

Rescuing Economics from the Discipline: The Green Learning Community

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Undergraduate economics is poised for reform because of readily available data and multimedia content. However, we argue that deep reform is needed to teach complex contemporary problems. This requires including institutional and historical content and restructuring the classroom to facilitate interdisciplinary pedagogy. Using Colander's (2006) analysis of reform as a starting point, we review the economics literature to identify alternative approaches and interdisciplinary pedagogy. The Green Learning Community is introduced as an intentional approach that links economics, humanities and environmental studies and provides first-year students adequate time to study, reflect upon, and internalize economic assumptions, models, values, and interdisciplinary insights.

BACKGROUND

The 2008 global financial collapse was a reminder that long-established institutions can rise and fall. Financial giants abruptly disappeared into the real estate collapse and resulting downturn. In the modern economy, established providers of any good or service face increasing pressure from global competition, ongoing revolution in digital communications, and rapidly changing consumer tastes. Undergraduate economics education is no exception. Contemporary economic problems demand new kinds of analysis and resolution. This article focuses on opportunities for reform of content, delivery, and classroom structure using interdisciplinary learning to ensure that economics students are prepared to understand, analyze, and resolve complex problems.

In *The Stories Economists Tell: Essays on the Art of Teaching Economics*, Colander (2006) argues that reform is needed if undergraduate economics education is to keep pace with demands to solve emerging problems. However, reform of content and pedagogy is constrained by incentive structures within the textbook industry and top-tier graduate programs. Change is slow because it involves overcoming high opportunity costsⁱ and entrenched interests. Risk-averse behavior within the textbook industry limits change in economic content to a small portion of existing models and concepts. (Colander, 2006, p. 33) The resulting "safe" content offers a stable but restricted stock of standardized content. The

mass production of economic content generates large classrooms that necessitate structured testing and grading procedures. Large classes, in turn, encourage standardized textbooks.

Colander (2006) argues that internal institutional factors also frustrate reform. Doctoral-level economics students are taught technical relationships using abstract variables and advanced mathematics. They receive scant exposure to actual context, that is, economic history, institutional knowledge, and events analysis. Graduate students typically learn a dense and technical version of the dominant neoclassical “efficiency story” (Colander, 2006, Chapter 8). Kuhn (1970) portrays this type of training as a narrow, puzzle-solving activity uncritical of its own limited paradigm. Consequently, trained economists teach the efficiency story to undergraduates as essential free market fundamentals. Chable (2012) confronts this bias and recommends focus on pluralistic and interdisciplinary approaches.

For these reasons, Colander argues that undergraduate economics education is inadequate, and that the complex nature of contemporary issues will *eventually* force undergraduate programs to replace the efficiency story in favor of the “complexity story” (Colander, 2006, Chapter 8). Rooted in systems theory, the complexity story is supported by the methodology of post-normal science, which focuses on stakeholder interaction in order to analyze complex real-world problems. (Farley, Erikson, and Daly, 2005, pp. 6-8). The complexity story is readily amenable to the ideal of environmental sustainability (Colander, 2006, p. 109). To accomplish this change, it will be necessary to teach essential concepts of systems theory alongside economic history, institutions and events. Furthermore, to convey the complexity story, it will be necessary to reform classroom structure to accommodate interdisciplinary learning.

Lubchenco’s (1998) landmark essay argues the 21st century will be the century of the environment, when ecological constraints will sharply increase the costs of growth-oriented private markets. As economies grow along with complex urban centers, the social costs of undifferentiated economic growth increase relative to private benefits. Private goods are becoming less important in promoting overall quality of life (McKibben, 2007, Myers, 2002, and Leiserowitz and Fernandez, 2008). Market failure inefficiencies related to unaccounted externalities, underprovision of public goods, and overexploited open access resources pose serious problems. Increasingly, economists must also explain “failure of market outcomes”, when markets function as theorized, yet produce undesirable outcomes such as destruction of natural capital, speculative bubbles, and increased carbon throughput (Colander, 2006). In a world defined by ecological constraints and social complexity, economics education needs to move beyond the efficiency story and incorporate concepts related to systems analysis, and it needs to teach the complexity story, both of which are best achieved in interdisciplinary settings.

LITERATURE REVIEW

Colander (2006) identifies two broad areas of reform in economics education: the first is content, and the second he calls the “educationalist” focus on classroom structure (Colander, 2006, p. 7 and p. 45). The former category addresses economic concepts, models, and stories used in undergraduate principles courses. The latter addresses a range of pedagogical devices, such as alternative modes of testing, active learning, current events, interdisciplinary approaches, and learning communities. Colander is skeptical of the educationalist approach, arguing that economists should be concerned with delivering sound economic content.

Our review of the economics literature, however, reveals both justification for and experimentation with changing classroom structure. The Boyer Commission Report (1998) calls for a broad reformation of undergraduate education in research universities through interdisciplinary approaches in the classroom. The commission regrets the predominance of didactic teaching and passive learning approaches as well as overspecialization within disciplines. The Boyer Report argues that “the concept of integrated education requires restructuring both the pedagogical and the integrative aspects of the research university experience” and calls for undergraduates to experience interdisciplinary collaborative learning that is inquiry based and socially engaged (Boyer Commission Report, 1998, p. 4).

In the remainder of this section, we identify interdisciplinary approaches that integrate economics with content from other disciplines. Leet and Houser (2003) discuss infusing classic films to foster interdisciplinary thinking. By analyzing the plots of films such as *Nanook of the North*, *The Grapes of Wrath*, *It's a Beautiful Life*, and *Erin Brockovich*, fundamental economic concepts of scarcity, business cycles, recession, fiscal policy, financial systems, and market externalities can be taught effectively (Leet and Houser, 2003). The cinematic plots add context to the economic concepts, diminishing reliance on textbooks, and encouraging discussion of underlying values. Economic concepts are also conveyed by the use of drama and literature (Watts, 1998), the great books of western civilization (Hartley, 2001), Shakespeare's *Merchant of Venice* to teach monetary economics (Kish-Goodling, 1998), music lyrics (Tinari and Khandke, 2000), and art (Watts and Christopher, 2012). These various media reflect a range of pedagogic innovations capable of infusing values and historical and institutional context into economics courses and promoting interdisciplinary thinking.

Caviglia-Harris (2003) focuses on teaching economics to undergraduate environmental studies majors at Salisbury College. Using the tropical forest as a unifying environmental theme, this interdisciplinary course integrates principles of microeconomics and environmental economics in conjunction with concepts and values drawn from ecology and philosophy. Freedman (2008) describes a course designed for first-year honors students, which is entitled "Sex, Class, and History: An Experiment in Teaching Economics in an Interdisciplinary Setting." Powlick (2009) discusses a 300-level course entitled "Gender and the Economy" designed to treat topics in gender economics in a historical context, relying on heterodox schools of thought. Such interdisciplinary approaches aid the teaching of economics in important ways: encouraging critical thinking and theory building; providing a richer empirical understanding of the world than that supplied by strictly deductive reasoning and quantitative data; and creating diverse learning environments that facilitate peer learning about race, gender, and class. Wade and Stone (2010) report team teaching an interdisciplinary course integrating sociology and economics that highlights the complementary perspectives each discipline brings to health care issues. Hermann (2010) combines psychology and economics to show how institutional economics and psychoanalysis can together interpret complex economic and social phenomena. Comsa and Munteanu (2009) report an effort to integrate theology and economics in order to critique the belief that neoclassical economics is an objective or value-free science.

Brooks and Schramm (2007) report a community-based "research-education-service" model in the economics department at the University of Vermont. Entitled "UVM and the Local Economy," this capstone course focuses on the local economic effects of UVM's expenditures, performs interdisciplinary research into those impacts over four semester-long courses, and establishes a university-community partnership to implement findings. Based upon their criticism of disciplinary curriculum at land grant universities, Parr et al. (2007) discuss an ambitious effort to integrate economics into an interdisciplinary program in sustainable agriculture, an interdisciplinary field of study that offers a potential for studying complex social, environmental, and technical problems.

To summarize, Colander (2006) presents a case for pedagogic reform so that undergraduate economic education delivers a broader range of economic models and concepts designed to teach environmental and socio-economic problems, areas in which the efficiency story proves increasingly inadequate. We agree that economic content must be a centerpiece of reform; however, we side with Boyer and other critics of higher education: interdisciplinary classrooms are the key to achieve the broader economic understanding desired by Colander. Change in classroom structure, which Colander dismisses as the "educationalist perspective," is in fact essential. The increasing complexity of real-world issues implies a need to integrate social and natural sciences, along with the humanities. The teaching literature reveals that efforts to do so are underway. In the following section, we offer a model of interdisciplinary learning that allows students to learn about a wider range of economic concepts in ways that reveal foundational values. The approach can be used to improve economics education in other universities, either through its model of linked courses, or by adaptation of interdisciplinary explorations within a stand-alone course.

THE GREEN LEARNING COMMUNITY

The Green Learning Community began in 1989 at the University of New England. The Department of Life Sciences, spurred by national blue-ribbon reports on the need for active learning, interdisciplinary perspective, and value-laden context in science education,ⁱⁱ established the “Biology Learning Community” as a first-year curriculum for biology and environmental studies majors. The curriculum integrated a two-semester “General Biology” course with “Introduction to Environmental Issues” and “Literature, Nature and the Environment.” As the Department evolved and the University adopted “Environmental Awareness” as an overall curricular goal, the Biology Learning Community became the Green Learning Community (GLC), focused upon interdisciplinary learning with “Introduction to Environmental Issues” serving as the hub course. To broaden the curriculum’s interdisciplinary platform, a social science course, “Economics in Context,” was added in 2007. The learning community has been reported in four peer reviewed articles: (Grumbling, et al., 1991), (Morgan, et al., 1992), (Morgan, et al., 1995), and (Lemons, et al., 1992). This article updates these earlier accounts by focusing on the implications for economics education in an interdisciplinary setting.

Intentional Community

Learning innovative economic models, such as the complexity story, takes place more readily in an environment that privileges exploration and discovery, this in turn requires an atmosphere of trust and collaboration. In keeping with research on the utility of learning communities, the GLC deliberately builds a community of learners connected by common interests and shared values focused on human relationships with the environment from multiple perspectives and personal experiences.ⁱⁱⁱ

The GLC begins with a retreat to foster familiarity and to explore students’ learning goals as they begin their college careers. Set at a lakeside camp in the mountains of Maine, the retreat employs a low-ropes course and outdoor recreation, coupled with a series of discussions on the question, “What is education for?” David Orr’s (1991) essay of the same name provides a perspective to articulate individual learning goals in a context that reveals students’ assumptions about economic goals: Orr’s essay asks students to define “success.” Following the initial retreat come a series of field trips to a waste-to-energy incinerator; a current conservation area whose development would enrich the University; a publicly held commons, such as an urban trail system; an acoustic blues show; and a ski mountain. The activities include preparation and discussions relevant to the goals of the curriculum.

Current Curricular Structure

The courses provide a context for economics that includes instruction on socio-economic issues as well as dramatizations of personal values that underlie economic decision-making. Introduction to Environmental Issues emphasizes awareness of environmental problems, analysis of their root causes and potential solutions, and consideration of the value changes necessitated by the costs of continuing current trends. Literature, Nature, and the Environment focuses on texts that dramatize values underlying the ways in which individuals interact with the economy and the biosphere. Economics in Context introduces select concepts from micro and macroeconomics. It also covers concepts from classical, institutional, feminist, Keynesian and ecological and environmental economics schools of thought, and these intellectual lenses are reinforced in Literature class, where they provide critical approaches to interpretation of narratives. The courses run concurrently during the fall and spring terms. This provides time for students to bond with one another and faculty, to internalize affective goals, and to form interdisciplinary linkages among the disciplines.

The courses meet separately so that the disciplinary content can be covered thoroughly. At regular intervals, however, the courses meet in common to integrate concepts that most college curricula leave isolated. The disciplinary learning is integrated through four overarching themes: *Knowledge and Power*, *Form and Function*, *Ways of Knowing*, and *Ways of Acting*. Each module is introduced in a common class by means of interactive exercises designed to help students internalize concepts that extend across disciplines.

Multidisciplinary/Interdisciplinary/Transdisciplinary

The GLC structure is multidisciplinary in that it provides grounding in specific disciplines: students learn concepts, models, and methods in economics, literature, biology, and environmental studies. It also employs interdisciplinary approaches. The four themes provide potential for approaching questions as actual practitioners must: drawing data and methods from formal disciplines to understand situations and solve problems. For example, by integrating an economic case study with a classic literary text, students learn that actual economic decisions rest upon motivating assumptions of value that may not be explicitly visible. In this way, cultural valuation calls into question the assumptions of the economic construct or its parts, such as the basic concept of price or the prioritization of private over public goods. On the other hand, economic analysis can deconstruct sentimental environmental values such as antipathy to all effects of consumption on a natural system and reflexive anti-market attitudes of some environmental narratives. From the perspective of the pluralistic approach espoused by ecological economics, Farley, Erikson and Daly (2005) write: “By incorporating knowledge across disciplines, very often the combination of tools and ideas lead to new tools and ideas, and transdisciplinary knowledge and understanding is born. The ecological economist strives to integrate transdisciplinary insights with human values—including but going beyond traditional notions of economic value—into a decision-making framework for solving problems in the real world” (Farley, Erikson and Daly, 2005, p. 8). We argue that economic thought profits from such transdisciplinary encounters within a classroom architecture that is interdisciplinary and enables active student participation. In the following two sections we briefly outline an aspect of the literature and environmental studies courses that provides means for understanding key economics concepts.

Disciplinary Aspects: Literature, Nature and the Environment

Understanding the Power of Narrative

An especially acute force of literature has direct applications for the discovery and communication of economic concepts. Literature presents *narratives*, stories with beginning, development, and resolution, focused upon characters with identifiable traits. Stories are structured by plots that provide positive and negative outcomes in worlds that may be as infinite as dreams or as constrained as the biological imperatives of birth and death. Because types of plots have evolved with human culture, their shapes resonate with individual experience. Economists speak, for example, of the “efficiency story.” Understanding plot structures enables deconstruction of such stories, enabling students to see underlying values that shape perceptions of reality.

The plots that structure narratives can aid students’ understandings of economic relationships. Because we are prepared to anticipate comedy or tragedy, for example, we are ready to impose such structures on the data of reality, whether it be the happy outcome of individual economic success, or the social tragedy of climate change. Unexamined, this predisposition to accept plot and its outcome can both obscure and induce understanding; examined, the predisposition may stimulate questioning of conventional wisdom. When the literary plot of comedy, appealing to human desire for a “happy ending,” filters out all but the most narrow market outcomes, it implies universal advancement, obscuring possible critique of the overall consequences of the market. Similarly, when an individual’s gain is rendered in a news story as a heroic accomplishment, its negative consequences tend to be ignored. Understanding climate change as an ironic story dramatizes how its social costs might in fact stem from a cumulative advancement in “the wealth of nations” that detracts from “the greatest good for the greatest number.”

Disciplinary Aspects: Introduction to Environmental Issues

Systems Thinking in Contrast to Reductionism

Environmental Issues focuses on the terms of systems, nonlinear relationships, and networks rather than in terms of parts, separateness, and isolation. The systems approach dovetails with the “complexity story” in economics. After exploring the history and features of western scientific mechanistic worldviews, we ask “What patterns pervade nature’s numerous forms?” Students learn to recognize and diagram positive and negative feedback loops operating in natural and social systems that often link the

two in complex relationships. For example, students gain an understanding of the root causes of rainforest destruction by mapping the positive feedback loops that often leave Amazonian farmers with few options other than clearing additional forest areas. Such understandings demonstrate how it is not just population growth that fuels degradation but also structural injustices, such as unequal land tenure.

Although we stress the importance and valuable insights that can come through reductionism's methodology, students learn that reductionism is only one strand in humanity's epistemological fabric and that learning the robust interconnectedness of nature's networks requires a different way of thinking—one that is equally powerful, with a rich history and full of contemporary discoveries. All of these conceptual fields in turn contribute to the learning that takes place in Economics in Context.

Disciplinary Aspects: Economics in Context

Assumptions of the Neoclassical Model

A weakness of the textbook approach in principles courses in economics is that the assumptions underlying the neoclassical choice model are given short shrift. Although mentioned, they are usually glossed over in a rush to teach the more familiar supply and demand apparatus and the associated efficiency story. Colander argues that the unrealistic assumptions and resulting models are not particularly relevant; however, students learn to think like economists by going through mental calisthenics (Colander, 2006, p. 5). The 15-week semester and the drive to “teach the textbook” do not afford time to present assumptions as elements of a coherent model and flesh out their implications to the efficiency narrative. One outcome of altering the structure of the classroom by stretching a one semester course into two semesters is that economic assumptions, concepts, models and implied values can be developed methodically. Students have adequate time to reflect on ideas and internalize them using in-class activities and writing assignments. Further, ideas can percolate over sufficient time so that students can make connections to concepts and values taught in environmental issues and literature.

Students have time to consider assumptions underlying economic models: they learn their limitations and their potential implications in understanding and solving actual problems. Furthermore, the implicit values underlying neoclassical assumptions can be understood through literary narratives and environmental concepts. The neoclassical model and its derivative efficiency narrative appear as a coherent story based upon an explicitly learned set of assumptions. There is time for meaningful discussion of foundational assumptions such as the autonomous individual, self-interested behavior, external motivation, market exchange, utility maximization, rational behavior, and price as a reflection of embedded values in market exchange. In the contemporary environment, where complex problems are the norm, students need to be fluent in both reductionist methodology (the efficiency story) and systems methodology (the complexity story). Once students understand and internalize the particular set of values unique to each approach, they possess conceptual tools that can be applied to problems that involve economic, environmental and social interactions.

Integrating Economics into the Four Overarching Themes

As previously mentioned, the overall flow of content is guided by four overarching themes: 1. Knowledge and Power; 2. Form and Function; 3. Ways of Knowing; and 4. Ways of Acting. In this section, we discuss the relationship of these formative themes to Economics in Context.

Knowledge and Power

The neoclassical model of individual choice under a scarcity constraint readily conforms to study and discussions regarding “knowledge and power.” Acquiring the knowledge to make a choice, inside or outside of the market, delivers power to transform oneself and the surrounding environment. To present choice theory in a balanced manner, the fundamental assumptions must be complemented to reveal their inherent limits and alternative possibilities need to be presented. To accomplish this, Goodwin et al.'s (2009) textbook, *Microeconomics in Context*, is used to present the standard assumptions. The textbook also offers a decent treatment of alternative assumptions regarding motivation, behavior, rationality, and information. The choice process is modeled using realistic assumptions about individual behavior. For

example, the textbook examines a range of assumptions dealing with motivation, including maximizing, altruistic, ameliorating, and "satisficing" behavior. Students learn that the neoclassical model only partially represents the nature of choice.

This pedagogic approach meets Colander's demand that undergraduate faculty not teach the neoclassical model as truth (Colander, 2006, p. 4). To reinforce the distinctions and drive home the implication of prioritizing certain assumptions over others in model building, students read, discuss, and write about Schumacher's (1973) thesis that "peace cannot be laid by universal prosperity, in the modern sense, because such prosperity, if attainable at all, is attainable only by cultivating such drives of human nature as greed and envy, which destroy intelligence, happiness, serenity, and thereby the peacefulness of man" (Schumacher, 1973, p. 32).

Form and Function

The form and function thematic module is introduced by looking at different types of automobiles and relating their "form" to "function." Later, students study the forms and functions of national income accounting systems and those of capital. They take a detailed look at the National Income Accounting (NIA) system. Using Goodwin et al.'s (2008) textbook, *Macroeconomics in Context*, students study the traditional categories of the NIA system and the concept of gross domestic product. They learn how the concepts that constitute the categorical form of the accounting system serve to emphasize monetized economic growth. Students learn how the traditional categories prioritize consumption and manufactured capital, and disregard domestic production and natural capital. Next, students are introduced to contemporary concepts of the NIA system. These include the categories of non-market family production, the greening of the national accounts, the distribution of income, and other indicators of social well-being. The modified NIA accounts highlight the value of family activities and the natural environment missing in the traditional accounts of economic activity. This leads to discussions of how a full accounting encompasses social well-being and sustainability.

To reinforce the theme of form and function, students also study the stock and flow nature of several forms of capital—manufactured, natural, human, social, and financial. They learn how the stock of each capital can be depleted or increased depending on the level of investment flow and consider the services that flow from each stock. The exercise teaches students a more complete understanding of what goes into production and the importance of stock maintenance. Students collaborate on business ideas and write papers describing how each form of capital functions to sustain a business or other economic activity.

Ways of Knowing

Using the *Turning Point: Science, Society, and the Rising Culture* by Frijof Capra (1982), students study the worldview and concepts of the "mechanistic" and "organic" approaches from the perspective of the philosophy of science. The worldviews coincide with the contemporary language of the reductionist and systems approaches. The chapter entitled "The Newtonian World Machine" portrays the eclipse of the organic worldview, and the evolution and eventual triumph of the mechanistic worldview. Capra meticulously lays out assumptions and values that constitute each worldview. Next, students read the chapters entitled "The Biomedical Model" and the "The Economic Impasse," in which assumptions and values from each worldview are fleshed out for biomedicine and economics. Students solidify an understanding of how conceptual models condition the manner in which we see the world and solve problems. Moreover, they learn that in addressing problems models may generate different outcomes, some good and others not so good. Biomedicine is particularly useful because nearly every student has a personal story of a doctor who treated a loved one in a mechanistic (reductionist) or an organic (holistic) manner. A meaningful discussion can occur about the difference between treating disease and generating health. Similarly, students study the underlying assumptions and values of modern economics in terms of both mechanistic and organic worldviews. A discussion about the difference between growth and development ensues. Students identify a medical or economic issue from their experience and write on how a mechanistic or an organic approach improved or worsened the situation. This reveals strengths and weaknesses of each approach and the conditions under which they may be successfully applied. This

balance is consistent with methodological pluralism, which as Colander argues is essential for solving complex problems.

To introduce students to distinct ways of knowing within the discipline of economics, they read and discuss from Heilbroner's (1980) *The Worldly Philosophers*. Students focus on The Economic Revolution, Adam Smith, Karl Marx, Thorstein Veblen, and Maynard Keynes. The module concludes with an in-depth look at the contrasting vision and assumptions of Ecological Economics. Using *Ecological Economics: A Workbook for Problem-Based Learning* by Farley, Erickson, and Daly (2005), students are introduced to the foundational vision of a finite biosphere containing the economic system. This vision is reinforced through Boulding's (1966) seminal article "The Economics of the Coming of Spaceship Earth."

Ways of Acting

This module starts with an interdisciplinary seminar in which students identify ways that people act to bring about change. The wide range of actions discussed include recycling programs, song and poetry, protests, research, canvassing, public speaking, and student organizing. Farley, Erickson, and Daly's (2005) chapter on communication and changing a system provides context in a multiple stakeholder environment.

Next, students read Meadows' (1997) article entitled "Places to Intervene in the System." Meadows prioritizes nine points of intervention to leverage change in a complex system, moving from short-term marginal adjustments of system parameters to long-term structural shifts in the rules, paradigm, or values underpinning a system. The article presents systems concepts (stocks, flows, feedback loops, buffers, nonlinearity, chaos, etc.) in a qualitative manner. Students gain an entry point into the language of systems analysis at a level of sophistication on par with a principles-level presentation of the efficiency narrative. Complex problems, such as urban sprawl, deforestation, global warming, water scarcity, and international wealth disparities, can be used to illustrate the interdisciplinary nature of economic, natural and social systems, as well as how issues may be understood by means of critical literary readings. To reinforce system dynamics, students organize and plan a long-distance group trip. By engaging in this project, they see how individuals constitute a social system. They are confronted with the constraints of an approaching snowstorm to simulate natural impacts and must deal with limited time and money to simulate economic matters. Students identify and design Meadow's nine intervention points with the goal of a safe and timely arrival at their destination. Students observe that some individuals assume more risk than others and apply the insight to theoretical economic models.

The Efficiency and the Complexity Narratives

The economics discipline does not suffer for lack of methodological diversity, and it has a rich array of theoretical perspectives. However, it is characterized by a dominant school of thought, and embedded institutions reinforce its dominance generation after generation. Reflecting a lively tradition, economists in heterodox schools have challenged the neoclassical orthodoxy since the 1870's. At that time, the marginalist revolution established economics as an "objective science" by purging the classical political economy focus on value and distribution. As a result, undergraduate economics students learn only the simple efficiency narrative. In cultural terms this is akin to being fluent in one language. Graduate students learn this language with greater technical and mathematical sophistication. Lacking training in systems language, undergraduate economics teachers who venture to teach the complexity story do so through common sense, self study, and accumulated wisdom. Without intentional graduate training, many economics teachers avoid teaching economics in a historical and institutional context and as embedded in social and natural systems. Colander (2006) points out that cutting edge, research economists do model complexity in terms of advanced statistical techniques. Still, lacking formal training in systems thinking during the formative years, it is difficult to pitch the complexity story at the undergraduate level. Fluency only in the efficiency narrative is the norm. With the exception of formal training in ecological economics, most economists are not prepared to teach both the efficiency and the complexity narratives.

One of the highlights of embedding *Economics in Context* in the GLC is the appropriate manner in which concepts and models are introduced at an introductory level. Undergraduate students are taught the rudiments of the standard reductionist approach as well as the systems approach. In essence, undergraduate economics students learn the basics of two methodologies. They begin to think and speak in terms of both the efficiency story and the complexity story. An interdisciplinary orientation and classroom structure makes this possible.

INTERDISCIPLINARY TO TRANSDISCIPLINARY

In the GLC, disciplinary integration is achieved through classroom sessions in which students and instructors focus upon a task requiring multidisciplinary analysis. This analysis not only requires understanding concepts learned within the several courses but also evokes new concepts that lead to deep, internalized learning. The literary component provides value-laden and emotionally charged texts that lend themselves to analysis of economic and environmental contexts. The process assembles learning tools offered by the disciplines while engaging students' active responses. The outcome for students is to see the utility of connected learning in dealing with economic decision-making about natural resource use. This kind of learning is known and valued in many sustainability programs as "transdisciplinary."

To describe the transdisciplinary method, two examples will suffice. The first focuses upon a classic text that demonstrates the inability of market processes to sustain ecological integrity in historical use of land. Aldo Leopold's (1949) "A Land Ethic" reflects upon Leopold's experience of land degradation caused by farmers' land management practices. It uses literary structures and techniques to explore assumptions of value. The essay begins with an allusion to Homer's *Ulysses*, calling up the passage in which Ulysses discovers that his slaves have misbehaved. When Ulysses has them hung for their transgressions, he conforms to the culture's assumptions about correct behavior regarding one's *property*. Ownership of slaves is accepted, and because of market pressures, must be sustained. Within his cultural context, it is ethically correct for Ulysses to discipline his human property however he sees fit. Leopold then traces the historical "evolution of the ethic" by which slavery has become first, taboo, then unlawful. He argues for a similar ethical evolution in how the community views the land. Leopold documents how land use problems such as erosion have not been solved sustainably by either market mechanisms or government incentives and argues that the only sustainable solution lies in changing the relationship between humans and the "soils, waters, plants and animals, or collectively, the land." His essay climaxes with the assertion that "a thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community; it is wrong when it tends otherwise" (Leopold, 1949, pp. 224-225).

Our case study moves to a simulation, casting the students as long-time farmers who love their land but face a budget deficit because of market pressures. A percentage of their land includes high-value wetlands that, if drained and planted, will right their farm's balance sheet. The exercise asks them, simply "What is right to do? and What **will** you do?" From their class in environmental issues, the students apply understanding of wetland functions supporting both the ecosystem and human communities; from their economics class, students envision economics' iron law that choices involve costs that must be met. Most poignantly, the exercise reveals that in the economic realm, one may not be free to do what Leopold calls "the right thing" according to one's personal ethic. Students are asked to choose a course of action based upon economic reasoning, and explain how it compares with their ethical belief. Their responses meet desired learning outcomes in complex ways. Some say baldly that despite their care for the wetland, they will convert it to crops because "retaining the land and providing for family" is the prime value. Others try to avoid the iron law of costs by hiring a more sanguine accountant. Some aspire to farm more efficiently or change crops. Some bring the idea of cutting costs by de-mechanizing (saving tractor payments) and by targeting organic or local food markets. Still others, more focused on the wetland, posit selling hunting rights or charging admission to visit its wildlife as a conserved area. As such proposals are aired, instructors continually respond by reiterating economic requirements. Deriving revenue from hunting requires a market, and selling the wetland as a conservation area requires revenue come from a source in government or a not-for-profit NGO.

A second case study is based upon Sara Orne Jewett's classic New England short story "A White Heron" (1899). In the story, a poor ten-year-old girl living in the backwoods of Maine meets a Boston ornithologist who is hunting a rare bird for his collection. The girl feels loyalty to her beautiful avian companion, but must consider the substantial monetary award offered by the scientist, large enough to change her quality of life. The story's plot avoids easy resolution. The girl doesn't really come to an active decision: when pressed by her grandmother to reveal the location, she simply does not answer, and the story's narrator expresses uncertainty about the outcome. The key in the case study lies with economics, in understanding how value is assigned individually and socially. The little girl had been asked to place a discrete monetary value upon a relationship with a living entity, a relationship laden with both emotional and ethical weight. The economic analysis becomes more complex when the instructors reveal the primary cause of extinction of avian species: harvesting for feathers to be used in women's hats. Data defining the demand as well as photographs of typical millenary lead to the concept of "conspicuous consumption" (Veblen 1899). That discussion returns to the distinction between "wants" and "needs." This analysis is applicable to the standard model of monopolistic competition.

Years of delivering this and similarly integrated case studies have demonstrated that such exercises effect qualitative change in students' learning. Learning in literature and environmental issues allows students to ground economics concepts such as "choice" and "opportunity cost" in intense, if vicarious, personal decision-making. Ecological health and ethical assumptions must engage a system defined by economic imperatives. Combining these kinds of learning in a group experience allows students to learn different assumptions of value and different responses to pressures or constraints. Students typically depart from such integrated case studies with more questions than answers—a mental set appropriate for dealing with the community's need to find sustainable solutions, a need just as absolute as economics' iron laws.

INSIGHTS FOR IMPLEMENTATION

Those interested in reforming economics education are welcome to draw upon our experiences as described here and to contact us for further discussion. One can deliver the experience in a structure of linked courses or by inputting learning experiences in a stand-alone course in economics. Creating an interdisciplinary experience involves a significant investment of time and labor in planning, debriefing, and revision. Time is also demanded to effect collaboration among academic departments. To create linked courses it is necessary to find faculty partners committed to more profound education and willing to research into pedagogy, model curricula, and desired student learning outcomes. The model of linked courses has the advantage of maintaining the identity of courses within their disciplinary departmental structures and avoids the donation of labor that often accompanies team teaching. Linked courses can be facilitated by a sympathetic dean and/or by strong department chairs. Alternatively, economics instructors can themselves incorporate elements of this interdisciplinary approach and teach the complexity story by integrating texts, exercises, and problem solving from complementary disciplines such as literature, cinema, women's studies, sociology, and environmental studies. Such elements may be created by consultation with willing colleagues or by searching models in the literature of economics education and that of interdisciplinary learning, and, again, by conversations with the authors of the current article.

Active shared learning in the classroom is crucial. Students must be confronted with complex problems requiring creative solution, while observing instructors practice interdisciplinary approaches. This requires writing assignments and small group activities in which students share their ideas. Likewise instructors must provide regular feedback to students. For students to embrace the uncertainty and individual responsibility necessary for active, interdisciplinary learning, shared passion must flow throughout the community, modeled by enthusiastic course instructors in the classroom and in co-curricular activities.

CONCLUSION

Colander (2006) elevates the discussion about reform in undergraduate economics education. He argues that content is narrow and slow to change because of incentive structures faced by undergraduate teachers related to the textbook industry, the tenure process and economics departments. Colander argues teaching a wider array of economic concepts and models is central to reform and is vigorous in his criticism of the limitations of the neoclassical approach, arguing that the complexity story should and will supplant the efficiency story. However, his analysis is founded on an *a priori* judgment that it is more important to reform economics content and less important to address the role that classroom structure plays in perpetuating outdated economics education. Accordingly, Colander limits his scope by not addressing the “educationalist” perspective, which focuses on pedagogic reform that alters classroom structure. Our review of the literature reveals cases of pedagogic innovation that involve attempts to reform both economic content and restructure the classroom. We, too, argue that economic content is important; however, genuine reform in undergraduate economics education is unlikely to occur without reforming the classroom to accommodate teaching systems thinking and the complexity story as well as efficiency story. An interdisciplinary setting such as the Green Learning Community is essential to adequately deliver the economic content required for teaching the complexity story and learning about and solving real world problems. Supported by the goals and structure of the learning community, students have adequate time to form bonds and trust with their peers. This is crucial to sustaining study and discussion of difficult value-laden topics, and to process and integrate economics concepts with courses in the natural sciences and humanities. Thus, reforming the content of undergraduate economics is accomplished by restructuring the classroom both in terms of a year-long delivery time and integration through an interdisciplinary linking of courses. Elements of this program can also be applied to stand-alone economics courses. In our experience, the students’ learning outcomes and the collegial collaboration render intensive labor satisfying for instructors.

ENDNOTES

1. Maier et al. (2012) report the development of a web-based portal, *Starting Point*, which offers easy access to resources for teaching economics. Designed to disseminate best-practice pedagogy, the clearinghouse was created by an interdisciplinary team of economics educators and pedagogic experts. It contains modules that cover traditional content and models as well as modules covering altered classroom structure, such as interdisciplinary approaches, cooperative learning, and service learning. The creation of the web-based portal addresses Colander’s (2006) argument that high set-up costs impede pedagogic reform. As well, the portal addresses Colander and McGoldrick’s (2009) reevaluation of the economics major and recommendation that a commons be created to disseminate pedagogic experience (Colander and McGoldrick, 2009).
2. Such as *The Liberal Art of Science: Agenda for Action: A report published by the American Association for the Advancement of Science in 1990*.
3. Based on research and experience, the faculty has arrived at goals for the Green Learning Community beyond the goals of the individual courses. Our goals as learners (both faculty and students) are to: participate actively in the educational processes; develop a sense of community emphasizing cooperation and purpose; share responsibility for the success of our attempts at learning; explore how individuals and social groups interpret reality differently; understand how deeply learning and research are related; study each discipline in adequate depth while studying how they complement one another; promote shared interests and experiences among students and faculty; develop the trust necessary to grapple with serious and controversial issues; expand each person’s repertoire of thinking, learning, and problem-solving skills; use reading, writing, thinking, and dialogue as activities that reinforce learning.

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