

Two Decades of Success: North Carolina State University's NC-MSEN Pre-College Program

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Abstract

For almost twenty-five years, North Carolina State University has helped to coordinate a state-wide Mathematics and Science Education Network Pre-College Program that serves disadvantaged youth in grades six through twelve. The university-school partnership includes middle school and high school academic enrichment in math, science, and communication through Saturday and summer academies that focus on STEM activities, an annual math/science statewide competition, and an annual awards program. The long-term results of the program are impressive: 99 percent of participating students go on to attend college, students maintain higher grade point averages and SAT scores than their peers, and two-thirds of the participants major in STEM or education in college.

In 2007 The National Academies released a report, “Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future,” in which it called for an increased K-16 focus on science, technology, engineering and mathematics (STEM) as key to continued American prosperity. This wake-up call was not new to educators in North Carolina. More than twenty years ago, they recognized the importance of increasing student achievement and teacher expertise in the STEM disciplines—especially for students and educators of color. A 1984 state-wide study revealed that while African American students comprised 30 percent of North Carolina’s high school student population, only 17 percent were taking college preparatory courses and less than half of those were enrolled in chemistry, physics or pre-calculus (Madrado and Fuller 2001).

As a result, educators and legislators came together to create a statewide Mathematics and Science Education Network Pre-College Program (MSEN PCP). Funded through private grants as well as state dollars and targeted to economically disadvantaged youth in grades six through twelve, the four-site pilot program was so successful in preparing students for college that it became a state-funded initiative that is now in its twenty-fourth year. The NC-MSEN Pre-College Program (NC-MSEN PCP), coordinated by the Center for School Leadership Development at the University of North Carolina system, operates at nine UNC system campuses and currently serves 2,621 students. Its goal is to prepare underserved students to attend a four-year college or university and to major in a STEM or education field.

The North Carolina State University NC-MSEN PCP

The NC-MSEN Pre-College Program at North Carolina State University (NCSU) is a cornerstone of this long-running initiative, illustrative of the contribution that university-school partnerships make to the program's success. NCSU is the largest university in the state with more than thirty thousand students. Working with the North Carolina University system NC-MSEN PCP coordinator, the NCSU program is housed at the Center for Research in Mathematics and Science Education at the College of Education. Funding for the coordinator, assistant coordinator and program assistant are paid by the state; the university covers overhead costs in addition to the leadership and fund-raising support provided by the chancellor, provost, and dean. The university-based coordinator is critical to the operation of the program and to maintaining the partnership with the state and area school districts.

NCSU's NC-MSEN PCP program currently serves 450 economically disadvantaged students from twelve middle schools and high schools primarily in the Wake County Public School System (WCPSS) and two adjoining counties. One of the fastest-growing areas in the United States, and home to Raleigh, the state capital, Wake County is home to an increasingly diverse, low-income population; 27 percent of WCPSS's students qualify for free or reduced lunch which includes more than half of its African American students and two-thirds of its Hispanic students. (Wake County Public Schools 2007; Vouk 2005).

Students must apply annually to participate in PCP and are encouraged to enroll for the full six years, although they may enter the PCP at any time up through their junior year of high school. Students must have a minimum grade point average of 2.5 and come from a socio-economically disadvantaged background. Parents must also be committed to participate in the program.

The success of the NCSU program is the result of the range of initiatives that are provided, outlined in brief below. Each program component employs a strategy that has been proven to provide academic success for underserved minority students. The program components were derived from several successful college access and success pre-college programs for underrepresented minority students including the Mathematics, Engineering, and Science Achievement Program (MESA) and the Philadelphia Regional Introduction for Minorities to Engineering (PRIME) program (MSEN PCP Coordinator Manual 1993). In addition to the academic enrichment it offers, the NC-MSEN PCP is designed to instill confidence and to provide opportunities for students to broaden their horizons. Consequently, by the time they graduate from high school, students are ready to attend a four-year college or university.

Program components include:

Middle School PCP Class. This elective class involves science, mathematics and communication skills enrichment as well as self-esteem and career awareness support.

Each content area is critical to the success of the program. The class is taught by a lead teacher (at some schools several teachers divide the subjects). WCPSS supports the program by funding a half-time teacher for each participating school. The PCP teacher also coordinates parent information meetings and works with the university's PCP coordinator.

High School Academic Chapter of Excellence (ACE) Club. At the high school level, a volunteer teacher or advisor oversees the ACE Club which provides peer support for students interested in math and science. The club invites guest speakers from area universities and sponsors field trips and community service projects to engage the students. Parents are involved through the ***Parents Involved in Excellence (PIE) Club*** which provides financial support, assists with chaperoning field trips, and identifies guest speakers.

Additional out-of-school academic opportunities are provided through the ***Saturday Academy*** and the ***Summer Scholars*** programs. Housed at the university, both provide academic enrichment, extra study help for students, and exposure to activities and experts in the STEM fields. Both also feature the opportunity for students to become familiar with a major college campus at a young age and to engage in hands-on activities and field trips. Recent student projects have included building a solar car and developing Web pages. The Saturday Academy provides academic assistance in three successive four-week sessions taught by master teachers from WCPSS. The Summer Scholars program has been offered both half and full-day during the summer with full-day sessions including visits to NCSU STEM departments.

MSEN Day is an annual math/science competition event that involves more than seven hundred students from the statewide Mathematics and Science Education Network. Students compete in teams on academic tests, oratory and science projects. An annual ***Awards Program*** recognizes student participation and achievement. Because of the outstanding pool of students that participate in NCSU's NC-MSEN PCP, other summer programs at NCSU, such as the engineering summer camp, provide opportunities for students to participate in those programs as well. For example, two of the program's high school students participate each year in a paid summer research internship in the Food Sciences Department at NCSU.

NC-MSEN PCP Impact

The NCSU coordinator handles program evaluation in conjunction with the statewide PCP staff. Annually all graduating seniors are interviewed and data collected on each student's final class rankings, grade point averages, SAT and ACT scores. Also reviewed are students' college applications, scholarship support, and anecdotal information on student opinions of the program.

Following are data gathered from the eighty-three students who graduated from the program between the academic years 2004/5 through 2006/7:

- Ninety-nine percent of the participating students went on to college. One student went to a community college, but this student is now attending a four-year university. One student chose to enter the military out of high school and plans to use the GI Bill to attend college.
- Students had an average grade point average of 3.53.
- Students had an average SAT score of 1,000 on the critical reading and math sections. This is significant since 99 percent of the seniors are African American and North Carolina's SAT average for African American students has consistently been in the 850s over the same period (North Carolina Department of Instruction 2007).
- Two-thirds of the students majored in a STEM or education area.

Looking Forward

NCSU's NC-MSEN Pre-College Program is anchored in a strong systemic partnership with three school districts. The teaching staff and classroom space provided by the schools are vital to the success of the program. Other school systems in the region have been contacted, and it is hoped that NCSU can develop partnerships with more schools. As the PCP continues in its second decade of operation, attention to several aspects of the partnership will be vital.

1. ***Maintaining instructional quality.*** The commitment and dedication of the teachers is at the heart of the program. The NCSU coordinator places a high priority on paying competitive salaries for the Summer Scholars and Saturday Academy instructors to assure participation of exemplary and experienced teachers. In addition, the NC-MSEN PCP engages teachers of color to serve as role models for the students. This is becoming an increasing challenge, however, as talented minority STEM instructors find high-paying opportunities in administration and fields other than public school teaching.
2. ***Engaging students and parents.*** Many other after-school, weekend, and summer activities compete for student and parent attention. Parent involvement is crucial to the NC-MSEN PCP program; however, it also requires significant attention by the program staff who work weekends and evenings to coordinate parent engagement, follow up with students, and organize the out-of-classroom activities. Ultimately the rewards are as significant as the demands on staff.
3. ***Serving disadvantaged students.*** Perhaps one of the best tributes to the success of NCSU's NC-MSEN PCP is the increasing numbers of middle-class families who want to have their children participate in the program. The program's mission, however, must remain focused on serving those students of ability who lack the opportunity to make their college dreams come true.

References

North Carolina Department of Instruction, 2007. *The North Carolina 2007 SAT report*. <http://www.dpi.state.nc.us/docs/accountability/reporting/sat/2007/final2007satreport070830.pdf>.

Madrazo, G., and R. Fuller. 2001. *MSEN pre-college program 15-year report: 15 years of mastering excellence*. Chapel Hill, NC: UNC-GA.

MSEN Pre-college Program. 1993. *MSEN pre-college program coordinator manual*. Chapel Hill, NC: UNC-Chapel Hill.

Vouk, M. 2005. *Wake County demographics growth and diversity*. Raleigh, NC: Office of Growth Management, Wake County Public Schools.
<http://www.wcpss.net/demographics/reports/Growth2005.pdf>.

Wake County Public Schools. 2007. Raleigh, NC: Wake County Public Schools.
<http://www.wcpss.net/demographics/>.

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