This step-by-step guide to the design of interdisciplinary courses explores their underlying theoretical rationales and expected educational outcomes while offering concrete suggestions and examples for every step of the course design and instruction process.

Designing Interdisciplinary Courses

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Interdisciplinary courses promise a wide range of desirable educational outcomes for students. Students in high-quality interdisciplinary courses are consistently reported to develop the traditional liberal arts skills of precision and clarity in reading, writing, speaking, and thinking; to confront challenges to their assumptions about themselves and their world; and to develop the habit of asking why instead of merely memorizing accepted facts. The student-centered ambiance of many interdisciplinary programs seems to promote mutual respect between students and faculty and among students of diverse backgrounds; it also leads to the development of affective as well as cognitive skills (Newell and Davis, 1988). These outcomes stem as much from the way in which the courses are taught as they do from their interdisciplinary nature.

Other educational outcomes seem to be a product of the interdisciplinary process itself: an appreciation for perspectives other than one's own; an ability to evaluate the testimony of experts; tolerance of ambiguity; increased sensitivity to ethical issues; an ability to synthesize or integrate; enlarged perspectives or horizons; more creative, original, or unconventional thinking; increased humility or listening skills; and sensitivity to disciplinary, political, or religious bias (Davis and Newell, 1981).

Interdisciplinary courses have advantages for institutions as well. Since topically focused interdisciplinary courses are inherently more interesting to take and teach than introductory or survey courses, they improve morale in required general education courses. They can also serve as efficient introductions to the various disciplines (Newell, 1983a). They offer a relatively low-cost but highly effective form of faculty development that facilitates reallocation of fixed faculty costs from underenrolled departments (Armstrong, 1980).

Half a dozen years ago, a comprehensive study of American undergraduate interdisciplinary programs (Newell, 1988) showed that institutions had responded to the manifold promise of interdisciplinarity by developing, first, new institutionwide general education programs in which interdisciplinary components were required and, second, interdisciplinary honors, humanities, and women's studies programs. These programs were at once surprisingly numerous, geographically dispersed, large, egalitarian, and recent in origin. Indeed, more than half of the programs documented in the study had been formed within the preceding dozen years. These developments have moved interdisciplinary study from the radical fringe to the liberal mainstream. Such reform, which builds on disciplines instead of supplanting them, has taken place in the name of excellence as well as coherence, although sometimes it has had a critical edge. Since the study cited, undergraduate interdisciplinarity seems to have accelerated even more, with almost all the growth coming in general education. For example, state boards of regents and councils of higher education now tend to see distributive general education as outmoded, and interdisciplinary approaches as the innovative norm (Miller and McCartan, 1990).

This chapter focuses on the process of designing an undergraduate interdisciplinary course. The process has eight steps: assembling an interdisciplinary team, selecting the topic, identifying disciplines, developing the subtext, structuring the course, selecting readings, designing assignments, and preparing the syllabus. Given the curricular context just discussed, most of the examples in this chapter have been drawn from interdisciplinary general education, although the focus is still broad enough to include interdisciplinary courses in honors, humanities, and women's studies as well as courses sometimes found in adult education; American studies; environmental studies; ethnic studies; science, technology, values, and society; the social and natural sciences; urban studies; global studies—and in some disciplinary departments (Newell, 1986).

Assembling an Interdisciplinary Team

Interdisciplinary teams have four common uses in teaching: for course development (our focus here as the first step in the course design process), faculty development seminars, team teaching, and collaboration among faculty who offer separate sections of a multisectioned course. At the intellectual heart of many interdisciplinary programs, we find an interdisciplinary faculty seminar in which a particular interdisciplinary book or issue is discussed at (typically) weekly or biweekly meetings. Such seminars are seldom available to disciplinary faculty whose interdisciplinary involvement is limited to the teaching of general education courses. They promote an intellectual community, expand faculty perspectives, develop interdisciplinary skills, and sometimes even spawn new interdisciplinary courses.

Team teaching may be necessary the first time an interdisciplinary course is taught. In the team's weekly meetings, a variety of essentials get worked out:

the disciplinary perspective underlying each reading; the key points that need to be made and the questions that need to be raised about them in the next week's seminar discussions; and paper topics, exam questions, and "right" answers. The main difference between interdisciplinary teams that prepare faculty for team teaching and interdisciplinary teams that prepare faculty for separately taught sections of the same course is the command required of the perspectives of other disciplines represented in the course. The tendency in courses taught by teams is to let the other person represent her or his discipline. The pressure to develop a sympathetic command of the other perspective(s) is limited to what is required to talk productively with colleagues. When a faculty member is alone in the room with students, he or she needs to be able to present the other perspective(s) sympathetically and convincingly. The consequent demand on team meetings is greater, but the resulting course can be more interdisciplinary than one that is team taught, since faculty model for students how to listen to contrasting perspectives and to think holistically about their integration (Newell, 1983b).

The first task in designing an interdisciplinary course is to identify colleagues in other disciplines that can be called on for collaborative assistance. An interdisciplinary topic takes more than one person's interest, even expertise, because an interdisciplinary course requires multiple perspectives. However broad a faculty member's training may be, it is still a human trait to seek cognitive order, to create a single coherent perspective on how the world works. But contrast if not conflict is essential to interdisciplinary study. To bring two or more perspectives to bear on a single topic, an individual working alone would need to have two minds.

With experience, a single faculty member can design an interdisciplinary course but only after developing sufficient feel for the worldviews, concepts, theories, and methods of relevant disciplines to be able to shift with ease from one perspective to another. Small wonder that interdisciplinarians tend to score high on the tolerance of ambiguity scale of personality tests. It would more fitting to say that they seek out ambiguity. Faculty members who do not have the support of a formal team can still ask colleagues in other departments for assistance. Those who do are often pleasantly surprised, as most faculty are delighted to help familiarize colleagues with their area of expertise. Moreover, those who make such an investment in the interdisciplinary project often become more supportive of the interdisciplinary program as a whole.

Not surprisingly, then, selecting a genuinely interdisciplinary team requires consideration not only of the expertise of possible participants but also of their personalities. For example, one needs to consider whether potential participants are open to diverse ways of thinking, wary of absolutism; able to admit that they do not know; good at listening; unconventional, flexible, willing to take risks, self-reflective, and comfortable with ambiguity. Those who are not may not be appropriate for interdisciplinary teaching (Trow, 1984–1985).

As it turns out, collaboration on an interdisciplinary team is a lot like marriage. One must ask whether the particular mix of personalities proposing a

course will work together appropriately. Are the prospective partners discreet as well as knowledgeable? They will learn where the other is most vulnerable or deficient. At least half of the course will deal with material outside one's expertise, which means that one runs the risk of exposing some cherished assumptions as incomplete and misleading if not actually wrong. Values as well as facts become the focus of discussion and debate, so that a partner must be trusted as well as respected. Love is optional.

Participation in an interdisciplinary team can be exhilarating but challenging. It gives the participants an opportunity to see issues from new angles, and, because the underlying assumptions are probed, they can see why others on the team think as they do. One's own perspective is subjected to the same scrutiny, and the holistic spirit of the enterprise requires that one rethink and reexamine it, not merely defend it. Respect for the perspectives of other disciplines is essential. After all, they usually come out of intellectual traditions to which many brilliant people have contributed. Nevertheless, their limitations must be sought out. Faculty members should represent their own disciplines as statespersons, embodying the disciplinary perspective and values but listening as well as contributing to debate, and then, relying on their expanded understanding, voting in the interest of the entire intellectual community.

Try being intellectually playful instead of contentious. Instead of dismissing an uncomfortable idea, hold it up to the light, turn it around, see how it might relate to more familiar ideas. Imaginative play produces unexpected connections, and laughter defuses tension wonderfully. When the perspectives of the disciplines have been set out and examined, let the test of convergent validity set the areas of agreement. Where disagreement remains, avoid dichotomies. They are, as Etzioni (1988, p. 203) puts it, "the curse of intellectual and scholarly discourse." Both-and thinking is the hallmark of the interdisciplinarian and the most promising route to integration.

Selecting a Topic

Successful interdisciplinary courses normally focus on a topic, although the term *topic* should be construed broadly as meaning an issue, theme, problem, region, time period, institution, figure, work, or idea. Within that topic, the most effective strategy is to ask a question that is too broad for any one discipline to answer fully. Since an interdisciplinary course "covers" disciplinary perspectives (typically disciplines or schools of thought) just as a disciplinary course treats subject matter, the course topic needs to be sufficiently narrow to include all relevant disciplinary perspectives. A narrow topic also ensures that these perspectives can be contrasted, because they will all have the same focus. Otherwise, disciplinary contributions will be regarded as merely complementary insights into separate subtopics that can be combined like the pieces of jigsaw puzzle, not as alternative perspectives that need to be reconceptualized before they can be integrated. An interdisciplinary whole is larger than the sum of its parts, and it is complex, not simply complicated. What

lends interdisciplinary study much of its challenge and delight is the creative tension that arises from contrasting disciplinary insights. The creative tension is lost if the disciplines are seen as specializing in different parts of the whole, and with the creative tension goes the richness and complexity introduced by the interdisciplinary approach. Many of its interesting educational outcomes are also lost (Fuller, 1993).

The composition of the faculty team severely constrains the range of possible topics. Clearly, there cannot be a serious mismatch between the disciplinary expertise represented on the team and the disciplines claiming to say something important about the topic under consideration. At the same time, one must not conceive of expertise too narrowly. An economist may find it unreasonable to draw on literature or religion if there is no humanist on the team, yet feel familiar enough with the principles of political science (thanks, perhaps, to the rational self-interest model of human nature) that he or she will include that discipline in the course when the team has no political scientist. However, the economist could pay regular visits to a political scientist on campus as the course is being developed to seek advice, tips on background readings, and reactions to the syllabus. In some cases, it may make sense to change the composition of the team, as we did when we added a philosopher with expertise in ethics who had shown considerable interest in the course when approached for advice by a team member. Under ideal conditions, the composition of the team and the course topic would be decided jointly. However, in most cases, one of these factors proves to be more inflexible than the other, which must therefore be adapted to it.

As if this balancing act were not enough, the selection of an appropriate topic must also take student interests into account. Interdisciplinary courses have the potential for motivating students to learn, whether the topic intrinsically interests them or not. When career-minded students are enrolled in required general education courses, that career mindedness can be a major consideration. Successful topics today often deal with issues that are timely and often global (such as ozone depletion), demonstrably relevant to students' careers (such as the American myth of success), or explicitly tied to social problems that affect their personal lives or families—for instance, for students of traditional college age, societal control over their lives; for older married students, teen pregnancy. Even courses that deal largely with other cultures or time periods can be reconceptualized in ways that emphasize their relevance for students' lives. For example, a course on the Weimar Republic could examine the political appeal of Ross Perot. Such courses need to draw on a very limited number of cultures and time periods for the same reasons that limit the number of disciplinary perspectives. Since the appeal of a course may hinge to a considerable extent on the accuracy with which planners evaluate the range of student interests, it may be worthwhile to probe those interests by surveying students or advisers, interviewing a cross section of students, or consulting a student advisory panel.

Differences between the interests of faculty and students become particu-

larly apparent when the topics that faculty propose for interdisciplinary general education courses are highly abstract (for example, The Concept of the Person) or focused on a discipline (for example, Introduction to the Social Sciences). While these topics represent what from the professor's perspective is the "real" course, they have little appeal for students. Such topics as abortion, invasion of privacy by computers, and sexual harassment can lead both to further examine the "real" topics that interest the faculty or meet educational goals and to attracting students' interest.

A substantive topic provides context for abstract issues, glue for the course, and motivation for students. How abstract the topic and how remote it can be from the experience of students depends on an assessment of their intellectual sophistication. For most undergraduates, abstract issues will not capture student imaginations unless the issues are grounded in concrete situations. A way of connecting a course to students' lives is especially important when the students are not particularly intellectually oriented or when they are studying about a different time and place.

Faculty must show students that they need to get behind the commonsense understandings of a topic if they are to explore it adequately. For example, the distinction between the rights of the individual and the rights of the collective can emerge in a class discussion of sexual harassment. Once that distinction (the "real" topic from the perspective of faculty) has been shown to be real and relevant, it can then be examined as a legitimate subtopic in its own right. Readings can be assigned, and students can write papers, but the discussion must always bring insights into the abstract issue to bear on sexual harassment—which in the students' eyes remains the concrete subject.

While academic disciplines are of considerable interest to faculty for a variety of reasons, they are seldom of innate interest to students, for whom they remain vague, abstract labels. If disciplines are not meaningful entities, then neither are courses that take disciplines as their focus. If faculty show students that disciplines contribute valuable insights into topics that do interest them, then those disciplines and their concepts, theories, and methods may start to interest students. When students see that their naive understandings of a topic are inadequate to explain comprehensively what they see, they become more willing to learn something about disciplines that claim to offer explanations of those phenomena.

Identifying Disciplines

One central intellectual task in the process of developing an interdisciplinary course is to determine the appropriate disciplines from which the course needs to draw. Ask of the disciplines selected, Why these and not others? What exactly does the course draw from each? Is there some sense in which disciplines offer different perspectives on the issue? What distinguishes those perspectives? One cannot treat disciplines like beads on a string, where, different

as they may be, one is as good as another. Decide on a subtext, that is, on the underlying categories (of assumptions, perhaps) embodied by the disciplines to be included in the course. For example, a course on poverty in America can take as its subtext varying disciplinary assumptions about human nature, such as the priority of individuality, autonomy, or rationality. After determining what each discipline can contribute (and how distinct that contribution is from those of other disciplines), one must decide how many categories the course allows time or space for. A discipline like political science can contribute to a key assumption (say, that people are rational and self-interested), yet it may not be selected for inclusion in the course because another discipline, such as economics, can do an even better job of elucidating that assumption, and there is time for only one discipline.

We must also ask, Is one text as good as another? In an interdisciplinary humanities course on women's expressions of self, do different media allow different facets of self to be expressed? Do they get at the peculiar shortcomings of the definition of women's self in various cultures? Or is the choice merely a matter of a medium in which women are most proficient? A sentence, even a phrase, of explanation about the distinctive contribution that each category of text makes will help to clarify the thinking of faculty and students about the role of these expressive media in the course—and help students to understand why they are studying something like quilts as a form of self-expression. For example, films and music videos could be found upon examination to present essentially similar images of women, whereas none of the literary texts initially selected comes close to their angle of vision.

It is fashionable these days to demand that general education courses pay some attention to ethical issues. However, many of the general education courses taught by faculty who are not philosophers seem content to explore the ethical dimensions of issues in a philosophically uninformed way. Students should become aware of the distinct ethical traditions in our culture: virtue-based, duty-based, rights-based, and utilitarian as well as the emerging, so-called feminist ethic of caring, sharing, and relationships. These traditions often present conflicting demands that complicate our ethical decision making. Students do not need to be exposed to all the variants of these traditions or to get involved in details of the ways in which they are applied, but it does seem important for these courses to make some explicit use of ethical theory. One alternative to the training of all general education faculty in moral philosophy is to use taped lectures by ethicists. Other options include casebooks and guest lectures.

In addition to providing an ethical dimension, the humanities can make distinctive contributions to courses focused on the social sciences. For example, imaginative literature is especially good in providing some empathetic feel for another time or a particular issue, and it can put a human face on a problem, like poverty, that the social sciences tend to hold at arm's length. Biography can reveal how motivations from a variety of sources can come together

in a single individual. History can show that the ways things are now are less inevitable than they may seem. For example, a study of the history of attitudes toward abortion reveals that the Catholic church in America did not oppose abortion until well into the nineteenth century. While the humanities seem to emphasize creative expression over patterned behavior, the unique over the predictable, they can play an important role in what would otherwise be exclusively social science courses.

The natural sciences have a role to play in predominantly humanities or social science courses, but that role is often abused. It is easy for the scientists on an interdisciplinary team to think of their disciplines as providing the boundaries or context within which the concerns of the humanities and social sciences are played out—a line of thought that effectively elevates their status within the team. Even nonscientists may agree that science provides facts—the givens with which the other domains of knowledge must come to grips—or that human perceptions and creative expression are subjective, whereas science is objective. However, the history, philosophy, and sociology of science tell us otherwise. Like the social sciences and the humanities, science is a human endeavor that reflects the social and cultural context. In a culture that makes science a secular religion and that enthrones scientists as secular priests, faculty have an obligation to students not to reinforce this myth by presenting science as a fountain of truth and its practice as unproblematic. Instead, insights from the natural sciences ought to be treated like those from other disciplines—that is, as valuable but as limited by their perspective and assumptions. For example, limiting its conception of what is worthy of study and even of what is real to what can be measured directly or indirectly has helped science to develop valuable insights into the portion of reality that it has chosen to study, but that very success has prevented scientists from taking seriously the world of the imaginative, spiritual, or creative.

Developing the Subtext

At the heart of an interdisciplinary course is what I am calling its *subtext*—the abstract issue or issues of which the substantive topic of the course is a particular embodiment. In the preceding example, the subtext underlying a course on poverty is the conflict among the social sciences over the individuality, autonomy, and rationality of human nature or more generally over the possibility of freedom in a deterministic world. For faculty, the subtext is what the course is "really" about. It may be revealed to students at the outset, or it can slowly emerge as the course proceeds, but it is not what motivates their interest—that is the function of the explicit, substantive topic rather than the implicit subtext.

Decisions about selecting a substantive topic, identifying colleagues and disciplines, and choosing texts all need to be informed by the subtext. For a

course on poverty in America, faculty need to decide what should be said about the assumptions of autonomy, individuality, self-interest, and rationality that underlie a belief in freedom. Here is where the scholarly challenge to the faculty and the need to consult with experts in other disciplines are greatest, since the relevant professional literatures are seldom organized in terms of such abstractions. Disciplines should be selected that not only have important things to say about poverty but that also embody contrasting assumptions about the autonomy, self-interest, and rationality of individuals. However, the mere contrast of perspectives or underlying assumptions in an interdisciplinary course is not enough. The contributions of diverse disciplines need to add up to something. They need to be integrated into a larger, holistic perspective. Decisions about topic and any subtopics, disciplines, colleagues, and texts have to be decided on both levels—the surface where students are and the subtext level theorized by faculty.

These decisions ultimately have to be made on three levels, because the choice of subtext itself needs to reflect desired educational outcomes. Interdisciplinary courses are really about such matters as recognizing contrasting perspectives; learning how to synthesize, think critically, and reexamine the world that we take for granted; empowering students to tackle meaningful but complex issues; weaning students from dependence on experts without dismissing expertise; and teaching students to value disciplines as powerful sources of insight while becoming aware of the nature of their various limitations. How these concerns fit into the educational goals of the course, not merely the interests of faculty, must guide the choice of subtext.

In general education courses, the choice of educational outcomes is ideally a collective faculty decision, to which faculty responsible for developing courses for a particular requirement must respond. The problem with most general education guidelines is that they are couched in terms so broad as to offer few clues about the specific educational outcomes that are desired. Perhaps in the files of some former chair of a general education committee there are minutes of discussions that clarify just what committee members hoped to accomplish when they ruled, for example, that students must take one course that presents a nondominant perspective. Summaries of the arguments made in meetings where faculty as a whole debated the requirement are even less likely to be available. Thus, even in the general education courses required institutionwide, the choice of educational outcomes is often left up to the faculty members who teach the courses.

This problem is especially apparent with interdisciplinary requirements, because faculty are even less apt to agree on the meaning of *interdisciplinary* than they are on such terms as *global perspective* or *history*. In many cases, a vote for an interdisciplinary requirement appears to have been a vote for innovation, for keeping up with the rest of higher education, or for nontraditional education. Faculty designing interdisciplinary general education courses thus

have a special responsibility to think through which educational outcomes are appropriate and to choose subtexts that respond to those goals.

The choice of disciplines must also be informed by the way in which disciplines are used in interdisciplinary courses, since disciplines and not substantive facts are the raw materials of interdisciplinary courses. Almost all first- and second-year interdisciplinary courses provide their own disciplinary base of concepts, theories, and methods instead of stipulating disciplinary courses prerequisites (Newell, 1992). Underlying this base is the perspective or worldview of the discipline. The holistic interdisciplinary perspective develops from the integration of reductionist insights from individual disciplines. This integration is accessible to students only if they can get behind the pronouncements of the discipline on the course topic and understand how those insights have been arrived at. Students need to develop some feel for the worldview of each discipline, and ultimately they need some awareness of the key assumptions on which those worldviews were predicated. Consequently, the selection of a discipline may depend in part upon the feasibility with which the relevant concepts can be derived. If the contribution of physics to the topic is centrally bound up in the notion that mass can be converted into energy, time limitations may preclude even a rough sketch of the basis of Einstein's equation in fundamental physical concepts, and the discipline cannot be included in the course. But simply telling students that $e=mc^2$ does nothing to ground that claim in a scientific worldview. However, if the contribution that physics makes to the topic is focused upon the law of conservation of energy, the discipline of physics can be readily incorporated into that course, since the first law of thermodynamics is already basic and readily grounded in a scientific worldview.

Structuring the Course

The next task is to identify the conceptual glue that holds the course together. The sequence of subtopics or texts that have been selected needs to have a clear-cut rationale that can be communicated to students. In fact, even the best-designed interdisciplinary courses face the problem of making the logic of their structure apparent to students. A thematic thread needs to run through the course connecting individual topics into a coherent pattern. It can provide the context that sets out the disciplinary constraints, or the causal factors, or the background against which the figure stands out. In some cases, the topic itself has some internal logic that can suggest an appropriate sequence of subtopics, but it is more common that the ordering of subtopics will seem largely arbitrary. In these cases, one can turn to the subtext for coherence.

Take the example used earlier of a course titled Perspectives on Women in Western Culture. If the course is to cohere, those perspectives must collectively add up to some theme or subtext. Possible strategies include the contention that there are identifiable historic trends in the ways in which the various arts

have portrayed women, that common themes across time and space reflect fundamental distinguishing characteristics of Western culture, or that some art forms are better than others at bringing out particular aspects of the common themes. No matter what argument informs the subtext, the appropriate subtopics, and the texts to be developed, the steps in that argument need to be articulated as precisely as possible, preferably in a written rationale that will also be useful when the course syllabus is drafted and the emerging course structure is reevaluated.

As the course is structured, it is important to keep in mind not only what is being taught but to whom. There are usually a number of reasonable alternatives for structuring an argument, and some arguments will be more educational than others. For example, in a course with a subtext that reexamines key values in American culture, it may be educationally desirable to have the metadiscussions of values grow out of an examination of the values that students see themselves holding (perhaps as the result of a values clarification exercise during the first week), then connecting them to the values of American culture as a whole. This structure would tie otherwise abstract or theoretical discussions to the lives and world of students, motivate them, and bring the lessons home.

In contrast, conceptual coherence in a problem-centered public policy course may come most easily through a course structure that offers a model of how to approach and think a public policy problem through to solution. Following this strategy, the first step is to decide which model to present. One simple model has five elements: It starts with a factual description of the status quo. Next, it makes explicit the values that render it a problem for some people. Then it presents alternative disciplinary analyses of the source of the problem and the recommended solutions flowing from them. Next, it probes the differences in the perspectives (and the underlying assumptions) that lead to such diverse analyses. Finally, it draws on those analyses to restate the problem in a way that is free of the contested assumptions of specific disciplines, develop a holistic analysis, and make an integrated set of recommendations.

The application of this model gets more complex, of course, when the problem is split into subproblems or if the course also undertakes to examine the ideological dimensions and values underlying each perspective. One key decision in structuring a course is the balance between depth and breadth. That is, we have to balance how much of the problem (or how large a problem) we examine against how much we complicate the examination. As the time we spend probing the implicit values or ideologies behind problem definitions or disciplinary perspectives or analyses increases, the time available for exploring the various dimensions or manifestations of the problem itself decreases. Our final decision will probably be based in part on an assessment of the academic strength of the students. Bright or more advanced students can handle depth and complexity. Other students may appreciate broad, substantive coverage.

No matter what the academic strength of the students, it is essential for each analysis to be complicated at least to the extent that students can be shown how the analysis has been arrived at. For example, giving students an assessment of global poverty by a Chicago School economist without explaining the supply and demand curves that underlie his assessment leaves them unprepared for critical evaluation. To choose between competing assessments, they must rely on their own biases, whether these are based on political or social ideology or on religious belief. In such a case, two potential advantages of interdisciplinary education are lost—namely that it helps students to develop the ability to evaluate the testimony of experts through critical thinking and that it thus empowers them to think through complex issues for themselves.

It is tempting to trust that one or a few recurring key concepts can hold a course together. An example from ecology is carrying capacity; an example from cultural materialism in anthropology is human-nature interface; an example from economics is growth with equity. However, such concepts cannot serve as the main source of conceptual glue. After all, concepts typically come out of, and hence reflect, a particular perspective, whether it be that of a discipline or a school of thought. For this reason, concepts alone cannot hold together the different perspectives represented in the course. At best, a concept can signal the coherence of one perspective as it applies to a specific part of the course.

Selecting Readings

It makes sense to start off even the most theoretically sophisticated course with a hook—a reading designed to pique students' interest in the substantive topic, to engage their emotions, and to make the topic real by connecting it with their experiences and their world. For that reason, faculty often start off interdisciplinary courses in the social or natural sciences with something from the humanities—a short story, a play, a poem, or a film. Time is always the chief limiting factor in an interdisciplinary course. Hence, long novels are best avoided.

Especially in the social sciences, it is desirable to assign early in the course a reading that brings home the limitations of students' commonsense understanding of the topic, hence rendering the topic more problematic, and revealing the inadequacy of what up until then had seemed a satisfactory understanding. Students tend to resist social scientific insights as pedantic, jargon laden, or unnecessarily technical until the need for such insights has become evident. Once students have become dissatisfied with their own insights, they tend to be much more open to investing time and effort in learning what the disciplines can offer.

Interdisciplinary courses of any type require readings that reflect the different disciplinary levels. It is clear that every course needs at least one reading on the substantive topic that unmistakably reflects the perspective of each discipline represented in the course. Student motivation and academic background permitting, a reading should be assigned about the role of each discipline—for example, as a particular theory or cluster of concepts—used in the course. The concepts or theory can be explained in lecture (instead of the relatively expensive discussion sections), and their use for this substantive topic can be elaborated and placed in the context of the discipline as a whole. Wherever possible, disciplinary perspectives should be presented by their adherents, whether through readings or lecture. The separate perspectives need to be made explicit in one way or another so that they can be examined by the students. Otherwise, we are asking students to reinvent the wheel, not to learn how to drive vehicles that have already been perfected. Readings must focus on the subtext while directly exploring the more general or abstract issues underlying the course.

How these different kinds of readings are ordered in the course is as much art as it is science. The trick is to anticipate the emerging understanding and interests of students. At what point will they see that they need to learn more about a discipline in order to understand why it advances its arguments? At what point will they recognize (even if the syllabus tells them as much) that the substantive topic is a specific embodiment of a more general issue that now has some interest for them in its own right? At what point will students be ready to pry into the foundation of assumptions upon which each discipline is constructed in order to find out why disciplines arrive at such contradictory conclusions about the same topic? The first time through, one can only guess. The second time provides a much better sense of the problems involved. The standard rule of thumb is that the third time through is the best. After that, faculty tend to get bored, and a new structure if not a new topic is often in order. When in doubt, one can assume that students will be ready for disciplinary insights as soon as their commonsense notions have been challenged and that they will be ready to dig into disciplinary assumptions as soon as two disciplines offer contradictory insights.

Designing Assignments

Evaluative assignments that promote the desired educational outcomes of interdisciplinary study tend to be relational, applied, novel, active, and often connected to self. Students need to learn facts and terms in interdisciplinary courses, and it may on occasion be necessary to use such traditional methods as short-answer questions, definitions, and even—am I saying this?—multiple-choice questions. However, the acquisition of facts is not an end in itself in an interdisciplinary course. Facts, terms, concepts, dates, and so forth are useful as raw material when connections are probed. More appropriate for most purposes, then, are paper topics, essay exams, in-class writing exercises, and discussion worksheets that ask students to decide what facts are relevant to the central task of making some connection, such as that between the insights of two authors, theories, ideologies, value systems, or cultures. At least some

assignments ought to ask students to apply course material to their own lives or to put themselves into the course material. For example, in a course on individual freedom in American society whose readings include Plato's *Apology* and *Crito* and Mill's *Essay on Liberty* but nothing on pornography, students could be asked to write an essay on the following topic: "You die of shock from reading this assignment and go to heaven, where you meet John Stuart Mill and Socrates. Engage in a discussion with them on the opposition to pornography in the contemporary women's movement." Students would have to figure out what position each author would take, why and how they would disagree, and where they themselves stood on the issue in the light of those arguments. Volunteers could locate articles on the contemporary debate for distribution in class. Students could even be encouraged to discuss how to answer the assignment among themselves as long as each student writes his or her own essay in his or her own words. While the immediate reaction might be fear, students can have fun with such an assignment, and it would help them to learn about Socrates and Mill, the women's movement, pornography, their own values, and ultimately freedom.

Not all valuable assignments need to be graded. Students can keep reflective journals in which they apply what interests them in the course. These journals can be graded quickly on a pass-fail basis or simply collected and returned. If faculty need a sampling of the journals and make occasional marginal comments, students feel that they are engaging in a dialogue, and little faculty time is invested. To give one illustration, students in a course on success in American society could be asked to keep a journal that chronicles how their views have changed between their first and final essays, both of which address the question, What is my personal view of success, and how do I hope to go about achieving it? The journal assignment could require students to document how each reading contributed to the shift in viewpoint.

Class participation in seminars can usefully be thought of in an interdisciplinary course as an assignment that has some of the burden of moral obligation. Students familiar only with disciplinary courses need to be informed that their role and hence their responsibilities are different in an interdisciplinary course. Because the teacher cannot be an expert, students cannot expect to sit passively at her or his feet. The teacher becomes a guide or coach, the students explorers or active players. Since class discussions become group explorations or team efforts, cooperation is valued over competition. Students hurt only themselves in a traditional disciplinary course when they do not come to class prepared. In an interdisciplinary course, they also hurt their classmates if they cannot contribute their unique insights. When student contributions are seen to be as valuable as faculty contributions, failure to contribute to class discussion becomes immoral—a matter of taking without giving. Consequently, some faculty grade students' class participation. Others find it difficult to make fine distinctions, especially for shy students. In such cases, gross distinctions in class participation can be used as a basis for raising or lowering borderline course grades at the end of a semester.

Two strategies are often used to get discussion started. One is to distribute discussion worksheets on each reading and have students fill them out before class. The other is to spend the first five to ten minutes of class time having students write freely on the topic of discussion for the day. Discussion worksheets afford more reflection. Free writing can help students to shift mental gears from what happened in the preceding period. The relative importance of these two advantages probably varies from semester to semester, depending on students' schedules, and it has to be determined empirically for each class.

In this computer age, it may be possible to require students to run their papers through a spell checker (which picks up most typos as well as spelling errors) before handing them in, which would help to reduce grading time. In order to ensure that students learn from feedback, have them staple their preceding paper to the back of the current one, and inform them that you will read the comments on the earlier paper before you grade the new one. You will tolerate new errors but not the repetition of old errors.

Group papers create a cooperative setting that forces students to confront and then take advantage of the relative strengths of team members. Moreover, students with relatively weak writing skills learn when they work on a computer with four other students while discussing how to structure the paper and word particular passages. Students can be asked to hand in their own individual evaluations of each team member's contribution, including their own. The student culture at any particular institution will determine whether these evaluations should be kept confidential and how they should be used. Unless teammates raise serious questions, the same grade is typically assigned to all team members. This kind of assignment works best in a residential setting. And although commuting students complain bitterly about such assignments, many still participate in them.

It is natural in an interdisciplinary course to ask students to pull the course together in a concluding assignment. However, you should first ask whether they have been adequately prepared for the task. Has class discussion been devoted to integration and synthesis or merely to comparison and contrast? Have students been assigned readings that attempt synthesis, or have readings only offered single perspectives? Have students been shown models of integration or techniques for integration, or have these responsibilities been ducked? General systems, Marxism, and structuralism are only a few of several ready-made models of integration. Pulling it all together is too difficult a task for students to undertake without some assistance. Since it is also the obvious concluding assignment, it behooves faculty to confront the integrative challenge in class.

Preparing the Syllabus

As already noted, making the logic of the structure of an interdisciplinary course apparent to students is a problem even in the best-designed courses. Since there is typically no authoritative textbook (and hence no preface,

annotated table of contents, introduction, and opening paragraph within each chapter) to lead students through the course and lay out how each individual section fits with the other, this burden falls primarily on the syllabus (although the message must be reinforced and particularized throughout the semester at the beginning of each lecture or seminar). Nor can the designers of interdisciplinary courses normally rely on a high-school-level course in the subject to orient students to the subject matter of an interdisciplinary course. As a result, course syllabi bear a special burden of explaining what courses are about and why that is of interest.

While some insights should dawn on students gradually as the course progresses, most students find an interdisciplinary course sufficiently confusing that faculty fears of giving away the punch line in the syllabus are simply unfounded. The more explicit the syllabus is about the nature of interdisciplinarity and the goals, objectives, and purposes of the course, the better. The syllabus also needs to spell out the subtext, the logic of the course structure, the disciplines included, and how they are used. Students may not understand these explanations at first, so you should encourage them to reread the syllabus periodically. By the end of the semester, they should have a pretty good idea (albeit in retrospect) of what the course was about.

Spelling out the reasoning underlying the course in some detail also has advantages for faculty. There is nothing like writing something down to clarify your thinking about it and nothing like trying to explain it to a novice to expose the flaws in your reasoning. Try using the syllabus as a developmental tool, drafting and then revising it as the course design takes shape instead of using it merely as a statement of what has been accomplished.

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