

Indigenizing a Student Learning Community at the University of Connecticut at Avery Point

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“Integrative Learning in Practice: Innovative Pedagogy & Course Redesign IX”
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Overview of “Looking for Indians: Indigenous People and the Environment”

Faculty and staff at the University of Connecticut Avery Point campus have designed a new Learning Community for the fall 2009-spring 2010 academic year, titled “Looking for Indians: Indigenous People and the Environment.” A total of 20 faculty (representing 14 different disciplines) and approximately 45 freshman and sophomore students will be participating in this initiative.

Participants will investigate both popular and scholarly understandings of indigenous people, knowledge, identity, and place, as a means to de-compartmentalize learning and build interdisciplinary awareness. Native American guest speakers, field trips, and extra-curricular activities will be scheduled, and faculty will participate in a series of forums to encourage both reflective and analytical approaches to the following questions: What is an Indian? What is the environment? How do we construct environments? How do environments construct us? Learning community participants will also collaborate on developing kin-centric models to help students map their relations to faculty, academic disciplines, the campus community, and southern New England.

Rationale for Interdisciplinary Learning Communities

Most entering students at the University of Connecticut are encouraged to participate in a one-credit “First Year Experience” (FYE) course as a way to familiarize themselves with the intellectual and social aspects of academia. Themes chosen for these courses are typically related to specific majors, career interests, or interdisciplinary topics, and the goal is to help students to become more active, engaged learners. Despite the success of this program, many undergraduate students still find it difficult to choose a major, and equally difficult to link contents, skills, theories, and methods learned in one class or discipline to other course work.

The University of Connecticut has articulated a vision for student learning communities of “integration and coherence—in each student’s experience and among programs.” The FYE goals focus on the relationships with self, academics, the community, and world and include self understanding, personal growth, development of life skills, academic savvy and the spirit of inquiry; and awareness of and investment in social development, human rights and equality, and “cultural competence, environmental awareness, and participation in a global society” (from UConn’s First Year Programs <http://livelearn.uconn.edu/vision_goals.htm>, 2/10/2009).

The ongoing project of enhancing student engagement includes developing innovative methods for curricular integration, and encouraging faculty collaboration vis-à-vis the content and teaching of the University of Connecticut’s General Education curriculum. The regional campuses are ideal locations for creative, collaborative approaches that can maximize visibility of the college’s offerings, encourage intellectual engagement and research, and increase student enrollment in specific programs, without incurring major faculty or departmental expenditures.

This project, therefore, seeks to improve and update the context of existing courses and syllabi through a ground-level approach, by encouraging faculty to highlight the unique qualities of specific disciplinary approaches to common themes. This local solution to addressing broad institutional concerns is expected to generate higher enrollment in majors and minors and increase student retention. It could also inspire faculty to collaborate with each other in new and exciting ways.

“While improved retention is a welcome consequence of learning-community work, it has never been its aim. In the push to improve student retention, it is easy to overlook what research tells us: Students persist in their studies if the learning they experience is meaningful, deeply engaging, and relevant to their lives. We know from campus visits—especially sitting in on classes—that if institutional energy goes to designing models and organizational structures without a similar attentiveness to teaching and learning, opportunities are squandered. The camaraderie of co-enrollment may help students stay in school longer, but learning communities can offer more: curricular coherence; integrative, high-quality learning; collaborative knowledge-construction; and skills and knowledge relevant to living in a complex, messy, diverse world.”

- Emily Lardner and Gillies Malnarich. “A New Era in Learning-Community Work: Why The Pedagogy of Intentional Integration Matters.” Change: The Magazine of Higher Learning, July-August 2008. Accessed on-line 2/10/2009 at: <<http://livelearn.uconn.edu/LCArticles.htm>>.

Shared Themes

The learning community focused on “Indigenous People and the Environment” will explore how indigenous and non-indigenous communities relate to various aspects of the natural landscape, regional flora and fauna, and marine and freshwater environments. Faculty will be encouraged to explore this topic in whatever way they choose. All participants will be asked to develop learning activities focused on two particular areas of inquiry:

- *Natural resources and sustainability*: stewardship, underwater archaeology, biological study, mathematical modeling, mapping, scientific exploration, sustainable harvesting, natural resource management, indigenous ecological knowledge, etc.

- *Sense of place and popular memory*: literary studies, interpreting human activities over time, the impact of place on identity construction, popular culture, indigenous folklore, museum studies, monuments and public events, rootedness in specific homelands, etc.

Goals and Philosophies of Learning Embodied in this Project

The primary goal of this project is to increase student and faculty exposure to the wide range of disciplinary approaches available for studying one’s topic of choice, whatever that topic might be. As a result of their various explorations of this shared topic, students will be exposed to intriguing, exciting, relevant issues that might not otherwise be addressed, and they will also benefit from the experiential component offered by guest speakers and films. Faculty will gain insights into other disciplinary approaches, and their collegial interactions are expected to inspire other creative projects and research.

Faculty hope to inspire multiple intelligences and stimulate “bicultural” learning, by inviting students and faculty to explore and discern ways to integrate their own culture(s) of origin and learning styles with the culture(s) of the learning community (classroom, university, peer group, etc.) for increased proficiency in their chosen field(s). Self-awareness is crucial for building linkages that can help students succeed. Some students may, for example, relate more closely to experiential activities with concrete and tangible results that have immediate application to one’s experience. Others may naturally prefer the abstracted and theoretical exercises embodied in scientific disciplines. Others may be inherently more expressive in musical or visual media. The opportunity to explore a single broad topic from wherever a student happens to be positioned, regardless of any prior experience, allows them to investigate something new with minimal risk of failure. In doing so, students may come to recognize different learning styles and disciplines as strategic entries into intriguing topics for study and research, rather than discrete or inaccessible academic mysteries.

This initiative aims to “indigenize the academy,” therefore, by integrating non-linear, holistic, indigenous epistemologies and perspectives to serve the goals of improving student-centered learning, community building, and academic renewal in general. We intend to provoke stimulating conversations and student and faculty interest outside of the classroom, as participants compare their experiences with their peers, and as they come to recognize how people construct relationships to unique cultures and landscapes and disciplines over time.

Making Connections: One Faculty Interest Group's Campus-Wide Expedition of "Looking for Indians"

Laurie Wolfley, English

I never really adjusted to moving up to middle school. What a huge leap it was from the small learning community I was used to in elementary school! Of course, my blossoming adolescence played a part in this discomfort, but what was even more confusing to me was how compartmentalized school had become: separate classes in separate rooms, separate teachers, separate disciplines. In seventh-grade social studies, Mrs. Gervasini spent the first half of the year teaching about Latin America; everything we did was focused on Latin America. Had you asked me what "Latin America" means, however, or where it is, or why it's significant, I would have been dumbfounded. What I had learned in that class was a series of apparently unrelated facts; I had no idea how those facts worked together to represent a region and its people. And this Latin America certainly had nothing to do with *me*.

Sadly, learning remained compartmentalized—at least for me—right through college. Only in graduate school did I begin to realize how disconnected my learning had been. When a professor asked me how a work of literature reflected the social, economic, and political environment of the times, I was once again dumbfounded. I hadn't thought to create connections between what were, after all, separate disciplines in my mind. I realized that when I saw a painting or read a book or heard about a war across the world, I compartmentalized that experience too, just as I was taught. I had stored away information but never interacted with it. This realization left me feeling cheated, as if school had failed me on some level.

More important, however, the realization ignited in me the desire to help my own future students create connections in their learning. As an educator who now teaches college freshmen, I have worked toward helping my students integrate their learning—creating connections between and among their various learning experiences to help foster not a series of unrelated facts but a more unified sense of the world.

Still, how much decompartmentalizing can one teacher in one discipline do?

When I heard that a Faculty Interest Group (FIG) was forming on campus to create a learning community for students, I jumped right in. This was exactly the kind of true integration I was hoping for. What I see developing as this FIG gets underway is an exciting, innovative approach to teaching, one that is forming alliances—we call them "kinships"—among all sorts of unlikely candidates. From our planning meetings, I've discovered how the work we do in my composition and literature class—even the content we cover—is intrinsically related to the work students do in their biology, political science, anthropology and art classes. Our faculty group is getting a strong sense of how our courses can easily fit together into one big picture, and the more clear we are on these connections, the more readily we can help students see them too. By exploring this big picture together with our students, we can help bridge the gaps that previously seemed to exist between our disciplines. Thus, we create kinships among students and teachers in several disciplines on a variety of levels.

The learning community, titled "Looking for Indians: Indigenous People and the Environment," focuses on building an interdisciplinary approach to teaching and learning that revolves somehow around the topic of the indigenous people of America. It turns out that this wide-reaching topic makes for a perfect model. Students who become part of this learning community will regularly find themes and ideas connecting their learning in one class to that in another; for example, they may discuss Indian fisheries in the Pacific Northwest and Alaska in their Agriculture and Resource Economics course, then read a novel in my English class that describes the environment of the dying fishing villages of Newfoundland, then study the Inuit Indian tribes of Alaska and Newfoundland in Anthropology—all of these topics are interconnected, so what students learn in one class will complement and reinforce what they're learning in another. Meanwhile, through a series of out-of-class field trips, presentations, panel discussions and other projects, students will find themselves personally interacting with that learning, finding ways to make it meaningful to themselves.

Our FIG has been working on the "Looking for Indians" project for many months. Even though we've got a strong plan in place for the fall, the semester is over, and summer break is officially here, we can't seem to quit those weekly meetings. Something draws us together. A sense of connection, perhaps.

Decolonizing Methodologies in the Colonial Classroom: Thoughts on Engaged Pedagogy and Indigenous Perspectives

Margaret Bruchac, Anthropology

For more than a decade, while teaching in American Studies, Anthropology, and History departments, I have been emphasizing the importance of decolonizing pedagogies and inter-disciplinary learning, particularly when teaching about Indigenous peoples. Native oral traditions must be studied as sophisticated repositories of knowledge and literature, not just simplistic children's tales. History and Museum Studies must consider the influence of collecting practices, popular memory, local monuments, and heritage tourism on conceptions of indigenous people. Geographers can use phenomenological, ecological, and literary approaches to examine activities and beliefs that have marked and shaped human relations with landscapes over time. Literature and Art can highlight ethno-poetic and performative aspects of language, song, dance, and consciousness. We can also weave together such diverse topics as paleo-maritime archaeology and contemporary fishing rights.

Important cross-cultural and cross-disciplinary conversations are now taking place in academia, as part of the effort to include voices and perspectives that have been heretofore marginalized or absent. Decolonizing methodologies, deeper discussions of traditional ecological knowledge, and greater awareness of Indigenous epistemologies are routine in Native American Studies and Indigenous Studies programs, and are influencing scholarly discourse in other fields. College faculty and administrators are finding that the increasing ethnic diversity of the student population, and the desire to incorporate more cultural diversity in the curriculum, call for critiques of theories and methods that marginalize American Indians and essentialize other ethnic identities.

This is a perfect moment in American history for entering into discourse about cross-cultural mixings in the post-colonial Americas. We might imagine mixed identities to be modern, conflicted forms of social fracture, but "fracture" may be the wrong paradigm. Transnational (multiple citizenships and loyalties) and transcultural (multiple families and cultures) models better elucidate the survival strategies of Indigenous peoples under the pressures of the colonial state, and better explain modern identities. If we attend to the values of social and cultural, as well as biological, diversity in human and non-human environments, we might also provoke intriguing questions about local and global futures. What might "society" look like if kinship-based models took the place of class hierarchies? What might "work" look like if it was better integrated with sustainability? What might "humanity" look like if we create more reciprocal relationships among human and non-human beings?

As educators, I believe we have an ethical responsibility to increase our students' sensitivity to, awareness of, theorizing about, and intellectual engagement with indigeneity as an essential aspect of American and world history. Students need exposure to texts that can help them articulate and understand the origins of contemporary human rights struggles. They need to be aware of the machinations of nationalism, and the uses of history and representation to resolve or provoke cultural and political conflicts. Students and faculty alike can also become better learners when they reflect upon their own positionality: their ancestries, histories, experiences, privileges, loyalties, abilities, and responsibilities. Educators can also make students consciously aware of their intellectual forebears, of European epistemologies and practices that shape and divide various academic disciplines, and of Indigenous perspectives that might inspire different configurations of knowledge and understandings of power.

Indigenizing the classroom is accomplished, in part, by creating a community of learners, each of whom has a unique perspective, rather than forcing conformity to a single approach to reach the right answer. Intellectual engagement is encouraged; students gain the confidence to speak from whatever position they happen to be standing in at the moment, with whatever skills they can contribute, rather than just saying what they think teacher wants to hear. My own classroom style is informed by the notion of multiple intelligences (intellectual, sensory, physical, aural, visual, etc.), incorporating readings, discussions, hands-on activities, critical analysis, small group work, and even storytelling techniques. When introducing controversial topics, I coach students to practice respectful mindfulness, and to avoid snap judgments, so they can more effectively sort their opinions, biases, and facts before engaging in debates. New students – even gifted students – can benefit from developing better interpersonal and intrapersonal skills if they are to become inspired learners. Students also need practice trying on various theoretical models, so as to discern where their own unique voices and skills and interests might be inserted into on-going work in their chosen disciplines. In these ways, even the non-indigenous can benefit from the process of indigenizing the classroom.

Faculty Teaching Statements: Some Ways to Integrate Indigenous Studies

Diane Barcelo, Art

When I first came to this group in the spring of 2009, I immediately knew this was going to help me invent and implement some new strategies for deeper student engagement. Even though the best way to gain appreciation for art is to simply do it, there is also plenty of rich conversation to be had by viewing art and sharing ideas. Alongside an independent art project, and plenty of visual slides, I needed to provide a general understanding of aesthetics and history, and I needed to find ways to get the students to come *to* the art. Student interaction by research, and discussion of issues raised in the work, seemed to be the most engaging.

Using the “Indian” theme was a great way to broaden and deepen awareness of the issues raised in artworks of cross-cultural artists. It also allowed for contextualizing the colonization of the Americas and the possibility of many other kinds of aesthetics aside from the one we have come to accept as mainstream. We then were able to entertain the idea of colonization and its effects, not just on aesthetics, but on the psyche of a people, and all of the ensuing societal problems. We were able to follow this by viewing examples of artworks of contemporary Native Americans, Africans and many ethnic groups now living outside their ancestral land and producing art that is a product of this exile or culture clash. There were many other segues from this into important topics being addressed in art such as feminism, ecology and racism.

In my fall course, “Art Appreciation,” I will introduce two contemporary Native American artists’ work. For one, students will write a short review from James Luna's website; for the other, students will pursue independent research. We will discuss the themes of these artists and relate them to other works of multicultural and international artists. We will also have fairly deep discussions about the multiple meanings in specific works and the implications of these ideas in society.

Several teaching tools have been successful for me. My students do a found object sculpture with a group share and discussion. I also assign short independent research projects, that are linked, later on, to small group work that requires higher level thinking and intense discussion, leading to a final group presentation. The success of the end work depended on the students making connections between their own research and themes of their group, and then inventing ways to best convey those connections to the class.

Joseph Comprone, English

English 2409, “The Modern Novel,” introduces students to eight novels stretching in publication from the turn of the twentieth century to the 1990’s. We engage in discussion of the theme of individual identity amidst diverse and sometimes threatening cultural contexts.

For the fall of 2009, this course will include a unit built around five Native American novels focused on questions of identity and cultural influences on the individual: Sherman Alexie, *Indian Killer*; Louise Erdrich, *The Bingo Palace*; James Welch, *The Indian Lawyer*; Linda Hogan, *Mean Spirit*; and N. Scott Momaday, *House Made of Dawn*. Settings will place Indian characters in urban, rural, reservation, and suburban environments. The tension between these natural and man-made environments and the Indians who live among and between them will tie directly in with the themes of identity and culture introduced earlier.

Students will be exposed to broader cultural themes related to the core themes through the symposia and panel discussions arranged by the learning community. Students will select one novel as the focus of a six to eight page essay. The essay will follow one character’s identity search with a focus on human, natural, and architectural environmental influences. In preparation, students will attend learning community symposia and presentations and will base class presentations on ideas related to cultural and individual identity. Presentations will form the basis of class group work.

Syma Ebbin, Agricultural and Resource Economics

In our Learning Community, we, as faculty, have spent a semester exploring ideas of how identity and environment are constructed, what it means to be indigenous and how to creatively introduce our students to these concepts in order to inspire deep, critical and self-reflective thinking among them on these themes. From many different disciplinary and personal perspectives, the faculty in the LC have explored how perceptions, depictions and interpretations of Indians have been created, co-opted and manipulated. As a professor of environmental science and policy, I have tried to guide my students towards thinking about the implications of these depictions to recognize how power differentials, implicit biases, and conventional problem definitions frame and define our understandings of both people and place, and environmental problems and solutions. Through readings, lectures and discussions, I've introduced my students to the notions that alternative ways of framing issues and different ways of knowing exist. I've done this with the goal of pointing my students towards existing and potential collaborative efforts of co-creation, which give voice to the previously unempowered.

I have used role-playing in the debate over drilling for gas and oil in the Arctic National Wildlife Refuge (ANWR) in Alaska as a mechanism to introduce students to the notion that different stakeholders with different, and often incompatible, perspectives and interests interact to negotiate outcomes through various political processes. Students research and present the positions of different stakeholders in this debate, including Gwich'in Indians, Inupiat Eskimos, Oil and gas Companies, pipeline entities, the State of Alaska and other states such as Connecticut, environmental organizations, the federal government, Government of Canada, etc. These perspectives are then embedded within the legal, regulatory and institutional context of the US government.

For the fall, I will be teaching "ARE 1110 - Population, Food and Environment," a course that examines the role of agriculture in the growth and development of societies throughout the world, with a focus on economic and social problems of food and fiber needs and production in developing and advanced societies. We will examine the multi-dimensional relationship among human populations and the environment, with a specific focus on food production, including agriculture, both industrial and subsistence modes, fisheries, aquacultural production, and hunting. Case studies will include an exploration of Indian subsistence strategies: pre-colonial Indian agriculture in New England, contemporary salmon fishing Tribes of the Pacific Northwest, Inuit subsistence strategies and bison management in Yellowstone Park. We will investigate the environmental impacts associated with our food production and consumption choices, including the Columbian exchange of plants, animals and germs, with reference to impacts on the populations of indigenous peoples, shaping food traditions and cultures, and the spread of invasive species, agriculture's impacts on water, soil, biodiversity and energy resources, contribution to anthropogenic climate change, and the use of biocides. Finally, we will examine sustainable economic, political, and cultural strategies and technologies to guide us into the future.

Christine Giambartolomei Green, Biology

Over the past two years, I became increasingly concerned about students' analytical and connection-making skills. After discussing this with colleagues, I found that it was a common concern. While at a conference, I participated in a case study (a real life story presenting a problem to be elucidated) workshop for biology. The case that was discussed appeared to me as having many connections with other disciplines beyond biology. This exercise gave me the idea of sharing a theme with instructors in concurrently taught courses in other disciplines. This pedagogic strategy could enhance connection-making skills. In addition, an interdisciplinary approach could spark the interest of non-science majors, who often have difficulty seeing the application of science to their own field of study.

While sharing this idea, I was pleased to get support from the administration and an enthusiastic response from faculty. As a result, we formed a Learning Community for the spring semester of 2009, titled "Representations of Indigenous People and Place," consisting of faculty from different disciplines. We had rich discussions over many topics, each person bringing a different angle to the subject. These weekly meetings became addictive and reinforced my philosophy on the integrative teaching approach that I have been using in my courses. All the discussions we had around the spring LC and the new "Indigenous People and the Environment" LC for 2009-2010 confirmed that we were sometimes teaching in a vacuum within our own disciplines. I believe that we all grew intellectually and will convey to our students a better explanation of our disciplines' principles.

My fall course, “Foundations of Biology,” is a laboratory course designed for non-science majors. This course is intended to engage students in the fascinating world of science and to encourage them to apply the newly learned concepts to everyday life. Among topics related to the “Indigenous People and the Environment” theme, we will discuss the concept of race; the impact of hunting, agriculture, and anthropogenic habitat alterations on plant and animal diversity; sustainable agriculture; and climate crisis. To be integrative, while teaching about one of these topics, I will refer to connections in other disciplines. For example, on the topic of the effects of pharmaceuticals in the environment some connections would be: the transformation and transport processes in water (Chemistry); public policy implications of this emerging problem (Political Science); the use of natural remedies that do not pose contamination problems (Anthropology); and the implications for fisheries (Maritime History and Coastal Studies).

As in the past, I will ask the students to search in the news media for these topics and give a written and oral report. This assignment has been very successful in my classes in stimulating the students’ interest and starting great discussions, even with shy individuals. I will also use case studies to integrate these issues into other disciplines and everyday life. My students always ask to use this method to learn principles. Their interest is sustained for the whole class period and they tell me that they enjoy this activity very much. A new assignment that I would like to add is service learning. I would like to have the students conduct research on the effects of pharmaceuticals in the environment and, working with local pharmacies, develop signs to inform and educate their clients on ways to decrease the impact of these chemicals on the environment. They will also work in developing collection sites for unwanted medicines. They could work with state legislators to develop laws for the disposal of these compounds. This exercise could possibly provide a bridge for connecting some courses involved in the learning community.

Dale Tuller, History

I mainly teach survey courses in “Western Civilization” (a particularly contested term today) and World History (an especially integrative course.) Because historical study emphasizes the significance of time to all subjects, historians’ research and teaching must be interdisciplinary and integrative.

One of our greatest Learning Community challenges will be to acknowledge cultural differences – while avoiding dichotomous stereotypes, which, along with power issues, have caused so much historical strife among peoples. Doing so will enlarge our understanding of the variety of human experience, acknowledge the existence of many shared goals and values, and contribute to integrative learning. Enlarging coverage of Indians, other indigenous peoples, and the environment will give my courses greater inclusivity. As a historian of Europe, I also can share some perspectives with the Learning Community about the complexity of Europeans’ experiences and values.

One way to confront these challenges is to analyze various perspectives about the complex results of major historical developments. In one planned Avery Point Faculty Symposium, “How do we construct our environments,?” I will be discussing what many researchers call the “Columbian Exchange.” From Columbus’ time to the present, dramatic global changes have resulted from transfers of peoples, diseases, animals, plants, and cultures between the eastern and western hemispheres.

In the Early Modern Period, (ca. 1500-1800), most Amerindians died from eastern hemispheric diseases to which they had little immunity, the Atlantic slave trade developed, and some western European states began to achieve (temporary) global dominance. Yet, long-term positive results have included the global spread of important foods, medicines, and knowledge. When introducing students to these changes – and to the inevitable ethical issues both they and scholars confront – I have used both large and small group in-class discussions. Students have identified many connections between these transfers and their own lives. Giving students an additional opportunity – to attend our Faculty Symposia and report what they learned to the class – enlarges everyone’s educational experience.

Building Coalitions & Solidarity in Native Communities Through STEM Initiatives

Excerpts from paper presented at the *Society for Applied Anthropology* annual meeting, March 21, 2009

Nancy Parent, Anthropology and Women's Studies

Current STEM (Science, Technology, Engineering, and Mathematics) initiatives in Indian Country reveal the challenges in building partnerships that seek to integrate traditional knowledge with Western science. With the United Nations General Assembly adoption of the Declaration on the Rights of Indigenous Peoples in 2007, the global realities of Native peoples are moving toward coalition-building and solidarity.

I suggest that a movement toward integrating indigenous knowledge systems into STEM projects is part of a greater movement toward indigenizing education and thus greater self-determination for indigenous peoples on both a national and global scale. Sensitivity to talking about indigenous epistemological and ontological perspectives is crucial. As a non-indigenous scholar, and middle-class white woman, I aim to avoid imposing through this work my power to dominate, silence, or erase the plight of Native peoples in my analysis.

Since the 1990s, the *National Science Foundation* has supported initiatives for under-represented and under-served youth, with Native American and Hispanic students at the top of the list. NSF reports indicate that Native Americans are the most underrepresented ethnic group in STEM careers in the United States. They account for only one-half of one percent of masters-level graduates in science and engineering and one-percent of all bachelor-level graduates in these fields. In computer and information sciences, life sciences, mathematics and physical sciences, Native American representation was not assigned a numerical equivalent due to the small size of the sample. In engineering, there were 85,000 bachelor's degrees awarded to Whites, but only 600 awarded to Native Americans (NSF 2009). In an effort to address low numbers of Indian students in the areas of STEM the *National Science Foundation* has funded multiple projects across the country, with currently over 20 active grant projects related to STEM education in Native communities

There are currently over 20 active NSF grant projects related to STEM education for Native American/Alaskan students. Most of these projects are funded through the NSF's Division of Research on Learning in Formal and Informal Settings (DRL). Although diverse in their locations, partnerships and the individuals and groups they seek to engage, these projects share some common goals: 1) culturally-responsive approaches to science learning; 2) identify commonalities between Native and Western worldviews; 3) build partnerships among public schools, museums, colleges/universities, businesses/industry, and/or non-profit organizations, 4) build capacity among project staff and participants; 5) engage in formative and summative evaluation of each project with the goal of improving future work; and 6) spark the interests of pre-college Native students in the STEM fields with the hopes of increasing the number of Native Americans in STEM-related careers.

Discourse on indigenous education emphasizes the unique distinction between Western and Native worldviews. Western worldview is generally characterized as materialistic, reductionist, rational, decontextualized, individual, competitive, linear, seeks power over nature and people. Indigenous worldview is generally characterized as holistic, spiritual, contextualized, communal, cooperative, non-linear/circular; seeks to coexist with nature and people. Western science and education have tended to emphasize categorical and compartmentalized knowledge, produced for its intrinsic value, decontextualized, and generally taught in a formal classroom setting.

Indigenous knowledge or Native science traditionally accumulates knowledge through direct experience in the natural world (Barnhardt & Kawagley 2005:10). Knowledge production is for specific cultural outcomes, to maintain society (Fleer 1999); knowledge is spiritually framed; art, dance, music and dreamtime stories link knowledge with the land and its people; knowledge is developed and used in context; scientific inquiry takes place in the everyday situation and not in an environment external to the context in which it will be applied (laboratory) (Fleer 1999, Cajete 1994, Deloria & Wildcat 2001).

Informal science education (ISE) seeks to situate science learning in environments that promote hands-on, experiential, place-based learning, engaging participants in a dialogical relationship about science, culture, and community sustainability. It draws from multiple disciplines and seeks to make connections to all aspects of life. Working on the assumption that "informal" science education is more conducive to Native American students Native and non-Native scholars suggest that these programs help bridge Western science with Native American

views of the natural world (Cajete 1994, Deloria 1994, Curwen Doige 2001). Such theories support the presupposition that Native students have not succeeded in the STEM disciplines because of a disconnect in teaching and learning between Western and Native ways of knowing. The implications of statistics pointing to Native American participation in STEM fields rely on the assumption that there exists an ostensibly “Native American” world view that bumps up against, collides with, or operates independently of Western thought.

Today’s curricula is caught in an obsession with “excellence”, “achievement” and “accountability.” In contrast, critical pedagogy is praxiological—it brings theoretical frameworks to bear on the context of peoples living real world struggles. Evaluation is not an objective test, but a measuring of attitudes. To quote Donaldo Macedo, “Critical pedagogy is a state of becoming, a way of being in the world and with the world—a never ending process that involves struggle and pain, but also hope and joy shaped and maintained by a humanizing pedagogy...” (Freire & Macedo 1997:394). Consciousization and the development of social awareness become part of the curriculum mission and planning. In a critically engaged model, the focus is socially oriented. Students are encouraged and trained to challenge existing relations of power and domination in terms of transformative epistemology. The curriculum is viewed as an instrument of empowerment (Emeagwali 2003).

In her article, “African Indigenous Knowledge Systems” (2003) Gloria Emeagwali views indigenizing education as a source of healing in the context of unhealthy imbalances, distortion, trivialization and neglect as inflicted by Eurocentric education and governance. “Tapping into the intellectual resource that is indigenous knowledge is not only cost effective but also relevant and indispensable for environmentally and ecologically sensitive activity” (Emeagwali 2003:2). Maori scholar Linda Tuhiwai Smith states (2005), “The insulation of disciplines, the culture of the institution which supports disciplines, and the systems of management and governance all work in ways which protect those privileges already in place” (Linda Tuhiwai Smith 1999:133).

For indigenous peoples, it is well understood that intellectual and political sovereignty is central to self-determination. A “paradigm shift” is under way in the academy such that indigenous knowledge and ways of knowing are beginning to be recognized as consisting of complex knowledge systems with an adaptive integrity of their own. Global indigenous survival requires a bridging of visions and measured accommodations to modernity and technology. The construction of coalitions among indigenous peoples, other marginalized groups, and peoples of conscience is already happening in informal science education projects, and I believe that Native knowledge systems and ways of knowing can also become catalysts for educational renewal across the academy.

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