

BIBLIOGRAFÍA

- AAAS (American Association for the Advancement of Science) (1998). *Blueprints for reform: Science, Mathematics and Technology education*. New York: Oxford University Press.
- ABELL, S. K. (1992). Helping science methods students construct meaning from text. *Journal of Science teacher Education*, 3(1), 11-15.
- _____ (2008). Twenty Years Later: Does pedagogical content knowledge remain a useful idea. *International Journal of Science Education*, 30(10), 1405-1416.
- ABELL, S. K. & BRYAN, L. A. (1997). Reconceptualizing the Elementary Science Methods Course Using a Reflection Orientation. *Journal of Science Teacher Education*, 8(3), 153-166.
- ABELL, S. K.; BRYAN, L. A. & ANDERSON, M. A. (1998). Investigating preservice elementary science teacher reflective thinking using integrated media case-based instruction in elementary science teacher preparation. *Science Education*, 82(4), 491-510.
- ABELL, S. K.; CENAMO, K. S.; ANDERSON, M. A.; BRYAN, L. A.; CAMPBELL, L. M. & Hug, J. W. (1996). Integrated media classroom cases in elementary science teacher education. *Journal of Computers in Mathematics and Science Teaching*, 15(1/2), 137-151.
- ANDERSON, C. W. & SMITH, E. L. (1987). Teaching science, en: V. Richardson-Koehler (ed.) *Educators' handbook. A research perspective* (pp. 84-111). New York: Longman.

- ANDERSON, R. & MITCHENER, C. P. (1994). Research on science teacher education, en: D. L. Gabel (ed.), *Handbook of research on science teaching and learning* (pp. 3-44). New York: Macmillan.
- AUSUBEL, D.; NOVAK, J. & HANESIAN, H. (2005). *Psicología educativa: Un punto de vista cognoscitivo*. México: Trillas.
- BADDELEY, A. (1986). *Working Memory*. Oxford: Oxford University Press.
- BALL, D. & MCDIARMID, G. (1990). The Subject Matter Preparation of Teachers, en: W. Houston, M. Haberman & J. Sikula (eds.), *Handbook of Research on Teacher Education* (pp. 437-449). New York: Macmillan.
- BALL, D. L. & COHEN, D. K. (1999). Developing practice, developing practitioners: Toward a practice-based theory of professional education, en: G. Sykes & L. Darling-Hammond, *Teaching as the Learning Profession: Handbook of Policy and Practice* (pp. 3-32). San Francisco: Jossey-Bass.
- BORKO, H. & MAYFIELD, V. (1995). The roles of the cooperating teacher and university supervisor in learning to teach. *Teaching & Teacher Education*, 11(5), 501-518.
- CALIFORNIA STATE BOARD OF EDUCATION (1990). *Science framework for California public schools kindergarten through grade twelve*. Sacramento, CA: California Dept. of Education.
- CANDELA, B. F. (2012). *La captura, la documentación y la representación del CPC de un profesor experimentado y «ejemplar» acerca del núcleo conceptual de la discontinuidad de la materia*. Tesis de maestría. Cali: Universidad del Valle.
- CHI, M. T.; SLOTTA, J. D. & De LEEUW, N. (1994). From things to processes: A theory of conceptual change for learning science concepts. *Learning and Instruction*, 4(1), 27-43.
- CLERMONT, C.; BORKO, H. & KRAJCIK, J. (1994). Comparative study of the pedagogical content knowledge of experienced and novice chemical demonstrators. *Journal of Research in Science Teaching*, 31 (4), 419-441.
- COLOMBIA, MINISTERIO DE EDUCACIÓN (MEN) (1998). *Lineamientos Curriculares para el Área de Ciencias Naturales y Educación Ambiental*. Bogotá: Autor.
- DE JONG, O. & VAN DRIEL, J. (2004). Exploring the development of student teachers' PCK of the multiple meaning of chemistry topics. *International Journal of Science and Mathematics Education*, 2(4), 477-491.
- DE JONG, O.; VEAL, W. & VAN DRIEL, J. (2002). Exploring Chemistry Teachers' Knowledge Base, en: J. K. Gilbert et al. (eds.), *Chemical Education: Towards*

- Research-based Practice* (pp. 369-390). Dordrecht, NLD: Kluwer Academic Publishers.
- DEWEY, J. (2004). *Experiencia y Educación*. Traducción de L. Luzuriaga. Madrid: Biblioteca Nueva (Trabajo original publicado en 1939).
- DOYLE, W. (1983). Academic Work. *Review of Educational Research*, 53(2), 159-199.
- DRECHSLER, M. & Van Driel, J. (2008). Experienced Teachers' Pedagogical Content Knowledge of Teaching Acid-Base Chemistry. *Research in Science Education*, 38(5), 611-631.
- DRIVER, R. (1999). Más allá de las apariencias: La conservación de la materia en las transformaciones físicas y químicas, en: R. Driver, E. Guesne & A. Tiberghien, *Ideas científicas en la infancia y la adolescencia* (pp. 225-258). Madrid: Morata.
- DRIVER, R. & EASLEY, J. (1978). Pupils and paradigms: A review of literature related to concept development in adolescent science students. *Studies in Science Education*, 5(1), 61-84.
- ELBAZ, F. (1983). *Teacher Thinking: A study of practical knowledge*. New York: Nichols Publishing Company.
- ERICKSON, F. (1989). Métodos cualitativos de investigación sobre la enseñanza, en: M. Wittrock, *La investigación de la enseñanza, II. Métodos cualitativos y de observación* (pp. 195-301). Barcelona: Paidós Educador.
- FEIMAN-NEMSER (2001). From Preparation to practice: Designing a Continuum to Strengthen and Sustain Teaching. *Teachers College Record*, 103(6), 1013-1055.
- FENSHAM, P. J. (1994). Beginning to teach chemistry, en: P. J. Fensham, R. F. Gunstone & R. T. White, *The content of science: A constructivist approach to its teaching and learning*. London: The Falmer Press.
- GABEL, D. L.; SAMUEL, K. V. & HUNN, D. (1987). Understanding the particulate nature of matter. *Journal of Chemical Education*, 64(8), 695-697.
- GARCÍA, J. (2003). *Didáctica de las ciencias: Resolución de problemas y desarrollo de la creatividad*. Bogotá: Magisterio.
- GARRITZ, A., & Trinidad-Velasco, R. (2006). El conocimiento pedagógico de la estructura corpuscular de la materia. *Educación Química*, 17(número extraordinario), 114-141.
- GARRITZ, A.; Porro, S.; Rembado, F. M. & Trinidad, R. (2007). Latin-American teachers' pedagogical content knowledge of the particulate nature of matter. *Revista de Educación en Ciencias*, 2(8), 79-84.

- GEDDIS, A. N. (1993). Transforming subject-matter knowledge: The role of pedagogical content knowledge in learning to reflect on teaching. *International Journal Science Education*, 15(6), 673-683.
- GRIFFITHS, A. K. & PRESTON, K. R. (1992). Grade-12 students' misconceptions relative to fundamental characteristics of atoms and molecules. *Journal of Research Science Teaching*, 29(6), 611-626.
- GROSSMAN, P. L. (1990). *The making of a teacher: Teacher knowledge and teacher education*. New York: Teachers College Press .
- GROSSMAN, P. L. (2005). Un estudio comparado: Las fuentes del conocimiento didáctico del contenido en la enseñanza del inglés en secundaria. *Profesorado: Revista de currículum y formación del profesorado*, 9(2), 1-17.
- GROSSMAN, P. L.; WILSON, S. & SHULMAN, L. (2005). Profesores de sustancia: El conocimiento de la materia para la enseñanza. *Profesorado: Revista de currículum y formación del profesorado*. Profesorado, 9(2).
- GUBA, E. & LINCOLN, Y. (1982). Epistemological and methodological bases of naturalistic inquiry. *Educational Communications and Technology: A Journal of Theory, Research, and Development*, 30(4), 232-252.
- GUDMUNDSDÓTTIR, S. & SHULMAN, L. (2005). Conocimiento pedagógico del contenido en ciencias sociales. *Profesorado: Revista de currículum y formación del profesorado*, 9(2), 1-12.
- GUNSTONE, R. F. & WHITE, R. T. (1981). Understanding of gravity. *Science Education*, 65, 291-299.
- HARRISON, A. G. (2001). Textbooks for outcomes science: A review. *The Queensland Science Teacher*, 27(6), 20-22.
- HARRISON, A. G. & TREAGUST, D. F. (2002). The Particulate Nature of Matter: Challenges in Understanding the Submicroscopic World, en: J. K. Gilbert; et al. (eds.), *Chemical Education: Towards Research-based Practice* (pp. 189-212). Dordrecht NLD: Kluwer Academic Publishers.
- HASHWEH, M. (1985). *An exploratory study of teacher knowledge and teaching: the effects of science teachers' knowledge of their subject matter and their conceptions of learning on their teaching*. Tesis doctoral. California: Stanford Graduate School of Education.
- HOLLON, R. E.; ROTH, K. J. & ANDERSON, C. W. (1991). Science teachers' conceptions of teaching and learning, en: J. Brophy (ed.), *Advances in Research on teaching*, vol. 2, (pp. 145-185). Greenwich, CT: JAI Press.

- JOHNSTONE, A. H. (1982). Macro and micro chemistry. *School Science Review*, 64 (227), 377-379.
- _____ (1991). Why is science difficult to learn? Things are seldom what they seem. *Journal of Computer Assisted Learning*, 7(2), 75-83.
- _____ (2010). You Can't Get There from Here. *Journal of Chemical Education*, 87(1), 22-29.
- KARPLUS, R. & THIER, H. D. (1967). *A new look at elementary school science: Science curriculum improvement study*. Chicago: Rand McNally.
- KUHN, T. S. (1970). *The structure of scientific revolutions* (2nd ed.). Chicago, IL: University of Chicago Press.
- LANIER, J. E. & LITTLE, J. W. (1986). Research on teacher education, en: M. C. Wittrock (ed.), *Handbook of Research on Teaching* (3rd ed.) (pp. 527-569). New York: Macmillan.
- LANTZ, O. & KASS, H. (1987). Chemistry teachers' functional paradigms. *Science Education*, 71(1), 117-134.
- LAWSON, A. E.; ABRAHAM, M. R. & RENNER, J. W. (1989). *A theory in instruction: Using the learning cycle to teach science concepts and thinkings skills*. Cincinnati, OH: National Association for Research in Science Teaching (NARST).
- LEDERMA, N.; GESS-NEWSOME, J. & LATZ, M. (1994). The Nature and Development of Preservice Science Teachers' Conceptions of Subject Matter and Pedagogy. *Journal Of Research In Science Teaching*, 31(2), 129-146.
- LEE, O.; EICHINGER, D. C.; ANDERSON, C. W.; BERKHEIMER, G. D. & BLAKESLEE, T. D. (1993). Changing middle school students' conceptions of matter and molecules. *Journal of Research in Science Teaching*, 30(3), 249-270.
- LEINHARDT, G. & SMITH, D. (1985). Expertise in mathematics instruction: Subject matter knowledge. *Journal of Educational Psychology*, 77(3), 247-271.
- LEMKE, J. L. (1997). *Aprender a hablar ciencia: Lenguaje, aprendizaje y valores*. Barcelona: Paidós.
- LLORENS, J. A. (1988). La concepción corpuscular de la materia. Obstáculos epistemológicos y problemas de aprendizaje. *Investigación en la escuela*, 4, 33-48.
- LORTIE, D. (1975). *Schoolteacher: A sociological study*. Chicago: University of Chicago Press.
- LOUGHRAN, J. (2001). Documenting Science Teachers' Pedagogical Content Knowledge. *Research in Science Education*, 31, 289-307.

- LOUGHRAN, J.; MILROY, P.; BERRY, A.; GUNSTONE, R. & MULHALL, P. (2001). Documenting Science Teachers' Pedagogical Content Knowledge Through PaP-eRs. *Research in Science Education*, 31(2), 289-307.
- LOUGHRAN, J.; MULHALL, P.; BERRY, A. (2004). In Search of Pedagogical Content Knowledge in Science: Developing ways of articulating and Documenting Professional Practice. *Journal of Research in Science Teaching*, 41 (4), 370-391.
- LOUGHRAN, J.; GUNSTONE, R.; BERRY, A.; MILROY, P. & MULHALL, P. (2000). Science Cases in Action: Developing an Understanding of Science Teachers' Pedagogical Content Knowledge. Ponencia presentada en la 73.^a reunión de la Asociación Nacional para la Investigación en Enseñanza de las Ciencias. New Orleans, LA, abril 28-mayo 1, pp. 1-36.
- MAGNUSSON, S.; KRAJCIK, J. & BORKO, H. (1999). Nature, sources, and development of pedagogical content knowledge for science teaching, en: J. Gess-Newsome & G. Lederman (eds.), *Examining pedagogical content knowledge: The construct and its implications for science education* (pp. 95-132). Dordrecht, NDL: Kluwer Academic Publishers.
- MAGNUSSON, S. J. & PALINESAR, A. S. (1995). Learning environments as a site of science education reform. *Theory into Practice*, 34(1), 1-8.
- MARX, R. W.; BLUMENFELD, P. C.; KRAJCIK, J. S.; BLUNK, M.; CRAWFORD, B.; KELLY, B. & MEYER, K. M. (1994). Enacting project-based science: Experiences of four middle grade teachers. *The Elementary School Journal*, 94(5), 517-538.
- MICHIGAN STATE BOARD OF EDUCATION (1991). *Michigan essential goals and objectives for science education (K-12)*. Lansing MI, MSBE.
- MORTIMER, C. E. (1983). *Chemistry*. California: Wadsworth Publishing Company, Belmont.
- MULHALL, P.; BERRY, A. & LOUGHRAN, J. (2003). Frameworks for representing teachers' pedagogical content knowledge. *Asia-Pacific Forum on Science Learning and Teaching*, 4(2), article 2.
- NASH, L. K. (1966). The atomic molecular theory, en: J. B. Conant (ed.), *Harvard case histories in experimental science* (pp. 215-321). New York: Harvard University Press.
- NATIONAL RESEARCH COUNCIL (NRC) (1996) *National Science Education Standards: observe, interact, change, learn*. Washington, D. C.: National Academy Press.

- NOVICK, S. & NUSSBAUM, J. (1978). Junior high school pupils' understanding of the particulate nature of matter: An interview study. *Science Education*, 62(3), 273-281.
- _____ (1981). Pupils' understanding of the particulate nature of matter: A cross-age study. *Science Education*, 65(2), 187-196.
- NSTA. (1999). *NSTA Standards for Science Teacher Preparation*. Recuperado el 18 de mayo de 2011, de <http://www.iuk.edu/faculty/sgilbert/nsta98.htm>
- OOSTERHEERT, E. & VERMUNT, J. D. (2003). Knowledge Construction in Learning to Teach: The role of dynamic sources. *Teachers and Teaching: theory and practice*, 9(2), 157-173.
- PAIXAO, M. F. & CACHAPUZ, A. (2000). Mass conservation in chemical reactions: The development of an innovative teaching strategy based on the history and philosophy of science. *Chemistry Education: Research and Practice in Europe*, 1(2), 201-215.
- PAJARES, M. (1992). Teachers' beliefs and education research: Cleaning up a messy construct. *Review of Education Research*, 62(3), 307-332.
- POZO, J. I. (2008). *Aprendices y maestros: La psicología cognitiva del aprendizaje*. Madrid: Alianza.
- _____ (1991). *Procesos cognitivos en la comprensión de la ciencia: Las ideas de los adolescentes sobre la química*. Madrid: Centro de Investigación y Documentación Educativa (CIDE).
- POZO, J. I. & GÓMEZ CRESPO, M. A. (1998). *Aprender y Enseñar Ciencia: del conocimiento cotidiano al conocimiento científico*. Madrid: Morata.
- POZO, J. I.; GÓMEZ, M. A.; LIMON, M. & SANZ, A. (1991). *Procesos cognitivos en la comprensión de la ciencia: Las ideas de los adolescentes sobre la química*. Madrid: CIDE.
- ROTH, K. J.; ANDERSON, C. W. & SMITH, E. L. (1987). Curriculum materials, teacher talk and student learning: Case studies in fifth-grade science teaching. *Journal of Curriculum Studies*, 19(6), 527-548.
- RUOPP, R.; GAL, S.; DRAYTON, B. & PFISTER, M. (eds.) (1993). *LabNet: Toward a community of practice*. Millsdale, NJ: Lawrence Erlbaum.
- SCHÖN, D. (1998). *El profesional reflexivo: Cómo piensan los profesionales cuando actúan*. Barcelona: Paidós.
- SCHWAB, J. (1971). The Practical: Arts of Eclectic. *The School Review*, 79(4), 493-542.

- SHAYER, M. & ADEY, P. (1986). *La ciencia de enseñar ciencias: Desarrollo cognoscitivo y exigencias del currículo*. Madrid: Narcea.
- SHULMAN, L. (2001). Conocimiento y enseñanza. *Estudios públicos*, 83, 163-196.
- _____ (1987). Knowledge and Teaching: Foundations of the New Reform. *Harvard Educational Review*, 57(1), 1-21.
- _____ (1986). Those Who understand: Knowledge growth in teaching. *Educational Researcher*, 15(2), 4-14.
- STAKE, R. (1999). *Investigación con estudio de casos*. España: Morata.
- STAVY, R. (1988). Children's conception of a gas. *International Journal of Science Education*, 10(5), 240-244.
- _____ (1990). Children's conception of changes in the state of matter. *Liquid (or solid) to gas Journal of Research in Science Teaching*, 27(3), 247-266
- TAMIR, P. (1995). Inquiry and the science teacher. *Science Education*, 67(5), 657-672.
- TOBIN, K. G. (abril, 1985). *Academic work in science classes*. Ponencia presentada en la reunión anual de la Asociación Americana de Investigación Educativa. Chicago, IL.
- _____ (1987). What happens in high school science classrooms? *Journal of Curriculum Studies*, 19(6), 549-560.
- TREAGUST, D. F.; Chittleborough, G. & Mamiala, T. L. (2003). The role of sub-microscopic and symbolic representations in chemical explanations. *International Journal of Science Education*, 25(11), 1353-1368.
- STRAUSS, A. & CORBIN, J. (2002). *Bases de la Investigación Cualitativa: Técnicas y procedimientos para desarrollar la teoría fundamentada*. Traducción de E. Zimmerman. Medellín: Universidad de Antioquía, Facultad de Enfermería (Trabajo original publicado en 1990).
- URIBE, C. (2005). *Pensar con la ciencia: Materiales del proyecto Aceleración cognoscitiva mediante la educación en ciencias en el contexto local*. Cali.
- URIBE GARTNER, C. (2005). *Pensar con la ciencia: Materiales del proyecto Aceleración cognoscitiva mediante la educación en ciencias en el contexto local*. Cali: Universidad del Valle, Facultad de Humanidades.
- VAN DRIEL, J.; VERLOOP, N. & De Vos, W. (1998). Developing Science Teachers' Pedagogical Content Knowledge. *Journal of Research in Science Teaching*, 35(6), 673-695.

- VALBUENA, E. O. (2007). *El conocimiento didáctico del contenido biológico. Estudios de las concepciones disciplinares y didácticas de futuros docentes de la Universidad Pedagógica Nacional*. Madrid: Universidad Complutense de Madrid.
- VEAL, W. & MAKINSTER, J. (1999). Pedagogical Content Knowledge Taxonomies. *Electronic Journal of Science Education*, 3(4). Recuperado el 22 de mayo de 2011, de <http://www.unr.edu/homepage/crowther/ejse/vealmak.html>
- VERLOOP, N.; VAN DRIEL, J. & MEIJER, P. (2002). Teacher knowledge and the knowledge base of teaching. *International Journal Educational Research*, 35(5), 441-461.
- WANDERSEE, J.; MINTZES, J. & NOVAK, J. D. (1994). Research on alternative conceptions in science, en: D. Gabel (ed.), *Handbook of research on science teaching and learning* (pp. 177-210). New York: MacMillan.
- WILSON, S.; SHULMAN, L. S. & RICHERT, A. E. (1987). 150 different ways of knowing: Representations of knowledge in teaching, en: J. Calderhead (ed.), *Exploring teachers' thinking* (pp. 104-124). London: Cassell.
- YARROCH, W. L. (1985). Student understanding of chemical equation balancing. *Journal of Research in Science Teaching*, 22(5), 449-459.
- ZEMBAL-SAUL, C.; STARR, M. & KRAJCIK, J. (1999). Constructing a framework for elementary science teaching using pedagogical content knowledge, en: J. Gess-Newsome & N. Lederman (eds.), *Examining pedagogical content knowledge: the construct and its implications for science education* (pp. 237-256). Dordrecht NLD: Kluwer Academic Publishers. Serie Science & Technology Education Library.
- ZEMBAL-SAUL, C.; BLUMENFELD, P. & KRAJCIK, J. (2000). Influence of guided cycles of planning, teaching, and reflection on prospective elementary teachers' science content representation. *Journal of Research in Science Teaching*, 37(4), 318-339.



Programa  ditorial