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ORIGINS AND MIND

AN INTEGRATED ACADEMIC EXPERIENCE FOR NEW STUDENTS

DISCOURSE

We aimed to build specific curricular links between the humanities, natural sciences, and social sciences so that students could see commonalities

MANY COLLEGES AND UNIVERSITIES specify distribution requirements in their undergraduate curricula. Frequently, such requirements lack an explicit rationale that can be readily communicated to students. If such requirements

have been in place for a substantial period of time, they often serve, not as a focal point for curricular discussions, but simply as a part of institutional history. For liberal arts institutions in particular, the substantive role such requirements should play in forming an integrating, if not foundational, framework for today's liberally educated students is frequently overpowered by students' fragmented academic schedules.

An experiment in providing a small group of liberal arts faculty with an opportunity to reflect upon, develop, and embody one view of the significance of college-wide requirements, our program linked three courses from three distinct disciplinary divisions. Such an effort, we believed, would overcome many first-year students' (frequently) random course selection and add the value of mutually enhancing disciplinary perspectives that can deepen a student's encounter with an established field of academic inquiry.

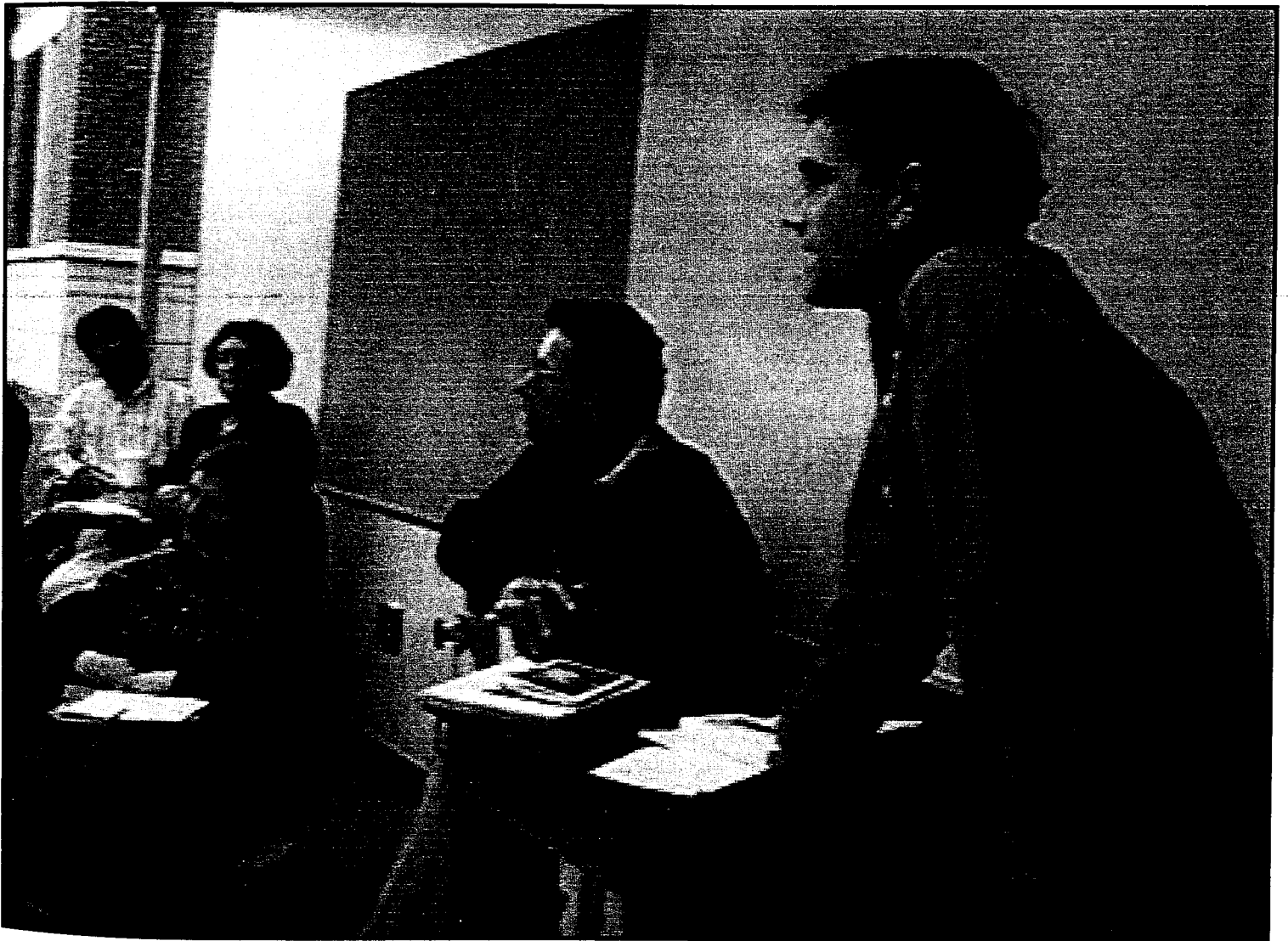
We aimed to build specific curricular links between the humanities, natural sciences, and social sciences so that students could see com-

monalities in both questions posed and differences in methods of approach to answering them. As faculty from departments of biology, philosophy, and psychology, we coordinated our teaching of introductory courses within these fields to highlight common themes. We enrolled the same group of forty-five students, who chose this program as an option. Because a "normal" course load for Carleton students is three courses during each of three terms, our program comprised their entire first-term academic program.

Our goals in developing this academic experience included:

- to foster a deeper understanding of connections among diverse disciplines for students and faculty
- to offer direct exposure to the integration of disciplines through weekly laboratory/discussion sessions attended by all faculty and students
- to offer opportunities for more in-depth and integrative discussions with fellow students outside of class because of the common classroom experience
- to provide participating faculty with time and space to engage in substantive interdisciplinary discussions about common questions
- to make clearer to students the rationale for our college distribution requirements
- to provide writing experiences in diverse disciplines that emphasize the development of both writing and critical thinking skills
- to model the integration of laboratory exercises into traditional lecture courses
- to integrate existing courses through faculty

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Video capture: Carleton College

discussion and coordination of syllabi rather than develop entirely new courses. Course modifications, if made at all, would be consistent with established departmental goals for introductory courses.

The specific courses

The three linked courses in our “triad” program existed prior to the program. Course titles were Introductory Biology II: Diversity, Form, and Function; in philosophy, Evolution and Mind; and Principles of Psychology. All were taught using texts and assignments normally part of the course, with the exception of the biology course, as discussed below. In the planning and rearrangement of topics on the three syllabi, coordination intended to maximize the temporal contiguity of related themes. A second mechanism for coordination came in the weekly “common time,” also described below.

Some intended/planned links

All three courses addressed aspects of these questions:

- How does the brain work?
- What types of simple neural mechanisms explain behavior?
- How does brain anatomy reflect functional organization?
- What is the mind?
- Is an understanding of how the brain works necessary and/or sufficient to explain the mind?
- What is the origin of the mind?
- Is there an evolution of the mind?
- What are the social and ethical consequences of an evolutionary view of the origin of mind and society?

We worked hard to coordinate the written assignments. Although it took a fair amount of negotiation, we made sure that no class had a written assignment due or exam scheduled on the same day, thereby encouraging students to focus their energies on each assignment and to relieve some of the stress typically reported about course assignments piling up.

The common meeting time

Once a week all students and faculty came together for a ninety-minute session. Sometimes, the session was designated as a laboratory, where students worked in pairs or small groups. For example, students spent one week training a “virtual rat” named Sniffy to press a

virtual “bar,” in a virtual operant chamber. Another week, students investigated different sensory systems.

Other sessions involved viewing films relevant to one or more of the courses, followed by discussion among the entire group. One film took up the topic of antisocial personality disorder and psychiatric diagnoses; another, the effects of extreme social deprivation on the acquisition of language skills.

During other weeks, faculty assigned brief articles for discussion. In the common time, we divided the forty-five students into groups of nine, each led by one faculty member. Half the period was spent discussing prepared questions in the small group, followed by reassembly of the entire group for additional exchange.

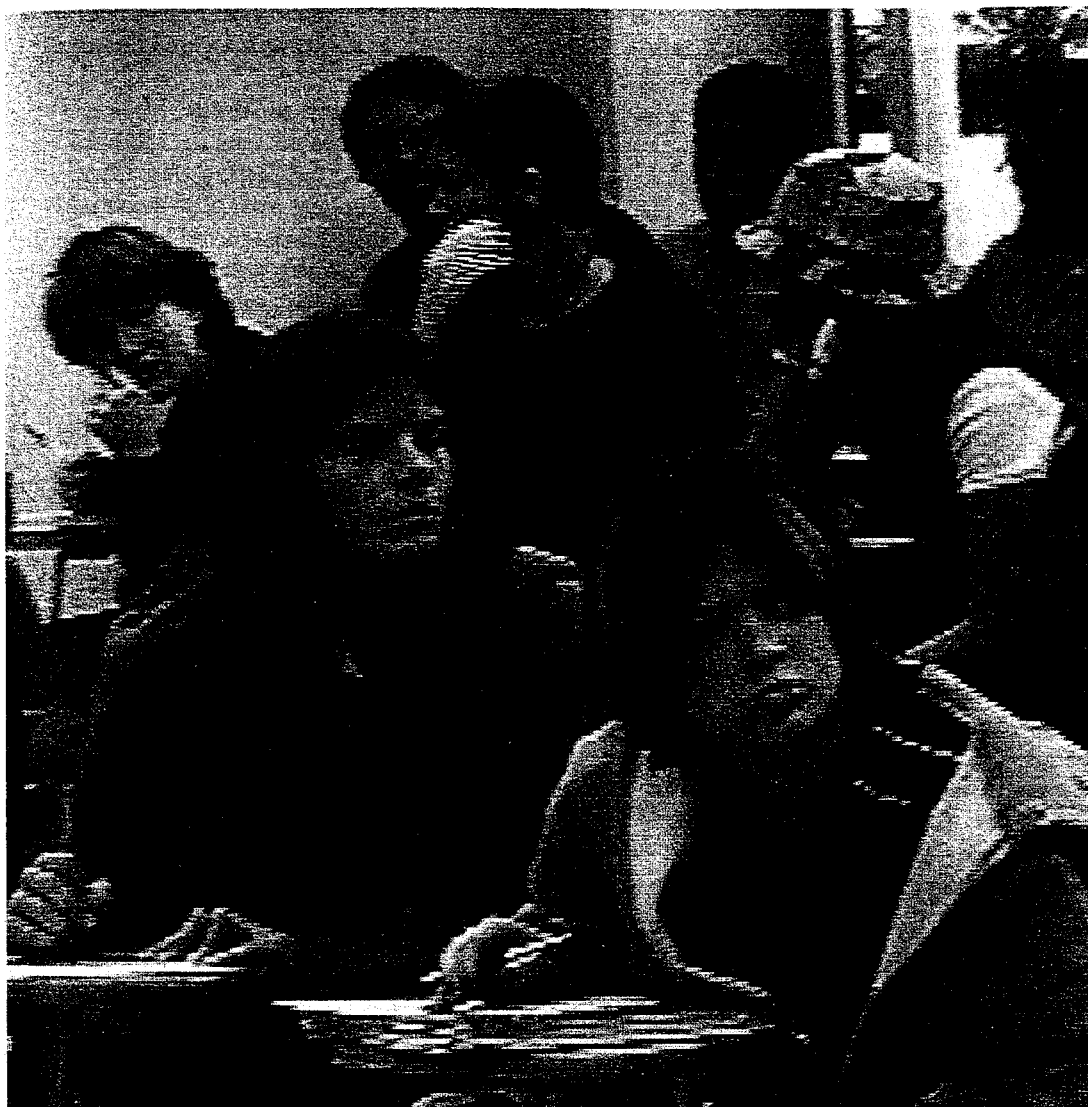
Integration of lecture and laboratory

Typical introductory biology classes at Carleton are taught as three 70-minute lecture periods and one 4-hour laboratory period per week. In part as an educational experiment and in part to address the pragmatic need to carve common meeting time from the students’ schedule, the biology faculty organized their course differently from the standard introductory class. Students and faculty met for two 3-hour blocks of time and moved from lecture hall to laboratory and, sometimes, back again. What resulted was greater fusion of lecture and lab material, more focused lectures leading directly into laboratory exercises, and greater flexibility for an instructor to pace a day’s instruction.

Evaluation

Throughout the term we had a great deal of anecdotal evidence of student enthusiasm. Sometimes at the end of our common meeting time, students would continue a spirited discussion—even after the faculty left. At the end of the term, the students designed for themselves a course sweatshirt, complete with icons representing all three courses, all five instructors, and the ways in which these connected.

As each faculty member gave presentations at the common meeting time, we found ourselves sharing a new excitement for teaching. Thus, we decided to gather more systematic data about the success of the triad. In the eighth week of our 10-week term, we created and distributed an assessment survey, and we received a 100 percent response rate. The in-



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Carleton College

strument we used contained twelve statements, presented in Table 1 (see page 36). Students were asked to indicate their degree of agreement or disagreement with each by using a seven-point Likert scale (1 = strongly disagree; 2 = somewhat disagree, 3 = slightly disagree, 4 = neither agree nor disagree, 5 = slightly agree, 6 = somewhat agree, 7 = strongly agree). For a basis of comparison, we recruited another sample of students enrolled in an introductory biology course co-taught by one of the triad instructors. The survey was distributed to all the students in that course, but to ensure comparability, we used only the responses from first-year students.

Mean responses for each of the objective items, by group, are presented in Table 1. Higher numbers represent stronger agreement with the statements. Independent-groups t-

tests were run to assess statistical differences between responses; results are summarized in the third column of the table.

First-year students in both groups reported their classes to be equivalently difficult (see items 2 and 3), and to be spending an approximately equal number of hours on homework. Students in both groups also did not differ reliably in their sense (generally positive) of making solid progress on college distribution requirements, and in their feeling (generally neutral) that their writing skills were improving.

Triad students did report a greater sense that their classes complemented one another and that the written assignments were well coordinated. Triad students also reported less fluctuation in their overall workload from week to week. These results suggest that the intention of coordinating both the content

TABLE I
RESPONSES TO LIKERT ITEMS

QUESTION	TRIAD GROUP (N = 45)	NON-TRIAD GROUP (N = 40)	DIFFER SIGNIFI- CANTLY?
My overall workload this term, including reading, writing, laboratory/studio, and other class assignments, has fluctuated a great deal, ranging from very heavy to very light.	3.84	4.65	p < .05
All in all, I feel that I have been honestly challenged in my classes this term.	6.29	6.40	no
My courses this term have been far too easy.	1.58	1.58	no
My courses this term have given me a good sense of what a liberal arts education is all about.	5.89	5.16	p < .05
My ability to grasp important theoretical issues has been improved this term.	5.67	4.79	p < .0
My classes this term complement each other.	6.82	4.00	p < .001
My written assignments (exams, papers, projects, reports) were well coordinated in my classes this term.	5.89	4.83	p < .001
I feel my writing has improved this term.	4.64	5.03	no
If I were advising a good friend whose interests were similar to mine, I would recommend the classes I took this term.	6.29	4.97	p < .001
I feel that I'm making good progress this term toward fulfilling my distribution requirements.	6.00	5.76	no
My classes this term have allowed me to see why science courses are considered liberal arts.	5.27	4.38	p < .01
My classes this term offer me a reasonable and broad view of intellectual inquiry.	6.22	5.37	p < .01
Please estimate the number of hours you have put in, on average, on all homework (reading, writing, problem sets, projects, etc.)	23.42	26.59	no

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and calendars of the courses was effective and well-received.

More surprising—and more gratifying to us—were the other statistically significant group differences. Triad students reported a greater sense of understanding the purpose of a liberal arts education, and a sense that their first term classes represented a broad view of intellectual inquiry.

We interpret this result as at least partially accounted for by the triad's affording them an opportunity to pursue three methodologically distinct fields of inquiry in a manner that allowed them not only to directly compare different perspectives, but also to see how the results of psychology and biology can serve to challenge or complement favored theories of the philosopher.

Although they were well integrated, the triad courses did not attempt to create a seamless interdisciplinary vision of human cognition. Students were intrigued to discover, for example, that Descartes' controversial claim that language separates animal "minds" from human minds might receive some confirmation from present psychology of language. But they also learned that Descartes' insistence upon the irreducible nature of consciousness and the failure of present philosophical accounts of the mind to offer an explanation of consciousness indicated that an important question in philosophy and psychology remains unsolved. It is perhaps only in the light of a competing theory or perspective that the shadows—the unilluminated issues—cast by a favored hypothesis can become visible. We believe that the intellectual breadth characteristic of a liberally educated mind is partly distinguished by this type of effort to gain the measure of a discipline or theory.

Triad students were also more able to see why science courses are considered liberal arts. They were able to trace the implications of scientific theories for classical and contemporary views of the mind and relate the methodologies of the sciences to broader issues, such as the role of scientific explanation in offering, or failing to offer, answers to central "human" issues such as friendship, the nature of altruism, the significance of sexuality.

More broadly, the triad students—more than did the non-triad students—felt their ability to grasp theoretical issues had improved. Two features of the triad program may have encouraged this type of response. First, weekly common meetings selected issues for discussion that allowed for a comparison of differing approaches to questions such as free will, addiction, the

meaning of language, and the nature of human sociality. Second, triad students were occasionally asked to respond to an issue from all three disciplinary perspectives, and they were then provided with an opportunity to step back from their "impersonations" to discuss the individual merits of the positions they had constructed. They were regularly challenged to make methodological and substantive comparisons on theoretical grounds. In many of these discussions, triad faculty unobtrusively served as moderators, with the weight of discussion falling upon the students themselves.

Psychology and biology courses provided a framework of empirical inquiry within which the "philosophical" issues of gender and scientific objectivity could be discussed. Concluding sessions of the philosophy component incorporated a critical discussion of feminist issues and positions distinguishing between the "lived" body and the body viewed as an item for objective, scientific inquiry. Within that context, triad students discovered that the sciences have something relevant to say to humanists and the issues they raise, and that humanists who do not side-step the sciences may have credible observations to make regarding shortcomings of scientific inquiry.

Lastly, triad students reported themselves more likely than did non-triad students, to recommend the set of courses they had enrolled in to a friend. It is an encouraging affirmation of our experiment, and although we pushed these students quite hard, they appreciated and enjoyed the challenge.

We also posed two open-ended questions on the survey. The second item, "Please comment (if you wish) on any related topic you would like regarding this terms' classes," did not elicit many general patterns of responses.

TABLE 2
CODING CATEGORIES FOR OPEN-ENDED QUESTION 2

Intellectual breadth: Student discusses intellectual breadth, growth, exploration, well-roundedness, taking a diverse set of courses, becoming "well-educated," broadening horizons alpha = .89, Means = .73, .60

Find a major: Student describes desire to find a major, concentration, focus for education alpha = .83, Means = .18, .10

Career preparation: Student describes wanting to prepare for graduate, law, medical school, and/or for a future career, job, employment alpha = .75, Means = .27, .23

Survival: Student describes wish to survive, make it through college (or the term) alpha = .90, Means = .02, .00

Discover interests: Student describes wish to find out what s/he likes, wants to study, discover passions alpha = .84, Means = .29, .13 (p < .07)

Enjoyment: Students describes fun, recreation alpha = .73, Means = .02, .08

Develop identity: Student describes wish to develop a personal philosophy, discover who s/he is alpha = .74, Means = .09, .03

Writing skills: Student describes wish to develop writing skills alpha = .91, Means = .04, .03

Thinking skills: Student describes wish to develop thinking skills, critical thinking skills, ability to reason, think rationally, problem-solve alpha = .91, Means = .07, .05

Technological skills: Student describes wish to develop computational skills, video skills, laboratory-based skills alpha = .00, Means = .00, .00

Fulfill specific requirements: Student describes wish to fulfill specific course of study (e.g., premed requirements) alpha = .39, Means = .02, .03

Accomplishment: Student describes a specific accomplishment to be attained (e.g., graduate, be in Phi Beta Kappa) alpha = .87, Means = .09, .08

Interrater reliabilities denoted by alpha; group means are given next for the Triad (n = 45) and non-Triad (n = 40) groups of students.

Responses to this question will not be further discussed here.

Responses to the first open-ended item ("Please state the most important goal you have for your Carleton College education") elicited a richer set of responses. These were coded independently by three coders, the second author and two undergraduate assistants. Each response was scored for the presence or absence of twelve different themes, shown in

Table 2. Any given response could contain *all*, *some*, *one*, or *none* of the themes described. Interrater reliabilities (calculated with coefficient alpha) were above .73 for all but two themes (technological skills, fulfill specific requirements), which had a low base rate of occurrence and were therefore dropped from consideration. For the remaining ten themes, interrater reliabilities ranged from .91 to .73, with a median of .84.

As with the responses to Likert items, the proportions of essays showing each theme were analyzed by means of independent-groups t-tests. No group differences were statistically significant. The mean proportion of students in each group whose essays contained a given theme are presented in Table 2.

The lack of significant differences between the two groups in their stated educational goals suggests to us that the triad students did not differ substantially from the comparison group. In turn, this suggests that the rated differences in ability to grasp theoretical issues, understanding of the purpose of a liberal arts education, and sense of having received exposure to a broad range of intellectual inquiry reflect the result of different educational experiences in the first term.

After thoughts

Several aspects of our program led to the overall positive reception by students. First, the syllabus coordination was very important in reducing student stress and allowing students to "pace themselves." Second, the weekly common meeting times helped students to see and experience the interdisciplinary connections vividly and fostered a sense of intellectual community. The group size of forty-five students was ideal, achieving a delicate balance between being small enough for students to get to know one another and to become known within the group. In "post-term" discussions, many of us remarked on how well our individual courses had gone. Even though course coverage was the same as regular versions of the course, the students seemed to perform somewhat better on exams and papers. We believe that the experience of intellectual camaraderie established in the program contributed greatly to this improved performance.

The institutional overhead required to provide this opportunity appears to be minimal. Optimally, an institution would develop three triadic programs, one offered each year in a three-year sequence. This would alleviate departmental scheduling challenges involved in coordinating the involvement of three to six faculty in three divisionally distinct departments. First-year students may be more open to

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this educationally novel opportunity than would upperclass students.

Institutional support for the encouragement and preparation of triads is desirable. Although extensive course modification need not be anticipated, it does take a fair amount of planning and discussion for three distinct syllabi to be thoughtfully coordinated.

Preparation of laboratories and discussion topics for the weekly common meetings would profit greatly by institutionally supported summer workshops or course releases for faculty planning a new triad.

One of the most important outcomes of the triad experiment was significant evidence that first-year students profited intellectually from a presentation of a truly interdisciplinary theme through the vehicle of three linked but independent courses. The triad students were perhaps better able than their peers to comprehend the value of the type of academic "breadth" aspired to by the liberal arts curriculum to the extent that their academic experience allowed them to gain insight into both important disciplinary differences and overlapping concerns.

Colleges and universities have a responsibility, not only to articulate their educational goals, but to actively implement them within the context of the curriculum. A high degree of departmental autonomy has brought about many of the existing strengths of liberal arts and university curricula. Yet, as the growth of interdisciplinary programs attests, interdisciplinary themes in the curriculum do more than reflect an integration of issues and disciplines on the part of individual faculty. Interdisciplinary programs offer significant opportunities for translating an institution's educational goals from a catalog statement into a concrete, memorable, and challenging shared intellectual experience for students and their instructors. □