

Teaching Philosophy

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If you want to make a difference, teach; however, if you really want to make a difference, teach teachers. I can not think of a more rewarding, a more challenging or a more awesome responsibility than that of helping future teachers reflect on how they are going to approach the teaching of science and related environmental issues. With the world's population doubling every 40 years and the world's resources being depleted at an alarming rate, it becomes critical that we have a well-educated and thoughtful citizenry with a deep understanding of science and environmental issues. Science teachers are the keys to imparting the wisdom and skills needed to thoughtfully address these difficult and complex issues.

In my teaching I attempt to share with students my love of science. This includes not only the content of science but also more importantly the questions asked and not easily answered, by science. For example, it is not enough for students to know the names of the clouds, they must be curious about clouds and be encouraged to wonder out loud about clouds.—*Why are some clouds like cotton: while others are dark and flat on one side? If clouds weigh thousands of tons each, how do they stay up in the air?*

It has been my experience that if teachers exhibit a “sense of awe and wonder” about their natural world, students will soon begin to share that interest. Once this interest has been cultivated, students will begin to ask critical questions themselves. Asking critical questions is, after all, what science is all about. Carl Sagan, in an address to the National Science Teachers Association in 1993 stated,

“If a student comes out of a science class not knowing a single fact but has learned to ask critical questions, I feel that class has been a splendid success.”

It is not uncommon to find high school physics students who can carry out complicated calculations using Boyles or Charles Law. However, when asked how a refrigerator works, these same students draw a blank. It appears that we have a great deal of room for growth in the area of educating students to ask critical questions about the world around them.

I hope that my classes make a difference in the lives of my students. In particular I hope I can make a difference in the way my students see the world. Outstanding science teachers do this by modeling their humanism and demonstrating to students that it is acceptable to care about issues and causes in the sciences as well as the humanities.

Finally, I hope that I can contribute to my methods students becoming life long learners. Outstanding science teachers are learners. They surround themselves with books and things such as telescopes, butterfly nets, rocks and charts. You will find these teachers at the museums, aquariums, state parks and the beaches questioning, probing and learning. They are happiest when they are learning new things and sharing these ideas or concepts with others. I hope that through my course I can reintroduce students to the joy and satisfaction of exploring and investigating their natural world so that they too can be happiest when they are sharing science with others.

Special Initiatives Related to Teaching

External Funding

Fostering the use of creative problem solving and critical thinking in science classrooms requires the training of inservice science teachers. To that end I have secured external funding to work with science teachers in the summer for intensive two-week workshops. Nine externally funded projects totaling approximately \$600,000 have provided teachers with equipment, a stipend and extensive training in how to incorporate problem solving in their teaching.

Distance Learning and Internet Enhanced Summer Course for Science Teachers

With funding from the Glaxo Corporation, I have developed a three-year teacher-training project entitled *Students as Scientists*. This project utilizes the State's distance learning system for teacher training in water chemistry and water testing during the summer. The teachers then go back to their classroom and train their students in water testing. The students submit their data to the project's web page to be posted. For more information on this project, please visit the *Students as Scientists* Website at:
<http://smec.uncwil.edu/GLAXO/SAS/index.htm>

The interest in this project from national organizations and professional journals has been both gratifying, and at times, over whelming. I have made over 10 presentations about this project including presentations at: The International Internet Conference, The National Science Teachers Meeting, The National Middle School Association Conference and the UNCW Board of Trustees and Board of Visitors 1998 Fall Meeting. I have written and co-authored several publications describing this project, some of which include: *Applying the Unlimited Potential of the Internet* (1998), *Reconceptualizing the Use of the Internet in Teaching Middle School Science* (1998), and *Support for Environmental Education from the National Science Education Standards and the Internet* (in-press).

Teaching on the North Carolina Information Highway (Distance Learning)

Last year I developed and began teaching an Environmental Studies course entitled *Teaching about the Environment*. This course focuses on contemporary environmental issues, all of which are North Carolina based. I team-teach this course over the State's Distance Learning System with colleagues at North Carolina State University and East Carolina University. Team teaching this course on the Distance Learning System allows us to utilize the expertise of each of the three instructors and to invite scientists from all three institutions to make guest presentations.

International Studies

Last summer I taught an international studies course for North Carolina teachers entitled *Teaching about the Rainforest*. This is a 3-hour graduate course that includes two weekends of study, one at the North Carolina Zoological Park and one at the Fort Fisher Aquarium, and then meets in the upper Amazon Basin of Southeast Ecuador at the Tiputini Biological Research Station for 8 days in July. A flier describing this cooperative project with the N.C. Aquarium at Fort Fisher and the N.C. Zoological Park has been included.

During the summer of 1995, I taught a graduate course at the University of San Francisco de Quito in Quito, Ecuador. The course entitled *Inquiry the Method of Science* focused on incorporating problem solving in teaching K-12 science. Participants in the course were Ecuadorian preservice and inservice teachers. During the five-week summer course, I conducted several seminars on weekends for local school administrators and teachers. A flier describing one of those weekend seminars is attached.

Technology and the Science Classroom

I spend a considerable amount of time reading and writing about the use of the Internet in K-12 education. I incorporate and model the use of the Internet for teaching science in my methods classes EDN-595, EDN-336 and EDN-338. These efforts have resulted in two manuscripts (see below and in supporting material section) and an interactive web site on water quality testing of the Lower Cape Fear River. Both of these papers and the web site are currently being used as part of the selected readings for the courses listed above.

- *Support for Environmental Education from the National Science Standards and the Internet*
- *Reconceptualizing the Use of the Internet in Teaching Middle School Science*
- Sample Web Pages from the *Students as Scientists* Project

Curriculum Development

In 1995 Ann Lockledge, Brad Walker and I developed and implemented the Theory Into Practice (TIPS Project). The TIPS Project is a “methods block program” with a concentrated field experience component designed for preservice elementary education majors. The project blocks the students into five methods courses on Tuesdays and Thursdays and places them in early field experiences on Mondays and Wednesdays. The TIPS Project evolved out of our desire to model a constructivist philosophy in our teaching and program design. In addition to serving as the TIPS project coordinator since 1995, I have researched and published several papers that have analyzed and evaluated the project. Two recent articles include *An Elementary Block Field Experience Program: Focusing on Reflection and Collaboration* (1998) and *A Constructivist Approach to Teacher Education and Early Field Experience* (in press). Copies of these manuscripts have been included in the related material section.

Work with Graduate Students

During the last two years I have co-authored two papers and made four presentations with my current graduate students. These papers and presentations include:

National Publications

- “Applying the Unlimited Potential of the Internet in Teaching Middle School Science,” Meridian, I, No. 1, 1-5, 1998. (Co-author W. Harriett)
- “Reconceptualizing the Use of the Internet in Teaching Middle School Science,” WebNet98 Disc II, 1093-1094. (Co-author W. Harriett)

State and National Presentations

- “Conducting Environmental Science over the Internet,” North Carolina Environmental Education Conference, Research Triangle Park, NC, February 1999. (Co-presenter C. Dutton)
- “Collaborative Learning in ‘Students as Scientists’ Project,” International Conference of the WWW, Internet, and Intranet, The Association for the Advancement of Computing In Education, Orlando, FL, November 1998. (Co-presenter W. Harriett)
- “Reconceptualizing the use of the Internet in Teaching Middle School Science,” International Conference of the WWW, Internet, and Intranet, The Association for The Advancement of Computing in Education, Orlando, FL, 1998. (Co-presenter W. Harriett)
- “Using the Internet to Teach Environmental Education,” North Carolina Science Teachers Association Annual Conference, Greensboro, NC, November 1998. (Co-presenter Chris Dutton)