



Campus Visit Summary
North Carolina School of Science and Math

Campus Visit Date: April 25, 2007

Brief Overview

Opened in 1980, NCSSM is the country's first public, residential high school. Through a challenging curriculum centered on science and math, NCSSM shapes leaders and thinkers for a great North Carolina. The school is the role model for 16 similar schools in the nation and world. NCSSM is an affiliate of the UNC system.

The diverse student body consists of 11th and 12th graders who represent more than 90 of North Carolina's 100 counties. They call home the campus of the former Watts Hospital in Durham, a 27-acre park-like setting that is listed on the National Register of Historic Places. Now updated with wireless network and internet access, renovated living facilities and a state-of-the-art educational technology center, the campus' unique architectural features hold firm the campus' rich history while the students within its walls cement its future.

Campus' definition of its "region"

The NCSSM is a residential high school institution for gifted students, and thus has a statewide focus.

Current responses to regional and statewide needs

The campus highlighted the following programs and initiatives as representative of its efforts to meet regional and state wide needs:

- *Educating students for the 21st century* – The NCSSM provides intensive opportunities for knowledge and skill development beyond classroom instruction. For example, humanities studies are presented in an interdisciplinary approach (history + literature), faculty tutorials for students, student mentoring, programs on life skills, student team projects, and writing across the curriculum programs all enhance student development beyond core content knowledge.
- *Virtual classes and Distance Learning* – Faculty at NCSSM teach classes via interactive video conferencing (virtual classes) in high schools across the state (mainly rural schools) where those schools have a deficit in licensed teachers or where teachers request assistance. In 2005-06, 412 students were served in 9 different credit-bearing courses, 3,582 students and 328 teachers were served in enrichment sessions, and 135 teachers were served in professional development

sessions. Through all of NCSSM's distance learning programs, an average of 500 hours per month of interactive videoconference programming is provided to students and educators statewide.

- *Interactive Videoconference Summer Workshop* – Workshop for NC educators on the use of and updates in interactive videoconferencing techniques; average attendance is 170 educators.
- *Summer teacher workshops* – The campus offers a number of professional development summer workshops for middle and high school teachers in subjects ranging from advanced functions and modeling to United States history. The NCSSM online professional development management system has documented 455 educators representing 91 school districts and 288 schools completed NCSSM professional development programs.
- *National workshops* – Last year, NCSSM faculty conducted workshops in 20 different states.
- *Electronic Resources Collections* – Curriculum, course plans, instructional materials, and professional development programs are available online for K-12 teachers. These include instructional modules and materials in United States History, science labs and demonstrations, supplemental mathematics materials, and a rich graphics library.
- *Ethics and Leadership Conference* – Annual conference for high school students and teachers from across the state where participants consider ethical dilemmas that students may face.
- *K-12 staff development in Durham* – NCSSM staff worked closely with the Durham Public Schools (DPS). Faculty consulted bi-weekly with DPS teachers implementing the Advanced Functions and Modeling course. NCSSM hosted a workshop for middle school science teachers (BOOST) and worked with the Durham Scholars and Labs for Learning to provide a science research experience for 40 Durham youth.
- *Community service* – All NCSSM students must perform 60 hours of community service as a graduation requirement; last year, students performed 19,000 hours of service to over 250 non-profit organizations across the state (over 60% of the students exceeded the number of hours required for graduation).
- *Summer Venture in Science and Math (SVSM)* – In partnership with 6 other UNC campuses, NCSSM coordinates a 4-week summer program for high achieving 11th and 12th graders who have expressed interest in pursuing careers in science and math; to date, 11,600 students have participated.

Methods of identifying and incorporating regional and statewide needs into academic mission

- Strategic Planning – As part of the campus’ strategic planning process, it conducts a statewide survey of high school students to determine students’ interests and aspirations and evaluates the effectiveness of its distance learning and outreach programs through curriculum needs surveys and statistical analysis.
- The campus also receives input on trends and needs from its advisory boards, alumni and parents, and collaborations such as direct outreach with public schools and the State Board of Education’s 21st Century Schools project.
- The campus works regularly with DPI in the development of statewide public school math and science curriculum, including the recent development of the new advanced functions and modeling curriculum.

Teaching Innovations (soft skills development, experiential learning, etc.)

- NCSSM believes students need skill-sets that include a thorough grounding in the sciences, mathematics, language arts, history, and foreign languages; that students become proficient in the use of technology, laboratory facilities, and other means by which knowledge is acquired and processed in the sciences and mathematics. NCSSM faculty has been able to develop curricula delivery that maximizes student engagement such that students are thinking deeply, processing the content, and contributing to classroom learning. NCSSM takes advantage of a residential learning environment to offer activities such as mentorship, independent studies, seminars, directed group studies, and Mini-Term
- The specific needs of students in the residential program include, but are not limited to:
 - Expanding their academic content knowledge;
 - Enhancing their “tool kit” of learning skills such as self-discipline, time management, research, reasoning, critical thinking, oral and written communication, as well as others;
 - Helping them learn from and work with each other, developing the ability to act in socially responsible ways and effectively serve in many work environments;
 - Developing information and technology (ICT) skills to enable them to access and use knowledge as lifelong learners in a continually changing international and competitive environment.
- *Mini-Term* is another means by which NCSSM provides opportunities for students to engage in unique educational experiences outside of the regular school curriculum and beyond the traditional classroom context. In the spring in place of seven regular class days, students choose between two stimulating academic options—either participating in one of the specialized mini-courses or conducting an approved

educational project of the student's own design. The goal is to support students in rigorous academic and personal growth and serve them well in their future academic aspirations.

- Students must also complete a *Student Life course* in both their junior and senior year. Residential Life offers SL 101 (junior year) which meets once a week over a two-trimester period, and SL 201 (senior year). These programs respond to the developmental needs of students in the areas of time management/study skills, hazing and harassment, diversity, leadership, sex education, drugs and alcohol education, interview skills, and resume preparation. Students are given the opportunity to address ideas that are shared through the curriculum and often challenge these ideas, creating meaningful dialogue between instructor and student as well as student to student.
- *NCSSM's Work Service and Service Learning/Community Service Programs* help students develop professionalism and work etiquette while becoming active participants in the growth of the community. Each student performs three hours per week of Work Service in a specific department on campus. Students learn the functions of the department while developing customer service skills and work ethic. The summer Service Learning program is in place to foster students' citizenship. Summer service learning allows students to give back to their home community while continuing the education process. Students complete 60 hours of service for a specific non-profit agency based on their interests and expertise.

Enrollment growth – General

- Since 1999, NCSSM has increased its residential enrollment from 545 to 640. This has been accomplished with legislatively supported enrollment growth funds and by repurposing some dormitory student lounges and larger dorm rooms to accommodate more students. The number of applications continues to increase and NCSSM is currently turning away twice the number of students it is able to serve on campus. The current dormitory complex limits any major enrollment growth. The proposed Discovery Center would allow the school to house approximately 225 more students. NCSSM anticipates serving a total residential student body of 850 by 2012. (NCSSM may be capable of educating 500-600 students through distance education and may also consider a virtual science and math high school.)
- NCSSM's diverse student body persists in the challenging NCSSM program with 91.9 percent of the entering Class of 2006 graduating high school at NCSSM. One hundred percent of NCSSM students complete pre-calculus with 82 percent enrolling in Calculus with a pass rate for Calculus of greater than 99 percent. One hundred percent complete advanced science proficiencies and 100 percent achieve two-year foreign language proficiency.

Enrollment growth – Special Populations

- NCSSM cannot accept the number of qualified applicants that are present in NC and expresses concern for those students in rural areas that may be presented with limited opportunities to excel. The schools enrollment has not kept up with the population growth of the state.
- The NCSSM Class of 2006 had a mean SAT score of 1378, higher than that of any 2006 freshman class in the University of North Carolina system. The school represents the diversity of the state in regard to gender, ethnicity, and socioeconomic background. One hundred percent of NCSSM students are NC residents. The school prides itself on having served all 13 of the state's congressional districts and all of the state's 100 counties.

Faculty Issues

- *Professional development* – Faculty indicated that they would benefit from professional development programs to enhance both content knowledge and classroom management skills.
- *Time management* – As the campus expands its outreach and service to the state's public school system, faculty feel time pressures in meeting these needs while performing their on-campus duties.

External Communications

- The campus communicates regularly with external stakeholders (parents, local community members, education leaders) through a variety of mechanisms, including web portals, reports, podcasts, streaming video conferences, and other distance communications.

Barriers and Challenges facing the campus

- *Physical growth* – The campus is virtually landlocked, making significant growth in facilities challenging. The campus would like to grow enrollment from 640 students to 850 by 2012, but lack of space makes this growth difficult. Construction of the proposed Discovery Center would address this problem.
- *Lack of funding for summer programs* – None of the summer programs offered by NCSSM are state-supported, and thus are funded entirely from grants and/or receipts. As the costs of these programs rise and grant funds shrink, registration fees increase creating barriers to wide access among public school teachers and students.

Opportunities

- *Increasing communications with public school teachers / helping address teacher retention and competence* – Faculty expressed an interest in increasing communications with and programs to assist public school teachers. As a specialized high school, there is a sense of disconnect between NCSSM and other high schools in the state; increased communications could help close this gap. In addition, the campus is considering developing additional professional development programs such as teacher in-service training short courses in math and science labs to demonstrate math and science content as well as innovative teaching techniques to assist lateral entry teachers achieve licensure.
- *Online advanced high school math/science courses* – The campus is a leader in technology innovations in high school teaching (as evidenced by its virtual classroom courses and other distance learning programs). Through its existing expertise, it has the potential to become a leader in developing advanced high school online math/science courses that could be made available to high school students statewide.
- *Virtual NCSSM* – To reach the high number of qualified students who are not admitted into NCSSM due to enrollment limitations (1,000 applications but only 325 admitted each year), the campus is considering utilizing UNC Online to offer rigorous science and math courses to qualified high school students with the goal of increasing their opportunity for admission into and preparation for college.
- *Distance Education Funding* - NCSSM currently has a base amount of funding for the operations of the distance education program offered to NC's public schools. An opportunity may exist to grow that program, if sufficient interest exists at the state level. It is important to consider this as a possibility, and then explore a way to incorporate a funding model for NCSSM's distance education enrollments, perhaps modeled on Learn and Earn Online or the UNC Distance Education programs.

NCSSM Points of Pride

- A UNC feeder high school--the legislatively established NCSSM Tuition Grant program (2004) ensures that graduates of NCSSM receive, at a minimum, a grant equal to the cost of tuition at any of the 16 campuses of the University of North Carolina.
- Since the inception of the Tuition Grant in 2004, 82 percent of NCSSM graduates have attended a UNC school.
- NCSSM has provided the largest number of participants in the Teaching Fellows Program, directing some of the state's brightest students to teaching.
- NCSSM is supplying the scientific workforce with percent of alumni pursuing a career in mathematics, science, and technology.

- In the last six years, NCSSM has had more semifinalists in the Siemens Competition for Math, Science and Technology than any other school in the nation, with students winning first place in the 2001 and 2004 competitions. NCSSM was the first school to receive the Siemens Founders award.
- NCSSM is a national specialized school model. The school is founding partner of the 95 constituent-member National Consortium of Specialized Secondary Schools for Mathematics, Science and Technology. Fourteen other state specialized schools have been modeled after NCSSM.
- NCSSM is a national model and leader in Distance Education having received the 2006 United States Distance Learning Association 21st Century Best Practice Award, and the distinction of being the State's leading provider of high school curriculum via interactive videoconferencing.