Developing an online based environmental education curriculum: the community college perspective

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ABSTRACT

This paper describes the developmental process involved with the creation of two online courses targeted at community college students in freshwater ecology and environmental landscaping and the attendant programs which have arisen as a result of this initiative. Funded by the Southwest Florida Water Management District and the Saint Johns River Water Management District, these credit experiences have been successful in attracting non-traditional students to the study of environmental education as well as developing online pedagogical skills of classroom based community college faculty. Numbers, approaches, online delivery mechanisms and evaluative methodology will be showcased in this presentation.

Background

Central Florida Community College has participated in several initiatives with local water management agencies to develop multimedia educational objects suitable for a variety of educational venues. Participating entities include:

Central Florida Community College*5000 Full time Equivalents*16,000 Lifelong Learning students
Serving Marion, Citrus and Levy counties, CFCC is one of Florida's 28 community colleges and serves its residents with a host of technical, vocational and academic programs. Students interested in science based learning may earn an A.S. degree or a vocational certificate in areas such as environmental horticulture and environmental science. University seeking students have at their disposal a host of science options including the standard physics, chemistry and biology and practical sciences such as environmental science, freshwater ecology and elements of Florida's Landscape.

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Southwest Florida Water Management District*Serving West Central Florida
Divided into several water basins, stretching from just below the panhandle to near Ft. Myers, SWFWMD has provided ongoing support for the Florida Waters projects. In particular the Withlacoochee River Basin Board with a catchment area in Levy, Citrus and part of Marion County is the primary recipient of these educational projects. Central Florida campuses and centers in Citrus and Levy counties are served by this Basin Board. The Ocala Campus is just outside the water management district boundary and is served by SJRWMD.

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Saint Johns River Water Management District*Serving North Central Florida
Serving the eastern part of Florida from Jacksonville to Indian River, SJRWMD is one of five water management districts serving the state of Florida. Through a variety of education programs, the District promotes sound practices in water conservation and landscape design. Central Florida Community College is located on the east side of the district.

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Instructional Design Process

Identifying the Components	**Implementing Objectives**	**Evaluating Courseware**
Identifying the Designers	**Implementing Course Plans**	**Evaluating Student Satisfaction**
Identifying Resources	**Implementing Curriculum Changes**	**Evaluation Instructor Development**

Central Florida Community College has developed the content for the set of four Florida Waters' modules/courses and is in the process of developing knowledge objects for the Florida Landscape series. One additional component of the Florida Landscape plan is to convert existing classroom modules produced by the Saint Johns River Water Management District to credit, non credit and continuing education, multimedia knowledge objects.

Florida Waters Modules: Content Outline

Florida Waters I
Where's All the Water:
Formation and description of surface waters and the structure and function of Florida Waters

1. **Formation of surface water features in Florida**
2. **Existing surface waters**
    a. **Lakes**
    b. **Rivers**
    c. **Wetlands (marsh, swamp and bogs**
    d. **Springs**
    e. **Groundwater sources**

Florida Waters II
What's In My Water?

A. **Water Chemistry**
    1. **Water molecule, structure and function**
    2. **Dissolving Substances**
    3. **Suspended Substances**
    4. **Water analysis of critical components**

Florida Waters III.
Florida's Beautiful Waterlands

A. **Florida Freshwater Organisms and Ecosystems**

1. **Microorganisms**
2. **Plants**
3. **Animals**
4. **Ecosystems**

Florida Waters IV.
Water! Water! Water! How Do I Use It?

A. **Cultural Impact (People and Water)**

B. **Pollution**
C. **Habitat Destruction**
D. **Economic Resources**
    a. **Fishing**
    b. **Recreation**
    c. **Irrigation**
    d. **Waste Disposal Systems**
    e. **Aquaculture**
    f. **Other**

Management

Elements of Florida's Landscape

Ecosystem Ecology
Course Objectives

1. **The student will gain an understanding of basic ecological concepts, including the ecology of fire.**
2. **The student will recognize the different ecosystems of Florida.**

Course Content

1. **Scientific Method**
2. **Ecological concepts**
    a. **Biotic and abiotic factors**
    b. **Populations, communities, ecosystems**
    c. **Energy flow**
        i. **Producers consumers, decomposers**
        ii. **Food chains, food webs, energy pyramids**
    d. **Succession**
3. **Ecology of fire**
4. **Florida's Ecosystems**
    a. **River swamp**
    b. **Prairies**
    c. **Hammocks**
        i. **Hydric**
        ii. **Mesic**
        iii. **Xeric**
    d. **Pine flatwoods**
    e. **Sandhills--longleaf pine and turkey oak**
5. **Impact on Landscape design and implementation**
    a. **Plant selections**
    b. **Plant and soil compatibility**
    c. **Other considerations**

The Geology of Florida
Course Objectives

1. **The student will gain an understanding of the geology of Florida with special focus on representative soil types and accompanying plant species.**
2. **The student will gain an understanding of the hydrologic cycle and the Floridan aquifer**

Course Content

1. **Hydrologic Cycle**
    a. **Processes**
    b. **Products**
2. **Soils**
    a. **Soil formation**
    b. **Soil properties**
    c. **Soil profile**
    d. **Soil types**
    e. **Florida soils**
3. **Aquifers-physical features**
    a. **Porosity**
    b. **Permeability**
    c. **Unconfined (free) groundwater system**
    d. **Artesian groundwater system**
4. **The Floridan aquifer**
    a. **Distribution of groundwater consumption**
    b. **Aquifer recharge and water quality**
5. **Geologic features**
    a. **Groundwater erosion and deposition**
    b. **Caves**
    c. **Sinkholes**
    d. **Other karst features**
6. **Impact on Landscape design and implementation**
    a. **Plant selections**
    b. **Plant and soil compatibility**

Irrigation systems

Elements of Florida's Landscape: Climatology

Course Objectives

1. **The student will gain an understanding of the concepts of weather and climate and how they influence ecosystems.**
2. **The student will describe local and regional weather and climate conditions.**
3. **The student will learn how to anticipate and describe extreme weather conditions such as drought and hurricanes.**

Course Content

1. **Introduction to Florida's weather and climate**
2. **Weather and Weather Patterns**
    a. **Seven weather elements**
    b. **Sun and the Sunshine State**
    c. **Weather patterns**
        i. **Global influences**
        ii. **Local influences**
        iii. **Seasons**
        iv. **Weather extremes**
    c. **Weather prediction**
3. **Weather and climate change**
4. **Finding and using weather and climate information**
5. **Impact on Landscape design and implementation**
    a. **Seasonal planting cycles**
    b. **Weather considerations**
    c. **Hardiness factors**

Elements of Florida's Landscape: Pests and Pesticides

Course Objectives

1. **The student will learn about the history of pesticide use and identify the major types of pesticides and their uses.**
2. **The student will be able to identify and discuss health issues associated with exposure to pesticides.**
3. **The student will gain an understanding of Integrated Pest Management.**

Course Content

1. **History of Pesticides**
    a. **Types**
    b. **Uses**
2. **Insecticides**
    a. **Organophosphates**
    b. **Carbamates**
    c. **Organochlorines**
    d. **Botanicals**
3. **Herbicides**
4. **Rodenticides**
5. **Fungicides**
6. **Integrated Pest Management (IPM)**
7. **Environmental and occupational risks**
8. **Impact on Landscape design and implementation**
    a. **Pest propagation**
    b. **Plant and soil compatibility**
    c. **Seasonal uses**

Instructional Delivery:

Florida Waters are taught in sequence each term with one month allotted for each module. Each module earns one credit which can count as an elective, biological or physical science. If the student completes all four Florida Waters modules, they will fulfill a lecture/lab biological or physical science requirement. These credits transfer to the state university system.

Web enabled is the primary method of delivery of Florida Waters. The Florida Water Atlas is the primary non electronic source for all four modules/courses.

To access these courses, contact Pat Fleming at flemingp@cfcc.cc.fl.us and you will be set up with a guest account.

Student Reception:

Florida Waters has been offered to A.A. degree seeking students since the Fall 1998. Each term the course has been offered, it has been fully subscribed (20 students per module). In sum, almost 500 students have taken one or more Florida Waters modules for credit, transferable to a four year university as a physical or biological science.

Enrollment Florida Waters Courses: 1998 to present

1998	March 1998 (7)	Fall 1998 (80)
1999	Spring 1999 (80)	Fall 1999 (80)
2000	Spring 2000 (80)	Fall 2000 (80)
2001	Spring 2001 (80)	

Student evaluations of this science sequence have been very positive. Numeric evaluation results constantly rank in the top 10% of all evaluations given. Anecdotal comments praise the format (web based and asynchronous) and the practical nature of the science content covered in the classes. Instrumentation used for this evaluation is from the University of Washington and is conducted confidentially and via the World Wide Web.

Faculty:

Since its inception in the Spring 1998, Florida Waters' modules have been taught by seven different instructors. The transition between instructors has been smooth and without a drop in quality. However, additional training in the web authoring tools has been required for those instructors unfamiliar with asynchronous instruction. Faculty backgrounds have included freshwater ecology, environmental science, biology and ecosystem ecology. Experience has ranged from 20+ years in the classroom to 3.

Course Delivery:

The manner in which Florida Waters is taught is that each course is offered for approximately one month, beginning with Florida Waters I and proceeding through the cycle to Florida Waters IV. It has been the college's practice for two instructors to share the teaching of these four modules. Instructor A teaches modules 1 and III and Instructor B teaches modules II and IV.

Future Programming:

Current funding includes support for the Florida Waters web site (floridawaters.org) and a series of community water education seminars scheduled for various high water use communities in west central Florida during 2001.

Floridawaters.org

Debuting in the late 2000, the FloridaWaters web site will be devoted to the integration of water based information specifically focused on the Withlacoochee River Basin Boards of the Southwest Florida Water Management District.

Floridawaters.live

Based on the Community Water Counselor Manual, twelve workshops will be held during 2001 in communities showing high water usage.

Envirocast

Attached to the Floridawaters.org site will be Envirocast fm, an environmentally based talk radio station, streamed via the Internet and also available as a low power f m station (LPFM)

For information on these and other programs, contact Pat Fleming at Central Florida Community College*PO Box 1388*Ocala, FL 34478*352-237-2111 x 1348*flemingp@cfcc.cc.fl.us

Milestones for Florida Waters

December 1997	**Florida Water adult education agreement approved by CFCC and SWFWMD**
March 1998	**Florida Waters IV Course Module Beta Tested**
Fall 1998	**Florida Waters I, II, III, IV offered for first time**
Spring 1999	**Kirstie Garlitz teaches Florida Waters IV**
Fall 1999	**Community Water Education Training Seminar held in Ocala** **Florida Waters I through IV** **Feasibility Study on Florida's Landscape takes place**
Spring 2000	**Elements of Florida's Landscape agreement approved** **Florida Waters II grant approved**
Fall 2000	**Elements of Florida's Landscape Course Module Beta Tested** **Elements of Florida's Landscape approved by CFCC Curriculum Committee**
March 2001	**Elements of Florida's Landscape offered through Continuing Education**
Spring 2001	**Fall 2001 Elements of Florida's Landscape I through IV offered for credit for the first time**