Chapter 14

Preparing Science Teachers: Developing a Sense of Community Using Technology

André M. Green
University of South Alabama, USA

ABSTRACT

Pathway to Science (PTS) is a nationally funded project through the National Science Foundation (Award # 0934829) involving a university’s Colleges of Education, Arts and Sciences, and Engineering Departments in partnership with a local school district. All entities involved have a vested interest in increasing the number of certified secondary science teachers as all are interested in producing students who are better prepared in science at both the collegiate and secondary levels. This chapter explores how technology is used in the training of science teachers and how technology is used to retain them as science teachers once they are employed.

BACKGROUND

Pathway to Science (PTS) is a nationally funded project involving a university’s Colleges of Education, Arts and Sciences, and Engineering departments in partnership with a local school district. All entities involved have a vested interest in increasing the number of certified secondary science teachers as all are interested in producing students who are better prepared in science at both the collegiate and secondary levels. The partnership between these entities is a very unique partnership in that more than 80% of the teachers who teach in the district hold at least one degree from this university.

The program has the goals to:

1. Prepare a total of up to approximately 24 science teachers over a five-year period who are highly qualified and generally in science at the secondary level in grades.
2. Enhance student achievement by providing certified science teachers in those classrooms that currently have no certified teachers.
3. Create a replicable model that will provide ongoing mentoring and professional de-
velopment for novice science teachers to increase the probability that they will be retained and become career teachers.

The goals of the program fall in line with the project’s desire to increase the supply of qualified science teachers for the local school district as well as for other partner school districts in rural regions of the state. The project thus far has managed to attract racially and ethnically diverse science majors (who are traditionally underrepresented among science teachers and who would likely take other career paths) into the teaching field by an extensive recruitment campaign that targets senior and recent graduates in the STEM disciplines. Currently the lack of certified science teachers is a major cause of poor achievement and low expectations for high-risk students. This problem is greatly exacerbated in both rural and urban areas because schools in these locales are most likely to serve disadvantaged children and to have teachers who are teaching out of field. For this reason, PTS immediately impacts the academic achievement of students in these target school districts. Through the Noyce scholarship program, a redesigned alternative certification program was developed to significantly increase the clinical field experiences while shortening the time to complete certification, thus putting more qualified science teachers into classrooms sooner.

The Noyce PTS program adds to the body of knowledge identifying factors that attract science majors to careers as secondary school teachers. Beyond providing incentives to commit to the program, the programs engage science education candidates in a replicable curriculum that is designed to provide a wide spectrum of teaching experiences to disadvantaged students, especially poor and minority students attending hard to staff schools. Perhaps the most critical characteristic for PTS is the mentoring of these newly minted teachers to ensure that they will provide effective instruction in their own classrooms and are set on a pathway to becoming career teachers.

**DESIGN OF THE PROGRAM**

Once applicants are accepted into the programs, they begin a content rich 48-hour program designed to increase their content knowledge in science and education to provide them with the foundation needed to become effective science teachers. In completing this program, participants are required to earn 15 hours of graduate level credit in science content courses. The remaining 33 credit hours are comprised of education pedagogy courses. The participants are full-time graduate students and complete the intensive program within four semesters (spring through the following spring). In the third semester, participants have a field experience at the middle school level and a field experience at the high school level. In the final semester of the program, participants complete a student teaching experience in a high needs hard to staff school under the supervision of a master teacher in the school, a university supervisor, and the program director.

In addition, Noyce Scholars in PTS are provided with a one-year membership to the Alabama Science Teachers Association (ASTA) and the National Science Teachers Association (NSTA). The program is designed for participants to have the opportunity to interact with and learn from different science teachers across the state of Alabama and across the nation. It is the intent of the program to expose its participants to the best and brightest science teachers in the state and to the best practices in the nation. Specifically, Noyce Scholars complete the following curriculum (also see Table 1):

1. Curriculum and Teaching (9 semester hours)
2. Foundations of Education (6 semester hours)
3. Evaluation of Teaching and Learning (3 semester hours)
4. Technology (3 semester hours)
5. Reading in the Content Areas (3 semester hours)