FINAL REPORT
SUSTAINABLE UNIVERSITIES INITIATIVE
June 6, 2001

PROJECT TITLE:
LINKING UNIVERSITIES AND K-12 THROUGH THE PLANNING AND DESIGN OF CURRICULA AND OUTDOOR LEARNING ENVIRONMENTS FOR SOUTH CAROLINA SCHOOLS

NAME: Mary T. Haque, Principal investigator (and Deborah Johnson, Co-principal investigator)
FACULTY RANK/TITLE: Professor
DEPT./COLLEGE/CAMPUS: Department of Horticulture, Clemson University, Main Campus
YEARS AT PRESENT INSTITUTION: 21
CAMPUS PHONE: 864-656-4958
FAX: 864-656-4960
E-MAIL: mhaque@clemson.edu
AMOUNT REQUESTED: $10,000
PROJECT DATES: May 1, 2000 to May 1, 2001

A Service Learning Project funded by the Sustainable Universities Initiative
Professor Mary Taylor Haque, Department of Horticulture, Clemson University
Ms. Deborah Johnson, The Belser Arboretum, The University of South Carolina
Dr. Bernadette Longo; Department of English, Clemson University
Dr. Barbara Weaver; America Reads, Clemson University

An interdisciplinary group of students and faculty from several institutions have completed another semester in an ongoing multi-grade collaboration to design and install sustainable schoolyard habitats throughout South Carolina. Funded by the Sustainable Universities Initiative (SUI), the project goal is to research, plan, design, and install sustainable landscape/naturescapes for schools, many of whose schoolyards are currently dessert-like. Building on the schoolyard habitat program and Campus Ecology established by the National Wildlife Federation (NWF), the project focus is to involve both university and K-12 school students in identifying environmental problems, using critical thinking skills to propose solutions, and taking action to effect change. This includes issues associated with wildlife habitat, curriculum development, transportation efficiency, energy use, recycling, water use, landscape maintenance, and biodiversity.

Our goals are to research, design, and reflect on sustainable and efficient landscapes, and to brainstorm and take action on issues that can make our universities and schools more sustainable. A colloquium at Clemson University in September of 2000 brought invited speakers Trish Jerman from the Sustainable Universities Initiative, Ed Falco representing the South Carolina Wildlife Federation and Duke Power, and Rick Huffman, president of the South Carolina Native Plant Society to lecture and brainstorm with students and faculty participating in the project. Students presenting the results of the brainstorm sessions indicated their interest in working towards advancing their knowledge and commitment to environmental stewardship and enhancing other’s education through this partnership.

One goal of this project is to reach out to a diverse population by sharing information about sustainable community environments. Another goal is to provide an opportunity for students to learn and develop
communication skills through participation in a project that has a community impact. Students are working with other students, teachers, parents, volunteers, and administrators in four phases: 1) research, analysis, and information gathering; 2) planning and design; 3) implementation and action; and 4) sharing, reflection, evaluation, and recognition.

In the past year, Clemson University students have completed designs for Clemson Elementary School, Hunt Meadows Elementary School, and D.W. Daniel High School in the upstate, Forest Heights Elementary School and Denny Terrace Elementary School in the mid-state, and Dorchester Academy in the lower part of the state. Design students working with Professors Mary Haque, Gina McLellan, and Lolly Tai have had multiple opportunities to practice their presentation skills by presenting their work to various groups and individuals including parent teacher organizations (PTO's), planning committees, television crews, reporters, and colleagues at professional society meetings. The various designs emphasized xeriscape, tree planting for energy efficiency, low maintenance, wildlife habitat, literature gardens, and outdoor learning environments. Guest lecturers and critics included teachers, parents, students and administrators from the schools and experts Dr. Brenda VanderMey, Dr. Bill Stringer, Ms. Diane Eldridge, Ms. Georgia Harrison, Mr. Gene Wilson, Dr. Don Ham and Dr. Delga O'Callaghan who provided direction, feedback, and evaluation on issues ranging from planning to tree protection at points throughout the design process.

English students enrolled in Professor Burnadette Longo's First Year Composition (English 101) researched and wrote about environmental issues, posted papers to their website, and presented reports and sustainability events. Professional Communication students enrolled in English 851 researched funding sources, wrote letters and proposals requesting funding for the project, and obtained donations of tools to help with project installation. English and horticulture students wanted to put what they learned into action, and some helped with phases one and two of the sustainable courtyard installation at Hunt Meadows Elementary School led by Dr. Sonja Maki.

Dr. Barbara Weaver organized "CommuniCon 2001: Sustaining the Upstate" in April 2001 to provide America Reads tutors and students an opportunity to join community partners to celebrate and share their accomplishments over the year. Clemson tutors and their elementary school students read about environmental issues throughout the year as did Ms. Megan Chandler's English classes at R.C. Edwards Middle school, who were invited to participate in the "Sustainability Fair" held at Littlejohn Community Center. University students from English and Horticulture classes also presented posters together with Dr. Deborah Johnson from the W. Gordon Belser Arboretum at the University of South Carolina and teachers from Forest Heights School in Columbia. CommuniCon 2001 was sponsored by Microsoft Corporation, The Sustainable Universities Initiative, and Landscapes for Learning with help from many additional organizations and individuals. The poster session format allowed students and faculty to present their work, meet others, and discuss their successes and challenges in a celebration enhanced by good food and punctuated by festive music by Dr. Michelle Martin.

Ms. Deborah Johnson, working in cooperation with teachers Fran Rizer and Barbara Dire at Forest Heights School, developed a curriculum reflecting state science standards for elementary schools using Clemson University student designs. Students and faculty have delivered PowerPoint presentations at schools and at professional society meetings. Posters about the project were developed and presented at Earth Day celebrations, service-learning meetings, landscape for learning collaborative meetings, and other appropriate occasions. Several students attended “Habitat Stewards” (NWF) workshops and are working to become certified Habitat Stewards with NWF. Students Jennifer Dukes from Horticulture and Erin Jordan from Landscape Architecture won the Clemson University Service Learning Award for their work on this project.
Teachers traditionally take the active role, gathering and compiling information, asking questions, and providing answers. Advanced learning, of an active and ongoing kind, can be stimulated by allowing and encouraging students to, first, ask important questions, and second, set about exploring new territories by finding their own answers. Once found, the depth of these answers can be measured by giving them to someone else to test and utilize. This project enables students to ask questions, and it stimulates curiosity, promotes interest, improves reasoning, and increases their ability to isolate and define problems.

This project also allows students to discover sources, collect information, analyze data, and solve problems. When asked to communicate solutions to an interested party, students must learn to sift through the information collected, decide what data is most appropriate, and prepare a meaningful presentation for their audience. A sense of accomplishment and satisfaction usually results when students follow this three-part process of asking questions, seeking solutions, and giving answers. The process takes on special significance when taken out of the classroom and placed in the community. Students become teachers, a reversal of roles which many find stimulating.

In conclusion, institutions of higher education and K-12 schools are meeting, communicating, and working toward common goals. With supervision from teaching faculty and partner organizations, students are providing the link to benefit schools, universities, surrounding communities, and most importantly, the students themselves. They are learning about research, environment, sustainable lifestyles and landscapes, oral, written, and graphic communication, collaboration, and electronic media. For an in-depth look at student designs, posters, PowerPoint presentations, brochures, and reaction papers, visit Professor Haque's and Professor Longo's web sites at:

http://virtual.clemson.edu/groups/hort/courses/sustainable_schoolyards/Designing_SSHs/dssh_ind.htm
http://people.clemson.edu/%7Eblongo/sustainability/susmain.html

**Participating College Courses: Clemson University:**

1) Horticulture 208 Landscape Appreciation--taught by Professor Mary Haque-Enrollment 35 students; Department of Horticulture, College of Agriculture, Forestry, and Life Sciences; Fall 2000 and spring 2001
2) Horticulture 308 Landscape Design --taught by Professor Mary Haque- enrollment 12 students; Department of Horticulture, College of Agriculture, Forestry, and Life Sciences; Fall 2000.
3) Agric. H491--taught by Professor Mary Haque-working with senior honors student Jennifer Dukes; Department of Horticulture, College of Agriculture, Forestry, and Life Sciences; Fall 2000.
4) Hort. 400 Landscape Implementation- taught by Professor Mary Haque-Enrollment 12 students; Department of Horticulture, College of Agriculture, Forestry, and Life Sciences; Spring 2001.
5) Hort. 461, Problems in Landscape Design, taught by Professor Mary Haque- Department of Horticulture, College of Agriculture, Forestry, and Life Sciences; enrollment 18 students spring 2001.
6) English 101, First Year Composition, taught by Professor Burnadette Longo, Department of English, College of Architecture, Arts, and Humanities. Fall 2000 and spring 2001.
7) English 851 Professional Communication, taught by Professor Burnadette Longo, Department of English, College of Architecture, Arts, and Humanities. Fall 2000.

**K-12 Schools and contacts:**
1) Morrison Elementary School, Clemson, SC-Dr. Gina McLellan, President, School Improvement Council; Dr. Paul Pritchard, Principal, and Margaret Simms, Science Teacher
2) Edwards Middle School, Central, SC-Meghan Chandler, English Teacher
3) Daniel High School, Clemson, SC, Mr. Earl Gilstrap, Principal, Ms. Sharon Sanders, School Improvement Council
4) East End Elementary School, Easley, SC, Ms. Vicki McKinney, Assistant Principal
5) Burton Pact Elementary School, Columbia, SC; Jennifer Francies; Nancy Hutchinson (The Science and Technology School for Richland County School District #1
6) Forest Heights Elementary School, Columbia, SC; Dr. Cynthia Cash-Greene, Principal Barbara Dire (735-3413 school; 786-9093 home) Richland County School District #1 (Denny Terrace and Cane Creek merged to form the new school of Forest Heights in 2000)
7) Hunt Meadow Primary School, Anderson County, SC- Nancy Prince, Principal; and Sonja Maki, Parent Volunteer
8) Dorchester Academy-St. George, SC. Jennifer Dukes, Alumnae; Mr. Berry, Headmaster
Elementary Curriculum

KINDERGARTEN – Component I

Objective: To adopt and write a story about a tree in the courtyard outside the classroom.

Activity 1

- Students elect a tree from the naturescape plant for the courtyard outside the KG room. Students will have pictures of the trees to be planted and will choose one of them. Using a seed from a real tree selected, the students will create a mural that represents the life cycle of the tree (seed, seedling, young tree, mature tree, aging tree).

Activity 2

- Each student will draw their own tree that represents the tree in the mural and the ones to be planted outside the classroom.

Activity 3

- Students will create a story about their individual tree.

SC Standards – Kindergarten
Life Science: Life Cycles of Organisms, 1a
K-CM-2, K-WA-2, K-WS-3
KINDERGARTEN – Component II

Objective: Describe earth materials using five senses.

Activity I
- Students will collect rocks and soil samples from various areas on the school grounds.

Activity II
- Students will compare the rocks according to color, texture and shape.
- Students will compare soil samples as to color and shape and size of particles that make up the soil.

Activity III
- Students will sift soil to reveal living organisms (worms, insects) in the soil.

Activity IV
- Students will make a display of the rock and soil they have studied.

SC Curriculum Standards: Kindergarten

Inquiry: Process Skills, 1a, 2a
Earth Science: Properties of Earth, A1a, A2a
KINDERGARTEN – Component III

Objective: Observe and describe how living things change as they grow

Activity I

- Students will put gourd seed plants to be grown in the naturescape outside their classroom in water to soak overnight. The next day the students will identify the parts of the seeds revealed from the soaking.

Activity II

- Students will identify and discuss the natural resources needed for gourd seeds to grow (water, air, light, food).

Activity III

- Students will help prepare the soil in the flowerbeds outside their classroom. This includes digging and breaking up the soil. Also amending the soil with composted material.

Activity IV

- Students will plant and water the gourd seeds

Activity V

- Students will monitor the growth of the seeds as they grow into a vine, flower and fruit. Students will discuss how they will use the gourds, using information on naturescape poster.

SC Curriculum Standards – Kindergarten
Science: Life Science, Plants and Animals, B1a, b, c
KINDERGARTEN – Component IV

Activity I

- Students will discuss the following about water:
  1. Would you drink water in a bucket that had been used for mopping? Why, why not?
  2. Would you drink water that has plant fertilizer in it? Why, why not?
  3. Would you drink water from a clear, mountain spring? Why, why not?
  4. Why is it important to have clean water?
  5. How do we keep water clean?

- Keeping water clean means there will be water for people to use next year. That is sustainability.

Activity II

- Students will discuss how they made paper in class.
  1. What was needed to make paper? Trees (tree pulp) and water. We can grow trees, cut them, make paper, recycle that paper and make more paper. We also can plant more trees to grow and cut and make paper – that is sustainability.
  2. Make the point that trees are a renewable (sustainable) resource.

SC Curriculum Standards: Kindergarten

THIRD GRADE – Component I

Objective: to understand the meaning of “sustainability” in reference to the use of natural resources.

Activity I

- Class will discuss the meaning of “to sustain”, “ability” and “natural resources” and give examples of each. Meaning and examples will be recorded on poster board.
- In groups of four, the students will review the “Selected Native Grasses of the Piedmont of South Carolina” and pick on grass to study. Students will make a poster illustrating their grass and answer the following questions:
  1. Why does this grass grow successfully in the Piedmont of South Carolina?
  2. Where does it grow in the Piedmont?
  3. What are its growth characteristics?
  4. What is its distribution?

Activity II

- Students will investigate if their grass is growing in the native grass area of the campus. If it is they will cut specimen, press and dry it. The specimen will be added to their poster.

Activity III

- Student groups will present their grass to class and explain why agronomists agree this is a “sustainable” grass for the Piedmont.

SC Curriculum Standards – Third Grade

Science: Life Science, Characteristics of Organisms, 2c, Organisms and their Environments, 1a, 2a, d, e, f
THIRD GRADE – Component II

Objective: To observe and monitor heat in the parking lot in front of the school.

Activity I

- Students will visit the front parking lot and make a drawing of it, including area for the cars and area for the plants. Students will include the trees and plants in this drawing.

Activity II

- The class as a whole will discuss the following:
  1. Where will the temperature be the coolest? The hottest?
  2. What time of day will the temperature be the hottest? In which direction is the sun when the temperature is the hottest?
  3. Predict how much higher the temperature will be inside a car with all the windows up and a car with all the windows down?
  4. Predict what the temperature will be in a car sitting in the shade of a tree.

Activity III

From the beginning of school record the following:

1. The temperature at 9:00 am, 12:00 pm and 2:00 pm in the following places in the parking lot: take the measurements once a week and be sure to record the weather (rainy, cloudy, sunny, foggy)
   - Under a tree
   - On the asphalt in the sun
   - In a car with the windows down (one in the shade, one in the sun)
   - In a car with the windows up (one in the shade, one in the sun)

Activity IV

- Students will create a chart showing data recorded over the school year. Present the data to a PTO meeting.

SC Curriculum Standards – Third Grade

Science: Process Skills: Predict, Observe, Measure, Infer
Property of Objects and Material, 2a, b, c
THIRD GRADE – Component III

Objective: To observe different plants that grow in different habitats.

Background: Except for the soccer field and the woods behind the school and a low area in front of the school, the land on which the Forest Heights School was built has been graded to one level. This lesson will use these slight differences in elevation to demonstrate that different plants live in even slightly different elevations and moisture level.

Activity I

- Students tour the campus grounds, observing differences in elevation and differences in moisture levels at each elevation.

Activity II

- In the classroom, students will draw a map of the campus, delineating the “xeric” and “mesic” areas of the campus. On the map, students will define “xeric” and “mesic”.

Activity III

- On a second tour of the campus, students will illustrate two plants growing in a “xeric” area and a “mesic” area. They will answer the following questions:
  1. Are there any similarities in the plants growing in a xeric area? In the mesic area? List the similarities.
  2. What are the differences/similarities between the plants growing in the two areas? List the similarities/differences.
- Students will illustrate a plant near their home, state whether it is growing in a xeric or mesic area and share the information with their family.

SC Curriculum Standards – Third Grade

Science: Organisms and their Environment, 1b:
Characteristics of Organisms, 1b: Changes in the Earth, 1d.
GRADE LEVEL 5 – Component I

Objective: The students will research soils and plants native to the Lower Piedmont Region of South Carolina.

Activity I

- Students will define the Lower Piedmont region of South Carolina and locate it on a topographical map.

Activity II

- Working in small groups, each group will research one of the following: soils, shrubs, trees, herbaceous plants, and vines native to the Lower Piedmont.

Activity III

- Students will share information researched and organized through presentations incorporating visual aids.

Activity IV

- Students will prepare summary reports integrating results of each group’s findings.

SC Curriculum Standards – Fifth Grade
ELA – Research
A. The student will...(p. 16)
Grade 5 – Science – III. Earth Science
A.1.c. – p. 26
GRADE LEVEL 5 – Component II

Objective: The students will investigate the cultural, botanical and agricultural history of the Lower Piedmont region of South Carolina and demonstrate their findings on a pictorial timeline.

Activity I

- Given the information concerning the cultural, botanical and agricultural history of the Lower Piedmont region, students will locate and/or create illustrations for each main heading.

Activity II

- Students will write and typeset brief descriptions to accompany illustrations.

Activity III

- Students will sequence illustration with writing in chronological order and assemble them on a sequential timeline.

SC Curriculum Standards – Fifth Grade
Life Science: B1a, b
ELA – p. 17 – VI – Computer/Tech – B (basic keyboarding)
GRADE LEVEL 5 – Component III

Objective: Students will make comparative studies on the site of Forest Heights Elementary School.

Activity I

- Students will identify specific on-campus temperature locations for comparative temperature studies. These areas will include areas under a Hickory tree, a Pine tree, in shaded area next to a building, in the middle of the parking lot, in an unpaved, unshaded area. Readings will be taken throughout the year at designated times and recorded.

Activity II

- Students will use Microsoft Excel to organize data and present it in graph and/or chart form.

Activity III

- Students will use augers to collect soil samples from several on-campus locations including the edge the woods and the lowest drain.

Activity IV

- Students will use soil samples to test and compare pH.

SC Curriculum Standards – Grade 5
Science – II, A4, e, f
ELA – p. 17 – VI – Computer/Tech D – application of software – computer graphics
GRADE LEVEL 5 – Component IV

Objective: Students will become familiar with the concept of sustainability and research the subject on the Internet.

Activity I

- Class will discuss the following questions:
  1. What is public transportation and why is it used?
  2. What is recycling? Give examples of things that are recycled. Make list of at least 20 items.
  3. Give examples of how to conserve water and electricity.
  4. What is carpooling and why is it used? What is a “carpool lane”?
  5. What is sustainability?
  6. How is it different from recycling? How is it the same?

Activity II

- Students will go on the Internet and find what the following government agencies are doing to make their practices more sustainable:
  - Federal Government
    1. EPA
    2. Health and Human Services
    3. Department of Defense
    4. Department of Agriculture
  - State Government
    1. Department of Health and Environmental Control
    2. Department of Natural Resources
    3. Forestry Commission

Activity III

- Working in groups of four, a group will choose one agency and make a poster that lists the sustainable practices of that agency.

SC Curriculum Standards – Grade 5
Science – IIB4c, e, f
Students and teachers from a variety of courses at K-12 schools and Clemson students from six courses worked towards advancing their knowledge and commitment to environmental stewardship. One goal of this project was to reach out to a diverse population by partnering with several institutions to design and to promote sustainable community environments for people as well as for wildlife. Another goal was to provide an opportunity for students to learn and mature through participation in a project that has a long-term visible impact. To that end, students, faculty, and administrators from partnering schools, Clemson University, volunteers, and school board officials worked together in three phases. 1) Information dissemination of the research, analysis, and designs completed in phase one; 2) Fund raising and grant application; 3) Implementation, evaluation, sharing, and recognition.

Outputs (Deliverables)
1. Posters were prepared by Clemson University college students and presented in the 2001 Gardening with Children Symposium. These included research and designs from phase one landscape designs and input from K-12 students.
2. A curriculum was developed by Mr. Jason Ginder, a graduate student with an environmental education focus. See below for a description of his Teacher's Environmental Resource Guide for Clemson Elementary School. His Guide uses the landscape/naturescape plan reflecting state science standards.
3. Landscape plans for three schools (Daniel High School, Clemson Elementary School, and Hunt Meadows Elementary School) have been partially implemented emphasizing tree planting for energy efficiency, an outdoor classroom, interpretative signage along a school nature trail, outdoor seating arrangements, composting, and a native plants courtyard for teaching and learning purposes.
4. A PowerPoint presentation on environmental stewardship and Schoolyard Projects was expanded to share with schools, volunteers, university professors and public through the web page and at conferences.
5. College students (as well as parents and teachers) are being encouraged to become certified “Habitat Stewards” (NWF). A poster about phase two of the project was developed for use at Earth Day Celebrations, Service-learning meetings, landscape for learning collaborative meetings, and other appropriate occasions.
6. The work completed on this SUI grant provided an effective base to seek outside funding for future support and continuation of this project. A $100,000 USDA Higher Education Challenge Grant proposal was submitted in February 2002 and funding was awarded in August of 2002. This support will enable us to continue work on this project for the next three years.
7. A paper entitled “Linking Universities and K-12 Schools Through Design of Outdoor Learning Environments” was presented at the 13th International Conference on College Teaching
and Learning held April 9-13, 2002, in Jacksonville, Fla. Professor Haque was presented an award for "Innovative Excellence in Teaching, Learning, and Technology" at the conference. See: www.fccj.org/Teaching%26LearningConference/AcceptedPapers.html for more information on the conference and paper.

8. Our paper “Linking Universities and K-12 Schools Through Design of Outdoor Learning Environments” was published in Selected Papers from the 13th International Conference on College Teaching and Learning edited by Jack A. Chambers. This publication contains articles selected as the 15 best papers from the conference which represent a cross-section of the nearly 300 faculty presentations. Papers were juried and judged on the following criteria: quality of content, quality of writing and presentation, focus of the paper, discipline, appeal to an audience of professional, post-secondary educators, and theoretical or practical applications.

Outcomes (Impact) and Benefits to Students and to the Community

Working on real world projects can greatly influence student motivation and learning while simultaneously helping solve community problems. This project encouraged creative thinking and problem solving while teaching students more about community relationships, wildlife habitats, and sustainable living. Working with school administrators, landscape architects, and public service organizations gave students a feeling for how institutions and communities function. An appreciation of the need for community involvement was also learned. Perhaps the most important lesson students learned is that a good plan grows from the site and from the needs of the people, plants, and wildlife that inhabit that site.

Our students are gaining an understanding of nature and natural sites by working with authentic projects. They are also gaining sensitivity to people through working with partners. One result of this interaction is the opportunity provided for students to practice oral communication skills in both formal (classroom), and informal (schoolyard) settings. As they implement a plan that is environmentally, functionally and aesthetically sound, students are learning to convey their ideas and educate others.

Teachers traditionally take the active role, gathering and compiling information, asking questions, and providing answers. Advanced learning, of an active and ongoing kind, can be stimulated by allowing and encouraging students to, first, ask important questions, and second, set about exploring new territories by finding their own answers. Once found, the depth of these answers can be measured by giving them to someone else to test and utilize. This project enabled students to ask questions, and it stimulated curiosity, promoted interest, improved reasoning, and increased student's ability to isolate, define, and solve problems.

Students versed in the art of asking questions become intellectually athletic and spring easily into the phase of seeking solutions. This project allowed them discover sources, collect information, analyze data, and solve problems. When asked to communicate his or her solutions to an interested party, the student learned to sift through the information collected, decided what data was most appropriate, and prepared a meaningful presentation for his or her audience. The presentation generally reinforced the importance of the cognitive functions, instilled confidence, and generated enthusiasm in the student while imparting information to the audience. A tremendous sense of accomplishment and satisfaction resulted when students followed this three-part process of asking questions, seeking solutions, and giving answers. The process took on special significance when taken out of the classroom and placed in the community. Students
became teachers, and this reversal of roles stimulated awareness and promoted intellectual maturity.

In addition, this project also addressed the following community based objectives outlined by the Landscapes for Learning Collaborative (LLC). Through participation in the 2001 Landscapes for Learning Gardening with Children Symposium, college students networked with interested parties and helped address learning landscape needs through their poster presentation. They became part of the network that helps school children, K-12, and college students to engage in hands-on, practical environmental education, environmental stewardship, public service, and nature-based enhancement in all areas of study. This also assisted community members in enhancing their environments while at the same time building community relationships and providing non formal environmental education. They helped integrate teaching, research and service for K-12 and colleges.

**Participating College Courses: Clemson University:**

1) Horticulture 208 Landscape Appreciation--taught by Professor Mary Haque-Department of Horticulture, College of Agriculture, Forestry, and Life Sciences; Fall 2001 and Spring 2002.
2) Horticulture 308 Landscape Design--taught by Professor Mary Haque-Department of Horticulture, College of Agriculture, Forestry, and Life Sciences; Fall 2001.
3) Landscape Architecture 490 Directed Studies--taught by Professor Francis Chamberlain with Professor Haque advising senior student Erin Jordan of the Department of Planning and Landscape Architecture; Summer and Fall 2001.
4) Horticulture 461 Problems in Landscape Design--taught by Professor Mary Haque-Department of Horticulture, College of Agriculture, Forestry, and Life Sciences; spring 2002.
5) Horticulture 400 Landscape Implementation--taught by Professor Mary Haque-Department of Horticulture, College of Agriculture, Forestry, and Life Sciences; spring 2002.
6) Horticulture 472/672 Garden Experiences in Youth Development; preparation and development by Professor Mary Haque summer 2002; being taught fall 2002.

Ms. Erin Jordan, a fifth year Landscape Architecture student enrolled in LA 490 Directed Studies under Mary Haque’s supervision researched the history, case studies, and safety issues associated with children and landscapes, and wrote a 100 page book entitled *Children and Landscapes: Environmental Education and Childhood Development*. She graduated Summa Cum Laude with honors in December of 2001 and is planning to publish her book.

**K-12 Schools and contacts:**

1) Clemson Elementary School- Dr. Paul Pritchard, Principal and Dr. Gina McLellan, President, School Improvement Council. This project (“Clemson Elementary Outdoors”) won the 2001 service learning award presented by the SC Commission on Higher Education. See below for a full description.
2) Hunt Meadow Primary School, Anderson County, SC- Nancy Prince, Principal; Sue Tarkenton, Teacher, and Sonja Maki, Parent Volunteer and President of the School Improvement Council. The lead teacher on this project, Ms. Sue Tarkenton, won the 2001 SC Wildlife Federation Education Award for her work on this project. See her website at: [http://www.anderson1.k12.sc.us/schools/hmes/Garden/courtyard%20garden.htm](http://www.anderson1.k12.sc.us/schools/hmes/Garden/courtyard%20garden.htm)
15 Agricultural Education majors enrolled in my Hort. 208 Landscape Appreciation in the Fall semester of 2001. I taught those students about sustainable landscapes and familiarized them with the NWF schoolyard habitat program. Over the course of the semester, I lectured on xeriscape (water conservation for the southeast), landscape design for energy efficiency, landscape design for wildlife habitat, and landscape design for low maintenance. Hort. 208 students joined the Hort. 308-landscape design class on October 24, 2001 to help install a native plant courtyard at Clemson Elementary School. The involvement of these university "pre-service teachers" will enable them to bring more to their classrooms after graduation. Students enrolled in Hort. 208 and 308 were also involved in applying the sustainable landscapes theory taught in the classroom to the 'Blitz Build' Habitat for Humanity site with installation on October 17, 2001.

Dr. Gina McLellan enlisted Mr. Jason Ginder, a graduate student with an environmental education focus, to develop a "Teacher's Environmental Resource Guide" for the project. Below is a description of the guide.

The Teacher’s Environmental Resource Guide

In an effort to encourage use of the new outdoor classrooms and environmental settings at the new Clemson Elementary School, we will be developing resources for teachers that correlate with the established South Carolina Curriculum Standards. These resources should allow teachers to more readily utilize the unique outdoor environment around them. This project will have two parts or stages. First a resource guide will be developed that describes different ways that teachers can utilize the outdoor classrooms. The second stage of this project will be a resource that offers suggestions and activities that will assist teachers in utilizing the outdoor environments to meet individual South Carolina Curriculum Standards.

The resource guide will include examples of outdoor lessons and alternatives to traditional lessons that will allow teachers to extend classroom learning into outdoor environments. The resource guide will include information on supplementary curriculum and materials that may assist the teachers. The second stage of this project will create a resource library with each curriculum standard...
identified along with a short list of possible resources, activities or lessons that will allow the educators to expand their use of the environment.

The goal of this project is to stimulate educators and assist them in utilizing the unique environment at this new school. We will use many of the established environmental education and outdoor education resources and techniques throughout these projects. It is our hope that teachers will challenge themselves to find new ways of presenting the traditional educational material. Through this process students and teachers will become more familiar with and possibly develop an appreciation for the environment around them.

To stimulate more widespread use of the nature trail by teachers and students, Clemson Elementary School invited Rudy Manke to lead a teacher in-service workday in March of 2002. He spent all day at Clemson Elementary School and led teachers and CU student teachers on a nature walk to highlight the opportunities for learning that are now available on school grounds. Dr. McLellan organized a “Bug Fun Day”, and students made insects out of recycled materials.

Troop 235 Boy Scouts partnered on the Clemson Elementary Project, and Mr. Hoke Hill led his troop in the construction of an outdoor classroom on the nature trail. Mr. Tripp Mostertz led his troop in the construction and installation of interpretative signage along the trail. Both projects were completed as part of the Eagle Scout requirements, and both brought to reality design recommendations made by Clemson University students during the design phase of the SUI project. A three tier compost bin was built at Clemson Elementary School by students enrolled in Hort. 400, Landscape Implementation.

This grant also enabled faculty to develop a base from which to offer a course entitled "Garden Experiences in Youth Development", Hort. 472/672. This course is being taught by Professor Haque in the Fall of 2002. Using experiential learning and the service learning model, students and faculty will continue to expand on the foundation established by this grant.

Thanks to the Sustainable Universities Initiative and other partners, The "Clemson Elementary Outdoors" project, one of our works in progress initiated in 1999 and directed by Dr. McLellan, won the 2001 service learning award presented by the SC Commission on Higher Education. Below is part of the nomination form which gives an overview of that project and more fully describes how we are involving college students in this project.

"Clemson Elementary Outdoors"
Submitted to the South Carolina Commission on Higher Education
1333 Main Street, Suite 200
Columbia, SC 29201
April 20, 2001

Total Number of Students Involved: 750 Clemson University Students; 600 elementary students from Morrison Elementary School
1. The commission on Higher Education defines service learning as college student learning at any level and in any situation that is linked in a direct, hands-on fashion to the resolution of a problem or concern in a target community outside the institution. Briefly, how does your project meet the parameters of this definition? Due to the fact that many schools have access to funds to support buildings and programs, but do not include funding or provisions for the surrounding landscapes, this project is intended to address the issue of creating sustainable outdoor learning environments through a collaboration between Clemson Elementary School and Clemson University. Building on the Sustainable Universities Initiative and the schoolyard habitat program established by the National Wildlife Federation (NWF), this project involves students, teachers, and administrators. Our goal is to research, plan, design, and reflect on sustainable and efficient landscapes for Clemson Elementary School. The focus is to involve both university and K-12 school students in identifying environmental problems and using critical thinking skills to propose solutions. This could include problems associated with transportation efficiency, energy use, recycling, water use, landscape maintenance, reading, nature trails, biodiversity, etc.

One goal of this project is to reach out to a diverse population by collaborating with several institutions to design and to promote sustainable community environments for people as well as for wildlife. Another goal is to provide an opportunity for students to learn and mature through participation in a project that has a long-term visible and measurable impact. To that end, students, faculty, and administrators from collaborating schools, Clemson University, volunteers, and school board officials are working together in four phases. 1) Research, analysis, and information gathering; 2) planning and design; 3) scheduling and implementation, and 4) reflection, evaluation, sharing, and recognition.

2. Specifically, which segments of the college/university community does your project involve? Many segments are involved including multiple departments and an interdisciplinary group of faculty and classes. Examples include:

Gina McLellan's classes in Recreation and Leisure Environments researched concepts pertaining to children and outdoor environments and also interviewed children at Morrison regarding what they wanted to see in the outdoor environments at their school. Using this research as a foundation, Lolly Tai, professor and landscape architect worked with her students to design Four courtyards based on favorite books picked by the children at Morrison: The Adventures of Peter Rabbit, Alice in Wonderland, The Secret Garden and the Harry Potter series. Clemson students researched how children learn outdoors, looked at famous children’s gardens in the United States and elsewhere and listened to the Morrison Elementary children. Each courtyard will include scenes from the book, an outdoor classroom area and complementary plantings.

Horticulture students designed an inner courtyard for native plants. Their work was guided by horticulture professor and landscape architect Mary Haque, whose schoolyard habitat projects have created sustainable landscapes for schools across the state.

Civil engineering students are building two bridges across the brook in the natural area. They will use steel that has been donated for their participation in the National Student Steel Bridge Competition held by the American Society of Civil Engineers each year. “The members of the
steel bridge team designed the bridges during spring semester. They will construct them in June and place them in July,” says Scott Schiff, civil engineering professor and adviser to the team.

Several PRTM and English classes have written grants for community businesses to donate goods. A technical writing class taught by English professor Summer Smith is writing brochures, a guide for the nature trail and an overview of the school and grounds for the beginning of school. The class is also developing a Web site.

An important resource for the Outdoors project has been Landscapes for Learning, a University collaborative that promotes environmental stewardship and education using plants and landscapes.

Coordinated by sociology professor and Extension specialist Brenda Vander Mey, Landscapes for Learning provides opportunities for service learning and building stronger communities to more than 30 schools within the state. Other Clemson Cooperative Extension specialists have helped with the Outdoors project including the Extension-trained Master Gardeners. And volunteer groups AmeriCorps, America Reads, and the Girl and Boy Scouts of America and others have helped.

Dr. Gina McLellan in PRTM continues to coordinate this diverse array of students, faculty, and community groups.

3. How many students (please specify degree levels to the extent possible) does the project affect? More than 750 Clemson students have helped design and create outdoor learning areas for the new school with guidance from University faculty and staff, and more than 600 elementary students, parents and community members. Degree levels range from elementary students at Morrison to sophomore, junior, senior, and master's level students from Clemson University. Students from each of Clemson’s academic colleges — including landscape architecture; design; civil engineering; English; horticulture; biology; and parks, recreation, and tourism management — have been engaged in the project.

4. Can you please describe the target community or communities that your project serves?

Three years ago, when Morrison Elementary School found a site for a new school — to be named Clemson Elementary when it opens — faculty, parents and the children themselves became involved in planning the grounds. They envisioned the school’s 36-acre campus as a wonderful living, learning environment extending beyond the structure of the new facilities. To figure out how to put their wish list into action, they called on the University. "Clemson Elementary’s campus will be unlike any other elementary school campus in the United States," says Gina McLellan, professor of parks, recreation and tourism management and coordinator of the outdoor project. She’s also president of the school improvement council. "Nevertheless," says McLellan, "it will serve as a state and, perhaps, national service-learning model for what can be done in partnership with a university committed to community."

The goal is to offer environments in which all types of learners can excel, especially those who need hands-on participation. Likewise, the features have been designed to coordinate with the S.C. Department of Education curriculum standards. While students, teachers, parents, and administrators are the primary target audience which this project serves, we are also partnering
with the City of Clemson to make athletic fields, outdoor classrooms, and the nature/walking trail available to the larger community on weekends and after school.

5. **Can you please describe your project's effectiveness in helping to solve the problems or concerns in the target community?** In service learning, both college students and the community are targeted in a mutual exchange. Clemson students from multiple courses are working towards advancing their knowledge and commitment to environmental stewardship while helping create outdoor learning environments for the larger community. The use of service learning techniques has already generated a tremendous enthusiasm for learning and doing at both schools. "It’s exciting, one of the most exciting things in my career," says Paul Prichard, principal of the elementary school. "It’s an opportunity of a lifetime. We want it to be a model throughout our district and the state." S.C. Educational Television will broadcast a special on the project, with video from Clemson’s Communications Center. Calls have already come in from as far away as the Denver Museum of Natural History. The school’s nature trail, which includes a brook that winds through 12 acres of wooded land, is already being used by students and the community although the school building itself is still under construction.

6. **Can you please describe the degree to which your project enhances student learning?** Students at all levels are learning and practicing oral, written, and graphic communication skills as they present their ideas to the community through conversation, speeches, booklets, flyers, posters, and landscape plans. They are learning to work in interdisciplinary teams and are developing an understanding of the planning process as they work through site analysis, research, preliminary plans, final plans, fund raising, and project implementation.

7. **Is there academic credit associated with the project (not necessary for submission)? If so, please explain the particulars.** Most of the college students working on this project are receiving academic credit as part of a course they are taking. For example, students in landscape architecture may learn how to do a site analysis by doing one for Clemson Elementary Outdoors for 10% of their grade. Twenty percent of a student's final grade in a horticulture class may be associated with researching native plants and drawing a native plant courtyard design for Clemson Elementary. Students have earned academic credit in technical writing, editing, Land Resource Management, Biology, and Engineering courses to name a few.

While most of the work to date has been associated with academic credit, engineering students have committed to help create features for the Alice courtyard. They will design forms for the card people and mushrooms, place them, let them cure, then set them up at the school. All of their work is voluntary, under the umbrella of the University’s chapter of the American Society of Civil Engineers. "We might even use some of the mixes we’ve used in our concrete canoe, so the material will be light," says Serji Amirkhanian, civil engineering professor and adviser to Clemson’s national champion concrete canoe team. He’s also been president of the Morrison PTO and a member of the school improvement council.

8. **If funding is required, how is the project funded and what is the approximate annual budget for the project?** Since funding for education in South Carolina is very limited at this time, most of the work to date has been done on a minimal budget with professors and students donating their time and expertise as part of their teaching and learning duties. The Clemson University Service Learning Collaborative provided a $500. Mini-grant to get the project started.
The Sustainable Universities Initiative funded $10,000 including Morrison and several other schools around the state, and Landscapes for Learning has also provided grant money for the project. The PTO has initiated a fundraising campaign with help from Clemson, and community agencies such as Tricounty Ace Hardware, Head/Lee Nursery, and Faffards have donated tools, plants, and potting soil. Students in Parks, Recreation and Tourism Management and technical writing classes have helped faculty prepare over twenty more grants, which have been submitted or are in review.

9. Feel free to add any other comments you may have about your project.
For a project that is intensely community-centered, Clemson Elementary Outdoors has far-reaching applications. At the higher-education level, the impact could be enormous. Clemson’s College of Agriculture, Forestry, and Life Sciences has submitted a challenge grant to the U.S. Department of Agriculture. Called "Greening Schools," the grant proposes for Clemson Elementary Outdoors and other sites across the state to be national models for experiential service learning. "Clemson Elementary Outdoors is a valuable contribution to the community; it is outreach in its fullest sense," says John Kelly, the University’s vice president for public service and agriculture. "This cross-college, community model is exactly what is envisioned in the concept of an ‘engaged’ university."

As President of Clemson University, I view Clemson Elementary Outdoors as a great example of how Clemson is setting the standard in public service for land-grant universities by engaging the whole campus in service and outreach. This fulfills our mission of world-class teaching, research and public service in the context of general education, student development and continuing education.

----------President Jim Barker