NORTH CAROLINA COMMUNITY COLLEGE SYSTEM
H. Martin Lancaster, President

February 26, 2008

MEMORANDUM

TO: Presidents
Chief Academic Officers
Distance Learning Administrators
Student Services Administrators
Continuing Education Administrators

FROM: Dr. Delores Parker
Vice President, Academic and Student Services

SUBJECT: Joint Report on the NCCCS – UNC 2 + 2 E-Learning Initiative

The North Carolina Community College System has recently received recognition for initiatives in distance learning. The General Assembly has appropriated recurring funds to the North Carolina Community College System for its efforts to address the critical teacher shortage in our state.

The attached document was provided at the request of the North Carolina General Assembly and includes results from the 2006-2007 fiscal year for the 2 + 2 E-Learning grant. This report represents a collaborative effort between the North Carolina Community College System and the University of North Carolina General Administration.

If you have questions concerning this initiative, you may contact Dr. Delores Parker at parkerd@nccommunitycolleges.edu or by phone (919) 807-7096.

c: Dr. Delores A. Parker
Dr. Saundra W. Williams

Attachment

CC08-051
E-mail

The North Carolina Community College System
and
The University of North Carolina
Joint Report on
The NCCCS – UNC 2 + 2 E-Learning Initiative
(Session Law 2006-66, Section 9.1)

Submitted At the Request of
The North Carolina General Assembly

H. Martin Lancaster, President
North Carolina Community College System

Erskine Bowles, President
University of North Carolina

February 2008

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Contact Persons:
Dr. Delores A. Parker, Vice President
Division of Academic and Student Services
North Carolina Community College System

Dr. Saundra Wall Williams, Vice President
Division of Administration
North Carolina Community College System

Dr. Alan R. Mabe, Vice President
Academic Planning
University of North Carolina

Alisa Chapman, Associate Vice President
Academic Planning and University School Programs
University of North Carolina

Part I
North Carolina Community College System

NCCCS/UNC 2 + 2 E-Learning Initiative
2006-2007

Pursuant to Session Law 2006-66, An Act to modify the Current Operations and Capital Appropriation Act of 2005, section 9.1, the North Carolina Community College System Office and the University of North Carolina General Administration submits this report on the implementation of the North Carolina Community College System (NCCCS) – University of North Carolina (UNC) 2 + 2 E-Learning initiative (the Initiative).

The System Office (SO) and the UNC General Administration (UNC-GA) have collaboratively identified four (4) areas to implement the 2 + 2 E-Learning Initiative. Those areas are:

A. Teacher Education online course development
B. Professional development
C. Student Tracking, and
D. Infrastructure

A. TEACHER EDUCATION ONLINE COURSE DEVELOPMENT

This initiative focuses on the critical teacher shortage facing the state and nation, both now and in the future. To address this need, the North Carolina Community College System (NCCCS), through the Virtual Learning Community (VLC), is focusing on the development of online courses needed to complete pre-major degrees in the following areas of greatest need:

Associate in Arts/Elementary Education (*totally online*)
Associate in Arts/Middle Grades Education and Special Education (*totally online*)
Associate in Science/Chemistry and Chemistry Education
Associate in Science/Biology and Biology Education
Associate in Science/Mathematics Education

The two systems have identified college transfer pre-education programs/courses within the Virtual Learning Community of the NCCCS that are currently available to students pursuing a teaching major at the university under the North Carolina Comprehensive Articulation Agreement (CAA). The VLC is a collection of online courses developed and shared by all North Carolina community colleges. As a result of the development of courses in 2006-2007, an Associate of Arts/Elementary Education and the Associate of Arts/Middle Grades Education and Special Education are now available totally online.

With the use of state appropriations to the NCCCS designated for distance learning, Virtual Learning Community course development centers developed five math and five science courses and edited 64 existing courses in 2006-2007. These courses help to build a strong foundation for the degree programs listed above. It is not enough to develop new online math and science programs. All courses in the Virtual Learning Community must be regularly edited and updated so that online degrees are maintained at the same high standards as traditional courses. Continuous editing of all courses strengthens each degree and enhances the reach of the 2 + 2 E-Learning Initiative funding which is focused on the development of math and science courses.

2006-2007 Math and Science Course Development Center

Courses developed in 2006-2007 by Virtual Learning Community Centers and currently available online:

New Online Math and Science Courses Developed in 2006-2007	
BIO 120	Introductory Botany
BIO 130	Introductory Zoology
CHM 131A	Introduction to Chemistry Lab
CHM 135	Survey of Chemistry I
MAT 175	Precalculus
MAT 175A	Precalculus Lab
MAT 271	Calculus I
MAT 272	Calculus II
MAT 273	Calculus III
PHY 110	Conceptual Physics

2007-2008 Math and Science Course Development Center

In November 2007, the NCCCS State Board awarded Southeastern Community College $150,000 in 2 + 2 E-Learning state appropriations to develop the following additional math and science courses for the VLC:

Course Number	Course Name
BIO 145	Ecology
CHM 151	General Chemistry I *
CHM 152	General Chemistry II *
MAT 285	Differential Equations
PHY 151	College Physics I
PHY 251	General Physics I

Note: Chemistry labs will be developed using Late Nite Labs software. This software was selected based on recommendations generated from software evaluations conducted during the 2005-2006 fiscal year.

These courses will be completed by May 26, 2008 and available for posting in the System Office course management system for use by colleges in Fall 2008.

B. PROFESSIONAL DEVELOPMENT

Description: The North Carolina Achieving Community College Excellence in Services to Students (NC-ACCESS) is an on-line resource dedicated to developing and providing professional development resources to student development personnel throughout the community college system. Realizing the success of the 2+2 E-Learning Initiative is dependent on students receiving strong support and guidance, the NC-ACCESS advisory board selected student retention and orientation for the year's focus, concentrating on aspects of advising, mentoring, at-risk services, and effective communications.

Audience: Student development personnel

Cost: $150,000

Status: Recommendations of the needs assessment conducted in Year One were implemented. Information on topics such as *Academic Advising, Evaluation/Assessment, Admissions, Registration,* and *Transition from High School to College* were added to the website. Over 13,000 visits to the website were recorded in the first three months of the launch of the revised website. Extensive marketing of the website and its contents took place throughout the year via presentations to student development personnel. Of impact were the suggestions made by student focus groups convened during the annual Student Leadership Institute. The importance of gathering and using the input of "customers" or "end users" cannot be over estimated. NCCCS staff responsible for the North Carolina Achieving Community College Excellence in Services to Students web site continued to work closely with system staff responsible for the North Carolina Network for Excellence in Teaching (NC-NET) to insure consistency between the two websites.

C. STUDENT TRACKING

In order to institute student tracking for education there must be the development of a statewide longitudinal data system. The North Carolina Department of Public Instruction (DPI), the North Carolina Community College System (NCCCS) and the University of North Carolina General Administration (UNCGA) are currently collaborating to plan the development of such a system. The purpose of the overall project will be to create one integrated longitudinal information system to provide input into the executive educational decision making processes for the state. Because of the complexity of the current data systems for each entity and the limited financial and human resources, the initial outcome

of the project will provide insight into areas where North Carolina is experiencing a critical shortage of qualified personnel: teaching and nursing.

The estimated cost of this type of project is beyond the scope of the UNC – NCCCS 2 + 2 E-Learning Initiative and will be a separate project from this initiative.

D. INFRASTRUCTURE

Utilization of 2+2 funding for System-wide distance learning solutions represents a cost-effective means to address our current and future teacher shortage. Solutions identified in this report establish the initial infrastructure required to update online courses, improve student resources, improve accessibility, and enhance learning opportunities for our education majors - or any target student population.

Collaboration with University of North Carolina General Administration
Collaboration between the University of North Carolina (UNC) and the North Carolina Community College System (NCCCS) personnel regarding distance learning infrastructure has been ongoing since April 2005. Since that time representatives from the two Systems have been meeting each month to discuss ways to promote collaboration and resource sharing.

For the past two years, the NCCCS staff has presented sessions at the Teaching Learning Technology Collaborative Conference and UNC staff has presented at the Distance Learning Alliance Conference. Both Conferences have included panel discussions featuring representatives from UNC, NCCCS, and Department of Public Instruction (DPI). These sessions have focused on collaboration and seeking common solutions to current and future challenges to education in NC. For example, in recent weeks, staff members of NCCCS and UNC have participated in multiple webinars related to Learning Object Repository (LOR) technology. Both Systems have established Learning Object Repository Steering Committees composed of faculty, library resources, support services, and administration. The first joint meeting of these Steering Committees occurred on July 11, 2006.

Student, Teaching and Learning Resources Implemented by the NCCCS

Educational Resource: North Carolina Learning Object Repository Resources for NCCCS - The Learning Edge (vendor), Hosted by ITS, NCCCS LOR Hardware

Description: Learning Object Repository technology provides a "library" of digitized learning content termed learning objects in which these objects can be catalogued, searched, shared, and modified. Learning Object Repository technology promotes sharing of high quality resources and drastically reduces costs of duplication. The 2+2 funds will be used to establish the North Carolina Learning Object Repository. Therefore, university and community college faculty, administrators, and support staff

will collaborate in all phases of planning, Request for Proposal development, evaluation of vendor proposals, implementation, and expansion of the North Carolina Learning Object Repository. The project includes 2+2 funds to be directed for appropriate project management services required to satisfy Senate Bill 991 documentation and protocol; and contract services to assure that all testing components of the vendor Request for Proposal and contract development are properly completed and documented.

Audience: Faculty and students of NCCCS and UNC

Cost: Not to exceed $500,000 first year

Status: The North Carolina Learning Object Repository (NCLOR) is in the final testing and confirmation phase as defined by the Senate Bill 991 process. The NCLOR is being evaluated by a team composed of skilled e-learning specialists and administrators representing NCCCS, UNC, and DPI. This evaluation team collaborated in the development of a national Request for Proposal, evaluation of vendor proposals, and selected the "best value" vendor. The product selected is Equella (product name) provided by The Learning Edge. The evaluation team is finalizing confirmation of the vendor proposal responses as articulated in the Request for Proposal. Vendor confirmation is expected by the end of 2007. The vendor confirmation will be completed in conjunction with Statewide Information Technology Procurement. Migration of the NCLOR to production services is expected by the end of February 2008, upon which time NCLOR services will be rolled out to NCCCS institutions.

[At the writing of this report, the contract for the Learning Object Repository has been awarded.]

Educational Resource: Southern Regional Education Board (SREB) Sharable Content Object Repositories for Education (SCORE) Initiative Charter Membership

Description: The Southern Regional Education Board Sharable Content Object Repositories for Education Initiative is the best organized and longest running regional effort to address adaptation of a Learning Object Repository to meet educational needs in the U.S. in a cost-wise fashion that enables all Southern Regional Education Board affiliates to reduce overall costs and duplication of effort. To this end, the Sharable Content Object Repositories for Education Initiative addresses the following:

- Quality assurance of e-learning resources based on standards and learning methodology
- Instructor qualifications, roles, responsibilities, and accountability
- Intelligent development of sharable learning resources based on areas of greatest need and utilization
- Federated standards-based Learning Object Repository protocol
  - Standard regional metadata development and deployment
  - Standard regional workflows development and deployment

       ○   Sharable Content Object Reference Model (SCORM) compliant Sharable Learning Object (SLO) development and deployment

Membership on the Sharable Content Object Repositories for Education Initiative Board will enable the NCCCS to have a voice in the future work undertaken by this Board.

Audience: NCCCS faculty and students

Cost: $20,000

Status: Active member

Educational Resource*:* Information Technology Services (ITS) Elluminate Collaboration Service

Description: Elluminate is a web-based collaboration tool that is effective for real time desktop sharing applications. It can be used in tandem with conference calls or for voice and video capabilities to provide effective communications with reduced long distance costs. Collaboration is important to meet the needs of students and faculty from diverse communities and programs. Elluminate is used for professional development by faculty of NCCCS.

Audience: Used for professional development for faculty and staff of NCCCS and to support Virtual Learning Community development centers

Cost: $25,000

Status: The NCCCS currently contracts with Information Technology Services for 50 Elluminate "seats." An additional 50 seats have been included in the three Virtual Learning Community Centers funded by new allocations in the 2007 Expansion Budget.

Educational Resource*:* Content-specific Pedagogy Project – Collaboration between NCCCS and LEARN NC

Description: LEARN NC led the development process for creating resources for content-specific pedagogy in the online environment. The project focus was math pedagogy, but laid the ground work for the development of future content-specific resource development. Resources were designed for current and future online math instructors at the post –secondary level.

Audience: Faculty of NCCCS and UNC

Cost: $40,000

Status: Project completed

Educational Resource: UNC Chapel Hill Course Management System Software Support (LEARN NC)

Description: LEARN NC, a program of the UNC-Chapel Hill School of Education will continue hosting Blackboard course management system software for the NCCCS Virtual Learning Community. Service includes hardware, backups, upgrades, and maintenance. The Blackboard license will be paid for by NCCCS.

Audience: Faculty and students of NCCCS

Cost: $25,700 annual renewal

Status: LEARN NC continues to host Blackboard, the course management system for the community colleges.

Educational Resource: SAS inSchool Curriculum Pathways - Higher Education Learning Objects

Description: Curriculum Pathways are high-end commercially prepared and copyrighted learning objects available to a wide array of community college students in areas of science, math, history, English/literature, and Spanish. These resources are available with a minimum of faculty training. These learning objects allow faculty to enhance either online learning or face to face courses.

Audience: Students and faculty of NCCCS

Cost: $63,500 renewal of contract

Status: NCCCS is now in the second year of a three-year contract. Use of Curriculum Pathways is steadily increasing in the majority of community colleges and in heavy use in a few community colleges.

Educational Resource: Late Nite Labs - Online Chemistry Lab Simulations

Description: Late Nite Labs are online chemistry simulations that provide instructors with the capability to develop and customize high quality online chemistry laboratory simulations. This software provides students with the capability of completing these labs anytime, anywhere.

Audience: Students and faculty of NCCCS

Cost: $6700 renewal

Status: Five hundred ninety-four (594) of the licensed 600 student seats were used by community colleges in 2007. Demand for Late Nite Labs resources has led to doubling the seats from 600 to 1200.

[At the writing of this report, an additional $52,200 for an additional 600 student "seats" has been approved by the State Board of Community Colleges at the November 2007 meeting.]

Educational Resource: Remote Learner

Description: Remote-Learner provides the North Carolina Community College System with system administration services, training for administrators and faculty, and hosting of Moodle online courses. Moodle is an open source alternative to expensive proprietary online course management systems such as Blackboard and WebCT currently in use by the vast majority of community colleges and universities in North Carolina. Open source solutions require no license fee for operation of online learning software. Remote-Learner provides cost-effective high level administration and expertise in open source course management system technology. These resources collectively are termed the North Carolina Moodle Users Group (NCMUG): effectively coordinating research efforts of both community colleges and universities into a cohesive, collaborative group.

Audience: Community college distance learning faculty and administrators

Cost: $41,000

Status: Twelve community colleges participating in the North Carolina Moodle Users Group project now run over 200 Moodle courses supported by Remote Learner. This service includes all hosting costs and faculty training required to launch Moodle courses. Two former North Carolina Moodle Users Group community colleges have established their own contracts with Remote Learner to expand online courses and services beyond the scope of the users group.

Educational Resource: Open Source Collaborative: Moodle Pilot

Description: Moodle open source course management system has been adopted by two NCCCS institutions. An open source system allows for the use of the most effective course designs without the limits of a proprietary system. Success of the North Carolina Moodle Users Group and the interest of several UNC institutions prompted creation of the joint NCCCS/UNC Open Source Collaborative: Moodle Pilot. This pilot project will consolidate the efforts of NCCCS and UNC institutions as they explore options of less

expensive and troublesome proprietary course management system solutions. The NCCCS staff has contracted with UNC General Administration to establish a central facility at which collaboration and experimentation can take place to enhance Moodle as an online learning platform, establish high quality faculty training and migration tools, and explore centralized, turn key solutions for the higher education community in North Carolina.

Audience: Faculty and students of NCCCS and UNC

Cost: $170,000

Status: The State Board of Community Colleges has approved the Open Source Collaborative. Members of the UNC staff are finalizing contractual work with a vendor to provide training, migration tools, and system administration. Hosting will take place at MCNC on the UNC network.

Educational Resource: North Carolina Information Highway (NCIH) Equipment

Description: The NCIH videoconferencing facility was equipped with a dedicated laptop computer programmed to mirror an image onto the video screen which integrates multi-media into videoconferencing sessions.

Audience: Faculty and students of NCCCS

Cost: $3700

Status: Equipment has been installed and is in use.

CONCLUSION

This report represents tremendous progress towards the goals of the 2+2 E-Learning Initiative, as well as the vision of distance learning for the North Carolina Community College System and UNC as a whole in achieving the goal of enhancing 2+2 programs through the use of e-learning. Currently, the work that is continuing through these and other funds is establishing resources that will enable faculty and staff statewide to develop high quality online courses and programs using broadband connectivity and that will enhance student learning and success, especially through 2+2 programs. The resources developed in support of this and other initiatives will create a North Carolina distance learning system that is:

Accessible by students, instructors, and developers;
Aligned across lifestyles, careers, and institutions;
Adaptable in meeting diverse and changing needs for learning;

Supportive of both faculty and student development needs;
Practical for effective delivery of courses and application of learning; and
Standards-based for quality and relevance.

Part II
UNIVERSITY OF NORTH CAROLINA
REPORT ON USE OF 2006-07
UNC-NCCCS 2+2 E-LEARNING INITIATIVE FUNDS

January 2008

In 2005, the General Assembly approved legislation to provide the North Carolina
Community College System $1 million (R) and the University of North Carolina $1
million (NR) 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.

While in the first year of this legislation (2005) the North Carolina Community College System (NCCCS) received recurring funds and University of North Carolina received non-recurring funds, the General Assembly provided the University of North Carolina $1 million (NR) in 2006 to continue work with the NCCCS to place more articulated degree programs online so students anywhere in the State could access them by taking the first two years online through a community college, followed by the upper-division major courses being completed through a constituent institution of the University of North Carolina.

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

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IDENTIFIED HIGH NEED PROGRAM AREAS

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The NCCCS and UNC have previously collaborated to articulate online degree programs in the areas of communication, criminal justice, liberal arts, and business, with continuing discussion of other potential areas for online articulation. Based on these previous program articulations the two systems agreed to focus the "UNC-NCCCS 2+2 E-Learning Initiative" on building online degree programs primarily in teacher education and targeting high-need licensure areas. This focus will result in full four-year articulated online degree programs accessible from anywhere in the State and can assist in increasing the number of teachers being produced for NC public school classrooms. The teacher education 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 of this collaborative plan is to have a pre-major agreement between the Community Colleges and the University serving each identified area so that students at community colleges will know the sequence of courses that will prepare them to enter the upper-division education major.

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UNC STRATEGY FOR ADDRESSING PRIORITY AREAS

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UNC identified two primary strategies to address the priority high-need program areas; 1) support for individual campus 2+2 development efforts in the identified areas, and 2) collaborative development effort that will enable all campuses to utilize courses developed in the areas of mathematics and science.

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

- UNC Strategy 2 – In high-need areas where few or almost no courses were available online at the UNC campuses, such as in mathematics and some sciences, the strategy adopted was to jointly develop of a full set of courses for these degree areas 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.

UNC INITIAL DEVELOPMENT EFFORTS AND SUPPORTING INITIATIVES

In 2005-06, East Carolina University (ECU) was funded to develop Elementary Education and Special Education; ECU was also funded to develop Birth through Kindergarten; North Carolina Agricultural & Technical State University was funded to develop Elementary Education; UNC Pembroke was funded to develop Birth through Kindergarten.

Also a focus of initial collaborative development efforts in 2005-06 was the Mathematics concentration in Middle Grades. First, faculty from Mathematics and Mathematics Education met to determine what constituted a good sequence of courses for a Middle Grades major who wanted to concentrate in Mathematics. From comprehensive list developed by the faculty, courses were selected for online development. Following this initial step faculty from across the system were identified to develop the courses. An education pedagogy review team, consisting of faculty from across the system, was established to ensure quality review and instructional design for each course prior to being made available for all campuses to utilize. Additionally, UNC contracted development support from LEARN NC to provide instructional design and project management for this work.

The courses selected for the Middle Grades concentration in Mathematics and currently under development are:

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

To ease the transition of community college students to upper-division online programs, an electronic portal devoted specifically to the needs of 2+2 track students was developed in 2005-06 to provide 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, but there have been difficulties connecting military and their spouses to teacher education opportunities around the State. In 2005-06, an online module was developed to acquaint military personnel and their spouses with the rich educational opportunities available across the State, and to make them aware of online programs that will allow them to start working on teacher certification before they retire.

UNC 2006-07 ACCOMPLISHMENTS AND CONTINUING DEVELOPMENT EFFORTS

Through the collaborative development strategy, 10 Middle Grades Mathematics concentration courses and 16 Secondary Mathematics Education courses are currently either under development or have been completely developed in an online format by mathematics and mathematics education faculty across the system. Of these courses, 2 (geometry and algebra) were offered online in fall 2007; 3 (number theory, mathematics methods I, and history of mathematics) are being offered online spring 2008; and 8 of the courses are currently being reviewed by the 2+2 pedagogy team and will be offered online in the summer and fall terms 2008. The remaining courses are still under development and will begin pedagogical review in the spring and summer terms 2008.

Secondary Mathematics Education Course Sequence
Courses selected for the Secondary Mathematics Education degree are:

- 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 (3sch)
- Mathematical Modeling (3sch)
- Discrete Math I (3sch)
- Discrete Math II (3sch)
- Teaching Methods I (3sch)
- Teaching Methods II (3sch)

In addition to addressing Secondary Mathematics Education in 2006-07, the course sequences for a Middle Grades Science concentration and Secondary Science Education were identified with initial coordination and development efforts beginning for this content area.

Middle Grades Science Concentration Course Sequence
Courses selected for the Middle Grades concentration Science are:

- Chemistry I (3sch) & Lab (1sch)
- Conceptual Physics (3sch) & Lab (1sch)
- Basic Physical Geology (3sch) & Lab (1sch)
- Earth Systems - (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
Courses selected for the Secondary Science Education degree are:

- 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 (3sch)
- Meteorology & Climatology Combination (3sch) & Lab (1sch)
- Earth Systems - (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 (3sch)
- Cellular and Molecular (3sch) & Lab (1sch)
- Secondary Science Methods I – integrated lab course
- Secondary Science Methods II – integrated lab course

Funding was also provided in 2006-07 to Western Carolina University and East Carolina University to develop the Middle Grades Education pedagogy courses that will complement the Middle Grades Mathematics and Science concentration courses for this degree program area. As part of this arrangement, these campuses have agreed to utilize the collaboratively developed concentration courses in Mathematics and Science to offer the degree fully online and in articulation with the community colleges.

UNC also directed a small portion of funding in 2006-07 toward the integration of online 2+2 degree program development with the University of North Carolina Online and the ongoing enhancement of the transfer articulation module developed 2005-06.

UNC 2006-07 BUDGET FOR DEVELOPMENT AND SUPPORTING EFFORTS

LINE	ITEM	AMOUNT
1	UNC CH LEARN NC • Middle Grades Education and Secondary Science Education Course Development • Expanded Support for Middle Grades Education and Secondary Math Education Course Development	$604,197
2	Western Carolina University • Middle Grades Education Pedagogy Course Development	$212,450
3	East Carolina University • Middle Grades Education Pedagogy Course Development	$120,450
4	2+2 Integration Efforts with University of North Carolina Online	$62,903
5	Total	$1,000,000

Note: With the exception of the 2+2 integration efforts with the University of North Carolina Online, all of the funds provided to the University of North Carolina were directed toward course and program development to support online 2+2 programs in teacher education.

UNC FUTURE STEPS FOR CONTINUED DEVELOPMENT AND IMPLEMENTATION

Future steps for continued development and implementation of the "UNC-NCCCS 2+2 E-Learning Initiative" will involve collaborative inter-institutional accessibility of the courses through the University of North Carolina Online, including establishing a timeline and process for continued rotation of pedagogical and content review directed at ensuring the online courses maintain standards of high quality.

Additionally, UNC will take steps to develop systems to track student progress and articulation between a North Carolina Community College and a UNC institution. In doing so, UNC will seek to forge partnerships with the Duke Data Center, NC 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 will continue development effort with the primary list of courses in Middle Grades Science and Mathematics concentrations, Secondary Mathematics, and Secondary Science. In addition to these, UNC will expand the list of Secondary Science courses to include upper-level concentration sequence courses.

<u>Expanded Secondary Science Education Courses:</u>
The expanded course list for Secondary Science Education is:

- 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

Conclusion

This work in online course development for high need teacher education areas is going well and we are nearing the end of the development of the full curriculum for mathematics secondary and middle grades mathematics concentration. As part of our quality control process we do not consider the course fully developed for online use until it has been reviewed by a pedagogy team and has been taught once by the developer and modified if needed based on the teaching experience. The level of faculty cooperation across institutions is to be applauded in this important initiative.

We are in the start up phase of developing the sciences courses which are complicated by the presence of labs that typically are taught on site. We are carefully exploring how to develop labs that provide the kinds of experiences the science faculty at our institutions expect from science students. The success with developing mathematics courses for

mathematics teacher education has generated a strong confidence that success can be realized with the challenges presented by offering online science courses and labs.

The availability of these programs online will not only address the quantity and quality of the preparation of prelicensure teachers, but the courses or parts of the course will be available for professional development of mathematics and sciences teachers across the State.