

NSEUS (National Study of Education in Undergraduate Science)

<http://nseus.org>

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San Diego State University's Center for Research in Mathematics and Science Education (CRMSE) members, Dr. Cheryl L. Mason and Corinne Lardy (MSED doctoral candidate), serve as the western region research team for NSEUS, collecting data from study institutions within the Western United States, as well as helping to coordinate larger aspects of the project as a whole.

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PROJECT OVERVIEW

The NSF-supported, multiyear National Study of Education in Undergraduate Science (NSEUS) project focuses on critical characteristics and variations in teaching science to undergraduates with diverse majors. The goal of the on-going national study is to investigate the impact of these variations on learning outcomes for all majors while focusing specifically on the long-term outcomes of preservice pK-6 teachers of science. On-site case studies are being conducted using 60 undergraduate science courses offered at 30 universities. The sample was selected by random stratification based on institutional type from a national population of 103 diverse institutions originally involved in the NASA/NOVA Project. A major aspect of the case studies involves visiting 180 elementary classes where science is taught. The data collection protocol involves observations, interviews, artifacts, and surveys using multiple instruments and sources. Criteria for success of the NSEUS project are determined by conclusions drawn from the research questions that include: evidence and effects of short-term impacts on all undergraduate students and long-term effects on matriculated inservice teachers in their teaching of science; identification of characteristics of reform courses that produce significant impact; and identification of characteristics of effective faculty.

Results are reported from a (1) review and synthesis of the research literature, (2) national survey of 103 instructors of reformed undergraduate science courses involved in the original NASA/NOVA Project, and (3) on-site case studies involving observations and interviews with faculty, inservice teachers and undergraduate university students, along with on-line surveys of students and teachers. It is heartening to see from the national survey that the majority of institutions have continued to offer reformed science courses even after 10-12 years following the initial intervention. Also, data from the recently conducted case studies indicate that there is significant difference in the way that science is being taught at the undergraduate level between the reformed and non-reformed courses. Faculty, teachers and students described how these courses and related experiences affected their teaching and learning of science in a very positive manner.

RESEARCH QUESTIONS

Reviewed studies were used to develop the data collection instruments and research methodologies. The NSEUS study addresses the following questions with the administered instruments in parentheses.

1. How does the NOVA professional development model change undergraduate science faculty members' teaching practices based on evidence of their descriptions of their curricular priorities, lesson planning, instruction, and explanations of their pedagogical decision-making? (STEBI-B, RTOP, faculty interviews, and student focus group interviews)
2. How do reform science course characteristics - learning environments, course structure, pedagogical content knowledge, and collaboration - differ between reform (treatment) and comparison (traditional) courses, and how does this relate to the learning outcomes of undergraduate students? (CLES, VNOS, DAST, STEBI-B, RTOP, CoRe, PaPer, faculty interviews, student focus group interviews, teacher interviews)
3. How do the levels of reform science course characteristics - learning environments, course structure, pedagogical content knowledge, and collaboration - differ among reform courses (treatment only) and how do these differences relate to the learning outcomes of undergraduate students? (CLES, VNOS, DAST, STEPI-B, RTOP, CoRe, PaPer)
4. How do the science course characteristics of reform and comparison courses compare in the long-term based on matriculated inservice pK-6 teachers in their own science classrooms? (CLES, VNOS, DAST, STEBI-B, RTOP, teacher interviews)

Please see the NSEUS website for further clarification of the project, a listing and explanation of the instruments used, and presentations and publications.

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