

Environmental Service-Learning: Social Transformation through Caring for a Particular Place

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The Calvin Environmental Assessment Program (CEAP) involves faculty who dedicate regular lab sessions or course projects to collecting data that contribute to an overall environmental assessment of the campus and surrounding areas. While integrating service-learning into the sciences, CEAP has also transformed institutional structures, created an institutional habit of stewardship, and provided a context for meaningful linkages between the college and surrounding community. CEAP is informed by debates in the philosophy of science over the particularity versus the universality of knowledge, exemplifying the science of local knowledge and the importance of the embeddedness of knowledge. CEAP also models educational philosopher Nel Noddings' Care Theory pedagogy, which calls for learning to be rooted in caring relationships and real life settings.

Service-learning offers exciting opportunities for pedagogy that can enhance natural science education. However, historically service-learning has been underrepresented in natural science courses at institutions of higher education. Our campus, like many others across the country, has seen considerable growth in academically based service-learning in recent years. Service-learning is now woven into the curriculum in almost every discipline and major we offer. But it has been especially challenging to integrate service-learning into the natural sciences. Part of the difficulty to engage natural science faculty in service-learning has been perceived time constraints imposed by course content. The subject matter is not easily organized around a service-learning component. In addition, labs must cover particular techniques and topics.

The Calvin Environmental Assessment Program (CEAP) was first developed to address the need to increase service-learning in Calvin College's Natural Science Division, but has grown to encompass transforming the institution itself and its relations with the surrounding community. The program involves faculty across the college, but mainly in the sciences, who each dedicate regular lab sessions or projects to collecting data that contribute to an overall environmental assessment of the campus and surrounding areas. These activities often provide a meaningful bridge to the community and more fully integrate the campus with the surrounding community. The CEAP service-learning model directly addresses service-learning's weakness in

general as Zlotkowski articulated (1995)—the need to ensure its full integration into American higher education through addressing individual disciplines' needs and allying service-learning with particular academic interest groups.

Much has also been written in recent years about the need for higher education to play a more active role in addressing our society's most pressing problems. Ernest Boyer (1996) is often quoted as a leading voice advocating that the academy must become a more vigorous partner in the search for answers to our most pressing social, civic, economic, and moral problems (p. 13). Higher education has been heavily criticized for its

lack of connectedness [which has] resulted in the compartmentalization of knowledge by discipline, preventing students from experiencing relationships among various modes of knowledge; subject matter [has been] walled off behind disciplinary borders and not applied in any integrated way in academic study or to social issues. Students also experience[d] a lack of connection between classroom learning and their personal lives and between classroom learning and public issues and involvement in the wider world. (Giles & Eyster, 1999, p. 13)

The national dialogue on this scholarship of engagement has created a framework for faculty, staff, students, and community to work collectively to confront this lack of connectedness and to begin making important connections that "make a difference in people's lives and, at the same time, to

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generate new insights, discoveries, ways of knowing and acting" (Rosaen, Foster-Fishman, & Fear, 2002). For some of these connections to happen, a broader understanding of service-learning and the scholarship of engagement may be needed. For example, the scholarship of engagement may need to expand to include service to a place, not just a people. As Steinke and Harrington (2001) have found, service-learning projects developed in natural science courses may not always involve building the kind of one-to-one relationships that often typify service-learning, and thus its very definition may differ.

CEAP is increasing how we understand what it means to be embedded in a natural and social system. Calvin College is situated in an environmental context, sharing its watershed with the surrounding community, as well as existing in an urban context, subject to several municipalities' zoning regulations. CEAP data provides a starting point for engagement with the surrounding community, providing natural links and service to surrounding municipalities, neighborhoods, and environmental groups. For example, analyzing the water quality of Calvin College's ponds leads to engagement with the surrounding neighborhoods over chemical use on lawns. Pond analysis also links with a local environmental group's concerns working to ensure the larger watershed's quality into which Calvin's ponds drain. Neighbors' concerns over diminished property values due to proximity to Calvin's campus, often the focus of public zoning meetings on Calvin's proposed land use changes, become economic geography projects that explore the relationship between proximity to Calvin and property values. The campus open space, wetlands, and walking paths are necessary to continually enhance the College and share such benefits with the adjacent neighborhood and larger Grand Rapids community.

Care of Place and Service-Learning Pedagogy

In higher education we work at challenging students to see issues in a framework that goes beyond the limitations of their parochial or locally-based experiences—college is meant to be a broadening experience. This is easy because, as Eric Zencey (1996) puts it, most faculty are themselves "rootless professors." Professors are supposed to belong to the world of ideas rather than places. An alternative is to see education as deepening local understanding. When we deepen our understanding of the places where we live, we gain a greater understanding of who we are, the intricacies of our place, and our responsibilities as citizens of these places.

CEAP is embedded in a larger discussion within the natural and social science academic communities over the universality versus the particularity of

knowledge. Science has typically removed questions of value from nature while valuing the development of universally applicable theories. The scientific enterprise has not been interested in completely understanding a specifically situated phenomenon, but rather emphasizing partially understanding widely dispersed but similar phenomena. This reductionism, according to its critics, has involved loss of context and applicability (Flora, 1992; Kloppenburg, 1991; Reisner, 1992).

Local knowledge, more akin to the CEAP project, differs from generalizable scientific knowledge because it has various ends rather than one, is not concerned with universal explanation, is valid only for a particular situation, and includes multiple factors rather than controlling for one. It allows for practical experience as a valid measure of success and includes detailed knowledge of local ecological and environmental factors (Reisner, 1992, p. 8). Local knowledge implies that understanding may be inseparable from a particular place in the sense of being embedded in the natural features of that place as well in a particular labor process—environmental and social embeddedness (Kloppenburg, 1991, p. 537). Place-based knowledge—that produced from a limited location—provides an alternative to contemporary science (Flora, 1992, p. 93).

Does the commitment to a place and its intertwined relationships lend itself to alternative ways of seeing? Hassanein and Kloppenburg (1995) contend that developing great attentiveness to natural systems changes relationships to physical places. The process of observation and interpretation of a dynamic system leads to new ways of seeing and thinking. Those that pay attention transcend multiple variables and acquire a wisdom that allows them to know how the interrelationships impact those variables. This wisdom is irreducible (Hassanein & Kloppenburg, 1995, pp. 727-728). Local knowledge and the practical become intertwined with the cosmological, with how one sees the world (p. 736).

The emphases on relationship, context, and serving the place where we live, are grounded in Nel Noddings' work, a nationally-known educational philosopher. She starts by taking relation as ontologically basic, meaning that we recognize human encounter and affective response as a basic fact of human existence (1984, p. 4). Moral decisions are, after all, made in real situations. The tradition of Western philosophy typically begins with a supremely free consciousness—an aloneness and emptiness at the heart of existence—and identifies anguish as the basic human affect. But the view put forth here, and by Noddings, is that we are rooted in relation, with the joy of relational wholeness as a basic human affect (p. 6).

Wholeness of relationship involves both perceptive/creative modes alongside judgmental/evaluative modes. It calls forth human judgment across a wide range of fact and feeling, and it allows for situations and conditions in which judgment may properly be put aside in favor of faith and commitment. The danger is when a teacher is too eager to move students into abstraction and objectivity that results in detachment and loss of relation (Noddings, 1984, p. 182). The cared for, in this case Calvin College's natural setting, becomes a "problem" rather than something "cared-for" (p. 25). Our cleverness and problem-solving replaces our attentiveness to the place, to nature, to the cared-for (Jackson, 1987, p. 9). The art of teaching is turning away at the right moment from the abstract back toward the concrete. The objective mode must continually be reframed from the base of commitment. Otherwise, science begins to serve itself, detached from nature, the object of caring (Noddings, p. 26).

The CEAP program attempts to keep this balance. Science becomes grounded in a real place. It incorporates the range of human experiences, from the aesthetics of a place, to water quality, always rooted in the context of place. The attentiveness that is required leads to continual grounding that ties to basic commitments and to developing an ethical ideal.

CEAP's goal, to develop the habit of stewardship, grows out of this attentiveness to a place. As Noddings (1984) argues, remembering our own best moments of caring and being cared for are analogous to a transfer of learning (pp. 79-80). It is our best picture of ourselves caring and being cared for in an attainable way (p. 80). Care-taking skills are thus developed and enhanced.

Rita Manning (1992) said we learn to care for strangers by first developing strong attachments to particular others. Weak parochialism is not an impediment to taking the moral point of view, but a necessary condition (p. 149). Commitment, attachment, "knowing" a place is the route to a moral point of view, not an impediment to rational decision-making (Held, 1993, p. 210). In reality, we love particular people and places. Abstract ideals need to be made concrete through loving, understanding, and caring for particular people and places.

History and Structure of CEAP

CEAP is based on the belief that, as we care for the particular place in which we live, we both enrich our skills at caring, but also build a context in which to form partnerships with those around us. Calvin College's immediate environmental context is the 400 acres upon which it is situated in west Michigan. This campus is on the edge of the city limits of Grand

Rapids, increasingly hemmed in by expanding suburban growth. Thus Calvin College is in a transition zone, subject to dual concerns of deteriorating urban quality of life, and increasing urban sprawl. When purchased in 1956 much of the campus property was a farm complex. Approximately one-fifth (80 acres) of the total campus acreage has been set aside as the Calvin College Ecosystem Preserve, while the other 320 acres has undergone varying degrees of development. The College's general appearance is one of sweeping lawn areas amid low-profile buildings, with noticeable remnant natural and semi-natural areas, most of which constitute fencerows and woodlots from the original farm. The main campus is open to the public and used by the community. Within the past two years a formal asphalt path around the campus has been developed. This has become a popular exercise route for community members. The campus ponds' quiet and semi-natural settings also attract community members for recreation, relaxation, fishing, and bird watching.

Possibly the property's most significant landscape features are its wetlands, which occupy positions near two separate watersheds' headwaters. The Ecosystem Preserve contains 10 natural ponds and the main campus contains three created ponds. The natural wetlands vary from small vernal pools to a large kettle depression. In addition, recent construction in the Ecosystem Preserve's vicinity has created two more ponds that will serve as treatment basins for runoff before it enters the Ecosystem Preserve's hydrological system.

The Ecosystem Preserve has a well maintained trail system and is open to the surrounding community. Beyond the more than 5,000 annual visitors, a formal K-3 environmental education program is conducted at the Preserve, training college students to lead school groups through the trails. This program attracts approximately 2,000 school children per year. Summer camps and other special programs serve an additional 400 individuals per year.

CEAP was launched in 1997, when the Science Division faculty coordinator for Service-Learning, a Geography professor, and the director of Academically Based Service-Learning organized a three-day summer workshop to explore the idea of building a campus environmental assessment model to promote service-learning in the sciences. Many campus environmental assessment projects have been attempted but they have, on the whole, been expensive, involved few students, and lacked comprehensiveness, scientific rigor, and continuity. The CEAP model that evolved from this initial workshop provided a cost-effective instructional

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method for integrating service-learning into the sciences, while meeting the need for an ongoing, comprehensive environmental assessment program.

The initial CEAP group included nine faculty from Geography, Physics, Biology, Chemistry, Math, and Computer Science. They developed a working input-output model of the campus environment, which helped to identify different areas that would benefit from data collection and monitoring, and to visualize the total environmental context. Participants then redesigned specific lab assignments from existing courses to contribute to the data collection on various assessment aspects. The college also received a Universities as Citizens grant based on the CEAP's development as a service-learning model. Yearly CEAP workshops have continued and incorporated student leaders, staff, and other faculty. At the workshops, the entire campus has been invited to attend a session where the "state of the research" is presented. This brings new and potential CEAP faculty up-to-date and aids them in identifying a piece that would fit well with their interests and course material. Working groups are also formed through these discussions and new directions defined.

CEAP's overall goals can be divided into two areas—curricular goals and goals of social and institutional transformation:

Curricular Goals

- To engage students and faculty, particularly in the sciences, in service-learning.
- To build a curricular program in service-learning that is sustainable through the characteristic of being well integrated into the curriculum.
- To encourage creativity, collaboration, and curriculum change across campus.
- To engage students in meaningful learning in a real-life context through applying course material and group work experiences.
- To engage students at all levels and across disciplines in quality research.

Goals of Social and Institutional Change

- To transform internal institutional structures.
- To develop a habit of stewardship based on attentiveness to place.
- To provide a context in which students, faculty, and the administrative planning process on campus are meaningfully linked with the surrounding community.
- To provide data for an overall environmental assessment of Calvin College and its sur-

rounding neighborhoods and link this data with larger environmental networks.

Curricular Goals

CEAP was specifically developed to address the need to increase service-learning in Calvin College's Natural Science Division. Service-learning in the natural sciences has grown over the past five years (Boylan, Miller, & Ritter-Smith, 1996). Likewise, much of this service-learning within the natural sciences has been displayed by various colleges and universities, like Calvin College's CEAP Program, through environmental involvement. Unlike CEAP, most of this natural science service-learning has involved individual courses and a variety of semester-long projects (e.g., Kaufman & Ziegler, 1991; Bardwell & Sullivan, 1993; Kellogg, 1999).

CEAP is unique in the United States in that its structure encourages multiple goals and broad-based involvement. Calvin students can potentially encounter CEAP through many classes, multiple times, enhancing social change through individual transformation, as well as institutional change through increased visibility and accurate data collection. This provides the context for engagement with the larger neighborhood and the larger Grand Rapids urban area. For example, as we studied the issue of planning on our own campus we encountered the larger issue of mass transit in the Grand Rapids region. Likewise, the CEAP garbology project, which tracks the nature of Calvin College's trash, has raised not only issues of recycling behavior on campus, but also the issue of the regional recycled material market and Calvin's place in this regional problem. At the same time, CEAP involves faculty and students in inter-disciplinary engagement, undergraduate research, and academically-based service-learning.

The CEAP program has great flexibility and creates interdisciplinary learning. For example, faculty can frame CEAP projects in terms of course material and needs. One English course was entirely organized around CEAP subject matter, while most science courses include particular lab exercises. Many of these projects lead to direct or indirect engagement with the neighborhood, with the administrative planning process, or with environmental groups in the larger Grand Rapids area. CEAP provides students with greater understanding of problems' interdisciplinary nature and the role of group work in their solutions by providing a context within which data must be shared across disciplines, and through formal course working groups. For example, geography students collected data on how students use campus space, to be analyzed by an advanced statistics class. Sharing

data forced the geography students to be thorough and pay closer attention to the data collection reporting format because others depended on their clarity and because it was going to be used for campus planning. Classes sometimes form working teams and share data and specialties, modeling real-world working-group strategies. The data form the basis for recommended changes in campus policies, programs that target individual behavioral changes, and identifying issues that involve and impact the adjacent neighborhoods, and thus form the basis for cooperative action and planning.

The CEAP project meets the need for increasing students' active engagement in research that makes a difference, at all college career levels. Currently, CEAP classes range from first year to senior level. Lower-level courses have tended to take on the environmental task to monitor elements like water and air quality. Upper-level students have taken on more complex tasks. For example, General Chemistry students identified problematic nutrient loads flowing into college ponds from an adjacent neighborhood. A senior engineering design team proposed and designed a constructed wetland as a possible solution. A technical writing class wrote a newsletter that discussed the issue in a general way for the neighborhood residents.

Overall integration among participants happens at several levels. CEAP participants are required to attend and present at end-of-the-semester poster sessions displaying all data collected during that semester. A keynote address focusing on environmental issues starts off the event. The neighbors surrounding Calvin College, regional environmental groups, and the larger community are specifically invited to these events. The CEAP Web site has been developed for courses to deposit results that the next semester's courses use. Its main purpose is to maintain continuity for all involved and be a source of information for faculty, students, administrators, and people from outside the campus. CEAP blurs the boundaries between academic learning and student life, between academic programs and campus planning, and between campus and the surrounding community.

Internal Knowledge and External Linking

CEAP continually produces local knowledge that provides growing and continual meaningful linkages to the local community. It models how to serve nature and a place. In addition, the program has not only identified and assessed our campus' environmental impact, but equipped itself to quickly respond to unforeseen environmental problems. To illustrate the synergism that arises from CEAP, two examples are presented: Living in a Watershed and Living in a

Plant Community.

Living in a Watershed

In August 1998, a two-acre pond on Calvin's main campus experienced an unprecedented fish die-off. During the days preceding this event a student conducting summer research on campus ponds noted the beginning of a sharp decline in planktonic algae. As this crash proceeded, fish started dying and within a 24-hour period, approximately 2,000 fish expired, and floated to the pond's surface. Shortly thereafter unhappy neighbors called to complain about the smell and wondered what provoked such an incident. Motivated by the fish-dying event, a Biology faculty member developed a CEAP project for a course. His students' work, combined with data collected during the summer, identified the algal bloom and consequent proliferation of oxygen-using bacteria that fed on the algae as what likely caused the fish death. Furthermore, the class concluded that a runoff of nitrogen and phosphorus from urban fertilizers likely caused this algae bloom. This pond is the immediate water detention basin for storm water runoff from the surrounding neighborhood. A popular practice in this suburban community is to fertilize lawn areas in late summer and it was surmised that unusually heavy rain events prior to the algal bloom had washed many of the lawn nutrients directly into the pond, stimulating algal growth.

This particular event and the accumulated data were presented at the CEAP poster session in November, heightening interest in the issue. The following spring, an honors English 100 class became engaged in a CEAP project that focused on producing a neighborhood newsletter for all homeowners within the watershed draining into these ponds. The newsletter emphasized how important it is to understand how watersheds function and highlighted the fish die-off, along with its likely cause.

In this newsletter homeowners were encouraged to change their behavior: decrease lawn fertilizing applications or use an alternative fertilizer recommended for yards adjacent to sensitive wetlands. Homeowners emptying their swimming pools directly into storm drains were also asked to allow pool water to settle for a sufficient time before it is drained, thereby diminishing the chlorine amount that may enter the pond. As a result, several neighbors contacted Calvin before emptying pools to ensure the college that they had allowed the chlorine to evaporate.

Attempting to further address this issue, a senior engineering design team selected this issue as their year-long project in the fall of 1999. Four engineering students and a Biology student became

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fully engaged with this issue and presented the administration with a state-of-the-art storm water treatment system proposal. This design utilized a series of levees and shallow water areas planted in native vegetation to filter out potential contaminants before they reached the pond itself. The administration seriously considered this plan, but due mostly to space constraints, opted for a simpler, less comprehensive storm water treatment basin. This plan led to constructing an earthen berm that holds back the storm water runoff in a detention pond, leading the overflow into the larger pond itself. Although this initially disappointed the design team and others involved in this issue, it did signify a positive step toward improving the pond's water quality. During the negotiations, the administration pledged funds to create an extensive native wildflower planting on the berm. During the summer of 2000 six students worked with two CEAP professors for two weeks, recontouring and planting this berm with over 2,000 transplanted native wildflowers and grasses, and over 20 pounds of native plant seed.

The planting itself was designed to facilitate future experimentation and monitoring. This particular project has attracted the attention of the municipality into which the water from the pond eventually flows. While not realizing the full capacity of the engineering students' original plan, this project has been cited as an example to the broader community of an environmentally sensitive strategy for improving water quality in the broader watershed.

This example illustrates how CEAP not only identifies and assesses our campus' environmental impact, but shows how it is equipped to quickly respond to unforeseen environmental problems. The process of this response, from initial assessment to neighborhood newsletter, and from the engineering design team to the native plant establishment project, also illustrates CEAP's multi-disciplinary strength. In addition, the administration's action, while scaled down from the proposed design, does show that the data collected and processed by CEAP are well respected and were used to promote more environmentally sensitive measures on campus that benefited the broader watershed community as well.

Living in a Plant Community

In the fall of 1998 a Plant Taxonomy class undertook a CEAP project involving a plant inventory of the remaining natural spaces within the main campus area. As the students learned how to identify plants in the classroom, they put this learning into practice by inventorying a specific site. Five laboratory sessions during the semester were devoted to this project. Groups, each assigned responsibility

for 1 of 10 locations, produced a detailed site assessment for their particular location and the entire class constructed a large poster that summarized the project's findings.

The data collected revealed approximately 300 different plant species in these sites. Somewhat surprisingly, fully one-third of these species were non-native plants, several of which had been planted horticulturally in formal landscaping beds both on our campus and in the surrounding community. Several non-native species were found to dominate some sites, and many of these species have been identified as problematic alien invasives in the surrounding natural communities.

From this survey, buckthorn was identified as a major problem on our campus due to its detrimental effect on native biodiversity. During the following fall of 1999, a General Botany lab session was devoted to alien species and specifically to a CEAP project to eradicate buckthorn in the preserve. Students treated buckthorn shrubs with one of four removal treatments. Removal was performed for a fixed, one-hour time period, during which the size and number of treated buckthorn shrubs were recorded. As an assignment, students were then asked to statistically compare the four treatments for their efficiency in treating buckthorn.

The General Botany class in 2000 repeated the four buckthorn removal treatments and also analyzed the re-growth that occurred in the previous year's treated shrubs. Students wrote a report that compared both the efficiency as well as the long-term (one year) effectiveness for the four treatments. This activity was repeated in 2001, at which time an additional activity to plant native shrubs and woodland wildflowers was initiated. Since buckthorn is so pervasive on our campus, this project of shrub removal and native plant replacement is expected to continue long into the future.

Response among the students to the buckthorn removal lab has been nearly unanimous. Lab assessments have elicited numerous positive comments regarding how learning about alien species in the classroom was successfully augmented with the hands-on field work. Other comments included responses that indicate how this activity caused students to feel great satisfaction that they were able to make a positive contribution to their own campus environment.

The buckthorn project site in the preserve has undergone a noticeable change. The understory has been significantly opened and numerous colored ribbons tied to treated stumps and trunks have generated questions from local visitors. This spot has become a discussion point for local school children's tours that come each fall and spring for an

environmental education field day in the preserve. This project was also highlighted in a CEAP community newsletter, serving an educational outreach function to the community.

An additional activity borne from the original Plant Taxonomy plant inventory has been to increasingly use native plants on campus. One student in the Plant Taxonomy class became particularly alarmed at the widespread use of non-native species on campus and petitioned the president for a site where students could establish a native wildflower garden. After meeting with the president and considering various options, a low-lying weedy wetland, filled mostly with a low diversity of non-native species, was turned over to the students for restoration to native vegetation.

The initial restoration activity occurred during the spring of 1999, involving two students from the student environmental group and one faculty member. Since then wildflower planting activities have occurred each year, each time involving more students and faculty. While still being converted, this weedy wetland is emerging as a prolific native biodiversity site, supporting over 60 perennial wildflowers species as well as providing habitat for numerous bird, mammal, and insect species. Monarch butterflies now breed in this site, as do American goldfinches, Song sparrows and green frogs. To date approximately 20,000 native wildflowers and grasses have been introduced to the site and countless non-native plants have been removed.

The plant material for this restoration work comes from local seeds collected and germinated as part of CEAP activities by students in other Biology classes. The students who propagate the native plants and the student environmental organization also take part in the planting project. During the summer of 2000 one planting event was announced to the general campus community. Approximately 25 people came for this "Wildflower Planting Party," including representatives from departments including Political Science, English, Information Technology, Biology, Geology, Geography, Environmental Science, and the Provost's Office. This past summer (2001) the Wildflower Planting Party was repeated, with more than 50 individuals from even more academic departments.

The student environmental club planting project, along with CEAP's influence has had a notable impact across campus. Five additional native wildflower plantings are currently underway on our main campus, with additional projects in the planning phase. The physical plant department has shown increased sensitivity to avoiding non-native species and a willingness to utilize native plants in

their formal plantings. We have also been greatly encouraged by the college's devotion to maximize native plantings in the grounds surrounding a major complex that is currently under construction.

The College's growing commitment to use native plants in its landscaping has been promoted to the community through the CEAP watershed newsletter. Landscaping with native plants has also been the topic of faculty-led community-attended seminars and was the subject of a student presentation at a national scientific conference in July 2001.

Two concrete examples illustrate how these activities continued to generate impacts beyond the campus within the broader community. First, during the summer of 2001, largely due to media covering naturalization efforts on campus (local television station and newspaper), many individuals called the college to learn more about these efforts and to ask about possibly acquiring plants for their own yards. By the end of the summer over 1,100 native plants had been distributed to approximately 30 homeowners for transplanting into their home landscaping.

Secondly, as the campus efforts become more broadly known, several local schools and community organizations have asked Calvin for assistance with similar projects. During the past two years we have supplied plants and volunteers to six local schools and six community groups to help them establish native plant gardens or restore natural areas using native plants. Many of these projects have become CEAP activities in themselves; others were done for summer research work borne out of and modeled after the original CEAP activities. Since a majority of the plants used in these projects are generated through service-learning activities, additional cost to the college has been largely negligible. The benefit, however, to the broader social and biotic community, continues to be significant.

Institutional and Social Transformation

Colleges and universities are institutions that have major impacts on their communities through their use of resources, the physical area they cover, and through their modeling of environmental stewardship. CEAP has focused on both internally transforming Calvin College's institutional structure and externally transforming the surrounding neighborhood and beyond.

Early in CEAP's development, involved faculty identified barriers to Calvin College's becoming a model of environmental sensitivity and planning. These barriers were: 1) environmental issues lacking visibility, 2) the lack of data to engage the campus planning process, and 3) a weak organizational structure for incorporating environmental concerns.

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CEAP's mere existence quickly solved the first barrier. Not only did hundreds of students very quickly become more environmentally aware of their surroundings, but the poster session speakers attracted large crowds. The administration (academic, student life, community relations, finance, etc.) was invited to attend poster sessions and had investment in the project as a curricular innovation model. Placing environmental goals in the College's most recent five year strategic plan was in part due to CEAP's existence and work. These elements include the overall goal to "establish campus standards for both environmental stewardship and environmental health and safety, and develop a monitoring system to assess their impact" (Calvin College, 2001).

The second barrier to institutional change was the need for good data, especially temporally-connected longitudinal data, and CEAP has begun to address this. Prior to CEAP, discontent with the planning process was often expressed, but lack of data meant that alternatives could rarely be proposed. Nor did data exist on the impacts of the various actions proposed by the administration. CEAP and its faculty quickly began to be spokespersons for environmental issues because they had acquired the necessary data. The administration turned to CEAP for assistance in collecting data as well. Thus a mutually beneficial relationship has been developed. The student environmental group, many of whose members have been involved in CEAP classes, also has become more active and knowledgeable since the program's initiation.

The third barrier, institutional structure, has just recently been addressed. The CEAP faculty, in conjunction with other groups on campus, proposed a change in the accountability structure for environmental issues on campus that has recently passed the Faculty Senate. This institutional change was grounded in the strategic plan.

The structure for overseeing environmental matters in the past at Calvin has been structurally diffuse. The campus-wide committee that has overseen environmental issues has had no budget and has been outside the lines of authority and communication needed to make it effective. Furthermore, this committee has not necessarily been composed of representatives that understand or know about environmental issues in general or the specific environmental issues facing campus. Members have been continually on a learning curve rather than easily moving toward recommendations or actions.

The change in structure at Calvin College (Fall 2002) will entail creating an environmental oversight committee that will be composed of those with knowledge and data collection capacities. These

include, for example, representatives from the Ecosystem Preserve Board, CEAP, Physical Plant, and Campus Architect (ex officio). This restructuring is the first step in a three-stage plan. The second stage will involve the environmental oversight committee in a planning process to establish guidelines for data management, recommend institutional structural change, and develop an environmental management philosophy. This planning will be instrumental in establishing the overall framework across campus needed to meet the strategic plan goals. The third stage will be assigning a staff or faculty member to be a campus environmental coordinator. At this, the end of the first five years of CEAP, the institution is close to moving into an entirely new phase of environmental stewardship.

Conclusion

CEAP has the potential to fulfill many goals that Nel Noddings (1984) puts forth as essential for good pedagogy. The emphasis should be on developing skills that contribute to competence in caring, not on skills for vocational ends (Noddings, p. 187). CEAP attempts to do this through extending its program beyond science majors. Noddings says that all students should be involved in caring apprenticeships and these tasks should have equal status with the other tasks encountered in education (p.188). Inherent in the CEAP program is its goal to care for that which is close at hand. Noddings asks that professional structures that separate us into narrow specialization areas be dismantled (p. 188). CEAP has been instrumental at increasing inter-disciplinary interaction. Finally, Noddings says that subjects should be laid out along the entire range of human experience so that students may make multiple and potentially meaningful contacts with it. This way, both personal and cultural aspects of the subject are revealed, including the meaning of the subject in individual lives (p. 191). CEAP crosses the range of human experience from religion to nature writing to water analysis, exploring the depth and breadth of what it means to serve as a citizen of, and care for, a particular place.

Learning to care for a place involves making good choices. Good choices, an important element in the scholarship of engagement, will lead to transforming individuals and institutions, the community, and the academy. William Plater, in describing the need to acquire new "habits of living," argues:

Real change will occur, finally, when individuals define their work in terms of whom it affects, for what purpose, and with what consequences. We will know that our revolution has been successful when what we

do actually matters to society at large, when society is so engaged with the university that our priorities are shaped by societal needs, when the work of every individual can be related purposefully and knowingly to the work of others, and when our habits of living are new habits. (p. 171)

CEAP builds on this need to learn habits of care and service through the process of paying attention to that which is closest at hand. CEAP is built on the philosophy that knowing what is closest at hand, our physical environment, and sense of place must be put to serving the campus and the larger community since they are inter-connected in important ways. Ultimately, CEAP's hope is that students and faculty will become better caretakers and citizens, connecting the campus life with surrounding Grand Rapids metropolitan area issues, and that we may in turn learn what it means to take care of the other places we encounter throughout our lifetimes.

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