

## REFERECENCE

- Adey, P. and M. Shayer. 1994. **Really raising standards cognitive intervention and academic achievement**. London; Routledge.
- Akerson, V., L. Flick and N. Lederman. 2000. The Influence of Primary Children's Ideas in Science on Teaching Practice. **Journal of Research in Science Teaching**. 37(4): 363-385.
- Alberts, R., P. van Beuzekom and I. de Roo. 1986. The assessment of practical work: A choice of options. **Innovations and developments**. 8(4): 361-369.
- American Association for the Advancement of Science. 1990. **Science for All Americans**. Oxford; Oxford University Press.
- Andersson, B. 1990. Pupils' Conceptions of Matter and its Transformations (age 12-16). **Studies in Science Education**. 18: 53-85.
- Anonymous. 2004. "Condensation". **Solids, liquids and gases**. Available: [http://sycd.co.uk/primary/pdf/materials/5.1\\_changing\\_water.pdf](http://sycd.co.uk/primary/pdf/materials/5.1_changing_water.pdf).
- Ball, S. 1985. **Strategies of Educational Research**. Sussex: Falmer Press
- Banister, P. et al. 1994. **Qualitative Methods in Psychology: A Research Guide**. Buckingham, Open University Press.
- Bar, V. and I. Galili. 1994. Stages of children's view about evaporation. **International Journal in Science Education**. 16(2): 157-174.
- Bar, V. and I. Galili. 1994. Stages of children's view about evaporation. **International Journal in Science Education**. 16(2): 157-174.

- Barker, M. 2001. How do people learn? Understanding the learning process. In C. McGee and D. Fraser (Eds.). **The professional practice of teaching** (2<sup>rd</sup> ed.). Palmerston North: Dunmore Press Ltd, pp.35-66.
- Barker, V. 1999. Students' reasoning about chemical reactions: what changes occur during a context-based post-16 chemistry course? **International Journal in Science Education**. 21(6): 645-665.
- Beeth, M. E. 1998. Teaching Science in Fifth Grades: Instructional Goals that Support Conceptual Change. **Journal of Research in Science Teaching**. 35(10): 1091-1101.
- Bell, B. 1993. **Children's Sciences, Constructivism and Learning in Science**. Victoria: Deakin University.
- Bell, B., and P. Freyberg. 1985. Language in the science classroom. In R. Osborne and P. Freyberg (Eds.). **Learning in Science** Auckland: Heinemann, pp. 29-40.
- Bennett, J. 2003. **Teaching and learning science**. London, Continuum.
- Bentley, D. and M. Watts. 1994. **Primary Science and Technology**. Buckingham: Open University Press.
- Best, W. and Kahn, V. 1998. **Research Methods in Education**. (8<sup>th</sup> ed.). Boston: A Viacom Company.
- Blanco, A. and T. Prieto. 1997. Pupils' views on how stirring and temperature affect the dissolution of a solid in a liquid: a cross-age study (12 to 18). **International Journal in Science Education**. 19(3): 303-315.

- Brown, L. et al. 2000. **Chemistry: The central science** (9th ed.). Upper Saddle River, NJ: Prentice Hall, 2003.
- Bryman, A. 2001. **Social research methods**. Oxford: Oxford University Press.
- Burns, L. 2000. Problem of item overlap between the Psychopathy Screening Device and attention deficit hyperactivity disorder, oppositional defiant disorder, and conduct disorder rating scales. **Psychological Assessment**. 12: 447-450.
- Carey, S. 1985. **Conceptual change in childhood**. Cambridge. MIT Press.
- Chantanapitan T. 1997. **Misconceptions of Molecule of Mathayomsuksa Five Science Program Students in the Seventh Group of Secondary School Center in Bangkok**. Bangkok: Thesis, Kasetsart University.
- Chi, M. and R. Roscoe. 2002. "Processes and Challenges of Conceptual Change". pp. 5-26. In Limon, Margarita (eds.), **Reconsidering Conceptual Change: Issue in Theory and Practice**. Hingham: Kluwer Academic Publishers.
- Christidou, V., V. Koulaidis, and T. Christidis. 1997. Children's Use of Metaphors in Relation to their Mental Models: The Case of the Ozone Layer and its Depletion. **Research in Science Education**. 27(4): 541-552.
- Claxton, G. 1984. **Live and learn: an introduction to the psychology of growth and change in everyday life**. London: Harper & Row.
- Clerk, D. and M. Rutherford. 2000. Language as a confounding variable in the diagnosis of misconceptions. **International Journal of Science Education**. 22: 703-717.

- Cobb, P. 1994. Where is the mind? “Constructivist and sociocultural perspectives on mathematical development”. **Educational Research**, 23(7), 13-20.
- Cohen L. and L. Manion. 1994. **Research Methods in Education**. (4<sup>th</sup> ed.). London: RoutledgeFalmer.
- Cohen L., L. Manion and K. Morrison. 2000. **Research Methods in Education**. (5<sup>th</sup> ed.). London: RoutledgeFalmer.
- Coll, R. and N. Taylor. 1997. The use of analogy in the teaching of solubility to pre-service primary teachers. **Australian Science Teachers Journal**. 43(4):58-64.
- Cosgrove, M. (n.d.). **Mixtures**. LIPS Working Paper 209. University of Waikato. New Zealand.
- Cosgrove, M. and R. Osborne. 1981. **Physical Change**. LIPS Working Paper 26. University of Waikato. New Zealand.
- Cowie, B. 2002. Re-viewing Conceptual Change Through a Formative Assessment Lens. **STER papers 2002**. 164-179.
- Creswell, W. 1998. *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks: Sage Publications.
- Crooks, T. and Lester, F. 1995. **Science Assessment Results**. National Education Monitoring Report.
- Denscombe, M. 1998. *The good research guide: For small-scale social research projects*. Buckingham: Open University Press.

- Denzin, K. and S. Lincoln. 1994. **Handbook of Qualitative Research**. Thousand Oaks, CA: Sage.
- Doyle, P., M. John and Y. Benjamin. 2000. **Living Science 1B**. Hong Kong: Longman Hong Kong Education.
- Driver, R. et al. 1994. Constructing scientific knowledge in the classroom. **Educational Researcher**. 27(7): 5–12.
- Duit, R. and Treagust, F. 2003. Conceptual change: a powerful framework for improving science teaching and learning. **International Journal of Science Education**. 25(6): 671-688.
- Duit, R., Komorek, M. and Wilbers, J. 1997. Studies on Educational Reconstruction of Chaos Theory. **Research in science education**. 27(3): 339-354.
- Duveen, J. and J. Solomon. 1994. “The Great Evolution Trial: Use of Role-Play in the Classroom”. **Journal of Research in Science Teaching**. 31(5): 575-582.
- Ebenezer, V. and G. Erickson. 1996. Chemistry Students’ Conceptions of Solubility: A Phenomenography. **Science Education**. 80(2): 181-201.
- Eggen, P. and Kauchak, D. 1997. **Educational psychology: Windows on the classroom** (3rd ed.). Upper Saddle River NJ: Prentice-Hall, Inc.
- Eilks, I. 2003. Students’ Understanding of the Particulate Nature of Matter and Misleading Textbook Illustrations. **Chemistry in Action!** 69(Spring): 35-40.
- Erickson, F. 1985. **Qualitative methods in research on teaching**. In M.C. Wittrock (Ed.), *Handbook of research on teaching* (3<sup>rd</sup> Edition).(pp 119-161). New York: Macmillan.

- Eskilsson, O. and G. Hellden. 2000. A longitudinal study on 10-12-year-olds' conceptions of the transformations of matter. **Chemistry education: research and practice in Europe**. 4(3):291-304.
- Franco, C. and D. Colinvaux 2001. Grasping mental model. In Gilbert, J., C. Boulter and R. Elmer (Eds.). **Developing models in science education**. Boston, Kluwer Academic Publishers.
- Georghiadis, P. 2000. "Beyond conceptual change learning in science education: focusing on transfer, durability and metacognition". **Educational Research**. 42(2): 119-139.
- Gibson, T. 1981. **Psychology for the classroom**. (2nd ed.). New Jersey: Prentice-Hall.
- Gilbert, J. and C. Boulter. 2001. **Developing models in science education**. Dordrecht; Boston, Kluwer Academic Publishers.
- Gilbert, J., C. Boulter and R. Elmer. 2001. Positioning model in science education and in design and technology education. In Gilbert, J., C. Boulter and R. Elmer (Eds.). **Developing models in science education**. Boston, Kluwer Academic Publishers.
- Glaserfeld, E.v.1995. **Radical Constructivism: A Way of Knowing and Learning**. London: The falmer Press.
- Glynn, R. Duit, R. and R. Thiele. 1995. **Teaching Science with Analogies: A strategy for Constructing Knowledge. Learning Science in the Schools: Research Reforming Practice**. S. M. Glynn and R. Duit. Mahwah, New Jersey, Lawrence Erlbaum Association, Publishers: 247-274.
- Good, L. and J. Brophy. 1980. **Educational psychology: A Realistic Approach**. New York: Holt, Rinehart and Winston.

- Goodwin, A. 2003. Evaporation and boiling-trainee sciences teachers' understanding. **School science review**. 84 (309): 131-141.
- Griffiths, K. and Preston, R. 1992. Grade 12 students' misconceptions relating to fundamental characteristics of atoms and molecules. **Journal of Research in Science Teaching**. 29: 611-628.
- Guba, E. and Lincoln, Y. 1989. **Fourth generation evaluation**. London: Sage.
- Guba, E. and Y. Lincoln. 1989. Judging the quality of fourth generation evaluation. In E. Guba and Y. Lincoln (Eds.). **Fourth generation evaluation**. Newbury Park, CA: Sage, pp. 228-51.
- Gustafson, B.J. 1991. "Thinking about sound: children's changing conceptions". **Qualitative studies in education**. 4(3): 203-214.
- Haidar, H. 1997. Prospective chemistry teachers' conceptions of the conservation of matter and related concepts. **Journal of Research in Science Teaching**. 34(2): 181-197.
- Hallden, O. 1999. Conceptual Change and Contextualization. In Schnotz, W. Vosniadou and M. Carretero (Eds.), **Advances in Learning and Instruction Series: New Perspectives on Conceptual Change**. Amsterdam: Pergamon, pp. 53-65.
- Happs, J. 1980. **Particles**. LIPS Working Paper 18. University of Waikato. New Zealand.
- Harlen, W. 1999. **Effective Teaching of Science: A Review of Research**. Glasgow; The Scottish Council for Research in Education.

- Harrison, A. and D. Treagust. 2000. Learning about atoms, molecules, and chemical bonds: A case study of multiple-model use in grade 11 chemistry. **Science Education**. 84(3) 352-381.
- Harrison, A. and D. Treagust. 2002. **A paper forming part of a symposium entitled Chemical education: Toward research based practice** presented at the annual conference of the National Association for Research in Science Teaching held in New Orleans, 7-10 April, 2002.
- Hessess, J., C. Anderson. 1992. Students' Conceptions of Chemical Change. **Journal of Research in Science Teaching**. 29(3): 277-299.
- Hewson, P. and M. Hewson. 1992. The status of students' conceptions. In R. Duit, F. Goldberg and H. Niedderer (Eds.). **Research in physics learning: Theoretical issues and empirical studies**. Kiel: Institute for Science Education, pp. 59-73.
- Hewson, W., E. Beeth, and R. Thorley. 1998. Teaching for conceptual change. In G. Tobin and B. Fraser (Eds.). **International Handbook of Science Education**. Dordrecht, Netherlands: Kluwer Academic Publishers, pp. 199-218.
- Hodson, D. 1990. "A critical look at practical work in school science". **School science review**.70: 33-40.
- Hodson, D. 1993. "Re-thinking Old Ways: Towards A More Critical Approach To Practical Work In School Science". **Studies in Science Education**. 22: 85-142.
- Hodson, D., and J. Hodson. 1998. From constructivism to social constructivism: A Vyotskian perspective on teaching and learning science. **School Science Review**. 79(289): 33-41.

- Howe, C. 1996. Development of science concepts within a Vygotskian framework. **Science Education**. 80(1): 35-51.
- Hurd, D. 1970. **New Directions in Teaching Secondary School Science**. Chicago: Rand McNally & Company.
- Institute of Promotion Teaching for Science and Technology. 2002. **Science Standard Learning Management Manual**. Bangkok: Curu Sapa Printing and Publishing Co.,Ltd.
- Jacobsen, A., P. Eggen and D. Kauchak. 1999. **Methods for Teaching**. (5 th ed.). New Jersey: Simon & Schuster/ A Viacom Company.
- Johnson, P. (a) 1998. Children's understanding of changes of state involving the gas state, Part 1: Boiling water and the particle theory. **International Journal in Science Education**. 20(5): 567-583.
- Johnson, P. (a) 2000. Children's understanding of substances, Part 1: recognizing chemical change. **International Journal in Science Education**. 22(7): 719-737.
- Johnson, P. (b) 1998. Children's understanding of changes of state involving the gas state, Part 2: Evaporation and condensation below boiling point. **International Journal in Science Education**. 20(6): 695-709.
- Johnson, P. (b) 2000. Developing students' understanding of chemical change: what should we be teaching? **Chemistry education: research and practice in Europe**. 1(1):77-90.
- Johnson, P. 2002. Children's understanding of substances, Part 2: explaining chemical change. **International Journal in Science Education**. 24(10): 1037-1054.

Jones, M., G. Carter and J. Rua. 2000. Exploring the Development of Conceptual Ecologies: Communities of Concepts Related to Convection and Heat. **Journal of Research in Science Teaching**. 37(1): 139-159.

Kalekin- Fishman, D. 1999. Knowledge, belief, and opinion: a sociologist's view of conceptual change. In Schnotz, W. Vosniadou and M. Carretero (Eds.), **Advances in Learning and Instruction Series: New Perspectives on Conceptual Change**. Amsterdam: Pergamon, pp. 91-109.

Krnel D., A. Glazar and R. Watson. 2003. The development of the concept of matter: a cross-age study of how children classify materials. **Science Education**. 87:621-638.

Krnel, D., R. Watson and A. Glazar. 1998. Survey of research related to the development of the concept of matter. **International Journal of Science Education**. 20 (3): 257-289.

Lasley II, J. and T. Matczynski. 1997. **Strategies for Teaching in a Diverse Society Instructional Models**. Washington: Wadsworth Publishing Company.

Leach, J. and Scott, P. 2000. **A paper entitled The concept of learning demand as a tool for designing teaching sequences** prepared for the meeting Research-based teaching sequences, University Paris VII, France, November 2000.

Leach, J. et al. 2003. **A paper forming part of a symposium entitled Evidence Based practice in science education: Evidence-informed approaches to teaching science at junior high school level: outcomes in terms of student learning** presented at the Annual Meeting of the National Association for Research in Science Teaching held in Philadelphia, March, 2003.

Lee, O. et al., 1993. Changing Middle School Students' Conceptions of Matter and

- Molecules. **Journal of Research in Science Teaching**. 30(3): 249-270.
- Lemke, J. 1990. **Talking science: language, learning, and values**. Norwood, N.J.: Ablex Pub. Corp.
- Levins L. 1992. Students' understanding of concepts related to evaporation. **Research in Science Education**. 22: 263-272.
- Lewis-Beck, S., A. Bryman and T. Liao. 2004. **The Sage encyclopedia of social science research methods: volume 2**. California: SAGE Publications Inc.
- Lillard, A. 2001. "Pretend Play as Twin Earth: A Social-Cognitive Analysis". **Developmental Review**. 21(4): 495-531.
- Lincoln, Y. and E. Guba .1985. **Naturalistic inquiry**. Beverly Hills, CA: Sage.
- Lincoln, Y. and E. Guba .1989. **Fourth generation evaluation**. Newbury Park: Sage.
- Linjse, L. 1995. "Development Research" As a Way to an Empirically Based "Didactical Structure" of Science. **Science education**. 79(2): 189-199.
- Liu, X. and J. Ebenezer. 2002. Descriptive Categories and Structural Characteristics of Students' Conceptions: an exploration of the relationship. **Research in Science and Technological Education**. 20(1): 111-132.
- Lock, R. and M. Ratcliffe. 1998. Learning about Social and Ethical Applications of Science. **ASE Guide to Secondary Science Education**. S Lock, R. and M. Ratcliffe. Hatfield, The Association for Science Education: 109-124.
- Longden, K., P. Black and J. Solomon. 1991. Children's interpretation of dissolving. **International Journal in Science Education**. 13(1): 59-68.
- MacNaughton, M., S.A. Rolfe and I. Siraj-Blatchford. 2001. **Doing early**

**childhood research: international perspectives on theory and practice.** St Leonards, N.S.W.: Allen and Unwin.

Maria de Posada, J. 1999. The Presentation of Metallic Bonding in High School Textbooks during Three Decades: Science Educational Reforms and Substantive Changes of Tendencies. **Science Education.** 83(4): 423-448.

Maykut, S. and R. Morehouse. 2001. **Beginning qualitative research: a philosophic and practical guide.** London; Philadelphia, Routledge/Falmer.

Maykut, P. and R. Morehouse. 1994. **Beginning qualitative research: a philosophic and practical guide.** London: The Falmer Press.

McComas, W.F., and Olson, J.K. (1998). **The nature of science in international science education standards documents.** In W.F. McComas (Ed.), *The nature of science in science education: Rationales and strategies* (pp. 41-52). Boston: Kluwer Academic Publishers.

Meheut, M. 1985. Pupils' (11-12 year olds) conceptions of combustion. **European Journal in Science Education.** 7(1): 83-93.

Miles, B. and M. Huberman. 1994. **Qualitative data analysis** (2nd ed.). Thousand Oaks, CA: SAGE.

Ministry of Education. 1978. **The Thai Primary Education Act (1978 and developing 1990).** Bangkok: Curu Sapa Printing and Publishing Co.,Ltd.

Ministry of Education. 2002. **Basic Education Curriculum.** Bangkok: Curu Sapa Printing and Publishing Co.,Ltd.

Ministry of Education.1994. **The Science in New Zealand Curriculum.**

Wellington: Learning Media Limited.

Muangsing, W. 1993. **Students' Alternative Conceptions about Genetics and The Use of Teaching Strategies for Conceptual Change.** Edmonton: Thesis, University of Alberta.

National Education Monitoring Project (New Zealand). 1995. **National education monitoring report 1: Science assessment results 1995.** Dunedin: Educational Assessment Research Unit: University of Otago.

National Education Monitoring Project (New Zealand). 1999. **National education monitoring report 1: Science assessment results 1999.** Dunedin: Educational Assessment Research Unit: University of Otago.

National Research Council. 1996. **National Science Education Standards.** Alexandria, Grafik, Inc.

Nelson, P.G. 2003. Basic chemical concepts. **Chemistry education: research and practice in Europe.** 4(1):19-24.

Nieswandt, M. 2001. Problem and Possibilities for Learning in an Introductory Course from a Conceptual Change Perspective. **Science Education.** 85 (2): 158-179.

Novick, S. and J. Nussbaum. 1978. Junior High School Pupils' Understanding of the Particulate Nature of Matter: An interview study. **Science Education.** 62(3): 273-281.

Office of the National Education Commission. 2000. **Learning Reform: A learner-centered approach.** Bangkok: Watna Panit Printing and Publishing Co.,

Ltd.

Office of the National Education Commission. 2002. **National Education Act (1999) and Amendments (the 2<sup>th</sup> National Education Act (2002)).**

Bangkok: Prig Wan Graphic Co., Ltd.

Ormrod, E. 2000. **Educational Psychology: Developing learners** (3rd ed.). Upper Saddle River, NJ: Merrill.

Osborne, R. and M. Cosgrove. 1983. Children's conceptions of the changes of state of water. **Journal of Research in Science Teaching**. 20(9): 825-838.

Osborne, R. and P. Freyberg. 1985. **Learning in science: The implications of children's science**. Portsmouth, NH: Heinemann.

Patton, Q. 1990. **Qualitative evaluation and research methods**. Newbury Park, Calif.: Sage Publications.

Pfundt, H. and Duit, R. 1994. **Bibliography: Students' alternative frameworks and science education (4<sup>th</sup> ed)**. Kiel, Germany: Institute for Science education at the University of Kiel.

Pintrich, P. and D. Schunk. 2002. **Motivation in education: theory, research, and applications**. Upper Saddle River, N.J., Merrill.

Pintrich, R., W. Marx and A. Boyle. 1993. Beyond cold conceptual change: The role of motivational beliefs and classroom contextual factors in the process of conceptual change. **Review of Educational Research**. 63(2): 167-199.

Pireto, T., J. Watson and J. Dillon. 1992. Pupils' understanding of combustion. **Research in Science Education**. 22: 331-340.

- Posner, J. et al. 1982. Accommodation of a scientific conception: Toward a theory of conceptual change. **Science Education**. 66: 211-227.
- Powney, J. and M. Watts. 1987. **Interviewing in Educational Research**. London: Routledge and Kegan Paul.
- Prieto, T., A. Blanco and A. Rodriguez. 1989. The ideas of 11 to 14-year-old students about the nature of solutions. **International Journal in Science Education**. 11(4): 451-463.
- Radford, L, L. DeTure and R. Doran. 1992. **Preliminary Assessment of Science Process Skills Achievement of Preservice Elementary Teachers**. Paper presented at the Annual Meeting of the National Association for Research in Science Teaching (Boston, MA, March 1992).
- Rahayu, S. and Tytler, R. 1999. Progression in Primary School Children's Conceptions of Burning: Toward an Understanding of the Concept of Substance. **Research in Science Education**. 29(3): 295-312.
- Renstorm, L., Bjorn, A. and Ference, M. 1990. Students' Conceptions of Matter. **Journal of Educational Psychology**. 82(3): 555-569.
- Rogoff, B. 1990. **Apprenticeship in thinking: cognitive development in social context**. New York, Oxford University Press.
- Rosen, A.B. and P. Rozin. 1993. Now You See It, Now You Don't: The Preschool Children's Conception of Invisible Particles in the Context of Dissolving. **Developmental Psychology**. 29(2): 300-311.
- Saljo, R. 1999. Concepts, Cognition and Discourse: From Mental Structures to Discursive Tools. In Schnotz, W. Vosniadou and M. Carretero (Eds.), **Advances in Learning and Instruction Series: New Perspectives on Conceptual Change**. Amsterdam: Pergamon, pp. 81-90.
- Sangaunsin, K. 2005. **Student conceptions in the state of substances and the**

**change in the state of substances in upper primary level.** Bangkok:  
Thesis,  
Kasetsart University.

Sanger, J. and T. Greenbowe. 1999. An analysis of College Chemistry Textbooks As Sources of Misconceptions and Errors in Electrochemistry. **Journal of Chemical Education**. 76(6): 853-860.

Savanakunanon Y. 1993. **Children's ideas about matter.** Song-Kla; Research, Rachaphat Institute Song-Kla.

Schnotz, W., S. Vosniadou and M. Carretero. 1999. Preface. In Schnotz, W. Vosniadou and M. Carretero (Eds.), **Advances in Learning and Instruction Series: New Perspectives on Conceptual Change.** Amsterdam: Pergamon, pp. xiii-xxiv.

Schollum, B. 1981. **Chemical Change.** LIPS Working Paper 27. University of Waikato. New Zealand.

Schollum, B. 1982. **Reaction.** LIPS Working Paper 37. University of Waikato. New Zealand.

Schollum, B., R. Osborne and J. Lambert. n.d. **Heating and Cooling.** LIPS Working Paper 38. University of Waikato. New Zealand.

Schunk, H. 2000. **Learning theories: an educational perspective.** Upper Saddle River, N.J., Merrill.

Scott P. H., H. M. Asoko and R. H. Driver. 1992. **Teaching for Conceptual Change: A Review of Strategies.** pp. 310-329. In Duit, R., Goldberg, F, Niederer, H (eds.), Research in physics Learning: Theoretical issue and empirical studies. Proceedings of an International Workshop. Bremen: University of Bremen.

- Scott, P., H. Asoko and R. Driver. 1992. Teaching for conceptual change: A review of strategies. In R. Duit, F. Goldberg and H. Niedderer (Eds.). **Research in Physics Learning: Theoretical Issues and Empirical Studies**. Kiel: Institute for Science Education at the University of Kiel, pp. 310-329.
- Seddigi, Z. and T. Overton. 2003. How students perceive group problem solving: the case of non-specialist chemistry class. **Chemistry education: research and practice**. 4(3): 387-395.
- Selley, N.2000. Students' Spontaneous Use of a Particulate Model for Dissolution. **Research in Science Education**. 30(4): 389-402.
- Sere, G. 1986. Children's conceptions of the gaseous state, prior to teaching. **European Journal in Science Education**. 8(4): 413-425.
- Sharan, M. 1998. **Qualitative Research and Case Study Applications in Education**. San Francisco: Jossey-Bass Publishers.
- Shiland, W. 1997. Quantum Mechanics and Conceptual Change in High School Chemistry Textbooks. **Journal of Research in Science Teaching**. 34(5): 535-545.
- Shulman, S. 1986. Those who understand: Knowledge growth in teaching. **Educational Researcher**. 15: 4-14.
- Shulman, S. 1987. Knowledge and teaching: Foundations of the new reform. **Harvard Educational Review**. 57: 1-22.
- Sinatra, G. M. and P. R. Pintrich (2002). **Intentional conceptual change**. Mahwah, N.J., L. Erlbaum.
- Skamp, K. 1999. Are atoms and molecules too difficult for primary school children? **School Science Review**. 81 (295): 87-96.

- Slone, M. and F. Bokhurst. 1992. Children's understanding of sugar water solutions. **International Journal in Science Education**. 14(2): 221-235.
- Solomon, J. 1993. **Teaching science, technology and society**. Suffolk: St Edmundsbury Press.
- Solomonidou, C. and H. Stavridou. 2000. From Inert Object to Chemical Substance: Students' Initial Conceptions and Conceptual Development during an Introductory Experimental Chemistry Sequence. **Science Education**. 84: 382-400.
- Stake, E. and Easley, Jr. A. 1987. **Case studies in science education**. Washington, DC: US Government Printing Office.
- Stake, R. 1995. **The art of case study research**. Thousand Oaks: Sage Publications.
- Stavy and Stachel. 1985. Children's ideas about 'solid' and 'liquid'. **European Journal of Science Education**. 7(1): 83-93.
- Stavy, R. 1990(a). Children's Conception of Changes in State of Matter: From Liquid (or Solid) to Gas. **Journal of Research in Science Teaching**. 27(3): 247-266.
- Stavy, R. 1990(b). Pupils' Problems in Understanding Conservation of Matter. **International Journal of Science Education**. 12: 501-512.
- Stavy, R. 1991. Children's ideas about matter. **School Science and Mathematics**. 91 (6): 240-244.
- Strauss, M. 1995. **Where Puddles Go: investigating science with kids**. Portsmouth, NH: Heinemann.

- Strike, K. and G. Posner. 1985. **A conceptual change view of learning and understanding**, pp. 211-231, In West H. and L. Pines (ed.) *Cognitive structure and conceptual change*, Academic Press, New York.
- Strike, K. and G. Posner. 1992. **A revisionist theory of conceptual change**. In Duschl, R and R. Hamilton (Eds.) *Philosophy of Science, Cognitive Psychology and Educational Theory and Practice*, Albany, N.Y., State University of New York Press; 147-176.
- The Buddhasa Foundation. 2000. **Handbook for mankind**. Bangkok: Dhammasapa.
- The Council of State of Thailand. 1997. **The Constitution of the Kingdom of Thailand**. Bangkok: n.p.
- Tobin, K. 1990. Social constructivist perspectives on the reform of science education. **Australian Science Teachers Journal**. 36(4): 29-35.
- Tobin, K., J. Kahle and F. Barry. 1990. **Window into Science Classrooms: Problems Associated with Higher-Level Cognitive Learning**. London; The Falmer Press.
- Tobin, K. 1993. **The Practice of Constructivism in Science Education**. Washington: AAAS Publication.
- Treagust, F. et al. 1996. Using an analogical teaching approach to engender conceptual change. **International Journal of Science Education**. 18: 213-229.
- Tyson, M. et al. 1997. A Multidimensional Framework for Interpreting Conceptual Change Events in the Classroom. **Science Education**. 81: 387.

- Tytler and Peterson, 2000. The Influence of Primary Children's Ideas in Science on Teaching Practice. **Journal of Research in Science Teaching**. 37(4): 363-385.
- Tytler, 2003. The Influence of Primary Children's Ideas in Science on Teaching Practice. **Journal of Research in Science Teaching**. 37(4): 363-385.
- Tytler, R. 1989. Children's idea about evaporation. **International Journal in Science Education**. 11(special issue): 566-576.
- Tytler, R. 2000. A comparison of year 1 and year 6 students' conceptions of evaporation and condensation: dimensions of conceptual progression. **International Journal in Science Education**. 22(5): 447-467.
- United Nation Children's Fund. 2000. **Statistical Profile**. New York: Division of Communication Division of Education.
- Valanides, N. 2000. Primary student teachers' understanding of the particulate nature of matter and its transformations during dissolving. **Chemistry education: research and practice in Europe**. 1(2): 249-262.
- Viiri, J. and H. Saari. 2004. Research-based teaching unit on the tides. **International Journal in Science Education**. 26(4): 463 - 481.
- Villani, A. 1992. Conceptual change in science and science education. **Science Education**. 76(2): 223-237.
- Vosniadou, S. 1994. Capturing and modeling the process of conceptual change. **Learning and Instruction**. 4(1): 45-70.
- Vosniadou, S. 2003. **Exploring the relationships between Conceptual Change**

**and Intentional Learning.** G.M. Sinatra and P.R. Pintrich (Eds.).  
Intentional Conceptual Change. Mahwah, Lawrence Erlbaum Associates,  
Inc.

Vosniadou, S. and C. Ioannides. 1998. From Conceptual Development to Science Education: A Psychological Point of View. **International Journal of Science Education.** 20(10): 1213-1230.

Vosniadou, S. and F. Brewer. 1992. Mental models of the earth: A study of conceptual change in childhood. **Cognitive Psychology.** 24: 535-585.

Vosniadou, S. and F. Brewer. 1994. Mental models of the day/night cycle. **Cognitive Science.** 18: 123-183.

Vygotsky, L.S. 1962. **Thought and language.** Cambridge, MA: MIT Press.

Walsh, D., J. Tobin and M. Graue. 1993. **The interpretive voice: qualitative research in early childhood education.** In B. Spodek (Ed.), Handbook of research on the education of young children (pp. 464-476). New York: MacMillan.

Wandersee, H., J. Mintzes, and D. Novak. 1994. **Research on alternative conceptions in science.** In D. Gabel (Ed.) Handbook of research on science teaching and learning (pp.177-203). Washington, DC: National Science Teachers Association.

Wellington, J. 2000. **Educational Research: Contemporary Issues and Practical Approaches.** London: Biddles Ltd, Guild.

Wellington, J. and J. Osborne. 2001. **Language and Literacy in Science Education.** Buckingham: Open University Press.

- Wellington, W. and J. Wellington. 2002. Children with communication difficulties in mainstream science classroom. **School Science Review**. 83 (305): 81-92.
- West, H. and L. Pines. 1985. **Cognitive structure and conceptual change**. New York: Academic Press.
- Westbrook, S.L. and E.A. Marek. 1991. A cross-age study of student understanding of the concept of diffusion. **Journal of Research in Science Teaching**. 28(8):649-660.
- Wiygul, M. and G. Vernon. 1987. **The Effect of the Use of Outside Facilities and Resources on Success in Secondary School Science Fairs**. Paper presented at the Annual Meeting of the National Association for Research in Science Teaching.
- Woolfolk, E. 1998. **Educational psychology** (7th ed.). Boston: Allyn and Bacon.
- Yong P. 2002. **Making Sense of Science Book A**. Christchurch: User Friendly Resource Enterprises Ltd.
- Yong P. 2002. **Making Sense of Science Book B**. Christchurch: User Friendly Resource Enterprises Ltd.
- Zoller, U. and G. Tshaparlis. 1997. "Higher and Lower-Order Cognitive Skills: The Case of Chemistry". **Research in Science Education**. 27(1): 117-130.