

SELECTED BIBLIOGRAPHY

- Adeniyi, E.D.(1985). Misconceptions of selected ecological concepts held by some Nigerian students. *Journal of Biological Education*, 19, 311-316.
- Adey, P.S. & Shayer, M. (1990). Accelerating the development of formal thinking in middle and high school students. *Journal of Research in Science Teaching*, 27, 267-285.
- Adey, P.S. & Shayer, M. (1994). Really raising standards: Cognitive intervention and academic achievement. London: Routledge. In Chiappetta, E. L. A review of Piagetian studies relevant to science instruction at the secondary and college level. *Science Education*, 60, 2 (1976) 253-261.
- Ananda K.R. (2003). *Understanding of concepts in electricity among Cambridge A-level physics students*. Unpublished master's project paper, University of Malaya.
- Bitner, B.L. (1991). Formal Reasoning Ability : Predictors of critical thinking abilities and grades assigned by teacher in science. *Journal of Research in Science Teaching*, 28(3), 265-274.
- Boram, R.D. & John W. R. (1985). *Measured formal thought and that required to understand formal concepts in college level physical science*. National Association for Research in Science Teaching. French Lick Springs, IN, April 15-18. (ERIC Document Reproduction Service ED 254 412)
- Bybee, W.R. & Sund, B.R. (1990). *Piaget for educators*. Second Edition, Waveland Press, Illinois.
- Cepni, S. & Ozsevec, T. (2002). *Science teachers' assessment tools and their relation with students' cognitive development*. Education: Changing Times, Changing Needs, First International Conference on Education, Faculty of Education Eastern Mediterranean University, May 8-10, Gazimagusa, Turkish Republic of Northern Cyprus.
- Cepni, S., San, H.M., Gokdere, M. & Kucuk, M. (2001). *Developing a constructivist activity based on 7E model in science*. Symposium of Science Education in New Millennium, Education Faculty of Maltepe University.
- Champagne, A.B., Klopfer, L.E., & Anderson, J.H.(1980). Factors influencing the learning of classical mechanics. *American Journal of Physics*, 48(12), 1074-1079.
- Chiappetta, E.L. (1976). A review of piagetian studies relevant to science instruction at the secondary and college level. *Science Education*, vol. 60, pp. 253-261.
- Christianson, R.G. & Fisher, K.M. (1999, July). Comparison of student learning about diffusion and osmosis in constructivist and traditional classrooms. *International Journal of Science Education*, 21(6), 687-698.

- Cohen, H.G. (1980). Dilemma of the objective paper and pencil assessment within the Piagetian framework. *Science Education*, 64, 741-745.
- Eccles, J.S., & Blumenfeld, P. (1985). *Classroom experiences and student gender: Are there differences and do they matter?* In L.C. Wilkinson & C.B. Marrett (Eds.), *Gender influences in classroom interaction* (pp. 79-114). New York: Academic Press.
- Ehindero, D.J. (1979). Formal operational precocity and achievement in biology among Nigerian high school students. *Science Education*, 63, 231-236.
- Ehindero, J.O. (1982). Correlates of gender-related differences in logical reasoning. *Journal of Research in Science Teaching*, 19, 7, 553-557.
- Eng, G.G. (2002). *The Understanding of the nature of science and its relationships with cognitive level, science major and academic achievement of form six science students*. Unpublished master's project paper, University of Malaya.
- Erickson, G.A., & Erickson, L.J. (1984). Achievement: Evidence, explanations and implications. *Science Education*, 68, 63-89.
- Esposito, M., Good, R. & Westmeyer, P. (1975). Evaluation of a child-structured science curriculum using the cognitive models of Piaget and Guilford. *Journal of Research in Science Teaching*, 12, 2, 147-155.
- Ferguson, G.A. & Takane, Y. (1989). *Statistical analysis in psychology and education*. New York: McGraw-Hill.
- Friedler, Y., Amir, R. & Tamir, P. (1985). *Identifying students' difficulties in understanding concepts pertaining to cell water relations: an exploratory study*. National Association of Research in Science Teaching, French Lick, USA.
- Friedler, Y., Amir, R., & Tamir, P. (1987). High school students' difficulties in understanding osmosis. *International Journal of Science Education*, 9 (52), 541-551.
- Garnett, P.J. & Hackling, M.W. (1995). Students' alternative conceptions in chemistry. *Studies in Science*, 25, 69-95.
- Garnett, P.J., & Tobin, K.G. (1984). Reasoning patterns of preservice elementary and middle school science teachers. *Science Education*, 68(5), 621-631.
- Giam, K.H. (1992). *Understanding of concepts in mechanics among form four science students in the Klang District*. Unpublished Master's dissertation, University of Malaya.
- Gilbert, J.K. (1977). The study of student misunderstandings in physical sciences. *Research in Science Education*, 7, 165-171.
- Gilbert, J.K., Osborne, R.J. & Fensham, P.J. (1982). Children's science and its consequences for teaching. *Science Education*, 66 (4), 623-633.

- Greenfield, T.A.(1997). Gender and grade level differences in science interest and participation. *Science Education*, 81, 259-276.
- Griffiths, D. (1976). Physics teaching: Does it hinder intellectual development? *American Journal of Physics*, 44, 81-85.
- Haslam, F. & Treagust, D.F. (1987). Diagnosing secondary students misconceptions of photosynthesis and respiration in plants using a two-tier multiple choice instrument. *Journal of Biological Education*, 21, 203-211.
- Hofstein, A., & Mandler, V. (1985). The use of Lawson's test of formal reasoning in the Israeli science education context. *Journal of Research in Science Teaching*, 22(2), 141-152.
- Inhelder, B., & Piaget, J. (1958). *The growth of logical thinking from childhood to adolescence*. New York: Basic Books, Inc.
- Iqbal, M.H. & Shayer, M. (2000). Accelerating the development of formal thinking in Pakistan secondary school students. Achievement effects and professional development issues. *Journal of Research in Science Teaching*, 37, 3, 259-274.
- Johnson, S., & Murphy, P. (1984). The underachievement of girls in physics: Towards explanations. *European Journal of Science Education*, 6(4), 399-409.
- Johnstone, A.H., & Mahmoud, N.A. (1980). Isolating topics of high perceived difficulty in school biology. *Journal of Biological Education*, 14, 163-166.
- Jones, L.R., Mullis, I.V.S., Raisen, S.A., Weiss, I.R., & Weston, E.A. (1992). *The 1990 science report card: NAEP's assessment of fourth, eighth, and twelfth graders*. Princeton, NJ: Educational Testing Service.
- Jovanovich, J., & King, S.S. (1998). Boys and girls in the performance-based science classroom: Who's doing the performing? *American Educational Research Journal*, 35, 477-496.
- Kahle, J. B., Parker, L.H., Rennie, L.J., & Riley, D.(1993). Gender differences in science education: Building a model. *Educational Psychologist*, 28, 379-404.
- Karplus, R. (1977). Science teaching and the development of reasoning. *Journal of Research in Science Teaching*, 14(2), 169-175.
- Kementerian Pendidikan Malaysia. (2003). *Kurikulum Bersepadu Sekolah Menengah: Huraian Sukatan Pelajaran Biologi Tingkatan Empat*. Kuala Lumpur : Dewan Bahasa dan Pustaka.
- Lam, S.Y. (1994). *Spatial ability, formal reasoning ability and field dependence-independence as predictors of form four students' achievements in geometry and engineering drawing*. Unpublished master's dissertation, University of Malaya.

- Lawrenz, F. (1986). Misconceptions of physical science concepts among elementary school teachers. *School Science and Mathematics*, 86, 654-660.
- Lawson, A.E. & Renner, J.W. (1975). Relationships of science subject matter and developmental level of learners. *Journal of Research in Science Teaching*, 12(4), 347-358.
- Lawson, A.E., Karplus, R. & Adi, H. (1978). The acquisition of propositional logic and formal operational schemata during the secondary school years. *Journal of Research in Science Teaching*, 15, 6, 465-478.
- Lawson, A.E. (1978). The development and validation of a classroom test of formal reasoning. *Journal of Research in Science Teaching*, 15, 11-24.
- Lawson, A.E. (1983). Predicting science achievement: The role of developmental level, disembedding ability, mental capacity, prior knowledge and beliefs. *Journal of Research in Science Teaching*, 19(3), 233-248.
- Lawson, A.E. (1985). A review of research of formal reasoning and science teaching. *Journal of Research in Science Teaching*, 22(7), 569-617.
- Lawson, A.E., & Thompson, L.D. (1988). Formal reasoning ability and misconceptions concerning genetics and natural selection. *Journal of Research in Science Teaching*, 25(9), 733-746.
- Lew, L.Y. (1994). *Conceptions of photosynthesis among Malaysian students across grade levels*. Unpublished Master's project paper, University of Malaya.
- Lew, T.S. (1987). *The relationship between the cognitive level of form four science students and their understanding of physics concepts*. Unpublished Master's dissertation, University of Malaya.
- Liberman, D., & Hudson, H.T. (1979). *Correlation between logical abilities and success in physics*. *American Journal of Physics*, 47(9), 784-786.
- Low, L.K. (2000). *College teacher trainees' understanding of the nature of science and its relationships with formal reasoning ability, academic background and gender*. Unpublished master's project paper, University of Malaya.
- Mah, C.C. (1999). *Conceptions in circular motion among form six physics students in Kuching, Sarawak*. Unpublished master's project paper, University of Malaya.
- Marek, E.A., Cowan, C.C., Cavallo, Ann M.L. (1994). Students' misconceptions about diffusion: How can they be eliminated? *The American Biology Teacher*, 56, 74-77.
- Morrell, P.D., & Lederman, N.G. (1998). Students' attitudes toward school and classroom science: Are they independent phenomena? *School Science and Mathematics*, 98, 76-82.

- Mulopo, M.M., & Fowler, H.S. (1987). Effects of traditional and discovery instructional approaches on learning outcomes for learners of different intellectual development: A study of chemistry students in Zambia. *Journal of Research in Science Teaching*, 24, 217-227.
- Mullis, I.V.S., Dossey, J.A., Foertsch, M.A., Jones, L.R., & Gentile, C.A. (1991). *Trends in academic progress: Achievement of U.S. students in science, 1969-70 to 1990; mathematics, 1973 to 1990; reading, 1971 to 1990; 1984 to 1990*. Princeton, NJ: Educational Testing Service.
- Mwamwenda, T.S. (1989). *Educational psychology: An African Perspective*. Durban : Butterworths.
- Mwamwenda, T.S. (1999). Undergraduate and graduate students' combinatorial reasoning and formal operations. *Journal of Genetic Psychology*, 160, 4, 503-505.
- Odom, A. (1992). *The development and validation of a two-tier diagnostic test measuring college biology students' understanding of diffusion and osmosis*. Dissertation for PhD, University of Missouri, Columbia.
- Odom, A.L., & Settlage, J. (1994). *High school students' understandings of diffusion concepts in relation to their levels of cognitive developments*. Anaheim, California: National Association for Research in Science Teaching. (ERIC Document Reproduction Service No. ED 368 581)
- Odom, A.L., & Barrow, L.H. (1995). Development and application of a two-tier diagnostic test measuring college biology students' understanding of diffusion and osmosis after a course of instruction. *Journal of Research in Science Teaching*, 32(1), 45-61.
- Odom, A.L. (1995, Oct.). Secondary and college biology students' misconceptions about diffusion and osmosis. *American Biology Teacher*, 57(7), 409-415 [EJ 518917].
- Odom, A.L. & Kelly, P.V. (2001, Nov.) Integrating concept mapping and the learning cycle to teach diffusion and osmosis concepts to high school biology students. *Science Education*, 85(6), 615-635.
- Okeke, E., & Wood-Robinson, C. (1980). A study of Nigerian pupils understandings of selected biological concepts. *Journal of Biological Education*, 14(4), 329-338.
- Osborne, R.J. & Freyberg, P. (1985). *Learning in science : the implications of children's science*. Auckland : Heinemann.
- Osborne, R.J., Bell, B.F. & Gilbert, J.R. (1983). Science teaching and children's views of the world. *European Journal of Science Education*, 5(1), 1-14.
- Piburn, M (1980). Spatial reasoning as correlate of formal thought and science achievement for New Zealand students. *Journal of Research in Science Teaching*, 17, 5, 443-448.

- Pella, M.O. (1966). Concept learning in science. *The Science Teacher*, 33(9), 31-34.
- Posner, G.J., Strike, K.A., Hewson, P.W. & Gertzog, W.A. (1982). Accommodation of a scientific conception : toward a theory of conceptual change. *Science Education*, 66, 211-227.
- Postlethwaite, T.N., & Wiley, D.E. (1991). *The IEA study of science II: Science achievements in 23 countries*. Oxford: Pergamon Press.
- Reap, M. A. & Cavallo, A.L. (1992). *Students' meaningful understanding of science concepts: Gender differences*. Paper presented at the Annual Conference of the National Association Research in Science Teaching, Boston.
- Rennie, L. (1987). *Out-of-school science: Are gender differences related to subsequent attitudes and achievement in science?* In J. Daniels & J. Kahle (Eds.), *Contributions to the Fourth Girls and Science and Technology Conference*(pp. 8-15). Ann Arbor, MI: University of Michigan.
- Renner, J.W., Abraham, M.R., Grzybowski, E.B. & Marek E.A. (1990). Understandings and misunderstandings of eighth graders of four physics concepts found in textbooks. *Journal of Research in Science Teaching*, 27(1), 35-54.
- Sharifah Maimunah 2000, in Poisson, M. & Nacereddine, F. (2000). Current trends and main concerns as regards to science curriculum development and implementation in selected States in Asia. *International Workshop in the Reform in the Teaching of Science and Technology at Primary and Secondary level in Asia*, Beijing, 27-31 March 2000, 39-45.
- Shayer, M., Kucherman, D.E. & Wylam, H. (1976). The distribution of piagetian stages of thinking in british middle and secondary school children. *British Journal of Educational Psychology*, 46, 164-173.
- Shemesh, M., Eckstein, S.F. & Lazarowitz, R. (1992). An experimental study of the developmental of formal reasoning among secondary school students. *School Science and Mathematics*, 92, 26-30.
- Simpson, R. D., & Oliver, J.S. (1985). Attitude toward science and achievement motivation profiles of male and female science students in grades six through ten. *Science Education*, 69, 511-52.
- Siow, C.F. (1993). *Achievement of form five students in selected aspects of logical reasoning in mathematics*. Unpublished master's practicum report, University of Malaya.
- Smail, B. & Kelly, A. (1984). Sex differences in science and technology among eleven year old school children. *Research in Science and Technological Education*, 2.
- Smith, E.L. & Anderson, C.W. (1984). Plant as producers: A case study of elementary science teaching. *Journal of Research in Science Teaching* 21, 685-698.

- Steinkamp, M.W., & Maehr, M.L. (1983). Affect, ability and science achievement: A quantitative synthesis of correlational research. *Review of Educational Research*, 53, 369-396.
- Tamir, P. (1971). An alternative approach to the construction of multiple choice test items. *Journal of Biological Education*, 5, 305-307.
- Treagust, D.F. (1988). Development and use of diagnostic tests to evaluate students' misconceptions in science. *International Journal Of Science Education*, 10 (2), 159-169.
- Tobin, K.G. & Capie, W. (1981). Development and validation of a group test of logical thinking. *Educational and Psychological Measurement*, 41(2), 413-424.
- Westbrook, S. (1987). *A cross-age study of student understanding of four biology concepts*. Dissertation for PhD, University of Oklahoma, Oklahoma.
- Westbrook, S. & Marek, E. (1991). A cross-age study of student understanding of the concept of diffusion. *Journal of Research in Science Teaching*, 28(8), 649-660.
- Westbrook, S.L. & Marek, E.A. (1992). A cross-age study of student understanding of the concept of homeostasis. *Journal of Research in Science Teaching*, 29, 51-61.
- Wilson, H.A. & Wilson, M.J. (1984). The development of formal thought during pretertiary science courses in Papua New Guinea. *Journal of Research in Science Teaching*, 21, 6, 528-535.
- Zeitoun, H.H. (1989). The relationship between abstract concept achievement and prior knowledge, formal reasoning ability and gender. *International Journal of Science Education*. 11(2), 227-234.
- Zuckerman, J. (1993). *Accurate and inaccurate conceptions about osmosis that accompanied meaningful problem solving*. Paper presented at the Annual Meeting of the National Association for Research in Science Teaching, Atlanta, GA.