- B. A. Ambrose, P. S. Shaffer, R. N. Steinberg, L. C. McDermott, "An investigation of Student Understanding of Single Slit Diffraction and Double Slit Interference," Am. J. Phys., 67 (2) 146-155 (1999).
- Y. Anzai and T. Yokoyama, "Internal Models in Physics Problem Solving," Cognition and Instruction, **1** (4) (1984).
- A. B. Arons, *Teaching introductory physics* (Wiley, New York, 1997).
- E. Bagno and B. Eylon, "From Problem Solving to a knowledge structure: An example from the domain of electromagnetism," Am. J. Phys. **65** (8) 726-736 (1997).
- R. J Beichner, "Testing student interpretation of kinematic graphs," Am. J. Phys. **62**, 750-762 (1994).
- R. Bhaskar and H. A. Simon, "Problem Solving in Semantically Rich Domains: An example from engineering thermodynamics," Cog. Sci., **1** 193-215 (1977).
- M. T. H. Chi, P.S. Feltovich and R. Glaser, "Categorization and representation of physics problems by experts and novices," Cognitive Science, 5, 121-152 (1981).
- M. T. H. Chi, N. de Leeuw, M.H. Chiu, and C. LaVancher, "Eliciting Self-Explanations Improves Understanding," Cognitive Science, **18**, 439-477 (1994).
- C. A. Chinn and W. F. Brewer, "The role of anomalous data in knowledge acquisition: A theoretical framework and implications for science instruction," Review of Educational Research, 63 (1), 1-49 (1993).
- J. Clement, "Students' preconceptions in introductory mechanics," Am. J. Phys. **50** (1) 66-71 (1982).
- A. A. diSessa, "Knowledge in Pieces," In *Constructivism in the Computer Age*, G. Forman and P. Pufall (Eds.) (Lawrence Erlbaum, NJ, 1988), pp. 1-24.
- R. Elio and P.B. Scharf, "Modeling Novice-to-Expert Shifts in Problem Solving Strategy and Knowledge Organization," Cognitive Science, **14**, 579-639 (1990).
- H. C. Ellis and R. R. Hunt, *Fundamentals of Cognitive Psychology*, (Brown & Benchmark, WI, 1993).

- B. Eylon and R. Reif, "Effects of knowledge organization on task performance," Cognition and Instruction," Cognition and Instruction, **1** (1), 5-44 (1984).
- R. J. Dufresne, W. J. Gerace, P. T., Hardiman, and J. P. Mestre, "Constraining novices to perform expert-like problem analyses: Effects on schema acquisition," Journal of the leaning Sciences, 2 (3) 3 07-331 (1992).
- M. G. M. Ferguson-Hessler and T. de Jong, "The quality of knowledge in the field of electricity and magnetism," Am. J. Phys., **55** (6) 492-497 (1987).
- D. Gentner and A. L. Stevens, *Mental Models*, (Lawrence Erlbaum Associates, NJ, 1983).
- R. Hake, "Interactive engagement versus traditional methods: a six-thousand-student survey of mechanics test data for introductory physics courses,: Am. J. Phys., 65 (5) 418-428 (1997).
- D. Halliday and R. Resnick, Fundamentals of physics, (Wiley, NY, 1974).
- D. Hammer, "Two approaches to learning physics," Phys. Teach. **27** (9) 664-670 (1989).
- D. Hammer, "Epistemological beliefs in introductory physics," Cognition and Instruction, **12** (2) 151-183 (1994).
- D. Hammer, "Students' beliefs about conceptual knowledge in introductory physics," Int. J. Sci. Ed., 16 (4) 385-403 (1994).
- D. Hammer, "More than misconceptions: Multiple perspectives on student knowledge, and an appropriate role for education research," Am. J. Phys. **64** (10) 1316-1325 (1996).
- I. A. Halloun and D. Hestenes, "The initial knowledge state of college physics students," Am. J. Phys. **53** (11) 1043-1055 (1985).
- I. A. Halloun and D. Hestenes, "Common sense concepts about motion," Am. J. Phys. 53 (11) 1056-1064 (1985).
- M. Hegarty, "Knowledge and processes in mechanical problem solving," In *Complex problem solving: Principles and mechanisms*, R. J. Sternberg and P. A. Frensch (Eds.) (Lawrence Erlbaum, NJ, 1991), pp. 283-285.
- J. L. Heller and F. Reif, "Prescribing effective human problem-solving process: Problem description in physics," Cognitive and Instruction, **1** (2), 177-216 (1984).

- P. Heller, R. Keith, and S. Anderson, "Teaching problem solving through cooperative grouping. Part 1: Group versus individual problem solving," Am. J. Phys. 60 (7), 627-636 (1992).
- P. Heller and M. Hollabaugh, "Teaching problem solving through cooperative grouping. Part 2: Designing problems and structuring groups," Am. J. Phys. 60 (7), 637-644 (1992).
- P. Heller and D. Huffman, "Interpreting the force concept inventory, a reply to Hestenes and Halloun," Phys. Teach. **33**, 503 (1995).
- D. Hestenes, "Wherefore a science teaching?" Phys. Teach. 17, 232-242, (1979).
- D. Hestenes, M. Wells and, G. Swackhammer, "Force Concept Inventory," Phys. Teach. **30** (3) 141-153 (1992).
- D. Hestenes and I. Halloun, "Interpreting the force concept inventory, a response to the March 1995 critique by Huffman and Heller," Phys. Teach. **33**, 502 (1995).
- D. Huffman and P. Heller, "What does the Force Concept Inventory actually measure?" Phys. Teach. **33**, 138-143 (1995).
- D. Huffman, "Effect of Explicit Problem Solving Instruction on High School Students' Problem Solving Performance and Conceptual Understanding of Physics," Journal of Research in Science Teaching, 34 (6) 551-570 (1997).
- S. Kanim, "An investigation of Student difficulties in qualitative and quantitative problem solving: Examples from electric circuits and electrostatics," Ph.D. dissertation, Department of Physics, University of Washington, (1999).
- J. H. Larkin and F. Reif, "Understanding and teaching problem solving in physics," European Journal of Science Education, **1**, (2), 191-203 (1979).
- J. H. Larkin, "Skilled problem solving in physics: A hierarchical planning model," Journal of Structural Learning, **1**, 271-297 (1980).
- J. H. Larkin, J. McDermott, D. P. Simon, and H.A. Simon, "Expert and Novice Performance in Solving Physics Problems," Science, **208** (20) 1335-1342 (1980).
- J. H. Larkin, "The role of problem representation in physics." In *Mental models*, D. Gentner and A. L. Stevens (Eds.) (Lawrence Erlbaum, NJ, 1983), pp. 75-98.
- W. J. Leonard, W. J. Gerace, R. J. Dufresne, and J. P. Mestre, "Concept-based Problem Solving in Physics," Internal Report PERG, (1994).

- W. J. Leonard, R. J. Dufresne, and J. P. Mestre, "Using Qualitative Problem-Solving Strategies to Highlight the role of conceptual knowledge in solving problems," Am. J. Phys., 64 (12), 1495-1503 (1996).
- D. P. Maloney, "Rule-governed approaches to physics: Newton's Third Law," Phys. Educ. **19**, 37-42 (1984).
- D. P. Maloney, "Research on Problem Solving: Physics. In *Handbook of Research on Science Teaching and Learning*, D. L. Gabel (Ed.), (Macmillan Publishing Co, NY, 1994), pp. 327-354.
- S. P. Marshall, "Assessing Problem Solving: A short term remedy and a long term solution," In *The teaching and assessing of mathematical problem solving*, R. I Charles and E. A. Silver (Eds.) (L. Erlbaum Associates and the National Council of Teachers of Mathematics, VA, 1988), pp. 159-177.
- S. P. Marshall, Schemas in Problem-solving, (Cambridge University Press, NY, 1995).
- E. Mazur, Peer Instruction, (Prentice Hall, NJ, 1997).
- J. Minstrell, "Facets of students' knowledge and relevant instruction," In Research in Physics Learning: Theoretical Issues and Empirical Studies, Proceedings of an International Workshop, R. Duit, F. Goldberg, and H. Neidderer, (Eds.) (IPN, Kiel Germany, 1992), pp. 110-128.
- L. C. McDermott, "Millikan Lecture 1990: What we teach and what is learned closing the gap," Am. J. Phys. **59** (4) 301-315 (1991).
- L. C. McDermott and P.S. Shaffer, "Research as a guide for curriculum development: An example from introductory electricity, Part I: Investigation of student understanding." Am. J. Phys. 60 (11), 994-1002 (1992); Erratum to Part I, Am. J. Phys. 61 (1), 81 (1993).
- L. C. McDermott, P. S. Shaffer, and M. D. Somers, "Research as a guide for teaching introductory mechanics: An illustration in the context of the Atwood's machine," Am. J. Phys. 62 (1) 46-55 (1994).
- L. C. McDermott, P. S. Shaffer, M. L. Rosenquist and the PEG, *Physics by Inquiry*, (Wiley, NY, 1996).
- L. C. McDermott, P. S. Shaffer, and the PEG, *Tutorials in introductory Physics*, (Prentice Hall, NY, 1997).
- L. C. McDermott, and the Physics Education Group, A perspective on physics education research as a guide to the improvement of instruction, unpublished collection, (1998).

- L. C. McDermott and E. F. Redish, "Resource Letter on Physics Education Research," to be published in Am. J. Phys. (1999)
- C. McMillian, and M. Swadener, "Novice Use of Qualitative versus Quantitative Problem Solving in Electrostatics," Journal of Research in Science Teaching, 28 (8), 661-670 (1991).
- A. Newell and H. A. Simon, *Human problem solving*. (Prentice Hall, NJ, 1972).
- T. S. O'Brien Pride, S. Vokos, and L. C. McDermott, "The challenge of matching learning assessments to teaching goals: An example from the work-energy and impulse-momentum theorems," Am. J. Phys. **66** (2) 147-157 (1998).
- G. Polya, How to solve it, (Doubleday, NY, 1945).
- E. F. Redish, "Implications of cognitive studies for teaching physics," Am. J. Phys. 62 (9), 796-803 (1994).
- E. F. Redish and J.S. Rigden (Eds.), AIP Conference Proceedings No. 399 The changing role of physics departments in modern universities: *Proceedings of the international conference on undergraduate physics education*, (AIP Press, NY, 1997).
- E. F. Redish, J. M. Saul, and R. N. Steinberg, "On the effectiveness of activeengagement microcomputer-based laboratories," Am. J. Phys. 66 (3), 212-224 (1998).
- E. F. Redish, J. M. Saul, and R. N. Steinberg, "Student expectations in introductory physics," Am. J. Phys. **66** (3), 212-224 (1998).
- E. F. Redish, "Millikan Award Lecture (1998): Building a Science of Teaching Physics," Am. J. Phys. **67** (7), 562-573 (1999).
- F. Reif, J. H. Larkin, and G.C. Brackett, "Teaching general learning and problemsolving skills," Am. J. Phys. 44 (3) 212-217 (1976).
- F. Reif, "Teaching problem solving A scientific approach," The Physics Teacher, 310-316 (1981).
- F. Reif and J. I. Heller, "Knowledge structures and problem solving in physics," Educational Psychologist, **17** (2), 102-127 (1982).
- F. Reif and S. Allen, "Cognition for Interpreting Scientific Concepts: A study of acceleration," Cognition and Instruction, **9** (1), 1-44 (1992).

- F. Reif, "Millikan Lecture 1994: Understanding and teaching important scientific thought processes," Am. J. Phys. **63**, 17-32 (1995).
- D. E. Rumelhart, "Schemata: The building blocks of cognition," In *Theoretical issues in reading comprehension*, R. Spiro, B. Bruce, and W. Brewer, (Eds.) (Lawrence Erlbaum, NY, 1980), pp. 33-58.
- J. M. Saul, "Beyond Problem Solving: Evaluating introductory physics courses through the hidden curriculum," Ph.D. dissertation, Department of Physics, University of Maryland, College Park, (1998).
- R. A. Serway, *Physics for Scientists and Engineers*, 4<sup>th</sup> edition, (Saunders College, Philadelphia, 1996).
- R. C. Shank, Tell me a story, (Charles Scribner's Sons, NY, 1990).
- P. S. Shaffer and L. C. McDermott, "Research as a guide for curriculum development: An example from introductory electricity, Part II: Design of instructional strategies." Am. J. Phys. 60 (11), 1003-1013 (1992).
- P. S. Shaffer, "Research as a guide for improving instruction in introductory physics," Ph.D. dissertation, Department of Physics, University of Washington, (1993).
- D. P. Simon and H. A. Simon, "Individual differences in solving physics problems," In *Children's Thinking: What develops?* R. S. Siegler (Ed.) (Lawrence Erlbaum, NJ, 1978), pp. 325-348.
- R. S. Steinberg and M. S. Sabella, "Performance on multiple-choice diagnostics and complimentary exam problems," Phys. Teach. **35** (3), 150-155 (1997).
- B. Sherin, "The Symbolic Basis of Physical Intuition: A study of two symbol systems in physics instruction," Ph.D. dissertation, School of Education, University of California, Berkley, (1996).
- B. Thacker, E. Kim, K. Trefz, S. Lea, "Comparing problem-solving performance of physics students in inquiry-based and traditional introductory physics courses," American Journal of Physics 62 (7), 627-633 (1991).
- R. K. Thornton and D. R. Sokoloff, "Assessing student learning of Newton's laws: The Force and motion concept evaluation and the evaluation of active learning laboratory and lecture," A. J. Phys. 66 (4) 338-351 (1998).
- J. Torney-Purta, "Schema Theory and Cognitive Psychology: Implications for Social Studies," Theory and Research in Social Education, **19** (2), 189-210 (1991).

- D. E. Trowbridge and L. C. McDermott, "Investigation of student understanding of the concept of acceleration in one dimension," Am. J. Phys. **49** (3), 242-253 (1981).
- A. Van Heuvelen, "Overview, Case Study Physics," Am. J. Phys. 59 (10), 898-907 (1991).
- S. Vosniadou, and W. F. Brewer, "Mental Models of the earth: A study of conceptual change in childhood," Cog. Psych., 24, 535-585 (1992).
- S. Vosniadou, "Capturing and modeling the process of conceptual change," Learning and Instruction, (4) 45-69 (1994).
- D. S. Ward, and J. Sweller, "Structuring effective worked examples," Cognition and Instruction. **7**, 1-39 (1990).
- M. C. Wittmann, "Making Sense of how students come to an understanding of physics: An example from mechanical waves," Ph.D. dissertation, Department of Physics, University of Maryland, College Park, (1998).