



The Teacher Pioneers Project

The Science House

North Carolina State University

A Report to the Progress Energy Foundation

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NC STATE UNIVERSITY

Introduction

In Spring, 2003, the Progress Energy Foundation awarded \$28,500 to support teacher training programs at three new regional satellite offices of The Science House in Asheville, Fayetteville and Jacksonville, NC. These offices, established by a grant from the US Department of Education, each houses a Master Teacher responsible for leading teacher training and school support projects, and for connecting middle and high schools to the resources of the state's science and technology campus. Each satellite office is hosted by a school system (Cumberland and Onslow County Schools) or a regional museum (the Health Adventure in Asheville) and is equipped with a library of up-to-date teaching laboratory equipment, which is loaned to area schools on a rotating basis. The Master Teacher not only leads teacher training from Countertop Chemistry to Using Computers in Teaching Biology, he or she is also a resource to teachers seeking to employ in their classrooms the inquiry-based hands-on activities that have been demonstrated to improve student learning.

Project Overview

The Teacher Pioneers grant has supported the initial training of 58 high school and middle school teachers who will use the lending libraries of equipment circulated from the three regional offices. The learning objectives were for the teachers to learn how to use computer- and calculator-based laboratory equipment, to work through laboratory exercises that conformed to the NC Standard Course of Study, and to learn how to integrate technology into their teaching. Science House personnel assisted by experienced teachers from the area schools led the workshops. The Satellite Coordinators work with the teachers in their classes after the workshop to ensure that they are successful in integrating the technology. The workshop agendas, calendars for equipment loans and photos are at <http://www.science-house.org/teacher/pioneers/index.html>

The evaluations to date and observation of the teacher-participants indicate that the program has met these objectives and prepared the teachers to use the laboratory equipment during the academic year.

Teacher Pioneers Training Programs		
Location	Dates	Participants
Asheville (taught by Elizabeth Snoke and Regina Barrier)	July 14-25, 2003 (60 hours)	10 middle and high school teachers from nine schools in Asheville City and Buncombe County school systems
Asheville	Follow-up training days October 25 February (not yet scheduled)	
Fayetteville (taught by Dennis Johnson and Anita Castles)	July 21 - 31, 2003 (60 hours)	13 middle school teachers from six Cumberland County schools
Fayetteville	October 2-3, 2003 (12 hours)	10 middle school teachers from two Cumberland County year-round middle schools
Fayetteville	Follow -up training days October 18, 2003 November 22, 2003	
Jacksonville (taught by Catherine Roberts and David English)	October 7, 14, 21, 28, 2003 (10 hours)	25 middle and high school teachers from 5 middle schools and 6 high schools in Onslow County
Jacksonville	Feb. 10th & 24th & March 9th & 23rd & 1 hr. Follow-up Session TBA (11 hours)	20 middle and high school teachers expected

Results and Public Awareness

In each of the workshops principals and school system officials were invited to participate in some part of the program, so that they could see what the teachers were learning. These teacher-led "show-and-tells" are intended to garner support from the visitors for implementing more laboratory work in science. Also, local representatives of Progress Energy and the Foundation have been invited to the summer programs.

The Teacher Pioneers project was featured in one newspaper article in Fayetteville and is highlighted on The Science House website, which is visited by thousands of teachers and students per month. (<http://www.science-house.org/teacher/pioneers/index.html>) Several of the Teacher Pioneers gave a presentation on the program at the November, 2003, meeting of the North Carolina Science Teachers Association, in Greensboro.

Project Evaluation

The goal of the training program was to introduce teachers to using up-to-date calculator and computer-based laboratory equipment to teach science. Research shows that hands-on inquiry-based learning with such equipment improves student learning and, anecdotally, we have evidence that it increases student motivation and enthusiasm for science. From other projects we have found that it takes some time for teachers to learn to use new teaching strategies and to integrate them into their classrooms. The Teacher Pioneers will receive year-round support from the regional coordinators to aid them in making these changes in their teaching.

The Teacher Pioneers were surveyed before and after the workshops about their use of technology and their attitudes toward it. The survey instrument was a Levels of Use of Technology survey adapted from an instrument developed by the CBAM Project, Research and Development Center for Teacher Evaluation, University of Texas.

The most complete evaluation documentation at this point comes from the Asheville workshop. The group averaged an increase of 1 level/teacher on Levels of Use of Technology in Classroom. Before the workshops the average teacher started at "Refinement: I am making changes in my use of technology in my classroom to increase outcomes." The average level at the end of the workshop was "Integration: I am making deliberate efforts to help others to use technology in my classroom."

From the ordered pair evaluation there was a significant change (1.0 or higher) in the approaches to teaching science the teachers marked before and after for:

- A. Classroom interaction builds on student ideas (not teacher led lecture)
 - D. Students learn terms and formulas WHILE solving problems (not before)
 - E. Students work on personally relevant problems (not theoretical problems with little connection to students)
 - F Students learn by hands-on methods (not readings lectures & demos)
 - G. Instructional materials are state of the art (not out of date)
- All other indicators stayed the same or improved slightly.

Teacher Responses

"I just wanted to say how much I enjoyed the first session of the workshop! It sparked a few ideas for future lesson plans and was refreshing to sit in a workshop and learn something and actually be sad that it was over so quickly!"

"Teacher Pioneers helped my school determine how we would spend a large percentage of our science funds this year. Beth came to my school and did a short workshop exposing our teachers to the lab-pros and their possibilities. I was able to follow up on that workshop and participate in the two week in service this summer. The two week course during the summer gave me a chance to experiment and learn how to best utilize this technology in the classroom. I talked to several teachers in our school about the lab pros and we have purchased 7 lab pros and some probes that can be used at all grade levels. This program has enriched our science program and will hopefully expand our students' ability to use technology to learn scientific concepts and run experiments more accurately and quickly. Beth has been a wonderful resource and I hope that this program can be continued for other teachers in Buncombe County and the surrounding region. My students have benefited from this program. I've used it in sound and light labs and I've even used it as an enrichment activity during special team times. Students love to work with the lab pro and see if the results match their predictions."

"As one of the teachers that benefited from the workshop and equipment use, I wish to express my thanks for the part Progress Energy played in making this possible. My hydrology unit and my physics unit are both receiving huge improvements due to the technology made available through the Teacher Pioneers Program. My students had an introductory unit on the use of the equipment and they were sold on "how cool it was." When I took my students down to the creek for our stream survey, they were excited about the temperature probe (air, water, and soil readings), the motion detector (stream flow), and the pH and Dissolved Oxygen probes. They can not wait for spring semester to use the motion detector again, along with the force plate, for some of our labs. The laptops were instrumental for the students to get on the internet and research their North Carolina River Basin. Both the calculators and the laptops made data gather a breeze. My only complaint is the time constriction because the quantity of material available to check out versus the requests by the teachers in need. Any assistance given to expand this program would benefit teachers and students, but more so our future. We will be sending students forward with a wider view of the possibilities of technology. Thanks again to The Science House and Progress Energy for making all this possible."

Partnerships with Other Education Stakeholders

The Teacher Pioneers activities link directly to the teacher training goals of several regional initiatives. They build on a US Dept. of Education grant that supports the establishment of the Asheville, Fayetteville and Jacksonville satellites. The Fayetteville and Jacksonville activities also enhance the teacher training programs of the NC Partnership for Improving Mathematics and Science and the Jacksonville Sturgeon City learning project funded by the Burroughs Wellcome Fund. There is close collaboration with the, Asheville City, Buncombe, Cumberland and Onslow school systems curriculum directors.

Expenditures of Funds

The project activities will be completed in the Spring Semester of 2004. All of the funds devoted to the project have been expended for teacher stipends, stipends for teaching assistants, travel to the NC Science Teachers Association Conference and for materials for the workshops or for use in the Teacher Pioneers classrooms.

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