

## References

- Abd-El-Khalick, F., & BouJaoude, S. (1997). An exploratory study of the knowledge base for science teaching. *Journal of Research in Science Teaching*, vol. 34, pp. 673-699.
- Abd-El-Khalick, F., Bell, R. L., & Lederman, N. G. (1998). The nature of science and instructional practice: making the unnatural natural. *Science Education*, 82 (4), pp. 417-436.
- Abd-El-Khalick, F. & Lederman, N. G. (2000). The influence of history of science courses on students' views of nature of science. *Journal of Research in Science Teaching*, vol. 37, no. 10, pp. 1057-1095.
- Abd-El-Khalick, F., Lederman, N. G., Bell, R. L., & Schwartz, R. (2002). Views of Nature of Science Questionnaire (VNOS). Online:  
[http://www.flaguide.org/tools/diagnostic/views\\_of\\_nature\\_questionnaire.html](http://www.flaguide.org/tools/diagnostic/views_of_nature_questionnaire.html).
- Abdullah, A., & Scaife, J. (1997). Using interviews to assess children's understanding of science concepts. *School Science Review*, 78 (285), pp. 79- 84.
- Aikenhead, G. & Ryan, A. G. (1991). Students' views on the epistemology of science (Ottawa: Social Sciences and Humanities Research Council of Canada).
- American Association for the Advancement of Science (AAAS). *Project 2061: Science for All Americans*. AAAS. Washington, 1989.
- American Association for the Advancement of Science (AAAS). *Project 2061: Science for All Americans*. AAAS. Oxford University Press, 1991. Published online under <http://www.project2061.org/tools/sfaaol/sfaatoc.htm> (26.03.2003).
- Baird, J. R. (1986). Improving learning through enhanced metacognition: a classroom study. *European Journal of Science Education*, 8(3), pp. 263-282.
- Barman, C. R. (1996). How do students really view science and scientists? *Science and Children*, pp. 30-33. Published online:  
<http://www.eiu.edu/~scienceced/329options/crbscience.html>
- Barman, C. R., Ostlund, K. L., Gatto, C. C., Halferty, M. (1997). Fifth Grade students' perceptions about scientists and how they study and use science. Published online: <http://www.ed.psu.edu/ci/Journals/97pap33.htm>
- Barth, M. (1999). *History of Science in Secondary Education*. In: History of Science and technology in Education and training in Europe. Luxembourg: Office for Official Publications of the European Communities, pp. 203-212.
- Berg, H.C. (1993): *Suchlinien – Studien zur Lehrkunst und Schulvielfalt*. Neuwied: Luchterhand.
- Berg, H.C. & Schulze T. (1995): *Lehrkunst – Lehrbuch der Didaktik*.

Berg, H.C, Klafki, W. & Schulze, T: (1977 – 2003): *Lehrkunstwerkstatt*. 5 Volumes. Neuwied: Luchterhand.

Boylan, C., Douglas, M., Wallace, A., & Wheeler, A. (1992). Beyond stereotypes. *Science Education*, vol. 76, no. 5, pp. 465-476.

Breidecker, V. (2004). Raus aus Schloss Langweile. Die Süddeutsche Zeitung, p. 14, no. 191, published on 19.08.2004.

British Association for the Advancement of Science (1918). *Report of the British Association for the Advancement of Science*. Murray, London.

Buck, P. (1996). Fachkompetenz und Sozialkompetenz. In: F. Bohnsack & S. Leber (Hrsg). *Sozialerziehung im Sozial-Verfall-Grundlagen, Kontroversen, Wege*. Weinheim: Beltz, pp. 377-382.

Buck, P. (2002 – 2003): Handouts of lectures and seminars at the University of Education, Heidelberg, unpublished.

Buck, P. (2001). European science education approaches in which ‘phenomenography’ as well as ‘anatomy of awareness’ may play a key role. Paper presented at the third international conference of ESERA, on science education research in the knowledge based society, Thessaloniki, Greece.

Burke, K. (1997). *Designing professional portfolios for change*. Arlington Heights, Illinois: SkyLight Training & Publishing.

Butler, R., & Nisan, M. (1986). Effects of no feedback, task-related comments, and grades on intrinsic motivation and performance. *Journal of Educational Psychology*, 78, pp. 210-216.

Carey, S. et al. (1988). “An experiment is when you try it and see if it works”: A study of junior high school students’ understanding of the construction of scientific knowledge. ERIC-Document (ED 303366).

Carey, S. et al. (1989). An experiment is when you try it and see if it works: A study of grade 7 students’ understanding of the construction of scientific knowledge. *International Journal of Science Education*, vol. 11, special issue, pp. 514-529.

Chambers, D.W.,(1983). Stereotypic images of the scientist: The Draw-A-Scientist Test. *Science Education*, vol. 76, no. 2, pp. 255-265.

Collins, A. (1992). Portfolios for science education: issues in purpose, structure, and authenticity. *Science Education*, 76(4): pp. 451-463.

Dana, T. M., & Tippins, D. J. (1998). *Portfolios, reflection and educating prospective teachers of science*. In: B. J. Fraser and K. G. Tobin (eds.), *International Handbook of Science Education*. Kluwer Academic Publishers, pp. 719-732.

Denzin, N. K. (1978). *Sociological methods. A sourcebook*. (2nd eds.). New York:

McGraw-Hill.

Denzin, N. K., & Lincoln, Y. S. (2000). *Handbook of qualitative research*. (2nd eds.). Thousand Oaks, CA: Sage.

DES and the Welsh Office. (1989). *Science in the national curriculum*. HMSO, London.

Dewey, J. (1926). *Democracy and Education: An Introduction to the Philosophy of Education*. New York: The Macmillan Company.

Dewey, J. (1933). *How we think: A Restatement of the Relation of Reflective Thinking to the Educative Progress*. Boston, New York, Chicago, Atlanta, Dallas, San Francisco, London: D. C. Heath and Company.

Dietrich, J. (1998). Leitideen für die Behandlung wissenschaftsethischer Themen in der Schule am Beispiel "Gentechnik bei Pflanzen". In: A. Müller, J. Dietrich & F.-Th. Hellwig (eds.), *Gentechnologie bei Pflanzen, Herausforderungen für den Schulunterricht*. Akademie für Technikfolgenabschätzung in Baden-Württemberg, pp. 80-103.

Drouin, J.M (2003). Le parcours d'une exposition. Dans le catalogue de la boussole & l'orchidée. Musée des arts et métiers. *La revue. Histoire, Sciences et Techniques*. No. 39/40

Dunne, M. & Wendt, N. (1996). Environmental education teachers' manual. Environmental education issues in the Pacific. ERIC- document (ED 420 496).

English translation of OECD/PISA. (2003). Published online:  
<http://www.sbg.ac.at/assess/pisa/download/science.pdf>

Finson, K. D., Beaver, J. B., & Cramond, B. L. (1995). Development and field tests of a checklist for the draw-a-scientist test. *School Science and Mathematics*, vol. 95, no. 4, pp. 195-205.

Flick, U. (1998). *An introduction to qualitative research: Theory, method and applications*. London: Sage.

Fontana, A., & Frey, J. (1994). *Interviewing, the art of Science*. In: *Handbook of Qualitative Research*. N. K. Denzin & Y. S. Lincoln (eds.). Thousand Oaks, CA: Sage.

Glossary of terms in science education. Online: [www.sln.org.uk/governors/p7b.htm](http://www.sln.org.uk/governors/p7b.htm)  
Bildungsplan für das Gymnasium. (2000). Lehrplan Naturphänomene für die Klassen 5 und 6.

Häcker, T. (2001). Portfolioarbeit in der Lehrer/innen-Bildung. *journal für lehrerinnen- und lehrerbildung*, 1 (4), 68-75.

Häcker, T. (2002). Der Portfolioansatz - die Wiederentdeckung des Lernsubjekts? *Die Deutsche Schule*, 94 (2), 204-216.

Häcker, T., Dumke, J., & Schallies, M. (2002). Weiterentwicklung der Lernkultur: Portfolio als Entwicklungsinstrument für selbstbestimmtes Lernen. *Informationsschrift zur Lehrerbildung, Lehrerfortbildung und pädagogischen Weiterbildung*, (63), 8-18.

Häcker, T. (2004a). Qualitäten des Projektlernens mit Portfolios zurückgewinnen. *TheoPrax. Magazin für Aus- und Weiterbildung*, (1), 14-22.

Häcker, T. (2004b). Selbstbestimmung fördern. Portfolioarbeit in Schreib- und Lesezentren. In Gerd Bräuer (Hrsg.), *Schreiben(d) lernen. Ideen und Projekte für die Schule*. (S.144-158). Hamburg: edition Körber-Stiftung.

Häcker, T. H. (2003). Selbstbestimmte Lernverträge als konstitutiver Teil von Portfolioarbeit: Lern-Lehr-Vorhaben jenseits von Belehrung und Angebot. In Thomas Rihm (Hrsg.), *Schulentwicklung durch Lerngruppen. Vom Subjektstandpunkt ausgehen...* (S.283-295). Opladen: Leske + Budrich.

Heering, P. (1998). *Welt erforschen – Welten konstruieren. Physikalische Experimentierkultur vom 16. bis zum 19. Jahrhundert*. Eine Sonderausstellung des Staatlichen Museums für Naturkunde und Vorgeschichte und der Carl Universität Oldenburg. Oldenburg: Isensee- Verlag.

Heering, P. (2000). Getting shocks: Teaching secondary school physics through history. *Science & Education*, 9, pp. 363-373.

Herbert, E. A. (2001). *The power of portfolios. What children can teach us about learning and assessment*. San Francisco: Jossey-Bass.

Hielscher, K., and Hücking, R. (2002). *Pflanzenjäger in fernen Welten auf der Suche nach dem Paradies*. Piper Verlag, München.

Histoire générale des sciences. (1961). *La science contemporaine* (Tome III). Le XIX siècle (Volume I). Presses universitaires de France.

Hobsbawm, E.J.1995. *Age of Extremes: The short Twentieth Century 1914- 1991*. London, Abacus.

Höttelecke, D. (2000). How and what can we learn from replicating historical experiments? A case study. *Science & Education*, 9, pp. 343-362.

Höttelecke, D. (2001). *Die Natur der Naturwissenschaften historisch verstehen. Fachdidaktische und wissenschaftshistorische Untersuchungen*. Berlin: Logos Verlag.

Howard. R., W. (1987). *Concepts and Schemata*. London: Cassell.

International Centre for the Advancement of Scientific Literacy (ICASL). <http://www.icasl.org>.

Irwin, A. (1997). Theories of burning: a case study using a historical perspective. *School Science Review*, 78 (285), pp. 31-38.

Jenkins, E.W. (1990). The history of science in British schools: retrospect and prospect. *International Journal of Science Education*, vol. 12, no. 3, pp. 274-281.

Klafki, W. (2003): *Allgemeinbildung heute – Sinndimensionen einer gegenwärts- und zukunftsorientierten Bildungskonzeption*. In: Schulmanagement Handbuch, vol. 106, München: Oldenbourg, p. 11-28.

Kuhn, T. S. (1962). *The structure of scientific revolutions*. University of Chicago Press.

Lederman, N. G. (1992). Students' and teachers' conceptions of the nature of science: A review of the research. *Journal of Research in Science Teaching*, 29, pp. 331-359.

Lederman, N. G. & Abd-El-Khalick, F. (1998). Avoiding de-natured science: activities that promote understandings of the nature of science. In: W. F. McComas (eds.). *The nature of Science in Science Education: Rationales and Strategies* (Dordrecht: Kluwer), pp. 83-126.

Levesque, C., Stanek, L., Zuehlke, A. N., & Ryan, R. (2004). Autonomy and competence in German and American University Students: A comparative study based on Self-Determination Theory. *Journal of Educational Psychology*, 96(1), pp. 68-84.

Lin, H.-S., Hung, J.-Y. & Hung, S.-H. (2002). Using the history of science to promote students' problem-solving ability. *International Journal of Science Education*, vol. 24, no. 5, pp. 453-464.

Lin, H.-S., Chiu, H.-L. & Chou, C.-Y. (2004). Student understanding of the nature of science and their problem-solving strategies. *International Journal of Science Education*, vol. 26, no. 1, pp. 101-112.

Mathias, R. (1999). From public understanding to accessibility of science. *Gegenworte. Zeitschrift für den Disput über Wissen*. Heft 3 Frühjahr. (eds.) Die Brandenburgische Akademie der Wissenschaft. pp.20-26.

Matthews, R. (1994). *The Role of History and Philosophy of Science*. New York & London: Routledge.

Matthews, R. (1998). The nature of science and science teaching. In: *The International Handbook of Science Education*. B. J. Fraser and K. G. Tobin (eds.). Kluwer Academic Publishers. pp. 981-999.

Mayan, M. J. (2001). *An introduction to qualitative methods: A training module for students and professionals*. The International Institute for Qualitative Methodology: University of Alberta.

McComas , W.F. & Olson, J. K. (2000). *The nature of science in international science education standards documents*. In: W. F. McComas (eds.). *The nature of Science in Science Education: Rationales and Strategies* (Dordrecht: Kluwer), pp. 41-52.

McDuffie, T. E. Jr. (2001). Scientists – Geeks & Nerds? Dispelling teachers' stereotypes of scientists. *Science and Children*, pp. 16-19.

Mead, M., & Metraux, R. (1957). The image of the scientist among high school students: a pilot study. *Science*, 126 (3269), pp. 384-390.

Millar, R. & Osborne, J. Beyond 2000. Science education for the future. Online: [www.kcl.ac.uk/education](http://www.kcl.ac.uk/education)

Moser, Karin S. (2000, June). Metaphor Analysis in Psychology—Method, Theory, and Fields of Application [22 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research [On-line Journal]*, 1(2). Available at: <http://www.qualitative-research.net/fqs-texte/2-00/2-00moser-e.htm> [Date of Access: April, 22, 2004].

Mueller, F., Riess, F. & Sichau, C. (2000). Popularising science by performing historical experiments. An article for the conference Science Communication, Education and the History of Science on July 12<sup>th</sup>, London. Published online: [www.bshs.org.uk/conf/2000sciencecomm/papers/mueller.doc](http://www.bshs.org.uk/conf/2000sciencecomm/papers/mueller.doc)

National Research Council (1996). National Science Education Standards (Washington, DC: National Academy Press).

National Foreign Language Resource Center, by John M. Norris. Online: <http://nflrc.hawaii.edu/NetWorks/NW04/default.html>

Niedermair, K. (2001). Metapheranalyse. In: *Einführung in die Forschungsmethodik und Forschungspraxis*. T. Hug (eds.). Baltmannweiler: Schneider Verlag Hohengehren.

Newton, L. D. and Newton, D. P. (1998). Primary children's conceptions of science and the scientist: is the impact of a National Curriculum breaking down the stereotype? *International Journal of Science Education*. Vol. 20, no. 9, pp. 1137-1149.

Novak, J. D. (2003). A preliminary statement on research in science education. *Journal of Research in Science Education*, vol. 40, Supplement pp. S1-S7. Originally published in vol. 1, no. 1, pp. 3-9 (1963).

OECD/PISA Deutschland. Programme for International Student Assessment (PISA). (2003). Internationales und nationales Rahmenkonzept für die Erfassung von naturwissenschaftler Kompetenz in PISA 2003. Leibniz-Institut für die Pädagogik der Naturwissenschaften IPN. Kiel. Online: <http://www.mpib-berlin.mpg.de/pisa>.

Osborne, J., Collins, S., Ratcliffe, M., Millar, R. & Duschl, R. (2003). What Ideas-about-Science should be taught at school? A Delphi study of the expert community. *Journal of Research in Science Teaching*, vol. 40, no. 7, pp. 692-720.

Piaget, J. (2003). Development and learning. *Journal of research in Science teaching*, vol. 40, Supplement pp. S8-S18. Originally published in vol. 2, no. 3, pp. 176-186 (1964).

PISA (2002). *PISA 2000: Overview of the Study. Design, Method and Results*. Max-Planck-Institute for Human Development, Berlin.

PISA Deutschland/ OECD. Programme for International Student Assessment (PISA). (2003). Internationales und nationales Rahmenkonzept für die Erfassung von

naturwissenschaftler Kompetenz in PISA 2003. Leibniz-Institut für die Pädagogik der Naturwissenschaften IPN. Kiel. Online: <http://www.mpib-berlin.mpg.de/pisa>.

Riess, F. (2000). History of physics in science teacher training in Oldenburg. *Science & Education*, 9, pp. 399-402.

Riess, F. (2000). Problems with German science education. *Science & Education*, special issue, vol. 9, no. 4, pp. 327-331.

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivation: Definitions and new directions. *Contemporary Educational Psychology*, 25, pp. 54-67.

Ryan, A.G., Aikenhead, G.S. (1992). Students' preconceptions about the epistemology of science. *Science Education*, vol. 76, no. 6, pp. 559-580.

Ryder, J., Leach, J. and Driver, R. (1997). Undergraduate science students' images of the nature of science. ERIC-Document (ED 407266).

Ryder, J., Leach, J. and Driver, R. (1999). Undergraduate science students' images of science. *Journal of Research in Science Teaching*, vol. 36, no. 2, pp. 201-219.

Sachs, Aaron. (1995). Humboldts Erbe oder die Rückeroberung der Wissenschaft. *World Watch*, vol. 8, no 2, p 21- 29.

Schallies, M., Wellensiek, A. & Lembens, A. (1999). *Technologien verstehen und beurteilen – Urteilskompetenz als didaktische und methodische Aufgabe am Beispiel der Gentechnik*. Heidelberg, Uni Heidelberg/ Arbeitgruppe VIT/SET.

Schallies, M., Wellensiek, A. & Lembens, A. (2001). Das Entwickeln von Urteils- und Handlungsfähigkeiten im fächerübergreifenden Unterricht. In: C. finkenbeiner & G. W. Schnaitmann (eds.), *Lehr- und Lernforschung an der Jahrtausendwende. Theoretische Grundlagen und konkrete Beispiele aus der Forschungspraxis und Fachdidaktik*, Donauwörth: Verlag Ludwig Auer, pp. 562-583.

Schallies, M., Wellensiek, A. & Lembens, A. (2002). The development of mature capabilities for understanding and valuing in technology through school project work: Individual and structural preconditions. *International Journal of Technology and design education*, 12, pp. 41-58.

Schallies, M., Wellensiek, A. & Lembens, A. (2002). Student Learning by research. *Journal of Biological education*, vol. 37, no. 1, pp. 13-17.

Sjøberg, S. (2000). *Science and Scientists: The SAS-study. Cross-cultural evidence and perspectives on pupils' interests, experiences and perceptions*. Department of Teacher Education and School Development. University of Oslo.

Sjøberg, S. (2001). "Why don't they love us anymore?" Science and Technology Education: A European high priority political concern!. A paper presented in the Third International Conference Science Education Research in the knowledge based society. Thessaloniki, Greece.

Sjøberg, S. (2002). Science and Technology Education Current Challenges and Possible Solutions. <http://www.uio.no/~sveinsj/> 29. 10.2003.

Solomon, J. (1991). Teaching about the nature of science in the British National Curriculum. *Science Education*, 75 (1), pp. 95-103.

Solomon et al (1992). Teaching about the nature of science through history: Action research in the Classroom. *Journal of Research in Science Teaching*, vol. 29, no. 4, pp. 409-421.

Solomon, J., Duveen, J., Scott, L. & McCathy, S. (1992). Teaching about the nature of science through history: action research in the classroom. *Journal of Research in Science teaching*, 29, pp. 409-421.

Solomon, J. (2000). The importance of stories. Speech at the British Society of History of Science (BSHS) conference Science Communication, Education and the History of Science at the Royal Society, 12-13 July. Online published as rtf-document. London.

Song, J., & Kim, K. S. (1999). How Korean students see scientists: the images of the scientist. *International Journal of Science Education*, vol. 21, no. 9, pp. 957-977.

Statham, A., Richardson, L., & Cook, J. A. (1991). *Gender and university teaching: A negotiated difference*. Albany: State University of New York Press.

Subject Matter Without Context-PPT of Lederman, N., 1998 online: <http://chemweb.vei.co.uk/library/lecture8/st/slides/lederman/004.html>

TERC (1996). *Teacher's guide and integrated science course*.

The New Encyclopædia Britannica. (1991). Volume 7, 15<sup>th</sup> edition. The University of Chicago. p. 528.

Thomas, G. P., & McRobbie, C. J. (2001). Using a metaphor for learning to improve students' metacognition in the chemistry classroom. *Journal of Research in Science Teaching*, 38(2), pp. 222-259.

Wagenschein, M. (1980). *Naturphänomene sehen und verstehen. Genetische Lehrgänge*. Stuttgart: Ernst Klett.

Wellensiek, A. (1998). Interdisziplinärer Unterricht am Beispiel der Gentechnik. Das Forschungsprojekt Schule Ethik Technologie (SET). In: H. Behrendt (eds.), *Zur didaktik der Physik und Chemie. Probleme und Perspektiven* L18, Leuchtturm-Verlag, Alsbach/Bergstraße, pp. 146-148.

Wellensiek, A., Lembens, A., & Schallies, M. (2001). Lernen mit dem Portfolio. *Arbeit+Technik*, 3, pp. 21-23.

Williams, G. C., & Deci, E. L. (1998). The importance of supporting autonomy in medical education. *Annals of Internal Medicine*, 129(4), pp. 303-308.

Wolf, D., P. (1989). Portfolio assessment: Sampling student work. *Educational Leadership*, 46 (7), 35-39. [http://nflrc.hawaii.edu/NetWorks/NW04/M\\_N.html#McNamara95](http://nflrc.hawaii.edu/NetWorks/NW04/M_N.html#McNamara95)

Ziman, J. 2000. *Real Science- What it is, what it means*. Cambridge, Cambridge University Press.