ISSUES IN INTEGRATIVE STUDIES
No. 20, pp. 45-64 (2002)

Assessment, Outcomes, and Forays in Interdisciplinary Curriculum Development

by
Michael R. McDonald
and
S. Gregory Tolley

Florida Gulf Coast University
Division of Ecological Studies

Abstract: An interdisciplinary course titled Issues in Ecology and Environment was developed and taught by an anthropologist and an oceanographer at Florida Gulf Coast University beginning spring 1998. Focusing on cognate interdisciplinary competencies rather than diverging disciplinary content, this collaboration also yielded working definitions of several integrating learning outcomes—an ecological perspective being chief among these. As part of the course development, authentic assessments, cooperative group activities, and opportunities for experiential learning using ecosystems located on campus were developed. Post-assessment debriefings were used to solicit student feedback as part of a continuous improvement model for the course. By structuring the course to target learning outcomes that transcended disciplinary traditions, the instructors were able to look beyond disciplinary barriers toward a point of convergence and benefit from the new perspective.

A STUDENT IN THE FIRST OFFERING of a team-taught course called Issues in Ecology and Environment wrote the following:

> I can't place myself nicely into the underlying values of either the western or deep ecology paradigms, my beliefs would overlap into both camps. . . . I'm blindly optimistic about our human ability to respond to crisis with technological solutions. I'm a capitalist in business and I promote a sense of community and country. On the other hand, in relation to the deep ecology paradigm, I am a deeply spiritual person who sees harmony with nature as an ideal. . . . I realize too that even seemingly blissful nature is riddled with killing and dominance

> struggles. . . . Getting optimistic western thinkers like me to change their actions and thoughts with regard to abundance perceptions, capitalistic approaches, and a belief in technological solutions is a tough nut to crack. Until the cumulative effects of this kind of thinking interrupts our daily lives, forcing us to look at the consequences of our values, we are destined to see this cycle continue in ever-wider circles of effect.

This excerpt reveals an aspiring stage of intellectual and ethical development (Perry 1981, p. 94) and an emerging ecological perspective, as it would come to be known in this course. Although the student acknowledges that competing, valid perspectives can be brought to bear on an issue, he is aware also of their limitations. He sees further, how his own perspective is influenced by, yet independent of, competing paradigms. In this article we recount our experience in outcomes-based, interdisciplinary course design including the pedagogical elements conceived to promote and evaluate certain interdisciplinary competencies, including analysis, synthesis, and integration.

Academic Setting

Florida Gulf Coast University

One of the exciting and distinguishing characteristics of Florida Gulf Coast University (FGCU), which first opened its doors in fall 1997, was its embrace of curricular innovation and interdisciplinary learning. The university committed to the following learning goals or outcomes for its students:

- aesthetic sensibility
- culturally diverse perspective
- ecological perspective
- effective communication
- ethical responsibility
- information literacy
- problem-solving abilities
- technological literacy
- community awareness and involvement

Although these nine goals are not inherently interdisciplinary, they were approached as such by the faculty in the College of Arts and Sciences.

The Collegium of Integrated Learning

In order to formalize the ideal of interdisciplinary study, the FGCU College of Arts and Sciences offers a single undergraduate degree: the Bachelor of Arts in Liberal Studies. In addition to selecting a primary academic concentration, students are required to participate in the Collegium of Integrated Learning, a core of courses designed to create a community of inquiry and to sustain the interdisciplinary spirit throughout the undergraduate experience. The Collegium courses explore the sociocultural, historical, philosophical, moral, scientific, and humanistic roots, as well as the contemporary expression of issues in five domains:

- culture and society
- politics and economics
- science and technology
- ecology and environment
- media, literature, and the arts

This central element of the Liberal Arts Curriculum concludes with an integrative and retrospective capstone seminar. Conceived only in the abstract by the founders of the college, the particulars of these courses—their content, designated learning outcomes, and structure—were left entirely for the new faculty to develop.

Philosophical Bases of the Course, Issues in Ecology and Environment

Offering a new course in a new university presents numerous challenges and opportunities. Several sections of Issues in Ecology and Environment (IDS 3304) were taught concurrently, beginning in the university's second semester of operation. With the exception of a common title and course number, these courses shared little; they varied widely in approach and scope, with instructors being drawn from all disciplines of the college. This frontier approach to curriculum building fostered creative responses from the faculty; it also led to the unlikely pairing of a cultural anthropologist and a biological oceanographer to teach one of the course sections. Although we had each taught courses on the environment before, our experiences and respective disciplines prepared us differently for the nebulous topic of ecology and environment. We brought to the table different emphases, different theoretical models, and different ideas: on the one hand, training in the physical and

biological sciences with teaching and research directed toward specific marine ecosystems; on the other hand, experience in ecological anthropology with interests in material culture, family farms, and rural communities. With the exception of some overlapping interest in fishing societies, the initial gap between anthropology and oceanography loomed large.

To meet this challenge, we envisioned a course that would be *transdisciplinary* (*sensu* Stember 1998), uniting "intellectual frameworks beyond the disciplinary perspectives" (p. 341). The course would allow both students and instructors to benefit from the influences of two disciplines, but at the same time we agreed to loosen our grips on the conceptual frameworks, assumptions, and lexicons that bound our separate academic traditions. To teach our course effectively meant being sensitive to these boundaries, recognizing and employing useful cognates and ideas, and leaving discipline-specific jargon aside.

Over several planning meetings, common ground emerged in conversations on pedagogy and content. We agreed the course would be discussion-based and experiential, concurring with Newell that interdisciplinary courses "lend themselves nicely to more student-centered, interactive teaching styles associated with progressive education and its outcomes" (1998, p. 51). We decided that the course would primarily address the "ecological perspective" (see Appendix A). This learning outcome fit nominally with the title of the course, but its meaning was not yet defined by the institution, a task we assumed for our course. Secondary outcomes—including effective communication and community awareness/involvement—were also undefined, but seemed on the surface necessary companions in the development, expression, and practice of the ecological perspective. However, we prioritized the attainment of these learning goals—goals that because they are not owned by any single discipline invited the synthesis and integration we envisioned.

Several additional factors shaped course structure. As Collegium courses enroll students from across the college, we could expect little in the way of shared content knowledge in our class. We recognized the need to provide a learning experience that would help the liberal studies graduate negotiate the various environmental issues he or she would face in his or her life, at FGCU, and beyond. In sum, we foresaw a course in which students would develop and employ a heuristic for engaging issues related to the environment. Following Bloom (1956), we delimited a suite of competencies—analysis, synthesis, and evaluation—that became the foundation on which the ecological perspective would be built as well as the standard by which

student progress through the course would be assessed. Our broader hope in approaching course design in this way was to model the outcomes approach and our interpretations of the meanings of certain outcomes for programmatic use across the college. We also saw the course as a built-in mechanism to refine a definition of the ecological perspective as our understanding of the learning outcome increased via student performance on course assessments and their feedback about the course.

Assessment Instruments

Rather than using traditional examinations prone to placing emphasis on short-term memory, we opted to create a number of developmentally linked "assessments" (Alverno College Faculty 1994, p. 1) that would allow students to demonstrate their familiarity with course content and at the same time develop their understanding and application of the course-learning outcomes over the series. The assessments themselves would also be learning experiences aimed at galvanizing, by ordeal, the habits of mind (e.g., observation, analysis, comprehension, application) that we defined as part of the ecological perspective.

Assessment One

What concepts are critical if one is to comprehend the literature of, and to communicate effectively on, environmental issues? How does one think about the environment and environmental issues in a manner that does not rely on opinion or conjecture? Questions such as these guided the creation of the first assessment, an exercise constructed for the purpose of introducing students to the scope, methods, and language of ecology. This assessment incorporated elements of FGCU's Campus Ecosystem Model for undergraduate education (Tolley, Everham, McDonald, & Savarese 2002), taking advantage of the fact that the university is situated on a large tract of undeveloped land and restored wetlands—a veritable living laboratory for immersion into studies of the environment.

In preparation for this assessment, we devoted one class period to a lecture covering some of the basic principles of ecosystem function: energy flow, nutrient recycling, and food webs. At the next class meeting, we created teams of four to five students and assigned each team a different ecosystem on campus (e.g., cypress swamp, freshwater marsh, pine upland, hardwood hammock). A course instructor or another faculty member familiar with the particular ecosystem under examination escorted a team to its field

site. Prior to this initial expedition, we briefed participating faculty members regarding both the course learning outcomes and the level of ecosystem orientation that should be provided to the students. We emphasized the importance of drawing students' attention to major ecosystem components while letting the students discover the function and interrelation of these components for themselves. Each team of students was also provided with a few basic references on the particular ecosystem in question prior to going out into the field for the first time.

As future course activities would require collaboration, one of the goals of this exercise was to develop familiarity with the techniques and challenges of group work. The problem before the students was essentially to determine whether or not their ecosystem had been correctly labeled. Did the structure, the living and non-living components, and the interactions that occurred among these elements fit the general descriptions available for similar ecosystems in southwest Florida? Students began collecting both direct and indirect evidence from their ecosystems over several observation periods (including the initial orientation visit) and then assembling these observations into meaningful constructs and illustrations. Using additional information retrieved from the library or from electronic resources, each team presented its results to the entire class and argued for or against its validity by relating its findings to those of experts in the field.

By requiring students to create evidence-based descriptions of a particular place that they had explored firsthand, this assessment encouraged them to move beyond the simple acceptance and recapitulation of existing generalizations about the environment, and toward a positivist, ecological perspective. The final stage of the assessment occurred when the class reconvened as a larger discussion group and in turn presented the various ecological units on campus. Through deliberate questions and discussion, students were urged to connect their systems via proximity, exchanges, etc. to one another and to other ecosystems outside the campus bounds. This integrating exercise allowed the entire class to induce the nested nature of ecosystems and to see how seemingly autonomous entities fit together in a composite whole. One of the chief aims of this assessment was to encourage what Bloom (1956) calls *synthesis*, relating knowledge from several areas, and what Perry (1981, p. 88), acknowledging Piaget, called a *vertical décalage*—the perception of a system at a concrete level that is then employed as an analogue in comprehending organizational structure at increasing levels of abstraction. Thus equipped, with a rudimentary understanding of ecology and a developing lexicon, students were able to delve into new materials in subsequent

class sessions, and we discovered that a concept like bio-accumulation of toxins seemed more readily accessible to students who had reported on trophic stratification of campus ecosystems based on their own observations. Sharing such observation-supported concepts contributed to student interdependence and independence from faculty.

Assessment Two

In preparation for the second course assessment, students were presented with details on marine environments, and on marine mammal population dynamics—especially whales and their historic decline in relation to human activities. And, since ecosystems become more complicated entities to study when humans are involved, we presented an anthropological paradigm, *cultural materialism*. We used it to examine the human/environment interface and to highlight the elements and patterns of subsistence technology and social organization of groups living along the coast of southwest Florida during the past five thousand years. Further resources provided and examined over several class meetings included causal frameworks such as the Tragedy of the Commons and Unintended Consequences used to analyze environmental issues (Hardin 1997, Tenner 1996), paradigms for understanding environmental behaviors and values including the Deep Ecology and the Dominant Western paradigms (Gardner & Stern 1996, p. 53), contemporary readings about human-whale interactions (Ackerman 1995, Mowat 1995), and the film *Moby Dick* (Huston & Huston 1996).

The second course assessment provided an opportunity for students to develop their ecological perspective further by examining how embedded cultural values both influence and are influenced by human-environment interactions. On assessment day, we showed the film *Moby Dick* and distributed supplemental readings and the charge. We set three problems before the students: (1) Describe the history of whaling in the United States and explain its demise using at least one of the causal frameworks developed in the class; (2) Identify specific examples and patterns of language, material culture, behavior, or symbolism that provide clues to the nature of the underlying environmental values in each of two cases—one the height of whaling in the U.S. and the other well after whaling's commercial demise; and (3) Examine, through reflection, similar evidence from your own life and then locate yourself along a gradient of environmental values created with the Deep Ecology paradigm and Dominant Western paradigm serving as points of reference.

The intellectual tasks in the second assessment developed from the

first in a number of important ways. As with the first assessment, students were asked to record observations and categorize them with appropriate terminology from the course, thereby demonstrating both comprehension and effective communication. They were presented with challenges in analysis and synthesis as well. Among variables including speech and material culture, they were asked to listen and look for pattern and to infer underlying values. By asking students to transfer the analysis protocol from a data set about other people to a reflection on their own behavior—an area where few of us are inclined to think analytically—we tried to stimulate responses that would evoke a *horizontal décalage* (Perry 1981, p. 89) and compel synthesis by asking students to locate themselves along a gradient. Thus, successful papers resulted in students demonstrating comprehension, application, and analytic competence, but also integration and synthesis as they presented their perceptions of other people and other perspectives. The segmented form of this assessment allowed us to direct positive feedback to successful areas of performance and point out areas where understanding could be enhanced to refine their ecological perspective of the course.

Assessment Three

As noted, our course goal was to help students develop an effective and inquisitive response to environmental issues. The course content and assessment activities heretofore prioritized the concepts, principles, and procedural knowledge necessary for problem solving in the environmental realm. In the final frame of the course, we had students examine case studies of particular environmental issues and their transformational solutions as a precursor to engaging those issues. We employed variations on the *jigsaw* cooperative learning strategy (Aronson, et al. 1978) in this section; dividing the class into four or five small groups and having each discuss a different reading relating to the issue under examination (e.g., air quality, water quality, or energy supply). We asked the students to explore relational structures among actors within the issue as well as the temporal development of the issue. Each group was then assigned the task of articulating a slightly different perspective on the common theme, in effect, asking them to become custodians of that perspective. After a sufficient period for development, the entire class reassembled and was given a charge to discuss the issue and come up with a possible policy solution. In turn, each student listened to the positions of others, advocated their own position, and attempted to influence the action plan. The various perspectives and plans were compared and evaluated for their merits, and the experience in dissecting and reacting to issues prepared the class

for the final course project aimed at the FGCU campus proper.

The third and final course assessment recapitulated and synthesized previous assessment tasks and skills as well as those modeled in the final weeks of the class. The students were presented with a further, *evaluative* challenge in this project of environmental advocacy. As part of a new university and of a largely commuter student body, our students have a characteristically weak attachment to university life; many do not know what to expect, accept, or demand from their on-campus experience. The final assessment aimed to empower students as university citizens by requiring them to propose an action or policy change that would improve some aspect of the human-environment interaction on the FGCU campus. In the assignment, students first explored and described a current practice or deficiency on campus using the relevant ecological concepts and frameworks developed throughout the semester. Water use, human waste management, and landscaping practices were among the topics suggested. The assignment required the presentation of a proposal for change based on a documented and appropriate precedent. For the topics of water use and waste management, local models provided a precedent. A Living Machine®—a wastewater treatment system constructed on ecological principals using flora and fauna as part of the treatment process—is currently being used at one of southwest Florida's regional parks. Upon comparison with the university's current waste-management strategy, the Living Machine® was recommended on the merits of resource conservation and reduced environmental impact. One student judged the regional airport's use of timed faucets in the restrooms to be more responsible for conserving water resources and therefore recommended the practice as an improvement to our institution.

Several students showed a heightened sensitivity to the competing concerns of stakeholders on the campus issues, including physical plant personnel, students, administrators, and neighbors of the university. This capacity to apprehend multiple perspectives impressed us as an important marker of intellectual development and consequently became a benchmark of the refined expression of the ecological perspective. As with the second assessment, students considered the role of personally held values in the actions they proposed. This continued to be a challenge for many, but highly effective papers revealed an awareness of how values acquired during the formative years including thrift, health consciousness, or aesthetic sensibility, serve as important guides in one's thinking and convictions as an adult. Our awareness of this connection between the learners' formative values and our ideal ecological perspective will likely guide the development of this and other

courses.

Student Perceptions—Course Evaluation

Recognizing that both the construction and implementation of any course can be a learning experience for the instructors, we deliberately sought and made ourselves open to multiple levels of feedback from students in the first and subsequent offerings of Issues in Ecology and Environment. In addition to the student feedback solicited as a part of each assessment event and the more formal student evaluation of instruction carried out by the university, we devised a brief course evaluation to seek specific information on our curricular approach. Table 1 presents a summary of the results of this course evaluation over several semesters.

Table 1. Summary of student evaluations for four offerings (1998-2000) of the course Issues in Ecology and Environment. Evaluation scheme: 1, very dissatisfied; 2, dissatisfied; 3, neither satisfied nor dissatisfied; 4, satisfied; and 5, very satisfied.

Evaluation Criteria	Student Response (Mean)	(Standard deviation)	(Sample size)
Course Construction			
1. Did you find the course construction to be consistent with the course title, Issues in Ecology and Environment?	4.49	0.72	68
Assessment/Course Material			
2. Were the assessments and course material integrated into a coherent whole?	4.24	0.65	68
3. Did the assessments and course material allow you to develop greater knowledge and understanding regarding issues in ecology and environment?	4.34	0.73	68
4. Did the assessment and course material address the following course goals?			
a. Effective communication	4.06	0.79	68
b. Ecological perspective	4.40	0.69	68
c. Community awareness and involvement	3.90	0.98	68
d. Analysis or critical thinking	4.13	0.77	68
5. Did you find the team-teaching approach effective?	3.70	1.09	30

In general, students have expressed their approval of the course, with the majority of mean scores falling between satisfied and very satisfied (4 and 5 respectively on a scale of 1 to 5). When asked to rate their level of satisfaction with how well the course addressed specific learning outcomes, students were significantly more satisfied with the treatment of the ecologi-

cal perspective than with that of either effective communication or community awareness and involvement (Kruskal-Wallis Test: $n = 68$, $w = 11.03$, $p = 0.004$). Furthermore, scores for the degree of student satisfaction with the ecological perspective did not vary significantly among course sections as was the case for scores associated with both the effective communication (One-way Analysis of Variance: $df = 67$, $F = 2.89$, $p = 0.04$) and community awareness and involvement (One-way Analysis of Variance: $df = 67$, $F = 4.78$, $p = 0.005$) learning outcomes.

Instructor Perceptions

Interdisciplinary team teaching takes many forms. When creating the syllabus for a new course, a common solution is for the faculty involved to define discrete modules that provide a disciplinary perspective on an issue and then link these units together primarily through the course calendar. This exercise can easily lead to conflict as instructors compete to ensure that their own discipline-specific content is included. In developing this course, we side stepped this problem by identifying and targeting, from the outset, learning outcomes that did not rely on or favor either one of the contributing perspectives in a way that diminished the other. We viewed an outcomes-based approach as a pragmatic way to work in ecology and environment, a contestable domain where anthropology and oceanography both have vested interests.

From this experience we recognized further value in an outcomes approach to interdisciplinary teaching and learning. The inclination in teaching courses in the discipline is generally to validate students' accumulation of discipline-specific knowledge as defined by experts external to the learner. In courses like the one described here, students are explicitly challenged to develop a skill set that has application beyond the boundaries of a given discipline and beyond the university experience. This approach requires alternative modes of student performance evaluation, ones that approximate real-world application. Course assessments were therefore created as an integral component of course development. Given our inclination toward developmental pedagogy, it was also important to us that each assessment built upon previous work and allowed students to demonstrate the skills they acquired along the way.

From a range of student work, we are assured that the assessment sequence does track the acquisition of an ecological perspective. We have come to recognize that outcomes-based interdisciplinary assessments are especially useful for providing insight regarding student thought processes.

Student responses to these assessments reveal qualities of intellect that cannot be concealed behind a flurry of terminology and proper noun references: for example, undergraduate students are quick to pick up on the form of writing, key phrases, and other nuances accepted within the canon of a particular discipline, but when asked to work outside that familiar domain, they often expose much about their real ability to formulate and communicate ideas.

An important component of each assessment instrument developed for IDS 3304 was an explicit statement of the elements of the outcomes we expected to evaluate. A self-evaluation sheet accompanied each assessment and provided a checklist for students to gauge their individual performance relative to those stated expectations. On the same sheet, instructors provided directional feedback on student work to encourage further development. With this assessment mechanism, we were also able to identify components in need of revision by discerning patterns in student performance within one class and across semesters. As a result, we refined and revised both the assessment instruments and the preparatory materials that accompany them. We also used this iterative process for increasing course effectiveness, developed within an interdisciplinary setting, in our respective discipline programs. Other carryovers include the pedagogical techniques transferred from one teaching partner to the other as part of the overall process. Continued conversations between the instructors over time not only encourage further course refinement, but also help fight the tendency for the course trajectory to head toward more discipline-specific territory.

Summary

The use of an outcomes approach has been of great benefit in developing a new course in a new university. Through the experience of developing and teaching the outcomes-based course, we identified particular areas of knowledge and stimuli that promote cognitive development in certain higher order thinking abilities including analysis, synthesis, and integration. We found that this focus on outcomes has the potential to benefit faculty as well. The identification of learning outcomes that both incorporated and transcended our own disciplinary traditions has allowed us, as instructors, to look beyond disciplinary barriers toward a point of convergence. We are reminded that each of our disciplines is a means toward an end, and not an end in itself—something that is all too often forgotten in academe. This experience influenced not only how we approach teaching in our respective disciplines, but also how we understand our roles as educators. Furthermore, as a direct re-

sult of our efforts to construct an ecological perspective for Issues in Ecology and Environment, FGCU's College of Arts and Sciences now defines this learning outcome as "an analytic approach derived from the study of the natural environment and applied to enhance understanding of various natural and socially derived structures and phenomenon" (see Appendix A).

***Acknowledgements**:* Special thanks go to Joe Wisdom for his encouragement and for bringing the authors together in the first place. We thank Rebecca Totaro for her valuable comments and careful review of the manuscript. We are grateful to Jack Crocker for his promotion of, and support for, team-teaching in the College of Arts and Sciences. FGCU's Campus Ecosystem Model is partially supported by the National Science Foundation (NSF-DUE 9850743).

***Biographical note**:* Michael R. McDonald is Associate Professor, Chief Anthropologist, and Program Leader for Environmental Studies at Florida Gulf Coast University. McDonald received his doctorate in anthropology from the University of Pittsburgh in 1994. He teaches a wide range of courses within and between the academic disciplines. His research and publications focus on experiential learning, intellectual development, and liberal arts curriculum. He is currently spearheading the development of an ethnographic field school in Honduras.

S. Gregory Tolley is Associate Professor of Marine Science at Florida Gulf Coast University. Tolley is a former recipient of the Knight Fellowship in Marine Science at the University of South Florida, where he received his doctoral degree in 1994. He is the author of publications focusing on estuarine ecology, deep-sea fishes, and fish physiology, as well as on novel approaches in science education. He has mentored both undergraduate and graduate students and has taught courses in estuarine ecology, fish biology, biogeography, and oceanography.

References

Ackerman, D. (1995). The moon by whale light. In F. Stewart (Ed.), *The presence of whales* (pp. 23-43). Anchorage: Alaska Northwest Books.

Alverno College Faculty. (1994). *Student assessment-as-learning at Alverno College*. Milwaukee, WI: Alverno College Institute.

Aronson, E., Blaney, N., Stephin, C., Sikes, J., & Snapp, M. (1978). *The jigsaw classroom*. Beverly Hills, CA: Sage Publishing.

Bloom, B.S. (Ed.). (1956). *Taxonomy of educational objectives: The classification of educational goals: Handbook I, cognitive domain*. New York: Longmans.

Gardner, G.T., & Stern, P.C. (1996). *Environmental problems and human behavior*. Boston: Allyn and Bacon.

Hardin, G. (1997). Tragedy of the commons. In T.D. Goldfarb (Ed.), *Sources: Notable selections in environmental studies* (pp. 39-47). Guilford, CT: Dushkin

Publishing Group.
Huston, J. (Producer), & Huston, J. (Director). (1996). *Moby Dick* [Motion picture]. Santa Monica, CA: MGM/UA.
Mowat, F. (1995). A whale for the killing. In F. Stewart (Ed.), *The presence of whales* (pp. 223-230). Anchorage: Alaska Northwest Books.
Newell, W.H. (1998). Interdisicplinary curriculum development. In W.H. Newell (Ed.), *Interdisciplinarity: Essays from the literature* (pp. 51-65). New York: College Entrance Examination Board.
Perry, W.G. (1981). Cognitive and ethical growth: The making of meaning. In A.W. Chickering (Ed.), *The modern American college* (pp. 76–116). San Francisco: Jossey-Bass.
Stember, M. (1998). Advancing the social sciences through the interdisciplinary enterprise. In W.H. Newell (Ed.), *Interdisicplinarity: Essays from the literature* (pp. 337-349). New York: College Entrance Examination Board.
Tenner, E. (1996). Ever since Frankenstein. In E. Tenner (Ed.), *Why things bite back: Technology and the revenge of unintended consequences* (pp. 3-32). New York: Vintage Books.
Tolley, S.G., Everham, III, E.M., McDonald, M.R., & Savarese, M. (2002). The Campus Ecosystem Model: Teaching students environmental stewardship. *Journal of College Science Teaching XXXI*, 364-369.

Appendix A

Florida Gulf Coast University
College of Arts and Sciences
Collegium of Integrated Learning

University Learning Outcome #3
Ecological Perspective

Meaning: An ecological perspective is an analytic approach derived from study of the natural environment and applied to enhance understanding of various natural and anthropogenic structures and phenomena. In the Collegium of Integrated Learning, we assume that students have had experiences within the natural environment and have developed particular attitudes toward it and understandings of it. As the ecological perspective is introduced, modeled, and exercised in coursework, students learn to observe more keenly with the conscious intent to see the elements that define environments within ecological relationships. The ability develops further as students acquire terminology and employ models and theoretical frameworks that facilitate understanding and communication of systemic relationships and processes within the natural environment. A refined expression of the ecological perspective is demonstrated when a range of ecological concepts (e.g., interdependence, emergence, symbiosis, sustainability), frameworks, and models are independently and creatively employed in the analysis of problems or the design of solutions that fall within and beyond the traditional applications of ecological analysis.

Beginning:

- The student articulates what she/he knows, believes about the natural environment, and what has influenced that perspective to date.
- The student identifies and undertakes strategies for increasing his or her own awareness of the natural environment. —To include information-gathering strategies and evaluating among sources.
- The student acquires conceptual language to identify, describe, and understand aspects of the natural environment.

Developing:

- The student acquires and applies frameworks, paradigms, and theories from across the disciplines to deepen understanding of the natural

environment or meaningful aspects of it.

Refined:

- The student selects and employs appropriate language and theoretical approaches from various disciplines, and or thinkers, to analyze and evaluate a subject or topic from an ecological perspective.

Issues in Ecology and Environment
IDS 3304

Course Description

This course is part of the Collegium of Integrated Learning and is required for the BA degree in Liberal Studies. Students and instructors will work together to investigate selected, contemporary ecological/environmental issues and problems and how they have developed through time. Individually and in teams, students will develop histories of an issue or problem. These histories will require building a context by examining issues through the perspectives and methods of knowing in the social sciences, natural sciences, and humanities. Students will be expected to formulate their own interpretations and responses to the issues. Consequently, success in the course will rely heavily on critical, creative, systematic, and collaborative thinking as well as the development and practice of communication, information, and technological skills.

Learning Goals

- *Working Knowledge*.—Demonstrated ability to analyze contemporary issues and choose courses of action individually and in collaboration with people of diverse backgrounds and viewpoints.
- *Life-long Learning*.—Effective self-assessment of performance on projects involving analysis of contemporary issues, collaboration with others, and presentation of ideas.
- *Ecological Perspective*.—Demonstrated ability to recognize ecological perspectives and to apply that recognition to the analysis of contemporary issues.
- *Effective Communication*.—Demonstrated ability to develop, organize, and effectively present an analysis of a contemporary issue in oral, written, and technological forms.
- *Information Literacy*.—Demonstrated ability to locate, evaluate, and

employ information relevant to the analysis of contemporary issues.
- *Problem-Solving*.—Demonstrated abilities to employ critical, creative, and systems thinking in the analysis of contemporary issues, and to recognize and solve problems in collaboration with others.

Structure
During this course, you will be working both individually and as part of a group to identify, analyze, discuss, and propose solutions for specific issues related to ecology and environment. This course relies on a variety of readings, films, and Web-based material to introduce relevant contemporary issues and to stimulate in-class analysis and discussion. Your performance will be evaluated primarily using three assessments that include both individual and group work.

Parameters
- *Attendance*. This course is largely discussion-based and involves a great deal of work within a group setting. Attendance is not only encouraged, but is also expected. We therefore reserve the right to adjust your final grade accordingly for excessive absences.
- *Participation/Conduct*. In order to stimulate effective discussion and analysis of contemporary issues in ecology and environment, you are expected to read and think about the assigned material prior to class. This course will involve the discussion of specific issues as viewed from a variety of perspectives. Therefore, common courtesy and mutual respect will be expected.
- *How do I get a B?*

Assessments				
I. Campus Ecosystem	30%	Scale:	90–100%	A
II. Valuing Environment	30%		80–89%	B
III. Environmental Action	30%		70–79%	C
Preparation/Participation	10%		60–69%	D

Note: Plagiarized work—defined as that which passes off the ideas or words of another as one's own, uses another's work without crediting the source, or presents as original an idea or product derived from an existing source—will not receive credit for a grade.

Class Schedule
Using Ecology to Understand Environment

Class Meeting.

1 Course Parameters
Creating a Box: Defining Ecology and Environment
2 Energy, Recycling, and Feedback: An Ecological Primer
Recognizing Patterns: The Forest and the Sea [4]
Introduction to Assessment I: Campus Ecosystem
3 The Campus Ecosystem
Introduction to the Campus Ecosystem Model
Field Orientation and Preliminary Analysis
4 The Gaia Hypothesis [3]
Campus Ecosystem Break Out

Analyzing Environmental Issues

5 Frameworks for Analysis
Tragedy of the Commons [8]
Unintended Consequences [13]
Components of Analysis
6 Origin of Environmental Problems
The Fisherfolk of Charlotte Harbor [7]
Historical Exploitation of Marine Resources
Assessment I Due: The Campus Ecosystem
Individual Papers Due

Valuing Environment

7 Moby Dick: Elements of an Environmental Narrative [9, 12]
Introduction to Assessment II: Valuing Environment—The Human-Whale Interaction
8 The Fishes of the Sea [10]
Green Advertising
9 **Spring Break—No Class**
10 The Global Environment: An Emerging World View [1]
Information vs. Misinformation [11]

Human-Environment Interaction

11 Taking Out vs. Putting In: The Ecologies of Exploitation and Pollution
Biodiversity and Extinction
Biosphere: Endangered Species [1]
Assessment II Due: Valuing Environment—The Human Whale Interaction
Individual Papers Due
12 Resources: Land, Water, and Air [1]

Pollution: The Hazards of Growth [1]
Introduction to Assessment III: Environmental Action

13 Final Assessment Preparation

14 Environmental Legacies: The Story of DDT
Silent Spring [2, 5]
Our Stolen Future [6]

15 ***Assessment III Due: Environmental Action***
Group Presentations
Individual Papers Due
Course Feedback

Reading List/Additional Resources

[1] Allen, J.L. 2001. Annual Editions: Environment 01/02.

[2] Anon. 1998. Fooling with Nature (http://www.pbs.org/wgbh/pages/frontline/shows/ nature/). PBS Online and WGBH/FRONTLINE, Boston, Massachusetts. (Web Resource).

[3] Barlow, C. 1991. *From Gaia to Selfish Genes*. Cambridge, MA: MIT Press.

[4] Bates, M. 1964. "Landscapes—and Seascapes" (pp. 15-26), in *The Forest and the Sea*. New York: Time Incorporated.

[5] Carson, R. 1994. *Silent Spring*. New York: Houghton Mifflin Company, 368 pp.

[6] Colborn, T., Dumanoski, D., & Peterson Myers, J. 1997. *Our Stolen Future*. New York: Plume, 304 pp.

[7] Edic, R.F. 1996. "Six Thousand Years of Tradition" (pp. 27-50) in *Fisherfolk of Charlotte Harbor, Florida*. Gainesville, FL: Institute of Archaeology and Paleoenvironmental Studies, University of Florida, 178 pp.

[8] Hardin, G. 1968. "Tragedy of the Commons" (pp. 39-47) in T.D. Goldfarb (Ed.), *Sources: Notable Selections in Environmental Studies*. Guilford, CT: Dushkin Publishing Group, 352 pp.

[9] *Moby Dick*, 1956. MGM/United Artists Home Entertainment, Inc. (1996).

[10] Preble, D. 2001. *The Fishes of the Sea: Commercial and Sport Fishing in New England*. Dobbs Ferry, NY: Sheridan House, 241 pp.

[11] Sanera, M., & Shaw, J.S. 1996. *Facts Not Fear: A Parent's Guide to Teaching Children About the Environment*. Washington, DC: Regnery Publishing, Inc., 300 pp.

[12] Stewart, F. 1995. *The Presence of Whales*. Anchorage: Alaska Northwest Books, 319 pp.

[13] Tenner, E. 1996. “Ever Since Frankenstein” (pp. 3-32). In *Why Things Bite Back: Technology and the Revenge of Unintended Consequences*. New York.