REPORT ON USE OF 2007-08
UNC-NCCCS 2+2 E-LEARNING INITIATIVE FUNDS

September 2008

In 2005, the General Assembly passed legislation to provide the North Carolina Community College System with $1 million in recurring funds and the University of North Carolina with $1 million in nonrecurring funds to support the UNC-NCCCS 2+2 E-Learning Initiative. The legislation (SL2005-0276, §9.5) states:

> Funds appropriated in this act to The University of North Carolina and the North Carolina Community College System for the UNC-NCCCS 2+2 E-Learning Initiative shall be used to fund further development of online courses for 2+2 programs. Based on a mutually agreed upon decision by the State Board of Education Chairman, the President of the North Carolina Community College System, and the President of The University of North Carolina as to the areas of greatest need, funds are available to support joint technology development, systems to track student progress and articulation between a North Carolina community college and a University of North Carolina campus, and to develop technology to support online courses and 2+2 programs.

In 2006-07, nonrecurring funds were again provided to UNC and were used to continue work with the NCCCS to place additional articulated degree programs online. Online programs allow students anywhere in the state to take the first two years of a program online through the community colleges and the final two years through a constituent institution of the University of North Carolina.

In 2007-08, the General Assembly provided recurring funds to the University of North Carolina and amended the legislative language (SL2005-0276, §9.7b and §9.7c) to include the following criteria:

> SECTION 9.7.(b) The University of North Carolina and the North Carolina Community College System shall use these funds first to develop online teacher education programs, including baccalaureate and associate pre-major programs.
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> SECTION 9.7.(c) The University of North Carolina and Community Colleges System Office shall report by September 1, 2008, and annually thereafter, to the Joint Legislative Education Oversight Commission, the State Board of Education, the Office of State Budget and Management, and the Fiscal Research Division of the General Assembly on the implementation of the UNC-NCCCS 2+2 E-Learning Initiative. This report shall include:
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> (1) The courses and programs within the 2+2 E-Learning Initiative;
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> (2) The total number of prospective teachers that have taken or are taking part in this initiative to date broken down by the current academic period and each of the previous academic periods since the program's inception;
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> (3) The total number of teachers currently in the State's classrooms, by local school administrative unit, who have taken part in this initiative;
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> (4) The change in the number of teachers available to schools since the program's inception;

(5) The qualitative data from students, teachers, local school administrative unit personnel, university personnel, and community college personnel as to the impact of this initiative on our State's teaching pool; and

(6) An explanation of the expenditures and collaborative programs between the North Carolina Community College System and The University of North Carolina, including recommendations for improvement.

This report meets the reporting requirements of the University of North Carolina. The North Carolina Community College System (NCCCS) is filing a separate report.

In response to the 2007-08 legislation, appropriations were used by the University towards the development of online middle grades science and mathematics concentration courses and secondary science and mathematics education courses throughout the system; 2+2 middle grades education pedagogy course development at Western Carolina University; 2+2 special education course development at UNC Pembroke and East Carolina University; and the enhancement of 2+2 elementary education course development at NC A&T State University.

The UNC courses and programs within the 2+2 E-Learning Initiative are identified in section 1 (programs) and section 4 (courses) of this report and an explanation of the expenditures and collaborative programs between the North Carolina Community College System and the University of North Carolina, including recommendations for improvement, is provided in section 5 and section 6.

In responding to items 2-5 identified in section 9.7.(c) of the legislation, it is important to understand the long-range nature of this project. Specifically, the primary motivations for this project were to improve the quality of high-need teachers education programs, to increase the number of people choosing to major in a high-need teacher education program by having it available online, and to foster cooperation between the North Carolina Community College System and the University of North Carolina by coordinating the first two years of a high-need teacher education program at a community college with the third and fourth year to be completed at a university - all years fully online. Optionally, students could elect to do face-to-face work on a community college campus and complete the upper division high-need teacher education program - such as mathematics education - online.

This must be viewed as a long-term project. Developing the program as a “system” program required a significant investment of time by a large number of faculty and staff in the first year as they worked to define the programs and the appropriate courses to be developed. For mathematics and science programs, UNC has organized one development process for all campuses. As a result, it requires time to gain the appropriate faculty buy-in across the campuses.

Next, faculty from across the system work to develop the specific online courses. The first focus has been on mathematics – there are now over 20 faculty working to develop 24 courses focused on secondary mathematics and as well as a Middle Grades concentration in mathematics.

As each course nears the end of development, there must be a thorough pedagogical review of the course content. This review is based on research regarding what constitutes a good learning experience for students. Based on the results of the review, a course may need additional work and revision.

The next stage is the initial offering and teaching of a course followed by further revision based on the feedback from students as well as the faculty member's assessment of what worked well and what may need attention and revision.

Only after this process has been completed is an online course released for use by faculty across the system. Significant development effort is needed in developing an online course since the course will be taught by different faculty who may have different teaching approaches.

It will take more time to report some of the data requested in the legislation. It takes at least four years for a student to matriculate through a high-need licensure program from the time of entry in a community college to graduation from the university. If a student is employed immediately upon graduation, it will take approximately two more years before DPI data would be available to track the student into employment. The current project for tracking teacher entry, persistence, and impact on K12 student learning is now using data from 2005. In summary, much of the data requested will not be available for at least six years from the point that a student enters a community college. Since this program has been in existence for only three years, much of which has been taken up with course and program development, there is little data to report at this time.

SECTION 1: IDENTIFIED HIGH-NEED PROGRAM AREAS

NCCCS and UNC have previously collaborated to articulate online degree programs in communication, criminal justice, liberal arts, and business, with continuing discussion of other potential areas for online articulation. Based on these previous articulations the two systems agreed to focus on building online degree programs primarily in teacher education and targeting high-need licensure areas. This strategy will result in full four-year articulated online degree programs accessible from anywhere in the state that can be used to increase the number of teachers being produced. Program areas identified for online development are as follows:

- Secondary Mathematics Education
- Secondary Science Education (specific fields and comprehensive)
- Middle Grades Education (Concentrations in Mathematics and in Science)
- Special Education
- Elementary Education
- Birth through Kindergarten
- Biology Education

The overarching goal is to have a pre-major agreement between the North Carolina Community Colleges and the University serving each identified area so that students at community colleges will be aware of the sequence of courses that will prepare them to enter the upper-division education major.

SECTION 2: STRATEGY FOR ADDRESSING PRIORITY AREAS

Two strategies have been implemented to address the identified priority areas; 1) support for individual campus 2+2 development efforts in the identified areas, and 2) a collaborative development effort that will enable all campuses to utilize courses developed in the high priority areas of mathematics and science.

- Strategy 1 - In some of the identified program areas, such as Birth to Kindergarten, Special Education, and Elementary Education, there were already a significant number of courses developed online at UNC campuses. For these areas and at those campuses that had a program almost completely online, funds have been provided to make those programs available fully online. It was anticipated that these programs would be ready to enroll students sooner since a smaller development effort was needed.

- Strategy 2 – In identified areas where few or almost no courses are available online at the UNC campuses, such as in Mathematics and some sciences, the strategy adopted was to jointly develop a full set of courses for a degree which would be available for use by any campus. As part of this arrangement one or more campuses would commit to offer the degree fully online and in articulation with the community colleges. While these courses will be developed as part of unitary degree programs, many of the courses will serve lateral entry teachers and others who hold a bachelor's degree in a subject area but who need additional course work in order to be certified.

SECTION 3: INITIAL DEVELOPMENT EFFORTS AND SUPPORTING INITIATIVES

East Carolina University (ECU) has been funded to develop Elementary Education and Special Education programs; ECU was also funded to develop a Birth through Kindergarten program; North Carolina Agricultural & Technical State University was funded to develop an Elementary Education program; UNC Pembroke was funded to develop Birth through Kindergarten and Special Education programs; and Western Carolina University has been funded to develop Middle Grades Education pedagogy courses.

Through the collaborative development strategy, mathematics and mathematics education faculty from across UNC are developing or have developed 16 middle grades mathematics concentration courses and 10 secondary mathematics education courses. Two of these courses (geometry and algebra) were offered online in fall 2007. Three of these courses (number theory, mathematics methods I, and history of mathematics) were offered online spring 2008. The remaining mathematics courses are still under development and pedagogical review.

To ease the transition of community college students to upper division online programs, an electronic portal devoted specifically to the needs of 2+2 students has been developed that provides the necessary information to make the transfer process much easier. UNC, in collaboration with NCCCS, is committed to expanding the development of this portal for these students.

A potential source of new teachers is retired military personnel but there have been past difficulties in connecting military personnel and their spouses to teacher education opportunities around the state. An online module has been developed to acquaint military personnel and their spouses with the rich educational opportunities available across the state as well as make them aware of online programs that will allow them to start working on teacher certification before retirement. Additionally, an online module for community college transfer students was developed specifically to assist 2+2 students with necessary information about 2+2 programs and transfer articulation issues. The military and 2+2 modules are available on the front page of the University of North Carolina Online website (http://online.northcarolina.edu).

Following the model established in 2005-06 for collaboratively addressing middle grades and secondary mathematics, faculty from science education and science came together to determine what constituted a good sequence of courses for a Middle Grades major who wanted to concentrate in Science. From a list of possible courses, 25 courses were chosen for development. Individual faculty members and teams of

faculty were then identified to develop the courses. Each course has a science faculty member addressing and developing the course content while working simultaneously with an education pedagogy team to ensure quality content and pedagogy in the development process. In addition, LEARN NC, a development support group, provides instructional design and project management for course development efforts and the pedagogical review team.

In 2006-07, funds provided to the University were directed toward the development of the online middle grades science concentration courses, secondary science education courses, middle grades education pedagogy course development at East Carolina University and Western Carolina University, expanded support for middle grades and secondary education mathematics courses, and 2+2 integration efforts with the University of North Carolina Online.

SECTION 4: 2007-08 DEVELOPMENT EFFORTS AND ACCOMPLISHMENTS

In 2007-08 UNC worked toward the development and implementation of collaborative inter-institutional accessibility of the courses through the University of North Carolina Online, including refinement of the process for pedagogical and content review directed at ensuring that online courses maintain standards of high quality. The University also began the initial development of an Online Community of Faculty Developers and Online Instructors to provide an online venue for exchange of information and ideas that will enhance online development efforts.

UNC has taken steps to develop systems to track student progress and articulation between a community college and a UNC institution. In doing so, UNC has partnered with the Duke Data Center, the North Carolina Department of Public Instruction, and others such as the Frank Porter Graham Child Development Institute at UNC Chapel Hill, to conduct research and data analysis regarding teacher quantity and quality and its impact on K16 education in North Carolina, particularly as it relates to student progress and articulation between North Carolina community college campuses and University of North Carolina institutions.

UNC has continued development efforts with the primary list of courses in Middle Grades Science and Mathematics concentrations, Secondary Mathematics, and Secondary Science. In addition to the original courses, UNC expanded the list of 18 Secondary Science courses to include upper-level concentration sequence courses.

<u>Expanded Secondary Science Education Courses:</u>
The expanded courses for secondary science education are:

- Mechanics
- Electricity and Magnetism
- Thermodynamics
- Quantum Mechanics
- Optics
- Hydrology
- Rocks and Minerals
- Structural Geology
- Geomorphology
- Plant Biology
- Animal Biology
- Plant Physiology

- Animal Physiology
- Evolutionary Biology
- Organismal Biology
- Micro Biology

List of alternative courses to add laboratories:
- Historical Geology
- Environmental Studies

Middle Grades Education Science Concentration Course Sequence
The courses and labs selected for the concentration in Middle Grades are:

- Chemistry I (3sch) & Lab (1sch)
- Conceptual Physics (3sch) & Lab (1sch)
- Basic Physical Geology (3sch) & Lab (1sch)
- Earth Systems - Geology, Oceanography, Atmospheric, Tectonics, Surface Process, Meteorology, Climatology (3sch) & Lab (1sch)
- Astronomy (3sch) & Lab (1sch)
- Environmental/Ecology (3sch) & Lab (1sch)
- Human Biology
- General Biology I (3sch) & Lab (1sch)
- Genetics (3sch) & Lab (1sch)
- Science Methods for Middle Grades I - integrated lab course
- Science Methods for Middle Grades II - integrated lab course

Secondary Science Education Course Sequence
The course and lab sequence for the online secondary science teacher education degree is as follows:

- Chemistry I (3sch) & Lab (1sch)
- Chemistry II (3sch) & Lab (1sch)
- Organic Chemistry I (3sch) & Lab (1sch)
- Organic Chemistry II (3sch) & Lab (1sch)
- Quantitative Analysis (3sch) & Lab (1sch)
- Physical Chemistry I (3sch) & Lab (1sch)
- Inorganic Chemistry (3sch) & Lab (1sch)
- Biochemistry (3sch) & Lab (1sch)
- Physics I – (3sch) & Lab (1sch)
- Physics II – (3sch) & Lab (1sch)
- Basic Physical Geology (3sch) & Lab (1sch)
- Historical Geology
- Meteorology & Climatology Combination (3sch) & Lab (1sch)
- Earth Systems - Geology, Oceanography, Atmospheric, Tectonics, Surface Process, Meteorology, Climatology (3sch) & Lab (1sch)
- Oceanography (3sch) & Lab (1sch)
- Astronomy (3sch) & Lab (1sch)
- General Biology I (3sch) & Lab (1sch)
- General Biology II (3sch) & Lab (1sch)
- Genetics (3sch) & Lab (1sch)
- Ecology (3sch) & Lab (1sch)
- Environmental Studies
- Cellular and Molecular

- Biology (3sch) & Lab (1sch)
- Secondary Science Methods I – integrated lab course
- Secondary Science Methods II – integrated lab course

Middle Grades Education Mathematics Course Sequence
The courses selected for the concentration in Middle Grades are:

- Calculus I (4sch)
- Calculus II (4sch)
- Numbers (only) (3sch)
- Algebra (only) (3sch)
- Numbers/Algebra (3sch)
- Geometry (only) (3sch)
- Measurement (only) (3sch)
- Geometry/Measurement (3sch)
- Data/Statistics (3sch)
- Discrete Math (3sch)

Secondary Mathematics Education Course Sequence
The course sequence for the online mathematics science teacher education degree is as follows:

- Calculus I (4sch)
- Calculus II (4sch)
- Calculus III (4sch)
- Linear Algebra (3sch)
- Modern Algebra (3sch)
- Geometry – primarily Euclidian, axiomatic, and proof oriented (3sch)
- History of Math (3sch)
- Differential Equations (3sch)
- Proof and Number Theory (3sch)
- Statistics II – calculus/probability based (3sch)
- Computer Science – programming emphasis (3sch)
- Mathematical Modeling (3sch)
- Discrete Math I (3sch)
- Discrete Math II (3sch)
- Mathematics Teaching Methods I (3sch)
- Mathematics Teaching Methods II (3sch)

SECTION 5: 2007-08 BUDGET FOR DEVELOPMENT AND SUPPORTING EFFORTS

LINE	ITEM	AMOUNT
1	UNC CH LEARN NC (Expanded Secondary Science Education Course and Laboratory Development, Primary list of Middle Grades and Secondary Science Education Course and Laboratory Development, and Pedagogy Review/Lab Facilitator Enhancement)	$559,577
2	WCU (Enhancement of 2+2 Middle Grades Education Pedagogy Course Development)	$18,000

3	ECU (Enhancement of 2+2 Special Education course Development)	$16,800
4	NCA&T (Enhancement of 2+2 Elementary Education course Development)	$19,500
5	UNC-P (2+2 Special Education course Development)	$75,862
6	Development of Online Community of Faculty Developers and Online Instructors	$15,000
7	Development of Systems to Track Students Progress	$21,236
8	Miscellaneous (Travel, Materials, and Equipment)	$1,320

Note: With the exception of items 6-8 (totaling $37,556), all of the funds provided to the University in 2007-08 were directed toward online course and program development to support 2+2 programs in teacher education.

SECTION 6: NEXT STEPS FOR CONTINUED DEVELOPMENT AND IMPLEMENTATION

Future efforts with the UNC-NCCCS 2+2 E-Learning Initiative will focus on the continuation of science course and laboratory development and mathematics courses development. This is a time intensive process that requires significant coordination with the campuses and participating faculty.

The University will also utilize funding in the 2008-09 to further develop the online community of faculty developers and online instructors and to continue the development of systems to track student progress and articulation through the online programs and into the public schools of North Carolina. There will be an emphasis placed on this aspect of the initiative in order to respond to the additional reporting elements identified in the amended the language of the legislation (SL2005-0276, §9.7b and §9.7c).