
Disciplinary Integration: The Sciences and Humanities in Learning Communities

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The interdisciplinary pedagogy at Wofford College includes learning communities for first-year students that integrate science and humanities courses. The program originated with a CCLI A&I grant, and this chapter describes the development of the grant proposal, the intellectual merit of the project, the elements of the model, the broader impact of our program, and the issues involved in extending and sustaining the initiative.

Development of Our NSF Proposal and the Intellectual Merit of Our Program

Beginning in 1999–2000, Wofford faculty members began meeting to explore changes to our General Education (GE) curriculum that could enhance learning and better prepare Wofford College graduates to be engaged citizens. Wofford is a private liberal arts college in Spartanburg, South Carolina, with approximately 1,150 full-time, traditional-age students. The average SAT scores for incoming students hovers around 1240, retention of students from first to second year fluctuates tightly around 90%, and we haven't experienced declining enrollments. Despite Wofford's fairly comfortable position, what emerged from the GE discussions was the clear desire among the faculty to innovate the curriculum and thereby help our students see more value in their GE coursework.

Concomitantly, during Wofford's 2000 January term, I worked with 21 undergraduate students to explore ways to revitalize my introductory (GE) science courses for non-science majors. I promised the students that if we diligently researched and developed our ideas, I would seek NSF funding to implement them. The students' work ultimately

led them to propose an approach that integrates science and humanities courses for freshmen, and their ideas provided the foundation of our initiative.

A nine-person interdisciplinary team of faculty members (five from the sciences, four from the humanities) gathered additional information and formulated the successful CCLI/A&I grant proposal (number 0126788). We knew it was important to earn the support of the broader Wofford community by articulating that our proposal to innovate the GE program by developing science/humanities learning communities wasn't change for change's sake, but an exciting and tangible way to enrich the learning experience for our students and faculty. What we've learned from the national dialogue on learning communities has underscored the strengths of our model in terms of its pedagogy, design, and implementation.

The learning community pedagogy has been adopted in various forms around the country, and the National Learning Communities Project (NLCP) has provided strong leadership in advocating the efficacy and use of learning communities (LCs) (for more information, see <http://learningcommons.evergreen.edu>). The NLCP recently published an excellent series of monographs (e.g., Taylor et al., 2003) that summarize the strengths and pitfalls of LCs as they are currently implemented in various forms at over 500 institutions of higher education. We adapted aspects of LC programs at three institutions—Evergreen State College, Wagner College, and Holyoke Community College—and the following section outlines the specific objectives and elements of our model.

The Six Elements of Wofford's Model

1. Two courses in each learning community

In brief, two general education courses—laboratory science for non-science majors (Science 104) and a humanities course (usually Humanities 101)—are linked by a common theme and developed and implemented as an integrated learning experience for first-year students.

Freshmen who pursue a Bachelor of Arts degree are required to take two, four-hour science courses: one a life science and the other a physical science. Faculty members in the Biology, Chemistry, Geology, Physics, and Psychology departments teach these courses. These Science 104 courses are designed to meet the goals of introducing non-science majors to the concepts of science and the scientific method of inquiry, and each faculty member chooses the course content.

All first-year students are required to take Humanities 101, a seminar taught by a member of the department of English, Fine Arts, Foreign Languages, History, Religion, or Philosophy.

Upon approval of an oversight committee, faculty members are free to tailor the content of their Humanities 101 course to their interests as long as the course 1) provides an introduction to the nature and methods of humanistic study, 2) introduces students to important values and issues in their lives, and 3) develops students' oral and written communication skills.

The two courses in each LC are integrated around a theme, and the following list provides the thematic LC titles and departments of each teaching team: "The Nature and Culture of Water" (biology and English), "Cosmology and the Ultimate Questions" (physics and philosophy), "Reality's Dark Dream: Scientific and Literary Perspectives on Madness" (psychology and English), "The Mammal in the Mirror" (biology and philosophy), "The Science in Science Fiction" (physics and English), "The Senses, the Mind, and Our Perception of Reality" (psychology and history), "Conservation: Thinking like a Mountain" (biology and sociology), and "Biomedical Ethics" (biology and philosophy).

Over the past three years that the LCs have been implemented, the number of students enrolled in each (freshmen co-register for both classes) ranged from 7 to 24, with a mean of 16. To date, the various LCs have been offered a total of 11 times, and approximately 170 stu-

dents had completed an LC by the end of the 2003–2004 academic year. For more information on each LC (including syllabi, student websites, and teaching team contact information), see <http://webs.wofford.edu/goldeyes/sciencehumanities/learningcommunities.html>.

2. Teaching-team and the role of the "preceptors"

Each LC is developed and implemented by a four-person team consisting of two faculty members (one from the sciences and one from the humanities) and two upper-classmen, known as "preceptors." Because students had formulated many of the foundational ideas of the program, it was a priority that they continue to play a leadership role in the LCs.

Preceptors work in partnership with their faculty colleagues for a total of eight, 40-hour weeks in the summer (earning \$14/hour) to develop the LC. Subsequently, the preceptors arrange their own semester schedule so that they can be present at all class and laboratory meetings of both courses in the LC. To acknowledge the preceptors' tremendous investment of time, creativity, and energy, and the educational value of the opportunity, the Wofford faculty approved a new 3-credit offering, "Independent Study in Teaching Learning Communities." Preceptors earn these credits by attending and facilitating both courses in their LC and completing an end-of-the-semester project reflecting on their experience. The preceptors also receive pay for assisting with the weekly three-hour science laboratory within each LC.

3. Summer development workshops providing an opportunity to learn from each other

A week of development workshops (held in May) initiated each summer's work, followed by seven weeks in which individual teams worked to develop their new LC (Figure 1). Exemplary of the administrative support given to this initiative, financial incentives were provided to encourage all faculty members to attend the May workshops, and the majority of Wofford's 82 full-time teaching faculty members participated. Workshop topics have addressed 1) the structure of the NSF-funded LC model, 2) background on "curricular learning communities" and why we should use them, 3) discussion of the "habits of mind" in different disciplines and how to integrate them, 4) demonstration and discussion of teaching methods that encourage critical thinking and active



Figure 1. Two faculty members and four undergraduate preceptors work as a team to prepare presentations on their work at the SENCER Summer Institute in 2002. Left to right: Thomas Pierce, Omar Javery, Ellen Goldey, Ashley Thomas, John Lane, and Amelia Snider.

learning, 5) how to plan effective field-work and educational outreach activities, 6) an introduction to our extensive educational technology resources, 7) effective classroom assessment techniques, 8) implementation of the LC program's assessment plan, and, in summer two, 9) what the first LC teaching teams learned from their experience.

External experts facilitated some of the workshops in 2001, but only "in-house" experts were used the next year. In March 2002, a letter invited any faculty member to give a presentation during the second summer's "Sharing Your Cool Stuff" workshops. Eighteen faculty members (including the six who presented outcomes from the first LCs) led workshops on effective teaching practices. Thirty faculty members, several of the first year's preceptors, and the six new preceptors participated during the week. All were "students" in these workshops, and the open discussions of new ideas quickly developed mutual trust and respect among faculty members and preceptors. I consider that week to be one of the most rewarding of my career, and it exemplifies how the NSF grant has had a broad impact at Wofford. In an evaluation, one faculty member summed it up this way: "I'm proud of the work I did for the workshop, and the excellence of my colleagues' presentations caused me to admire them and raised my whole spirit level. Teaching was highlighted and teaching is what we're about!" One of the new preceptors wrote: "I think this was a great experience from a student perspective. Not only did I learn a lot about teaching strategies, learning communities, and other "cool stuff," but I also saw faculty from a different point of view...I learned that faculty are real people who make mistakes...I also got to

see what faculty go through to create a class and the challenges they face."

These in-house workshops provided the template for the regional Open House that Wofford hosted, "Learning Communities and Other Cool Stuff," which was sponsored by the NLCP (November, 2003). Each LC team presented the benefits and challenges of their LC, and numerous other Wofford faculty members presented their "Cool Stuff" from the May workshops. Forty faculty members and administrators came to the Wofford Open House from 11 campuses and four states (South Carolina, North Carolina, Georgia, and West Virginia), and the evaluations unanimously praised the day.

4. Educational outreach as a structured, low-risk approach to service-learning

Each LC incorporates an educational outreach project, usually for public school elementary children, and the basic template is described here along with more detail about one example. Each outreach project, culminating in a full day of working with children, is designed and implemented by the freshmen enrolled in the LC. The project had the following objectives for the freshmen: 1) develop teamwork skills by working in groups of three to four to design, prepare, and implement the activities for children; 2) become "experts" in specific content areas before teaching children; 3) experience the role of teaching and the responsibilities that come along with it; 4) be reminded of the eagerness for learning that they once had as children; and 5) become more aware of the needs of people in their surrounding community and witness, first hand, the positive difference their involvement can make.

Freshmen meet with the elementary teachers and/or faculty members from Wofford's Education Department and learn about South Carolina's Educational Standards for the targeted age-group, how to design a lesson plan that complements the elementary teachers' course work, and the logistical issues to consider for the day.

The "Nature and Culture of Water" LC hosts a field day called "Meet the Creek" for all fifth grade classes from an ethnically diverse elementary school with 52% African American, 40% Caucasian, 6% Hispanic, and 2% Asian Pacific or Native American children. A total of 60–80 children participate in Meet the Creek each year (Figure 2).

Preparation for Meet the Creek is incorporated into the content and design of the LC, and during the first month of the semester, a local stream (the same stream that the freshmen will use during the outreach day) becomes a learning landscape. By the time the outreach day comes around, the freshmen have studied stream ecology, sampled macroinvertebrates as indicators of the water quality, and learned how science relates to treatment of urban sewage and maintenance of a safe drinking water supply. From the “humanities” perspective, they have written about the stream considering issues such as its aesthetic value, how it has been affected by humans, whether they have responsibility in protecting and restoring it, and what historical and social roles the stream has played in the settlement of Spartanburg.

The freshmen form four teams, and each team designs a highly interactive learning station along the stream. On Meet the Creek day, groups of 15–20 children (yielding a maximum freshman-to-child ratio of 1:5) move from station to station in a “round-robin” setup. One station is a macroinvertebrate-sampling station in which freshmen help the children collect, sort, and iden-



Figure 2. First-year Wofford College student Howard Wilkerson is surrounded by happy fifth grade students from Spartanburg’s Chapman Elementary School during “Meet the Creek.” This daylong educational outreach experience is designed and implemented by the freshmen in the “Nature and Culture of Water” LC.

tify the various organisms. Another station is a “scavenger hunt” in which children find different types of leaves from trees along the stream and then use a key to match their leaves to the correct tree species. For a third station, freshmen lead the children in a discussion of native versus introduced species and then help each child use paint and rollers to stencil real leaf patterns onto a new white T-shirt (that the children subsequently take home). In the fourth station, the children write nature-inspired poetry. Initially, this is the least popular station, but poetry quickly becomes a favorite when the poems are read aloud with much fanfare.

The activities that the freshmen develop are fun, interactive, and educational, and the readily identifiable “hero worship” by the children for their freshman “teachers” underscores the strong impact the undergraduates made. The elementary teachers tell us that they refer back to the day as they introduce new, related topics throughout the year; that the children continue to talk about the experience weeks later; and that, at the end of the year, the kids identify the day as the “best thing they did all year.”

Freshmen wrote in their reflective journals that working with the children had been a challenging and rewarding experience, and despite their initial fears, they had shown that they could teach science to kids. Anecdotal evidence from our students’ journals suggests that we have encouraged some to consider teaching as a profession, others to avoid it at all costs, but all to have new respect for the profession.

Service learning is the pedagogy that links community service and academic study so that each are strengthened, and our outreach projects incorporate this pedagogy into our LC model. While the benefits of service learning, done well, are clear (MacGregor, 2003), many faculty members find the concept of service learning daunting because of the extensive work to develop relationships with community service organizations and concern that students will not fully engage in the practice of service without the professor’s oversight. We believe that the outreach projects undertaken in the LCs provide a structured, sustainable, and low-risk approach to introducing students and faculty to the benefits of service-learning. Faculty members involved in the LCs admit that they would have been unlikely to move

"out of the classroom into the community," especially with freshmen, without the incentive of the LC project. Feedback from all involved indicates that the LC outreach projects, while fairly simple in design, fit the definition of service learning by providing a vital service to the community and enriching the learning experience for everyone.

5. Making use of Wofford's rich resources in educational technology

One objective of the project is for freshmen and the LC teaching teams to develop facility with Wofford's educational technology. The teaching teams and other faculty members learn about the various resources during the May workshops and develop their skills during the rest of the summer and beyond.

Signs of success include that each LC hosts a website and all freshmen in the LCs developed and maintained their own websites (which are linked to their LC homepage). Freshmen post weekly journal entries, pictures, and other coursework. Parents, in particular, love having Internet access to follow the progress of the learning communities and to view samples of their own freshman's work.

6. Assessment: Using multiple techniques to evaluate the successes and challenges of our LC program

Our assessment methods include student pre- and post-semester LC evaluations (containing both quantitative and qualitative questions developed specifically for this project), students' weekly reflective journals, informal and videotaped interviews with preceptors, formal end-of-term reflective papers by the preceptors, faculty interviews (and their written comments, when possible), formal presentations by LC teaching teams about their LC, and two sets of invaluable external reviews. (Trace Jordan, Assistant Director of the Morse Academic Plan at New York University, visited Wofford at the launch of our NSF project and returned two more times over the past two years to monitor our progress. Jean MacGregor, Co-Director of the NLCP, and Frankie Shackelford, Associate Dean at Augsburg College, evaluated our LC program during an intensive two-day visit in fall 2003.)

Broader Impact of Our Program

Impact on first-year students

Post-semester evaluations and the students' weekly journal entries indicate that the freshmen were pleased with their LC experience. A few highlights from their comments reveal 1) the closeness they felt to the teaching team and each other, 2) a heightened sense of self-reflection and responsibility to succeed academically, 3) an increased willingness to consider new ideas that challenged their beliefs, 4) a better appreciation for science as an integral part of their education, 5) initial skepticism followed by embrace of the integrated LC pedagogy, and 6) an increased civic awareness and responsibility.

Impact on the preceptors

Few students will ever have the preceptors' level of insight into the behind-the-scenes life of an academic institution nor will they develop such closeness with individual faculty members. In turn, their involvement has greatly added to the success of the LC program.

Each member of the teaching team is also a learner, thus establishing a particularly engaged and active learning environment. The preceptors serve as a liaison between faculty and students, and they help professors understand the students' perspective. Preceptors take ownership of the success of their LC, and they get particularly frustrated when the freshmen fail to put in their best effort, and this motivates the freshmen.

The freshmen look up to the preceptors, and the preceptors speak of a sense of responsibility to act as a role model to their freshmen and confess that occasionally this new role is challenging for them, especially in social settings. The preceptors develop friendships with the freshmen that facilitate an atmosphere of trust and comfort within each learning community. The freshmen report turning to the preceptors for advice throughout the semester, whether that advice is academic or social.

The preceptors develop excellent communication skills, and they are the program's strongest spokespeople. With institutional funding, several have presented their work at national meetings, and others have presented to various campus constituencies, including the Board of Trustees, thus helping to secure continued institutional support for the LC initiative.

Benefits and challenges for the LC faculty

Like the preceptors, faculty members indicate that they are pleased with their participation in the LC program. They report changes in their teaching styles (often dramatic) because of working with, and learning from, their faculty colleagues and preceptors. Most indicate that they had more fun teaching the LC than they'd had in years and that they better understand and appreciate their faculty partner's discipline and habits of mind. They miss their faculty partner in their other stand-alone courses, but they also report that the time commitment to team-teaching the LC is challenging. Although LC faculty strongly agree that it is important to share the experience and learn from each other by sitting in on all meetings of both courses the first time the LC is offered, several indicate that it would be difficult to maintain this investment of time to the LC in the future, particularly if the course reduction each received to teach the LC was discontinued. The time factor is particularly difficult for the humanities professors who add six additional contact hours when sitting in on the science course (class plus lab), whereas the science professors add three contact hours to their load. Therefore, the commitment to team-teach every class meeting may be reduced after the LC is taught the first time. Another option is to increase the enrollment of each LC to 30–40 students, thus justifying a permanent course reduction for each faculty member on a per capita basis. Several of us enjoy team-teaching so much that we're likely to teach an overload to maintain the integrity of the fully integrated LC.

Broader Impact of the LCs on Wofford

This NSF-funded initiative has had a broad impact on Wofford College. The dialogue of the campus has shifted toward discussions of pedagogy with an emphasis on integration of knowledge. Several faculty members have initiated LCs among (and within) other disciplines, and professors and students refer to learning communities as part of the established campus vocabulary. From general observation, freshmen appear to identify themselves as belonging to an LC as often as they claim their affiliation with a Greek organization, and even after an LC is over, former LC students often refer to themselves by their LC identity. For example, when a former student from the "Nature and Culture of Water" LC says, "I'm one of the Water

People," most people on campus know what they mean.

Wofford's president has often held up the LCs as models of teaching and learning excellence for Wofford, whether it is during faculty meetings or during fundraising trips. His strong support of the project has led the Board of Trustees to incorporate funding for the LCs into the college's operating budget. The Dean has also given his support, giving faculty a course reduction during their LC semester, encouraging all to attend the summer workshops, and working with us to construct a formal plan to sustain the LC initiative.

Dissemination and National Impact of Wofford's Model

The teaching teams involved in the LCs have been actively engaged in disseminating our model, most often through presentations and workshops at national conferences. In the past two years, my colleagues and I have given over 20 presentations or workshops throughout the country (many at conferences hosted by the NLCP or the Association of American Colleges and Universities), including three extended workshops at colleges where core groups of faculty are currently adapting our model. Particularly beneficial in our dissemination efforts has been our affiliation with SENCER (Science Education for New Civic Engagements and Responsibilities), an NSF-funded national dissemination project (see <http://www.sencer.net>). For each of the 2002, 2003, and 2004 SENCER Summer Institutes, Wofford has been invited to conduct two workshops at the institute: the first on the integration of sciences into LCs and the second on the power of partnering with students to foster positive academic change.

Growing and Sustaining Wofford's LC Program

We recognize the challenges we face in extending and sustaining our LC program, but we are also optimistic about its ultimate success. The NSF grant provided the opportunity to implement an excellent model that has had a tremendous positive impact within and beyond the walls of Wofford. Our external reviewers have praised our work to date, and they noted the impact the program has had on Wofford students and faculty. They have also provided concrete advice on ways to sustain the program, and we have included these ideas

and our own in a proposal that will ultimately go before Wofford's Board of Trustees. Our administration and a growing core faculty remain committed to this initiative, and we are confident that the Science-Humanities LC model at Wofford will grow and flourish for many years to come.

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