

Teacher Preparation and Environmental Education: Meeting the Challenge in New York State

Executive Summary

In the early 1980's a statewide consortium of organizations worked cooperatively with the State Education Department (SED) and The Board of Regents to implement goal#7 of the Regents Action Plan, which states, "each student will acquire knowledge of the ecological consequences of choices in the use of the environment and natural resources."

The coalition helped infuse the State Education Department Syllabus and Curriculum with environmental concepts in most subject areas. The State Education Department also included environmental questions on Regent Examinations. After the coalition's formal work ceased, New York State Standards in Math, Science and Technology, Social Studies, and other areas were eventually infused with concepts that related to a healthy environment and a sustainable society.

Unfortunately, pre-service teacher training in schools of education across the state, with a few exceptions, did not and most still do not incorporate environmental subject matter into their preparation programs. Teachers in general are not prepared to take advantage of the opportunities being presented to infuse Environmental Education (EE) into classroom teaching.

In response to this situation, Teacher Environmental Education Preparation (TEEP) was formed by the Council on the Environment of New York City, the Wallerstein Collaborative for Urban Environmental Education at New York University and the Environmental Education Advisory Council (EEAC). TEEP is working in partnership with SUNY Cortland, Brooklyn College, Pace University and several other universities and organizations.

Two major strategies for incorporation of EE into teacher preparation have emerged from TEEP meetings and documents. One is the development of a statewide center for environmental education, which would make EE a major focus of teacher preparation throughout NY. The second approach is the development of one or more innovations in the teacher certification structure to bring it in line with State Standards.

The New York State Standards in Math, Science and Technology and Social Studies are replete with environmental concepts on all levels - overall standards, key ideas, performance indicators, sample tasks, and sample problems/activities.

There is a contradiction between the comprehensive infusion of EE into the standards, and the lack of environmental education requirements in the teacher certification structure. In order to fully implement the standards, teachers need to have some environmental background but there are no formal EE training requirements or inducements to seek EE training. What are the options available to remedy this situation?

- Encourage the 110 teacher education institutions throughout the state to recognize a cognate, or a series of courses in an area, in this case environmental studies or science, as applicable to teacher certification in Biology, Chemistry, Earth Science, Physics, General Science, Social Studies and Childhood Education grades 1 to 6 – Common Branches.
- Require an environmental cognate as part of a certifiable course package.
- Develop a certificate in EE program in which the SED would recognize a 9-12 credit "Certificate in Environmental Science (or Studies)" giving teachers the background to teach environmental science (or studies) in their schools.
- Adopt a separate, complete certification in environmental science and/or studies.

Teacher Preparation and Environmental Education: Meeting the Challenge in New York State

History and Background

In the early 1980's a statewide consortium of organizations worked cooperatively with the State Education Department and The Board of Regents to implement goal#7 of the Regents Action Plan, which states, "each student will acquire knowledge of the ecological consequences of choices in the use of the environment and natural resources." These organizations included the Council on the Environment of New York City (CENYC), the Environment Education Advisory Council (EEAC), the Environmental Action Coalition, the New York State Outdoor Education Association, SUNY Cortland, the New York State Conservation Council, the National Audubon Society, the New York State Department of Environmental Conservation and nearly 50 other groups.

The coalition helped infuse the State Education Department Syllabus and Curriculum with environmental concepts in most subject areas. The State Education Department also included environmental questions on Regent Examinations. After the coalition's formal work ceased, New York State Standards in Math, Science and Technology, Social Studies, and other areas were eventually infused with concepts that related to a healthy environment and a sustainable society.

During this period, environmental education (EE) continued to spread at the grassroots level through the work of government agencies, other organizations and individuals. A growing body of research supported and continues to support the notion that involving students in a systematic program of environmental education improves learning in science, math, social studies and other curriculum areas.¹

Unfortunately, pre-service teacher training² in schools of education across the state, with a few exceptions, did not and most still do not incorporate environmental subject matter³ into their preparation programs. Teachers in general are not prepared to take advantage of the opportunities being presented to infuse EE into classroom teaching. Teachers are not trained to give students all the tools necessary to do well on Regents exams, or give themselves additional ways to implement the State Standards.

¹ See, "Closing the Achievement Gap." Lieberman, Gerald - PhD and Hoody, Linda - MA, *State Education and Environment Roundtable: Science Wizards*, Poway, CA, 1998.

² We are defining pre-service teacher training as preparation for undergraduates studying to be teachers, for graduate students who are entering the teaching profession for the first time, and for practicing teachers who are returning to school to meet current certification requirements.

³ With respect to environmental subject matter for teachers we are referring to concepts and information related to environmental issues and to pedagogical skills and techniques associated with environmental education.

New licensing requirements, which went into effect in 2004, increased the number of science credits to be taken by teachers in preparation at all levels, which expands the opportunity for teachers to use available environmental science courses to satisfy these requirements.

In response to this situation, Teacher Environmental Education Preparation (TEEP) was formed by CENYC, the Wallerstein Collaborative for Urban Environmental Education at New York University and EEAC. TEEP is working in partnership with SUNY Cortland, Brooklyn College, Pace University, the NY State Department of Environmental Conservation, the NY State Education Department, NYC Department of Environmental Protection, the NY State Chapter of National Audubon and several other universities, colleges and organizations. TEEP *has* held five symposiums around the state at Pace University in Westchester County, SUNY Cortland, Teachers College, the State Education Department in Albany and New York University to explore strategies for expanding teacher preparation in EE in colleges of education in NY State. A total of 18 colleges and a number of governmental agencies and non-formal organizations have attended at least one of the 5 colloquiums.

Two major strategies for incorporation of ee into teacher preparation have emerged from TEEP meetings and documents. One is the development of a statewide center for environmental education, which would make ee a major focus of teacher preparation throughout NY. Drs. Beth Klein and Gail Tooker of SUNY Cortland, and Mary Leou of NYU, in collaboration with other TEEP participants are preparing a strategy for the center. The second approach is the development of one or more innovations in the teacher certification structure to bring it in line with State Standards. The remainder of this paper will focus on the latter strategy.

New York State Standards and EE

The New York State Standards are replete with environmental concepts on all levels - overall standards, key ideas, performance indicators, sample tasks, and sample problems/activities.

For example, the New York State Education Department (SED) Science Standard #4, in the SED's 1996 Math, Science and Technology (MST) Booklet⁴ states that "students will understand and apply scientific concepts, principles and theories pertaining to the physical setting and living environment, and recognize the historical development of ideas in science."

- The standard has a Living Environment section, which contains key idea #7 - it states, "human decisions and activities have had a profound impact on the physical and living environment."
- On an elementary level, as a performance indicator of idea #7, students are to "identify ways in which humans have changed their environment and the effects of those changes."

⁴ Learning Standards for Mathematics, Science and Technology, the University of the State of New York, the State Education Department, Albany, NY March 1996.

- On an intermediate level students should "describe how living things, including humans, depend upon the living and nonliving environment for their survival" and "describe the effects of environmental changes on humans and other populations." This is evident when students "conduct an extended investigation of a local environment affected by human actions, (e.g., a pond, stream, forest, empty lot)."
- On a commencement level, idea # 7 asks students to "describe, the range of inter-relationships of humans with the living and non-living environment, explain the impact of technological development and growth in the human population on the living and non-living environment, and explain how individual choices and societal actions can contribute to improving the environment."
- This is evident when students, "as a sample task, compile a case study of a technological development that has significant impact on the environment".

Comprehensive as the environmental infusion is in Standard #4, Living Environment Section Key Idea #7, there is much more environmental study called for in both the Living Environment and Physical Setting sections of Standard 4. MST Standard #5, "Students will apply technological knowledge and skills to design, construct, use and evaluate products and systems to satisfy human and environmental needs," contains numerous environmental references including 6 of 8 sample problems/activities on solid waste, water or energy systems. All of these involve the application of mathematical skills such as graphing, measurement and analysis of spatial design.

The same intensity and frequency of infusion is characteristic of MST Standards 6 and 7, which deal with interconnectedness and interdisciplinary problem solving respectively.

The Social Studies Standards also contain significant environmental content. Social Studies Standard #3 states that: "Students will use a variety of intellectual skills to demonstrate their understanding of the geography of the interdependent world in which we live - local, national and global - including the distribution of people, places and environment over the Earth's surface." Key idea #1 of Standard #3 states that:

"Geography can be divided into six essential elements which can be used to analyze important historic, geographic, economic, and environmental questions and issues. These six elements include: the world in spatial terms, places and regions, physical settings (including natural resources), human systems, environment and society, and the use of geography." (Adapted from The Geography Standards, 1994: Geography for Life).

The Key Idea Section includes the following performance indicators - Students will:

- "Study about how people live, work, and utilize natural resources" (elementary level)
- "Investigate how people depend on and modify the physical environment" (elementary level)
- "Map information about people, places, and environments (intermediate)"
- "Describe the relationships between people and the connections between people and places" (intermediate)

- "Describe the physical characteristics of the Earth's surface and investigate the continual reshaping of the surface by physical processes and human activities" (commencement)⁵

Throughout all these performance indicators, sample tasks and sample problems/activities in MST and Social Studies, literacy skills are called for and reinforced.

New York State Standards, EE and Teacher Certification

The subject areas that qualify for certification in Middle Childhood or Adolescence are science, chemistry, biology, physics and Earth science. For the social sciences there is a social studies certification. There are currently no plans to include environmental science or environmental studies as a subject that qualifies for certification.

There is a contradiction between the comprehensive infusion of EE into the standards, and the lack of environmental education requirements in the teacher certification structure. In order to fully implement the standards, teachers need to have some environmental background but there are no formal EE training requirements or inducements to seek EE training. What are the options available to remedy this situation?

Possible Strategies

- Encourage the 110 teacher education institutions throughout the state to offer a cognate, or a series of courses in an area, in this case environmental studies or science, that relate to a certificate major, e.g. Biology, Chemistry, Earth Science, Physics, Social Studies and Childhood Education Grades 1 to 6 - Common Branches, but are not directly given in that major. A two course or six credit environmental cognate could be included in a 36 credit package submitted to the state for certification.
- Require an environmental cognate as part of a certifiable course package. This would leave open the choice of course offerings in the environment to the college but require six credits of environmental studies or science.
- Create a certificate in EE program in which the SED would recognize a 9-12 credit "Certificate in Environmental Science (or Studies)" as giving teachers the background to teach environmental science in their schools. Most high schools offer environmental science. The certificate would give teachers who possess it first choice in teaching the course. Elementary and middle school teachers who earn the certificate would gain the expertise necessary to instruct their students in this area. Teacher education institutions would attract prospective teaching candidates who are interested in environmental concerns.
- Adopt a separate, complete certification in environmental science and/or studies. Many schools throughout the state already offer environmental science as a way

⁵ <http://www.emsc.nysed.gov/ciai/socst/socstands/soc31.html>

for students to satisfy the science credits required for graduation; in some NYC schools the entire ninth year is devoted to it. A certification in it would generate many teachers who are truly qualified to teach it and who can provide their colleagues who teach courses relevant to the environment, with the information and techniques necessary to apply the standards across the curriculum.

Summary/Conclusion

Although New York State has made significant strides in incorporating environmental concepts into State Education Department syllabi and curricula, on Regents examinations and in the State Standards in Math, Science and Technology, and Social Studies, most teacher preparation programs still do not infuse environmental education (EE) into their teacher preparation programs. There is a contradiction between the infusion of EE into the curricula, exams and standards and the lack of EE requirements in the teacher certification structure.

Possible solutions are:

- Encourage the 110 teacher education institutions throughout the state to recognize a cognate, or a series of courses in an area, in this case environmental studies or science, as applicable to teacher certification in Biology, Chemistry, Earth Science, Physics, Social Studies or Childhood Education grades 1 to 6 – Common Branches.
- Require an environmental cognate as part of a certifiable course package.
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- Adopt a separate, complete certification in environmental science and/or studies.

Whatever strategies are chosen it is imperative that the SED encourage teacher education schools to incorporate environmental education into the training of their students, who after all share the responsibility for the social, scientific and ethical development of our children.

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Revised October 2005.