners: badges given to, 233*fig*–234, 283–284, 342*fig*; curiosity of, 242–243; gamification providing status opportunities to, 227; leaderboards listing those with most points, 230–231, 283–284; mobile device behavior by, 283; preventing them from gaming the system or cheating, 235–237; production team member acting as advocate for, 173; providing challenge to, 98–99, 227–228, 241–242; providing rewards to, 95, 195*t*, 225, 229–230; providing them the freedom to fail, 245–246; start the simulation design by considering the, 253. *See also* Feedback; Motivation  
 Learning: bridging the Learn-Do gap challenge of, 252; chart of customization vs., 276*fig*; providing opportunities to fail as part of, 245–246; simulations as uniquely suitable for, 251–252; storytelling used to enhance, 104–106; when to use fantasy in games for, 53–54; when to use games for, 42–52; when to use gamification for, 56–58; when to use simulations for, 61–63. *See also* Knowledge

- Learning and development (L&D) professionals, 2
- “Learning by doing,” 21–22
- Learning domains: affective, 42, 46, 47*t*; cognitive, 42; psychomotor, 42, 46, 48*t*
- Learning needs: considerations for selecting games for, 37–54; considerations for selecting gamification for, 54–58; considerations for selecting simulations for, 58–65; foundational questions to ask about, 69–73*t*, 82*t*–83*t*; matching learning outcomes with the right ILE, 64*t*–65*t*; matching the right ILE to specific, 36*fig*–65*t*; practical questions to ask about, 73–75, 76*t*, 83*t*–85*t*
- Learning objectives (LOs): designer notes on establishing, 202; educational games, 153*t*, 201; turning them into a challenge, 242
- Learning outcomes: design document statement on, 194*t*; game development driven by, 148, 153*t*, 200–203; identifying the desired, 71, 82*t*; matching game use with, 64*t*–65*t*; matching the scoring with, 77, 85*t*; questions for matching ILEs with, 73*t*, 83*t*
- Lectura authoring tool, 277
- Lemmings game, 41
- Leveling up: designer notes on, 235; leaderboards listing those who achieve, 230–231, 283–284; scaffolding linked to, 308; structural gamification design for, 234
- Levels and experience scoring method, 97
- Low game literacy, 173
- M**
- MacArthur, E., 121
- Magnolia* (film), 112
- Malone, Thomas, 53
- Managing Talent for Results game, 323–331
- Marcinkevage, Carrie, 250, 253, 254, 259
- Matching games: description of, 38; matching learning outcomes with, 64*t*; revised Bloom’s Taxonomy for remembering matched with, 45*t*
- Media Semantics animation software, 277
- Medical simulations: Introcan Safety IV Catheter, 371–389; providing CPR practice, 30
- Memory: episodic, 53–54; how fantasy helps to evoke episodic, 53–54; spaced learning and repetition to drive, 308
- Merchants serious game case study: background information on, 347–348; benefits and results of the, 355–356; Carlo Vecchio character used to teach negotiation, 351*fig*–354*fig*; the challenge, 348–349; lessons learned during, 356–357; Merchants developed as game-based solution, 350–352; practicing versus listening, 350*fig*; rationale for using a game approach, 349–350
- Mesch, Rich, 251
- Metrics: Decision Design Worksheet on simulation, 267–269; dollarizing performance, 134, 135*t*; as feedback tone consideration, 92; games, gamification, and simulation performance, 133–134*t*; MindTickle case study, 361–363; return on investment justification, 129–130; Simulation Design Worksheet on simulation, 266; simulations as being driven by, 250–251; story performance objective, 113, 115*t*
- Microsoft PowerPoint, 289
- Microsoft Visio, 257
- Miller, Diane Disney, 288
- Mind mapping: brainstorming ideas using, 185–186*fig*; description of, 185
- MindTickle case study: background information on, 359–360; the challenge during, 360; gamification as part of the solution, 360–361, 364*fig*, 365*fig*; lessons learned during, 368–369; making the case by using metrics, 361–363; post-joining new employee orientation results during, 367–368;

- pre-joining engagement results of, 365–367; the two-part solution, 363–365*fig*
- MindTickle (gamification platform), 282
- Minecraft game, 40, 44*t*
- Minesweeper game, 46
- MISSION: Turfgrass storyboard, 294–298, 300
- Mobile Cricket U case study: background information on, 333–334; benefits of the, 343; the challenge in the, 334–336; custom user experience with “My Games” feature enabled, 335*fig*; defined trophies and badges, 342*fig*; game mechanics/dynamics accessed via online web browser, 339*fig*; game profile screen used to define game mechanics/dynamics, 337*fig*; game selections, game details, and launched assignment, 342*fig*; leaderboards used in, 341*fig*; lessons learned during, 344; managing formal and informal learning elements within game profile, 340*fig*; Mobile Cricket U development, 336–343; Mobile CU learning initiative launched, 334–335; online Cricket University game portal interface (planned), 345*fig*; post-game survey results, 344*fig*; reason for using gamification, 336–337
- Mobile device games: Angry Birds, 180, 181, 182; delivery of, 283; Fruit Ninja, 182; learner behavior on, 283; sample wireframe for a, 210*fig*; technical differences related to development of, 282*fig*–283
- Motivation: Challenge, Curiosity, and Fantasy elements of, 53; Deloitte Leadership Academy (DLA) gamification used for, 23–26, 57, 123, 281; using gamification for, 57; gamification issue of intrinsic versus extrinsic, 220–224. *See also* Learners
- Movement-type feedback, 95
- Moxley, John, 334–335
- MPE (managing people essentials) case study: background information on, 319–320; benefits and results of the, 329–330; challenge of the, 320–321; developing the solution, 323–329; lessons learned during, 330–331; making the case, 323; “Managing Talent for Results” game as solution, 321–323; MPE: Succeed workshop implemented, 328–329
- MPE Succeed game: development production of, 323–329; game board for, 324*fig*; input screen for Web portion of game, 325*fig*; results screen, 326*fig*; summary of changes screen for, 325*fig*
- Multiple-choice simulation decisions, 260, 261*e*
- Multiple-select (of several choices) simulation decisions, 260, 261*e*
- Music sound effects, 94
- MUVE Music, 334
- Myst game, 40, 45*t*, 182
- N**
- New Hampshire Housing Finance Authority (NHHFA): background information on, 391–392; Financial Freedom Island Cruise online board game case study on, 391–398
- Nike, 139
- Nike+Fuel Bank, 4, 5
- NOAH animation software, 277
- Nutrition Guru game, 309
- O**
- On-boarding employees, 359–369
- One-page design document: created on a whiteboard, 212*fig*; description and writing an, 193, 196*fig*–197; finished game screen based on, 213*fig*; information to include in, 211–212
- OnPoint Digital: background information on, 333–334; CellCast Solution by, 335; Mobile Cricket U case study on, 333–345*fig*

- Operation game, 42
- Orvis, K. L., 121, 124*t*
- P**
- Pac-Man game, 39, 97
- Paper prototyping: brainstorming by, 187–189; a development team engaged in, 188*fig*; play testing your, 189–191; process of developing, 212–214
- Parker, Bill, 191
- Peer/facilitator feedback, 264
- Performance-based justification: overview of the eight steps of, 128, 137; step 1: identify the need, 129–132; step 2: determine sponsor's goals, 132–133; step 3: decide how to measure, 133–134*t*; step 4: dollarize the measurements, 134, 135*t*; step 5: conduct a baseline assessment, 134, 136; step 6: implement and delivery the game, gamification, or simulation, 136; step 7: gather post-learning data and control group data, 136–137, 136*t*; step 8: determine the return, 137, 139*t*
- Performance objectives, 113–115
- “Plane Crazy” Disney short (1923), 289
- Playtesting: production process role of, 172–173; your paper prototype, 189–191
- Point systems, 231–232
- Pope, Alexander, 13
- Post-learning data: single group pre-test/post-test study, 137, 138*t*; two-group comparison study, 137, 138*t*
- Post-traumatic stress disorder (PTSD), 96, 207
- Practical questions: description of, 73; summary of questions used to identify the learners, 76*t*, 85*t*; what are the logistics?, 74; what are the technical issues?, 74–75; who are the learners?, 73–74
- Practice/practicing: how ILE provide opportunities for authentic, 29–31; Learn-Gap learning bridged through, 252; simulations for, 59; structural gamification and opportunities for distributed, 228; takeoffs and safe landings with flight simulator, 253*fig*
- Pre-production: assessing team member's game literacy, 173; developing an appreciation for, 172; managing expectations during, 174–175; planning checklist for, 149*t*–150*t*
- “Predictable unexpected” storyline, 112, 114, 115*t*
- Process simulations, 60
- Production notes (storyboard), 300
- Production process. *See* Game production process
- Production storyboard, 290
- Prototypes: creating a paper-based, 180, 187–191, 212–214; game development phase of, 163
- Psychomotor learning domain: definitions of terms associated with, 48*t*; description of, 42; matching game activity to, 46
- Punch Tab, 281
- Puzzle solving games: brainstorming ideas by playing, 182; description of, 40; matching learning outcomes with, 64*t*; revised Bloom's Taxonomy for understanding matched with, 45*t*
- Q**
- Quandary authoring tool, 278
- R**
- Radio Shack, 334
- Railroad Tycoon game, 182
- Rails for Zombies gamification, 58
- Ranking (ordering) simulation decisions, 260, 261*e*
- Ranking (prioritizing) simulation decisions, 260, 262*e*
- Raptivity template, 277

- Raptivity's Games Turbopack, 277
- Reality: simulations as being grounded in, 250; as story element, 110–111
- Red Dead Redemption game, 45*t*
- Reflection opportunities, 26–27
- Release candidate phase, 163
- Research-based justification: game elements and their use for learning, 124*t*–125*t*; gamification, 123; pros and cons of, 118–119; simulation, 123, 126–127; supporting evidence that games teach, 119–121; on why we need games for learning, 121–122
- Resource allocation games: description of, 39; revised Bloom's Taxonomy for analyzing matched with, 44*t*
- Resurrecting a save point, 97
- RETRO lab (University of Central Florida), 96
- Return on investment justification: costs and benefits calculations, 137, 139*t*; overview of, 127–128; performance-based justification for, 128–139*t*
- Rewards: comparing feedback to, 95; description and function of, 95; design document statement on how to structure, 195*t*; Mobile Cricket U trophies, 342*fig*; structural gamification game element of, 229–230; structural gamification providing incremental goals and, 225
- Risk board game, 18, 44*t*
- Riven game, 40
- Role-playing games: brainstorming ideas by playing, 182; description of, 41–42; matching learning outcomes with, 64*t*; revised Bloom's Taxonomy for applying matched with, 45*t*
- Ronen, M., 125*t*
- Rosenberg, R. S., 125*t*
- Ruby on Rails gamification, 58
- Rules (game or simulation): description and function of, 98; structural gamification use of, 228–229
- S**
- Salas, E., 121, 124*t*
- Scaffolding game levels, 308
- Scoring and assessment questions: description of, 75–76; does the scoring match learner outcomes?, 77, 85*t*; summary of, 77–78*t*, 85*t*; what drives the ILE?, 76–77, 85*t*; what is the rationale behind scoring?, 77, 85*t*; what should the measurement criteria be?, 76, 85*t*
- Scoring methods: attributes, 97; levels and experience, 97
- SCORM compatibility, 277, 280
- Scrum Master Certification, Training, 161
- Self-determination theory (SDT), 222–223
- Serious games: learning to negotiate through Merchants, 347–357; lessons learned about designing, 330–331; MPE Succeed game, 323–329
- Serrano, E. L., 124*t*
- Settlers of Catan board game, 182
- Sharing output: description and need for, 193; one-page design document, 193, 196*fig*–197; traditional design document elements used for, 193, 194*t*–195*t*
- Shazam!* (DC Comics), 191
- Shazam session: brainstorming ideas using a, 191–193; description of, 191
- SimCity game, 39
- The Sims game, 44*t*
- Simulation decisions: Decision Design Worksheet for, 267–269; guidelines for designing, 265; on how to control storyline time, 258; Simulation Design Worksheet for, 266; simulations to experience impacts of decision making, 59; tips for writing, 262–263; types of branching simulations, 260–263
- Simulation design tool: Decision Design Worksheet, 267–269; decisions design guidelines, 265; description of, 264–265; designer notes on, 265; Simulation Design Worksheet, 266

- Simulation development: for authentic practice opportunities, 29–31; creating characters, 113, 115*t*, 238–240, 240*t*, 243–244, 259; creating feedback, 263–264; designing a simulation, 252–256; factors for ensuring successful, 31–33; using flowcharts for, 256–257*fig*; keeping the branching storyline scenario simple, 254–256; making time-related decisions, 258; most common wrong reasons for, 14–20; overly complex flowchart for storyline scenario, 255*fig*; questions to ponder for, 31, 32*t*; reasons for increase in, 3; the right reasons for, 20–33; Simulation Design Worksheet, 266; storyboarding, 298–299*fig*; storytelling, 250–251, 258–259; using subject-matter experts to design scenarios, 264–265
- Simulation development tips: Alan Kumor's, 250, 259; Carrie Marcinkevage's, 250, 253, 254, 259; Ken Spero's, 250, 258; Stacie Comolli's, 250, 254
- Simulation types: branching storyline, 60, 260–263; equipment/software simulation, 60; systems dynamics or process simulation, 60
- Simulations: applying to learning challenges, 62–63; *Avaya* sales training game simulation, 403–404; as being grounded in reality, 250; comparing games to, 61; definition and elements of, 58–59; designing a, 252–269; dollarizing performance metrics, 134, 135*t*; as driven by metrics, 250–251; Introcan Safety IV Catheter case study on, 371–389; matching learning outcomes with use of, 64*t*; the most important things to know about, 250–251; moving from ideas to finishing, 181*fig*; performance-based justification for, 128–139*t*; performance metrics for, 133–134*t*, 266, 267–269; playing them in order to brainstorm ideas for new ones, 183–184; practicing takeoffs and safe landings with flight simulator, 253*fig*; providing CPR practice, 30; research-based justification for, 123, 126–127; selection criteria for justifying a, 130*t*; simulation + gamification = game equation, 90; storytelling component of, 250–251, 258–259; types of, 59–60; as uniquely suitable for learning, 251–252; when to use, 61–62; why L&D professionals need skills related to, 2–5. *See also* Interactive learning event (ILE)
- Single group pre-test/post-test study: baseline assessment using, 136; post-learning data and control group data, 137, 138*t*
- Situation (story), 113, 115*t*
- Sitzmann, T., 122, 125*t*
- The Sixth Sense* (film), 112
- Skill building: game design that breaks down tasks into individual, 204–205; gamification used for, 58; Merchants serious game for negotiation, 347–357; selecting game genre/type and game mechanics to help, 206–209*fig*; simulations applied to, 63; simulations for capstone experiences for, 63. *See also* Knowledge, skills, and attitudes (KSAs)
- Skills: knowledge of soft, 51*t*; why L&D professionals need game, 2–5. *See also* Knowledge
- Smith, Webb, 288
- Social sharing, 235
- Solitaire game, 46
- Sound effects: feedback provided through, 94; music and ambient noises as, 94
- Spero, Ken, 250, 258
- Sprint burndown charts, 164*fig*, 165
- Sprite, 275
- Standard University, 24, 28
- Star Trek* Kobayashi Maru “cheat” (*Star Trek*), 236
- Stealth game mechanics: description of, 96; Devil's Advocate, 207, 208*fig*

- Stealth justification, 139–140
- “Steamboat Willie” Disney short (1929), 288
- Stories: architecting and performance objectives of, 112–114; content gamification element of, 238–241; converting a written story into an ILE, 108*fig*; description and function of, 99; designer note on subject-matter experts (SMEs) for, 100; exaggerated, 99–100; game design inclusion of theme or, 205; goal-based scenario, 109–110; keep the simulation storyline scenario simple, 254–256; overly complex flowchart for simulation, 255*fig*; predictable unexpected approach to, 112, 114, 115*t*; the role of reality in, 110–111. *See also* Characters; Fantasy; Storytelling
- The Story of Walt Disney* (Holt), 288
- Storyboarding: description of, 287–288; history and evolution of, 288; importance of, 290–293; MISSION: Turfgrass example of, 294–298, 300; process of, 293–294; simulations, 298–299*fig*; themes, storytelling, production notes, and tags used for, 300. *See also* Structural gamification
- Storyboards: audio narration script type of, 289; description and functions of, 214–215; Devil’s Advocate game, 216*fig*; instructional narrative type of, 289; more formalized, 297*fig*; pencil sketch of a, 296*fig*; production storyboard type of, 290; storytelling design using, 214–216*fig*, 300; video shot list type of, 289–290
- Storytelling: elements of, 106–107; enhancing adult learning through, 104–106; gamification use of, 108; “the illusion of complexity” in simulation, 107–108; movie vs. learning, 112; for simulations, 250–251, 258–259; storyboards used to design the, 214–216*fig*, 300; unique characteristics of ILEs, 107–108. *See also* Stories
- Strategizing games: brainstorming ideas by playing, 182; description of, 39–40; matching learning outcomes with, 64*t*, 65*t*; revised Bloom’s Taxonomy for evaluating matched with, 44*t*
- Stratego game, 44*t*
- Structural gamification: affordances provided by, 224; clear goals required for, 224; comparing content and, 295; description of, 55; distributed practice times provided by, 228; game elements used for, 228–234; high stakes/challenge built into, 227–228; keeping learners from gaming the system or cheating, 235–237; leveling up, 234–235; matching learning outcomes with use of, 65*t*; on-boarding employees using, 359–369; progression allowed by, 225; providing incremental goals and rewards, 225; real-time feedback of, 226; social sharing, 235; status as design element in, 227; transparency provided by, 226–227. *See also* Content gamification; Storyboarding
- Structural gamification game elements: badges, 233*fig*–234, 283–284, 342*fig*; currency systems, 232–233; leaderboards, 230–231; point systems, 231–232; reward structure, 229–230; rules, 228–229
- Subject-matter experts (SMEs): designing simulation scenarios using help of, 264–265; getting a story for ILE from, 100
- Survival Master architecture: alpha LAN multiplayer (circa 2011), 160*fig*; beta game enterprise (circa 2013), 161*fig*; database model for initial, 157*fig*; iterations to, 160–161, 163
- Survival Master production: architecture, 155, 157*fig*–161, 163; clarifying instructional design, 150–154; development process



- phases of the, 145–146; examining the process for producing the, 142–143, 145; example: Snowshoe Race Level, 153, 165*e*–170; four production milestones defining lifecycle of, 163; ISD to LDD checklist, 155*t*; launch flowboard for, 156*fig*; level design concept: Snow Shoe Race, 165*e*–170; model for managing development of, 147*fig*; pre-production documentation checklist, 151*t*, 152*t*; pre-production highlights, 148; pre-production planning checklist, 149*t*–150*t*; production functions at course games, 144*fig*; production highlights, 155, 158; scheduling tools and formats used during, 164*fig*–165. *See also* Educational games; Game production process
- Systems dynamics simulations, 60
- T**
- T-haler gamification, 4, 46
- Tactile stimulation, 95
- Tags (storyboard), 300
- Teaching games: description of, 49; when to use, 52
- Template-based authoring tools, 276–278
- Testing games: description of, 49; matching learning outcomes with, 64*t*; when to use, 52
- Themes (storyboard), 300
- Thorn, Kevin, 287
- “Three Little Pigs” Disney short (1933), 288
- 3-D games: description of, 275; programming requirements for advanced, 279–280; selected game engines, 279
- Timeline: design document statement on the, 195*t*; how simulations handle time and, 258; time-slowing mechanic, 96–97
- Touch (tactile stimulation), 95
- Training: Avaya sales game used for, 399–404; evidence-based, 118; Financial Freedom Island Cruise online board game for financial, 391–398; The Knowledge Guru case study on, 305–318; MindTickle for on-boarding, 359–369
- Transparency of structural gamification, 226–227
- Trivia games, 38
- Trivial Pursuit game, 45*t*
- Two-group comparison study: baseline assessment using, 136; post-learning data and control group data, 137, 138*t*
- 2-D games: description of, 275; selected game engines, 279
- Types of knowledge: affective, 51*t*; conceptual, 50*t*; declarative, 50*t*; matching game activities to, 49, 50*t*–52; procedural, 51*t*; psychomotor domain, 51*t*; rules-based, 50*t*; soft skills, 51*t*
- U**
- Uncharted Series PlayState game, 182
- University of Central Florida, 96
- University of Chicago, 43
- U.S. Department of Defense (DoD), 121, 123–124
- User experience gap, 361
- The Usual Suspects* (film), 112
- V**
- Video-based sports games, 45*t*
- Video shot list, 289–290
- Virtual Human Interaction Lab (Standard University), 28
- Virtual production team management, 171–172
- Visual effects: feedback provided through, 94; setting that functions as, 94
- Visual feedback delivery, 93

**W**

Wal-Mart, 334

What2Learn authoring tool, 278

Wii Sports Games (Wii Systems), 182

Wilson, K. A., 121, 124*t*

Wireframing: description and function of,  
209–210; sample for a mobile device game,  
210*fig*

WordPress, 281

**Y**

Yee, N., 124*t*

**Z**

ZebraZapps authoring tool, 278

<http://www.pbookshop.com>