

Index

A

adaptive guidance strategy 232
 adaptive instruction 222
 adaptive online environments, and learner modeling 228
 adaptive procedures, comparisons of 281
 adaptive procedures, using multiple cognitive measures 277
 animated pedagogical agents 178
 animation 173
 animation, vs. static diagrams 175
 aptitude-treatment interactions 222
 audiovisual multimedia presentations, future trends 142
 audiovisual presentations, and cognitive load 128
 automatic cognitive operations 12

C

cerebral lobes 174
 cognitive architecture 2
 cognitive architecture, evolution of 14
 cognitive load 35
 cognitive load, and audio-visual presentations 128
 cognitive load, and expertise reversal methods 69
 cognitive load, approaches in learning 101

cognitive load, evaluation of 101–122
 cognitive load, evaluation using concurrent verbal reports 106
 cognitive load, evaluation using dual-task techniques 104
 cognitive load, evaluation using rating scales 104
 cognitive load, in instructional simulations 140
 cognitive load, in interactive hypermedia learning 158
 cognitive load, in interactive multimedia 149–170
 cognitive load, in onscreen or printed text 127
 cognitive load, in verbal and pictorial representations 123
 cognitive load, reducing in learning 6
 cognitive load effects 42
 cognitive load theory 34–57, 202
 cognitive load theory, future trends 50
 cognitive overload 61
 cognitive processes, and domain knowledge 4
 cognitive processing, and expertise 17
 cognitive system 2
 complex learning environments 227

D

domain-specific knowledge 159
 domain-specific knowledge, assessment of 82
 dual-coding theory 171
 dual-modality presentations 130
 dynamic visualizations 171
 dynamic visualizations, and cognitive load 176, 180
 dynamic visual representations, managing cognitive load in 171–197

E

educational games, enhancing effectiveness 201
 efficient learning, adaptive procedures for 272–294
 executive imbalances 60
 expertise 1
 expertise, adaptive 23
 expertise, task-specific 19, 21, 81–100
 expertise reversal effect 58–80, 81, 272
 extraneous cognitive load 37

F

folk biology 14
 folk physics 14
 folk psychology 14

G

germane cognitive load 39
 graph transforming tasks 93

H

human cognition, future trends in 25
 human cognitive architecture 2
 human cognitive processes 1–33
 hypermedia 228
 hypermedia learning environment 161
 hypermedia learning environments 150
 hypertext learning environment 161

I

instructional animations 172

instructional efficiency 108
 instructional involvement, measures of 112
 instructional simulation and games 198–220
 intelligent tutoring systems 227
 interactive hypermedia learning, and cognitive load 158
 interactive learning, reduction of extraneous cognitive load 157
 interactive learning environments 151
 interactive multimedia, and cognitive load 149–170
 interactive visualization 199

K

kinematics 91
 knowledge base 1

L

learner control 154, 231
 learner control, dynamic 231
 learner domain expertise 229
 learner prior knowledge 276
 long-term memory 1, 84
 long-term memory knowledge base 83
 long-term memory structures 59
 long-term working memory 3

M

memory structures 7
 mental effort rating 110
 mobile devices, and cognitive load issues 209
 modality effect 46
 multimedia environment, personalization/tailoring 221
 multimedia instructional sessions 97
 multimedia learning, cognitive overload in 48
 multimedia learning, cognitive theory of 47
 multimedia learning environment 149
 multimedia redundancy, and segmentation 134
 multimedia redundancy effect 132

O

online learning 97
 online simulations, and cognitive load 206
 optimization of cognitive load 63
 organized knowledge 85

P

personalized adaptive multimedia environments 221

R

rapid assessment approach 86
 rapid assessment methods 273
 rapid verification diagnostic method 89
 rapid verification method, for graph transforming tasks 93
 rapid verification method, in kinematics 91
 redundancy effect 44

S

short-term memory 4
 simulations, and learner guidance 202
 split attention effect 43
 static diagrams, vs. animation 175

T

task-specific expertise 19, 81–100

V

visual cognitive load 136

W

working memory 2–33, 83