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NSF-funded program boosts teachers' skills

4:48 p.m., Feb. 20, 2007--High school science teachers from the New Castle County Vocational Technical (Vo-Tech) School District and nine UD science graduate fellows spent Feb. 16 at UD assessing student learning of science concepts as part of a three-year, \$1.7 million National Science Foundation (NSF) GK-12 grant to UD. The workshop, part of a professional development day for the district, was designed to bring the two groups together in an ongoing partnership to benefit science curriculum and pedagogy in northern Delaware.



Amy Quillen, science specialist for the New Castle County Vocational Technical School District, leads a workshop session on transfer tasks.

George Watson, senior associate dean of the College of Arts and Sciences, along with Kate Scantlebury, UD associate professor of chemistry and biochemistry and co-principal investigator of the NSF project and project manager, and Amy Quillen, science specialist for the New Castle County Vocational Technical School District, organized the workshop, which included teachers from Delcastle, Hodgson, Howard and St. Georges vo-tech high schools.

Watson said the workshop focused on how science educators can best use transfer tasks to give students opportunities to demonstrate what they've learned in the classroom and to help educators assess student learning. Watson said transfer tasks give students the opportunity to apply information in a new context and to work at a higher level.

"When you want to know if the students are really learning the concept, you give them a task," Watson said. "Completing the task in a new situation...demonstrates that they have learned the concept because they need to apply what they've learned in the new context."

The daylong workshop is collaborative, Watson said, with teachers and fellows working together in small groups to develop new transfer tasks and to design new activities for the classroom.

"We try to put them in the role of the students, have them do what you expect the students to do," Watson said. "Then, they have a better idea of what it is they should be doing for their own students."

Quillen, who facilitated the workshop, said she got involved with the project as a liaison between the school district and the University.

"The workshop has given us an opportunity to be able to provide good quality professional development to our teachers," Quillen said. "Professional development is what really gives them the tools that they need to be better teachers."

The NSF grant also gives nine qualified UD doctoral candidates the opportunity to partner with eight other high school science teachers for a year in the New Castle County Vocational Technical School District. The fellows receive a \$30,000 stipend and tuition waivers to work in science classroom two days a week, learning about teaching and sharing their own expertise in their chosen fields. After the year, the fellows give presentations to both students and grant participants about their research and experience in the program.

Watson said the fellows spend 10 hours a week in the classroom while completing their own research for their dissertations.

One of the program's main objectives, Watson said, is to expose graduate students and teachers to each other and to develop partnerships with local school districts.

"We want our students to have some experience out in the community," he said. "When they go to work as scientists or professors, we think they'll have more of a connection to the high school system, and they'll be more inclined to work in the community in outreach activities. For the teachers, graduate students are serving almost as resident scientists in the classrooms. We want the teachers to have an opportunity to interact with people who are doing research in science and laboratories."

Quillen said they plan for the graduate fellows to be placed in St. Georges and Hodgson vo-tech high schools over the next two years. Quillen said they have asked for two out of the district's four professional days each year to run GK-12 workshops.

Katie Skalak, a doctoral candidate in geology at UD and a fellow under the NSF grant, said she works at Howard two days a week helping to develop presentations, lessons and facilitate lab activities.

"We've come up with four or five different transfer tasks for integrated science and physical science where students can take what they've either learned in the classroom or their own prior knowledge that they're taking to the situation, and apply this to a real-world scenario," Skalak said.

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Skalak said she presents her doctoral research on mercury contamination in sediment in an aquatic ecosystem to the students as a real-life problem, allowing them to pick roles such as a doctor or an environmentalist to approach the issue.

"Students can identify what role they want to take, work in groups and do their own research to solve their problems," she said. "It's been a lot of fun. The kids are great. It's a mutual experience, definitely. As much as I'm putting into it, I'm getting out."

Brian Gross, who teaches regular and advanced biology courses at Delcastle, said science fellow and UD biology doctoral candidate Genevieve Griffiths has helped him develop modern and authentic classroom activities such as testing the effects of caffeine on chicken embryos and DNA fingerprinting, activities that he would not have been able to implement on his own. Gross said Griffiths also has brought a level of expertise to his honors biology class that is motivating to students.

"They have seen this path to higher education, and it's opened their eyes to the fact they can do it. At Delcastle, that's not necessarily the norm," Gross said. "Lots of kids go to college, but I don't think that's the goal of the school. They prepare kids to work and build professionalism and give them a plate of skills that is more than academic. But for these kids, they've seen they can use that but also go on to higher education."

Quillen said she has seen a new enthusiasm in the teachers and a willingness to try new things as a result of the grant. "The teachers have an extra set of hands and a set of hands with greater expertise, which is really nice," she said. "I also think the students are responding really well to this."

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