

INDEX

A

Abilene Christian University, 174, 195
 Abrahamson, L., 4, 5
 Accessibility, 168
 Adobe PDF, 175
 Advanced Placement exams, 118
 Agile teaching, 3, 39–41; and
 backchannel, 62; frequently asked
 questions about, 47–61;
 question-driven form of, 61–62; two
 advanced techniques for, 61–62
 Allen, D., 95
 Anderson, C., 59
 Anderson, L. W., 74, 97, 129
 Angelo, T. A., 43–44
 Anonymity, 103, 122, 137, 138, 140, 158,
 168, 169, 186, 189, 191, 192
 Aristotle, 8
 Assessment: formative, 39, 41, 43–47;
 peer, 94–96; summative, 39, 41,
 66–70; and uncovering student
 learning, 39–62
 Atwood, Bruce, 85, 86, 120, 158
 Audience response systems, 4–5. *See also*
 Classroom response system
 Augustine, Brian, 52, 116, 127, 201

B

Backchannel, 62, 110. *See also under* Agile
 teaching
 Background knowledge probes, 43–44
 Banks, D. A., 5
 Barnes, L. B., 33
 Barnett, J., 130
 Bartsch, Robert, 35, 89, 140
 Beatty, I. D., 3, 14, 39, 61, 91, 92, 125, 146
 Belenky, M. F., 93, 133
 Bell, A., 177

Beloit College, 85, 120, 158; Mathematics
 Department, 86
 Bender, Holly, 18–20, 24, 79, 190
 Benzing, Thomas, 40, 41, 136, 201–202
 Blayney, P., 177, 186
 Bloom's taxonomy, 74, 86, 97, 129
Board of Education, Brown v., 42
 Bodie, G. D., 130
 Bombaro, C., 82
 Boscardin, C. K., xiv, 5
 Boston University, 17
 Bowler, Meagan, 95
 Bransford, J. D., 27, 41, 63, 106, 119
 Brickman, P., 33
 Briggs, L., 177
 Brooke, Corly, 47, 67, 100, 109, 198
 Brown, A. L., 41, 106, 119
 Brown, M. I., 39, 127
Brown v. Board of Education, 42
 Bruff, D., 2, 112, 185
 Bunce, D. M., 61, 187
 Burke, Mary, 66, 114, 124, 125, 147

C

Caldwell, J. E., 5
Canterbury Tales (Chaucer), 87
 Cappellari, A., 118
 Carleton College, 118
 Caron, P. L., 200
 Case, S. M., 56, 72, 93
 Case studies: biological sciences, 10–11,
 66; chemistry, 27–29; communication
 studies, 6–8; environmental sciences,
 40–41; health and physical education,
 63–64; language instruction, 11–13,
 17–18; mathematics, 36–37; physics,
 15; psychology, 30–31; veterinary
 medicine, 18–20
 Cell phones, 195–196

216 INDEX

- Chaucer, G., 86
- Cheating, 36, 136, 138, 139, 149
- Cheung, S. L., 112, 195
- Choral response, 191–192
- Christensen, C. R., 33
- Civilization*, 92
- Class time: and biological sciences case study, 33; and mathematics case study, 36–37; reason to use clickers to structure, 34–35; structuring, 32–35
- Classroom choices, 151–157
- Classroom communication systems, 4–5
- Classroom experiments, 110–112; example of, 111–112
- Classroom response systems: and assessing students, 39–70; and creating times for telling, 27–32; engaging students with, 1–6; and generating classwide discussion, 6–14; and generating small-group discussion, 14–27; and making class more fun, 35–38; and structuring class time, 32–35; technical and logistical choices in, 161–196; technology for, 4–5
- Classwide discussions: and biological sciences case study, 10–11; and communication studies case study, 6–8; generating, 6–14; and language instruction case study, 11–13; reason to use clickers for, 8–13; strategies for leading, 13–14
- Cleary, A. M., 111
- Clicker questions: choice in types of, 171–172; effective grading schemes for, 145–150; grading, 140–145; and notification of correct choices, 156–157; sharing results of, 153–156; in small classes, 158–160; time allowed for answering, 150–153; where to find, 118–119
- Clicker questions, taxonomy, 71–112; and conceptual understanding questions, 75–86; and confidence level questions, 104–107; and content questions, 72–75; and critical thinking questions, 86–89; and free-response questions, 96–98; instructor improvement of, 126–127; and monitoring questions, 107–110; and multiple mark questions, 124; and on-the-fly questions, 126–127; and one-best-answer questions, 91–94; and prediction questions, 85–86; and procedural questions, 83–85; and process questions, 72, 98–112; and student perspective questions, 98–104
- Clickers: anonymity of, 103, 122, 137, 138, 140, 158, 168, 169, 186, 189, 191, 192; assessing students with, 39–70; and biological sciences case study, 66; cost of, 3; and creating times for telling, 29–31; engaging students with, 1–38; final suggestions for, 205–207; and frequent feedback on student learning, 202–204; and generating classwide discussions, 6–14; and generating small-group discussions, 14–15; ideas for summative assessment using, 66–70; and increased student engagement, 6–14, 199–202; and increased student participation, 197–199; supporting and promoting use of, 178–186; for uncovering student learning, 41–47; use of, in evaluating student learning, 64–66
- Clinchy, B. M., 93, 133
- Cline, K., 118
- “Cloaks of invisibility,” 10
- Cocking, R. R., 41, 106, 119
- “Cold-calling,” 160
- Columbia State Community College (Tennessee), 36
- Community College of Allegheny County (Pennsylvania), 63, 73; Health and Physical Education Department, 73
- ConcepTest, 78, 151
- Conceptual understanding questions, 75–80; example of, 75–76, 78–79; in quantitative disciplines, 77–80
- Confidence level questions, 104–107; grading system for, 105; and stacked bar chart showing how confident students are in answers to content question, 107
- Connected* (short film; Abilene Christian University), 172–175
- Content questions, 72, 107; and conceptual understanding questions,

75–86; and critical thinking questions, 86–96; and free-response questions, 96–98; and recall questions, 73–80
 Contingent teaching, 39
 Cornell University, 75; Department of Mathematics, 76
 Cosby, Teresa, 42, 159
 Cost factors, 166
 Crawford, V. M., xiv, 5
 Crider, Anthony, 16, 21, 49, 94, 148, 158, 204
 Critical thinking questions, 86–96
 Cross, P., 43–44
 Crouch, C. H., 17, 114
 Cullingford, Elizabeth, 67, 86, 88, 198

D

Darwin, C., 76
 Davies, I. K., 34
Day After Tomorrow, The (movie), 44
 Deal, A., 185
 Delivery modes, 169–171
 Desrochers, C., 130, 189, 191
 Desrochers, Marcie, 189, 191
 Dickinson College, 82
 Disciplinary experts, 119
 Dorsher, Michael, 6–10
 Draper, S. W., 39, 127
 Dripps, Weston, 44, 45, 187, 204
 Duch, B., 95
 Dufresne, R. J., 3, 14, 39, 61, 125, 146
 Dunning, J. B., 130

E

Electronic voting systems, 4–5
 Ellis, A. B., 118
 Elmore, D., 130
 Elon University (North Carolina), 16, 21, 49, 86, 94, 101, 148, 158, 201, 204
Engagement, 6
 Estrada-Belli, Francisco, 92, 93, 121
 Exams, 68–69

F

Fagen, A. P., 17
 Fassihi, Parvanak, 17, 18
 Feedback, frequent, 202–204
 Fies, C., 5
 Fink, L. D., 18
 Fitzpatrick, Brian, 160

Force Concept Inventory, 122
 Formative assessment, 39; defined, 41; occasions for, using clickers, 43–47
 Free-response questions, 96–98
 Freeman, M., 177, 186
 Fun, classroom: and mathematics case study, 36–37; using clickers to make classes, 37–38
 Furman University, 42, 44, 159, 187, 204; Earth and Environment Sciences, 45

G

Gely, Rafael, 80, 81, 99, 100, 200, 203
 Gerace, W. J., 3, 14, 39, 61, 125, 146
 Ginns, P., 186
 Glasgow University, 84
 Goldberger, N. R., 93, 133
 GoodQuestions Project (Cornell University Department of Mathematics), 75, 76
 Grading, 130–157, 175–177
 Graduate Record Examinations, 71
 Graham, C. R., 130, 184
 Green, P., 118
 Gron, S., 95
 Group response systems, 4–5

H

Hake, R. R., 190
Hamlet (Shakespeare), 86–88
 Hand-raising method, 186–187
 Hansen, A. J., 33
 Hardware, 166–167
 Harkins, Charlene, 41, 109, 110, 129, 139, 163, 195, 197
 Harris, A. H., 120
 Hartley, J., 34
 Harvard University, 14, 17; Department of Physics, 79
 Havanki, K., 61, 187
 Herreid, C. F., 33
 Hessler, Kristen, 22, 81, 82, 141, 148, 149, 202
 Hestenes, D., 122
 High-tech options, 193–196; and cell phones, 195–196; and laptops, 193–195
 Hill, Bill, 23, 110, 111, 116, 200
 Hinde, K., 35, 112
 Hoekstra, Angel, 49, 107
 Holocaust, 95

218 INDEX

Homan, S. R., 130
 Homework quizzes, 68
 HTML format, 175
 Hunt, A., 35, 112
 Hutson, Shane, 79

I

Iowa State University, 18, 24, 47, 67, 79,
 100, 109, 183, 190, 198

J

Jackson, M. H., 130, 184
 Jacobs, Dennis, 27–29, 54–55, 85, 104,
 105, 147
 James Madison University (Virginia),
 11–13, 40, 52, 69, 79, 114, 116, 127,
 136, 148, 201–203; Chemistry
 Department, 80, 90
Jaws (movie), 30
 Jenkins, A., 84
 Joeckel, G. L., 130, 184
 Johnstone, Linda, 147
 Joosten, T., 130
 Judson, E., 4, 5, 39, 49, 61
 Julius, J., 177

K

Kahneman, D., 111, 112
 Kaleta, R., 130
 Kalish, A., 34, 116
 Kennesaw State University, 23, 110, 116,
 200
 Khichadia, S., 130
 Klein, Stacy, 52, 68, 77, 120
 Kline-Gabel, Karina, 11–13, 69, 70,
 203
 Knapp, Andrew, 189
 Knight, A. B., 18, 130
 Knight, Curtis, 129–130
 Korn, J. H., 34
 Krathwohl, D., 74, 96–97, 129

L

Laptops, 193–195
 LCD. *See* Liquid crystal display (LCD)
 Len, P. M., 21
 Leonard, W. J., 3, 14, 39, 61, 125, 146
 Levine, Philippa, 76, 99, 140,
 198–199
 Licensure exams, 71
 Linux, 167–168

Liquid crystal display (LCD), 166–167,
 169, 171
 Lisensky, G. C., 118
 List, Adam, 113, 132
 Logan, Margaret, 84, 115–116, 148
 “Long tail,” 59–60
 Lorenz, J. K., 118
 Low-tech options: and choral response,
 191–192; and hand-raising method,
 186–187; and response cards,
 187–191; and written response,
 192–193
 Lucas, A., 24, 25, 84, 85, 115, 133
 Lyman, F., 6

M

Mac OS (Apple), 167–168
 MacGeorge, E. L., 130
 Marshall, J., 5
 Marshall, S., 195
 Masyn, K., xiv, 5
 Mazur, E., xi, 2, 14, 15, 17, 78, 79, 114
 McClamrock, Ron, 45, 46, 92, 119, 137
 McCoy, Meredith, 36
 McKinney, K., 122
 McTighe, J., 76
 Meeker, K., 118
 Merrow, J., 10, 135
 Metacognition, 106
 Michaelsen, L. K., 18
 Microsoft Excel, 175
 Microsoft PowerPoint, 164, 165, 168–171
 Microsoft Windows, 167–168
 Middendorf, J., 34, 116
 Mill, John Stuart, 8
 Monitoring questions, 107–110
 Moore, D., 118
 Mount Royal College, 67, 95
 Multiple mark questions, 124; example
 of, 125
 Mulvaney, Matthew, 21, 97
 Murphy, T. J., 129–130
 Murphy-Boyer, L., 177

N

Nagy-Shadman, E., 130, 184
National Geographic magazine, 94, 204
 National Science Foundation, 129
 Nelson, J. M., 189
 Nuhfer, E., 106

O

Ohio State University College of
Pharmacy, 91
Oliver, M., 5
On-the-fly questions, 126–127
One-best-answer questions, 91
Online test banks, 119
Oregon State University, 66, 114, 124,
125, 147

P

Palmeri, Thomas, 44, 106, 149, 150, 198
Paluti, Lori, 63, 64, 73
Parker, M., 118
Participation, 130–157
Peer assessment, 94–96
Peer instruction (PI), 14–15; defined, 2;
frequently asked questions about,
20–27
Peer Instruction: A User's Manual (Mazur),
14–15
Peer mentors, 181
Penn State Berks, 21, 73, 115, 129, 157
Penuel, W. R., xiv, 5
Perry, W. G., 93, 133
Personal response systems, 4–5
PI. *See* Peer instruction (PI)
Pollock, S., 15, 78, 118, 123
Prediction questions, 85–86
Prisoner's Dilemma, 112
Procedural questions, 83–85
Process questions, 72, 98–112; and
classroom experiments, 110–112; and
confidence level questions, 104–107;
and monitoring questions, 107–110;
and student perspective questions,
98–104

Q

Quantitative disciplines, 77–80
Question-driven instruction, 61–62. *See*
also Agile teaching

R

Rawls, John, 7
Reading quizzes, 67
Recording options, 175–177
Registration methods, 168–169
Reisner, Barbara, 79, 80, 90, 114, 148
Response cards, 187–191
Result displays, 172–175

Rich, Adam, 10–11, 187, 198
Richman, Michael, 129–130
Roschelle, J., 5
Ross, Edna, 25, 30–31, 115, 139

S

Saint Mary's College (California), 24, 84,
115, 133; Mathematics Department,
85
Sawada, D., 4, 5, 39, 49, 61
Schwartz, D. L., 27
Science Education Resource Center, 118
Scornavacca, E., 195
Seawright, L., 130, 184
Shakespeare, W., 87–88
Shibley, Ivan, 21, 73, 115, 129, 157
Shulman, Lee, 10
Simpson, V., 5
Slater, T., 163, 188
Small-group discussions: generating,
14–15; and language instruction case
study, 17–18; and physics case study,
15; reason to use clickers for, 16–20;
and veterinary medicine case study,
18–20
Smith, M. K., 129, 177
Smith, Shelley, 129
Socratic method, 160, 200
Software, 167–168
State University of New York, Albany, 22,
45, 81, 92, 119, 137, 141, 148, 202;
Philosophy Department, 46, 82, 92
State University of New York College at
Brockport, 10–11, 21, 115–116, 148,
187, 189, 191, 198; Chemistry
Department, 84; Department of
Psychology, 97
Stowell, J. R., 189
Street, Kori, 67–68, 95, 96
Stuart, S.A.J., 8, 91, 92, 127
Student engagement, increased, 199–202
Student learning, evaluating, 63–70; and
health and physical education case
study, 63–64; and increased feedback,
202–204; reason to use clickers for,
64–66
Student learning, uncovering, 39–62;
and environmental sciences case
study, 40–41; reason to use clickers
for, 41–47

220 INDEX

- Student participation, increased, 197–199
- Student perspective questions, 98–104
- Student response, teaching choices regarding, 130–157; example, 134
- Student response systems, 4–5. *See also* Classroom response systems
- Summative assessment, 39; ideas for, using clickers, 66–70
- Swackhamer, G., 122
- Swanson, D. B., 56, 72, 93
- Syllabus reminder question, 133
- T**
- Tapler, Amanda, 86, 101, 102, 201
- Tarule, J. M., 93, 133
- Teaching choices, 113–160; and classroom choices, 151–157; and high-tech options, 193–196; and low-tech options, 186–193; and small classes, 158–160; and student response, participation, and grading, 130–157; and use of class time, 113–117; and writing questions, 118–130
- Technical and logistical choices, 161–196; and supporting and promoting use of clickers, 178–186; and technical problems, 161–165; and vendor selection and adoption, 165–178
- Terrell, M., 76
- Terry, Robert, 129–130
- Times for telling; and chemistry case study, 27–29; creating, 27–32; and psychology case study, 30–31; reason to use clickers to create, 29–31; strategies for creating, 31–32
- Trees, A. R., 130, 184
- Tripp, T. R., 130, 184
- Tulenko, J. D., 135
- Tversky, A., 111, 112
- Twetten, J., 177
- U**
- Ultimatum game, 112
- Unabomber, 6–7
- University of Cincinnati College of Law, 80, 81, 99, 200, 203
- University of Colorado, Boulder, 15, 49, 78, 107, 123
- University of Houston, Clear Lake, 35, 89, 140
- University of Louisville, 25, 30–31, 115, 139
- University of Minnesota, Duluth, 41, 109, 129, 139, 163, 197
- University of Notre Dame, 27, 54–55, 85, 104, 105, 147
- University of Oklahoma, 129
- University of South Carolina, Aiken, 147
- University of Southern California, 76, 140, 198–199; Evolution Debates, 99
- University of Texas, Austin, 67, 86, 198; English Department, 88
- University of Wisconsin, Eau Claire, 6
- U.S. Family Educational Rights and Privacy Act, 169
- V**
- VandenPlas, J., 61, 187
- Vanderbilt University, 2, 52, 68, 77, 79, 92, 106, 112, 113, 120, 132, 149, 198; Department of Psychology, 44; School of Law, 160
- Vendor selection and adoption, 165–178; and accessibility, 168; and choice in question types, 171–172; and cost factors, 166; and delivery modes, 169–171; and hardware factors, 166–167; and recording and grading options, 175–177; and registration methods, 168–169; and result displays, 172–175; software factors in, 167–168
- W**
- Walch, Resa, 101, 102, 201
- Wang, Yaoling, 183
- Washington Post*, 6–7
- Wells, M., 122
- Wiggins, G., 76
- Wilson, K., 34
- Workshops, 184
- Written response, 192–193
- Z**
- Zhu, E., 185
- Zullo, H., 118