



## **The Role of Research on Science Teaching and Learning**

### **Introduction**

Research on science teaching and learning plays an important role in improving science literacy, a goal called for in the National Science Education Standards (NRC 1996) and supported by the National Science Teachers Association (NSTA 2003). NSTA promotes a research agenda that is focused on the goal of enhancing student learning through effective teaching practices and that effectively connects research and practice. NSTA encourages ALL participants in science education, including K–16 teachers of science and administrators, to recognize the importance of research and assume active roles in research practices.

NSTA considers a broad range of activities to be within the scope of research, including research conducted by teachers that can lead to immediate classroom changes as well as research that contributes to a larger body of knowledge such as long-term or large-scale studies. Research on science teaching and learning involves identifying and asking appropriate questions, designing and conducting investigations, collecting evidence, drawing conclusions, and communicating and defending results (NSTA 2004).

To produce research that has meaningful outcomes and the ability to improve the teaching and learning of science, NSTA advocates that research and practice be linked and support compatible goals. This synergistic relationship between research and practice includes teachers and researchers communicating goals, activities, and findings with the greater science education community in ways that make research accessible, understandable, meaningful, and relevant to teachers, administrators, and policy makers.

The process of research is the essence of the scientific enterprise and of scientific inquiry. Science education builds on the best of research in both worlds—science and education. By engaging in continual inquiry into teaching and learning, we can promote science literacy for students in the 21st century.

NSTA makes the following recommendations to promote effective research on science teaching and learning.

### **Declarations**

Regarding the focus of research on science teaching and learning, NSTA recommends those conducting research

- examine questions that are relevant to enhancing science teaching and learning for all learners;

- address areas that have not have been investigated, or investigated insufficiently, and have the potential to improve what is known about science teaching and learning; and
- extend theories of science teaching and learning in order to contribute to a coherent body of knowledge.

Regarding the practice of research on science teaching and learning, NSTA recommends those conducting research

- draw and build upon previous research that may exist in the area of study;
- focus on longitudinal studies that build on promising areas of research and link to a larger body of work;
- form collaborations and partnerships among those involved in science education (e.g., teachers, administrators, college faculty, informal science educators) as they examine science teaching and learning;
- demonstrate, when possible, the degree to which student learning is affected;
- engage in rigorous peer review that challenges the status quo and values varying perspectives on research pertaining to science teaching and learning;
- view everyday experiences as opportunities to conduct research that yields findings to improve teaching practices and student learning;
- support the participants in research with ample professional development to enhance their ability to design, conduct, interpret, and apply science education research; and
- share research results with the wider science education community inside and outside the classroom.

Regarding the use of research on science teaching and learning, NSTA recommends

- researchers communicate about research in ways that can be understood and embraced by science educators, administrators, policy makers, and others in the science education community;
- researchers make research readily accessible by disseminating it to teachers and other decision makers using many forms of communication, including practitioner journals, professional conferences, and websites;
- researchers recognize and state the limitations of their research;
- researchers and consumers of research discuss, critique, and apply findings;
- school researchers have ample administrative support, time, and resources to conduct research in the classroom, share their findings with colleagues, and implement results to improve student learning; and
- science educators embrace a culture of inquiry grounded in research that focuses on examining practice and improving student outcomes.

*Adopted by the  
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**References**

National Research Council (NRC). 1996. National science education standards. Washington, DC: National Academy Press.

National Science Teachers Association (NSTA). 2003. NSTA Position Statement: National Science Education Standards.

National Science Teachers Association (NSTA). 2004. NSTA Position Statement: Scientific Inquiry.