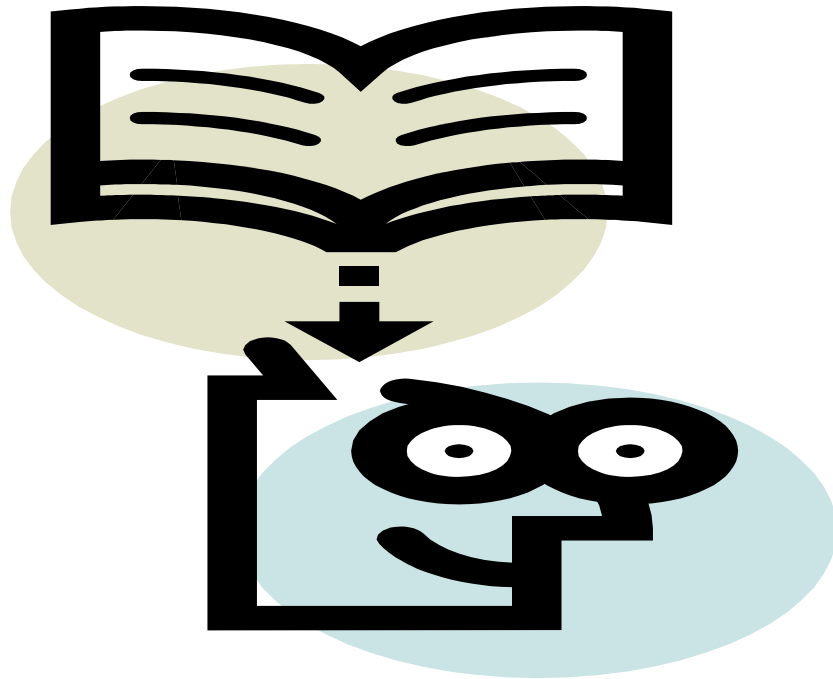


# *Designing and Teaching an Interdisciplinary Course*



## **RESOURCE MANUAL**

**Developed for “Teaching Outside the Lines” Workshop  
John Hope Franklin Humanities Institute  
Duke University**

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# *Interdisciplinary Terminology and Theory*

## *Terminology Relating to Interdisciplinarity*

### **Basic Terms**

A *discipline* is “perhaps best characterized as a socio-political organization which concentrates on a historically linked set of problems. . . . Disciplines are also distinguished from one another by the questions they ask about the world, by their perspective or world view, by the set of assumptions they employ, and by the methods which they use to build up a body of knowledge (facts, concepts, theories) around a certain subject matter” (Newell and Green).

*Adisciplinarity* posits the view that disciplines are fundamentally misguided and should be abandoned. Adisciplinary courses often address a general theme such as hunger or time, but there is no self-conscious discussions of disciplinary insights that contribute to understanding that theme.

*Transdisciplinarity* takes as an article of faith the underlying unity of all knowledge. This typically leads to a search for a superdiscipline (e.g., systems theory, Marxism). Transdisciplinary courses are often theoretical and are focused on creating a holistic understanding of the world, nature, or society.

*Multidisciplinarity* generally focuses on the separate contributions that selected disciplines make to a problem or issue. Multidisciplinary thinkers are not concerned with integrating disciplinary insights; they often arrange courses so that the separate disciplines are presented in serial fashion.

*Cross-disciplinary* inquiries usually entail one discipline having hegemony over the other in such a fashion that the second discipline becomes a passive object of study rather than an active system of thought. An example is the art department offering a course in art history or a physics professor describing the physics of music.

*Interdisciplinarity* pushes for the integration of the contributions of several disciplines to a problem or issue. It has been defined as a “process of answering a question, solving a problem, or addressing a topic that is too broad or complex to be dealt with adequately by a single discipline or profession. . . . IDS draws on disciplinary perspectives and integrates their insights through the construction of a more comprehensive perspective” (Klein and Newell). Interdisciplinary courses typically address a focused problem or question and incorporate disciplines self-consciously to advance an understanding of the problem or question.

*Narrow interdisciplinarity* involves interaction between disciplines with the same paradigms and methods. Thus disciplinary outputs can be easily integrated. There are few disciplines involved which simplifies communication. The representatives of the disciplines are located in the same organization and from the same culture.

*Broad interdisciplinarity* involves interaction between disciplines with different paradigms or methods. Many disciplines may be involved; and representatives from the disciplines may come from different organizations and cultures.



## **Other Definitions of Interdisciplinarity**

“Enterprise that requires more or less integration and even modification of the disciplinary contributions while the inquiry or teaching is proceeding” (Stember).

“The attempt to connect the explanatory approaches of the different [disciplines] with one another, with the goal of explaining a specific phenomenon in its totality” (Hubenthal).

“Integrative thinking means not just bringing together diverse data, diverse disciplinary perspectives in order to reach an overarching synthesis but also using and testing such a synthesis in relation to the more specific and concrete. . . Thus, the process and goal may also be . . . to break down a synthesis” (Seabury).

Interdisciplinary work “gets done by moving across the vertical plane of depth and the horizontal plane of breadth. Breadth connotes a comprehensive approach based in multiple variables and perspectives. Depth connotes competence in pertinent disciplinary, professional and interdisciplinary approaches. Synthesis connotes creation of an interdisciplinary outcome through a series of integrative actions” (Klein, *Crossing Boundaries*).

“In addition to seeking a full, self-consciously integrated understanding of the topic, what “interests us most is that which happens inside the [learner] . . .healing, creating new opportunities, building self-esteem, recognizing unsuspected abilities and interests, developing new views of the world and new commitment” (Wentworth and Davis).

Interdisciplinary teaching and learning “is concerned primarily with fostering . . .a sense of self-authorship and a situated, partial and perspectival notion of knowledge that [learners] can use to respond to complex questions, issues or problems. . . It is a complicated interpersonal, intrapersonal and cognitive process” (Haynes).



## ***Integrative Process***

(from Klein, J. T. *Interdisciplinarity: History, Theory and Practice*. Wayne State UP, 1990)

### **Basic Skills Interdisciplinary Must Develop:**

- differentiating
- comparing
- contrasting
- relating
- clarifying
- reconciling
- synthesizing

### **The Integrative Process**

Interdisciplinarity "is a process for achieving an integrative synthesis, a process that usually begins with a problem, a question, topic or issue. Individuals must work to overcome problems created by differences in disciplinary language and world view. Although there is no absolute linear progression, there are a number of different steps in the process." Below are Klein's suggested steps. Note that these steps represent a blend of theory and practice. Klein includes interpersonal issues relating to interdisciplinary teamwork into conceptual issues of interdisciplinary epistemology.

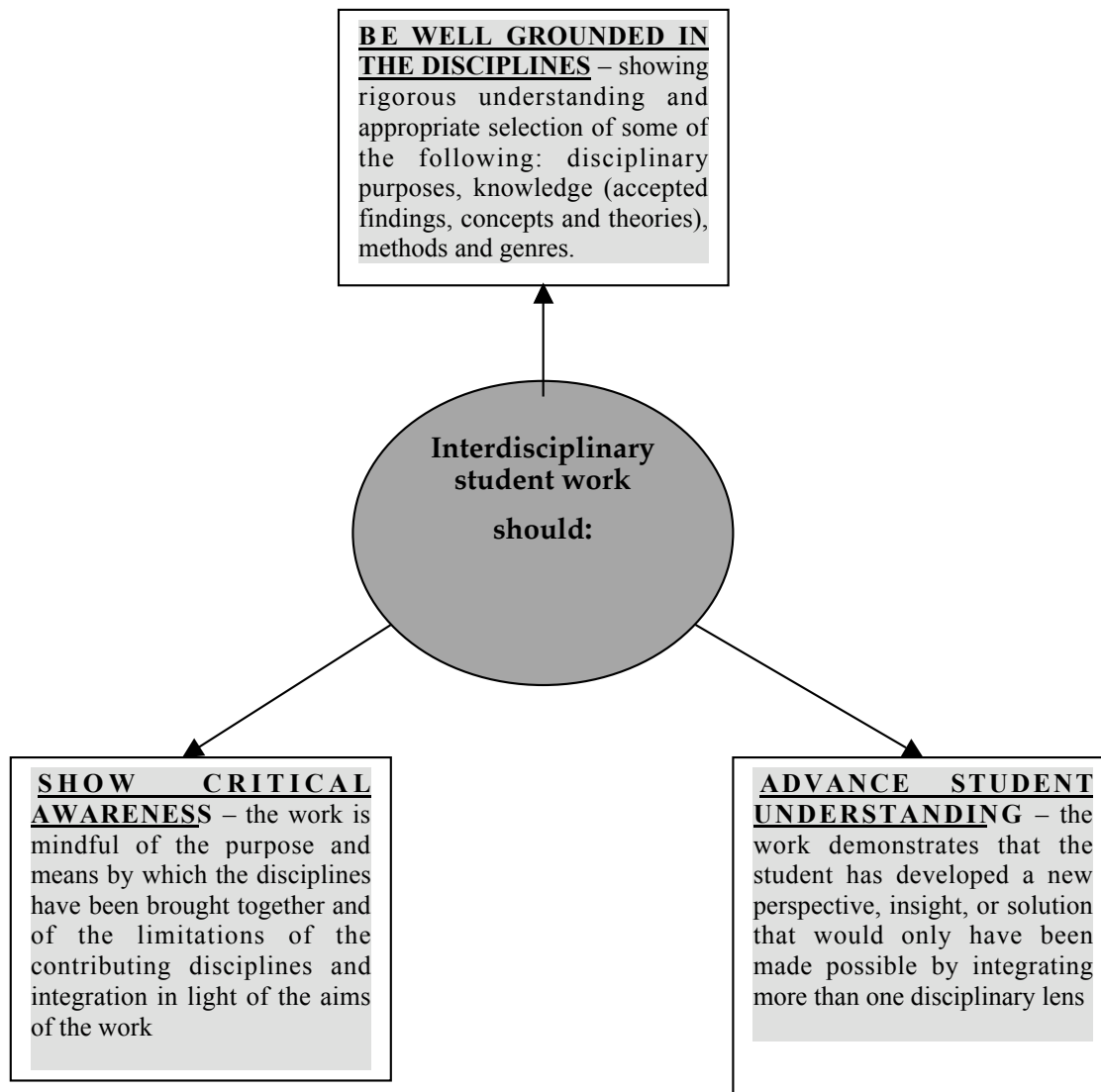
- 1a. *defining* the problem [question, topic, issue];
  - b. *determining* all knowledge needs, including appropriate disciplinary representatives and consultants, as well as relevant models, traditions and literatures;
  - c. *developing* an integrative framework and appropriate questions to be investigated;
- 2a. *specifying* particular studies to be undertaken;
  - b. *engaging* in "role negotiation" (in teamwork);
  - c. *gathering* all current knowledge and *searching* for new information;
  - d. *resolving* disciplinary conflicts by working toward a common vocabulary (and focusing on reciprocal learning in teamwork);
  - e. *building* and *maintaining* communication through integrative techniques;
- 3a. *collating* all contributions and evaluating their adequacy, relevancy and adaptability;
  - b. *integrating* the individual pieces to determine a pattern of mutual relatedness and relevancy;
  - c. *confirming* or *disconfirming* the proposed solution [answer]; and
  - d. *deciding* about future management or disposition of the task/project/patient/curriculum.



## ***Interdisciplinary Understanding***

[From V. Boix-Mansilla and L. Dawes. "Toward a Framework for Assessing Students' Interdisciplinary Work." Interdisciplinary Studies Project, Project Zero, Harvard University Graduate School of Education, Unpublished manuscript, 2004. Used with permission.]

Interdisciplinarity occurs when accepted knowledge and modes of thinking from established disciplines are integrated in such a way that new understandings are reached that could not have emerged from a single disciplinary perspectives. The resulting integration is a means to reach a purpose rather than an end in itself and disciplinary standards are upheld as leverage is gained from combining disciplinary lenses. Work should (1) be well grounded in the disciplines; (2) advance student understanding through the integration of more than one disciplinary lens; (3) show critical awareness of the purpose, means and limitations of the integration.





## ***Techniques of Interdisciplinary Integration***

[From W. Newell, *Transdisciplinarity Reconsidered*. In M. Somerville and D. Rapport (Eds.) *Transdisciplinarity: recreating integrated knowledge—advances in sustainable development*. Oxford, UK: EOLSS Publishers, 2000. 42-48.]

Integration is often considered to be the hallmark of interdisciplinary studies. But how do you teach students to integrate? Toward this end, Newell underscores the importance of helping students to replace dichotomous “either/or” assumptions with more inclusive “both/and” assumptions. And he has identified a number of specific strategies for accomplishing this goal:

- 1) *Redefining* terms from different disciplines to bring out a commonality. This technique can be used when two disciplines seem to talk past one another because they focus on different subjects. To do this, you can identify what subjects traditionally studied by different disciplines have in common and then redefine them as part of the same larger subject.
- 2) *Extending* the meaning of a concept or a range application of a concept. In this technique, concepts from one discipline are expanded to include the perspective of another discipline. For example, Kenneth Boulding extended the economic concept of “utility” to include the satisfaction of others as well as oneself (a perspective from psychology).
- 3) Creating a *continuum* of meaning along with concepts of different disciplines can be arrayed. This strategy is to link disciplines by placing on a continuum their conflicting assumptions that have some underlying common element.
- 4) Transforming opposing disciplinary axioms into a *continuous variable*. Newell suggests that this technique can solve the problem of reconciling disciplines separated by conflicting assumptions by transforming those assumptions into variables. For example, conflicting assumptions about the rationality or irrationality of humans can be resolved by changing a dichotomous assumption about rationality into a variable—that is, the degree of rationality. By transforming conflicting assumptions into variables, we push back assumptions and expand the scope of the theory.
- 5) *Rearranging sub-systems to bring out interrelationships*. Instead of redefining variables to bring out their commonalities, one can also explore a number of possible interactions that preserve the tension between them while eliminating their conflict. For example, one discipline can provide the context, boundary constraints or “envelope” for the other to operate in. Or sometimes, one discipline dominates or absorbs the other; insights from other disciplines are used to enhance the thinking of the dominating discipline. Or one discipline is used to study another as in the sociology of art. Finally, one can explore one discipline through applying the knowledge and strategies of another to its issues or problems.
- 6) Recognizing *joint dependent variables*. In this strategy, the “either/or” debates between two disciplines are replaced with a “both/and” perspective. For example, the rational, self-interest model of economics and the normative-affective model from sociology are typically seen as antithetical. However, they can be rethought as being fundamentally different, rather than oppositional. The economics model is rule-governed and intentionalist, while the sociological model is consequentialist.
- 7) *Reasoning by analogy or metaphor*—A metaphor can be created which helps to explain a concept and which combines insights from two or more disciplines—e.g., the study of music as a city and the study of city as music.



# *Interdisciplinary Course Design*

## **Guidelines for Planning an Interdisciplinary Course**

### IN THE COURSE PLANNING PROCESS

- Place a definition(s) of interdisciplinarity in front of faculty for discussion.
- Create a course topic that is integrative (i.e., can best be addressed through the lens of two or more disciplines). If the course is team-taught, make sure each faculty member's expertise is utilized.
- Identify what disciplinary perspectives will be central to the course.
- Have a team of faculty from different disciplines plan the course, even if the course will be individually taught (e.g., to discuss course focus, share readings, discuss pedagogy and assignments).

### IN COURSE DESIGN

- Let go of rigid adherence to "coverage."
- Develop a set of focusing questions or subthemes, defined so that more than one discipline can address them.
- Explore a limited set of key discipline-crossing concepts that will unify the course.
- Clarify key terms across disciplines.
- Clarify skills to be developed in the course: discipline specific and discipline crossing.
- Generate learning activities and a pedagogical approach(es) specifically designed toward building those skills.

### IN COURSE MATERIALS FOR STUDENTS

- Write explicitly in the syllabus, as well as discuss with students, in what ways the course will be interdisciplinary.
- Write explicitly in the syllabus, as well as discuss with students, how the course will help students toward the overarching goals of the program or their life-long learning skills.
- The course focus, organization, learning objectives, etc. may need to be spelled out more than in a disciplinary course.

### IN COURSE SESSIONS/ONLINE INTERACTIONS

- Make sure course sessions/activities explicitly draw on different disciplinary perspectives.
- Occasionally take a step back from the process and make the disciplinary "moves" visible.
- Model integration, and create ongoing activities that ask students to practice it.
- Invite guests representing different disciplinary perspectives on the course focus.
- Use diverse student expertise.

### IN ASSIGNMENTS

- Be sure to coach the process.
- When possible, provide models, such as dialogues among disciplinary viewpoints; double-entry notebooks or online discussion-board conversations; interviewing; projects which group students with diverse expertise

### IN ONGOING FACULTY DEVELOPMENT

- It helps to have a course coordinator or area coordinator, ideally with stipend.
- It helps to have ongoing communication among faculty within the course or area – lunches/dinners?
- It helps for faculty across disciplines sometimes to sit in on each other's courses.
- It helps to have summer workshops for faculty across disciplines teaching the same or related courses.



## ***Integrating Disciplinary Course Content***

[From J. Wentworth and J.R. Davis, "Enhancing Interdisciplinarity Through Team Teaching." *Innovations in Interdisciplinary Teaching*. Ed. C. Haynes. Westport, CT.: ACE/Oryx Press, 2002. 16-37.]

The key feature of an interdisciplinary course is the integration of disciplinary knowledge, skills or methods. An interdisciplinary course seems to work best when the interdisciplinary aspects of the course are made explicit to and discussed with the students. But what might be some of the interdisciplinary aspects that you want to make explicit? For example, are you trying for an explicit synthesis of disciplinary knowledge? Are you trying to teach processes? Are you trying to give the richest possible view of the topic, theme, or comparison? All of the above? To illustrate this aspect of the planning process, consider the problem of synthesis or integration.

In a sense, a topic, theme, or comparison that requires several disciplines to explicate adequately creates a new interdisciplinary "field" of inquiry. Since it is a new field, it may require creating metaphors, vocabulary, concepts, and principles that apply to the field. The new field might also invite "borrowing," i.e., taking a metaphor, concept, set of principles, research data, or the like from one discipline and applying it to another in hopes of enlarging, enriching, and/or clarifying one or both disciplines. However, all integrative methods are somewhat perilous. For example, Julie Klein has offered the following six problems that can arise when we borrow material from one discipline to apply in another:

- 1) distortion and misunderstanding of borrowed materials;
- 2) use of data, methods, concepts, and theories out of context;
- 3) use of borrowings out of favor in their original context . . .;
- 4) 'illusions of certainty' about phenomena treated with caution or skepticism in their original disciplines;
- 5) overreliance on one particular theory or perspective; and
- 6) tendency to dismiss contradictory tests, evidence, and explanations. (88)

Keeping these problems in mind will help you and the students work more productively together though "progress" may be slow; however, what does come together is likely to stay together! Furthermore, these problems help show why, even as interdisciplinarians, we are well off to heed evolutionary biologist and essayist Stephen Jay Gould's comment that "interdisciplinary unification represents a grand and worthy goal of intellectual life, but greater understanding can often be won by principled separation and mutual respect, based on clear definitions and distinctions among truly disparate processes, rather than by false unions forged with superficial similarities and papered over by a common terminology" (32). Yes, patience in the expectation of integration is far better than creating false connections, and genuine, carefully prepared integration is difficult. While borrowing isn't the only way integration takes place, it has, we hope, illustrated what you need to contend with in your own deliberations about content. What can you do to integrate content, if that is your explicit goal?

First, you can help students define a conceptual framework, such as a model, that integrates the disciplinary aspects of a course into a larger whole. An example would be a course on "Minority Women Writers" where the final task students worked on was attempting to create a model of self-identity that encompassed all the identity issues that the authors studied in the course had described. Another example would be a comparative cultures course, in which students would be asked to develop a model of culture that would embrace the variety of forms studied.

Synthesis could also be achieved by integrative action in an interdisciplinary group. For example, a group of students from different majors can select a problem, use everyone's expertise to get as broad and deep a

view of the problem as possible, generate a proposal for action, and either carry it out or present it to a body that has the power to carry it out. Many kinds of service learning courses or components have much to offer as integrative action when they are conceptualized, discussed, and analyzed as interdisciplinary.

Another possibility would be a creative integration of material digested from various sources. For example, a performance art class works with teachers from music, theatre, dance, art, and creative writing. Student syntheses consist of a variety of performances, which use and modify the various media at their disposal (requiring the development of new skills and a transformed aesthetic). Artistic responses to social problems can actually help solve those problems, and that is integration of a high order—though not what we usually think of as integration.

The term “meta-goals” refers to the larger learning outcomes that transcend immediate course objectives, and this concept is useful for thinking about the classroom aspect of content integration. For example, an interdisciplinary course focusing on non-Western cultures might have the meta-goal of giving students some experience of the more collective (less individualistic) nature of non-Western cultures. Thus, they might put students in shifting groups of three to do most of the assignments. Such a design will drive the students crazy, but they will learn to work together more effectively, and in the end, the meta-goal can be explained and discussed. A course on utopian communities might divide students into project groups to design their own ideal society but include the rule that all members of the group have to agree that s/he would be willing to live in that society. The rule would facilitate the meta-goal of an experience of reaching consensus— especially on values—a process that actually illustrates what utopia is all about. A course on life-span development might have as its meta-goal the cultivation of more student responsibility for learning, so as the course proceeds, the team may begin as lecturer/experts, then become discussion leaders, co-learners, and finish in the role of resources.

## **Guide to Interdisciplinary Syllabus Preparation**

[From Newell, W.H. (1996). "Guide to Interdisciplinary Syllabus Preparation."  
*Journal of General Education* 45(2).]

### **A. Relation to the Disciplines**

1. Is the course issue-based (e.g., societal problem, historical moment, text, geographical region, or key concept)? What question about the issue is the course designed to explore? What makes that question appropriate to interdisciplinary inquiry?
2. Is the issue focused enough? Are there few enough sub-issues, for instance, for students to develop an understanding of the various perspectives on the issue (and facility with the concepts, theories, and methods introduced)?
3. Are the perspectives of disciplines or schools of thought explicit? Are their respective contributions to the issue explicit?
4. How dominant is one discipline? Do the less-dominant disciplines provide more than subject matter?

### **B. Course Structure**

1. Is there a "hook" or "grabber" at the beginning that draws students into the issue, motivating them to learn about it, and that serves as a touchstone for course (e.g., movie, newspaper article)?
2. Is the structure of the course clear? Does the syllabus serve as a map of, or orientation to, the course? Do the tools, readings, and subtext for each week reinforce each other and advance the understanding of the issue?
3. Does the instructor have an explicit subtext (the 'real' educational agenda—e.g., exposure to disciplines, development of certain skills, values or sensitivities—of which the substantive topic is a particular embodiment)?
4. Is integration ongoing, or does it appear only at the end of the course?
5. Is the level of the course (introductory, more advanced, senior) consistent with the depth in which disciplinary perspectives are presented, the explicitness with which their assumptions are probed, the sophistication of the disciplinary tools and their use by students, the explicitness about interdisciplinary method, and the overall balance between breadth and depth?
6. Does more than one discipline contribute to the depth in the course?
7. If the course is multi-sectioned, is there a common syllabus and readings? Do faculty consult weekly to determine what should be discussed in sections? Are there common paper assignments and exams and explicit agreement on a common set of grading standards?
8. Have connections been explored to complementary pedagogies or concerns reflecting other institutional objectives such as collaborative learning, critical thinking, learning styles and stages, or multiculturalism?

### **C. Level of Integration Attempted**

1. *Multidisciplinary*
  - a. Do contributing faculty tend to work on their own separate parts of the course?
  - b. Do they tend to see the topic only from the perspective of their discipline?
  - c. Has their disciplinary perspective remained unaltered while developing the course?
  - d. Is the contact among disciplines limited to sharing data?
  - e. Is there not even a section at the course reserved for integration?
  - f. Are students expected to undertake any integration without faculty assistance?

- g. Are disciplinary methodologies and epistemologies unexamined and unstated?
2. *Cross-disciplinary*
- a. Is there a dominant-subordinate pattern to faculty interactions, where one faculty member tends to prevail?
  - b. Does the practice of one discipline become the subject matter of the other discipline?
  - c. Is there a conclusion resulting from new insights but no integration because only one disciplinary perspective is evident?
3. *Interdisciplinary*
- a. Do faculty tend to work together as much as alone?
  - b. Do they interact instead of merely working jointly?
  - c. Did the issue of the course shift as the course evolved?
  - d. Have faculty perspectives on that issue been altered in the process?
  - e. Is there a collaboration between students and faculty in forging a synthesis/integration?
  - f. Does the synthesis result in a larger, more holistic understanding of the issue? Has a new metaphor been created?
  - g. Have the perspective of each discipline and some of its key underlying assumptions been brought to light and made explicit?
  - h. Does the contact among disciplines include: reasoning by analogy from the data, theory, methods, or models of another discipline? Revising hypotheses or principles in light of evidence uncovered by another discipline? Redefining or extending definitions of key concepts from each discipline to form a common ground on which to integrate their insights? Replacing conflicting assumptions with new variables (e.g., assumptions that people are free or determined are replaced by looking at the extent of influence)?

# *Interdisciplinary Assignments*

## *Designing Integrative Assignments*

- Begin by considering what you want your students to learn. For interdisciplinary courses, goals might include comparing and contrasting disciplines, evaluating disciplinary knowledge, or combining disciplinary insights to solve a problem. Once the goals are identified, select assignments that both teach and test the learning you value most. Writing assignments generally assist students in exploration, analysis, argument, integration, and research. If you are interested in making sure that students understand key terms or facts, objective tests or quizzes might be a better form of assessment.
- Make the scheduling and sequencing of assignments support your course goals. Use "layered assignments" when your task is a complex one. For example, before assigning an integrative research project, you can ask students to complete an annotated bibliography which categories the sources by their different disciplinary perspectives. Also, make sure that the ordering of assignments reflects an increasing difficulty in tasks. For example, early assignments might be focused on gaining disciplinary expertise, while later ones might compare and contrast the disciplines.
- Ask yourself whether the workload you are planning for yourself and your students is reasonable, strategically planned, and sustainable. Are you challenging students enough? Are your assignment due dates scheduled at a feasible time for you and your students? Are there ways that you can use in-class time or students can use out-of-class time to reinforce key proficiencies so that you are not killing yourself grading papers and other work?
- Put all of your directions and guidelines clearly and comprehensively in writing. Give students a special handout for each assignment. Below are some possible items to include in your writing assignment prompts:
  - The purpose (to communicate their knowledge of a topic, to persuade, to simulate activities of a professional in a certain discipline, to combine or compare disciplinary perspectives);
  - The audience (you, their peers, experts in a certain field, a general audience, an interdisciplinary audience);
  - The genre, form or mode expected (lab report, research paper, performance type, oral presentation). Or if a hybrid or experimental form, mode, genre is expected, articulate that;
  - A clear articulation of the problem, topic or question(s) to be addressed as well as an indication of the disciplines involved;
  - The organizational plan and other needed forms of presentation (e.g., what typically comes first, in the middle, and toward the end? Are there subheadings, certain documentation styles or organizational formats expected?)
  - The evidence that counts (logic, quotations from experts, statistics, first-hand experience)
  - An explanation of how the student might go about investigating the topic and completing the assignment;
  - Your expectations regarding scope, depth, format, and length;
  - What sources or other resources you expect to be used;
  - The evaluation procedures and standards you will apply to the paper.

Make sure your assignment sheet is an appropriate length. Overly detailed and lengthy prompts can produce "cognitive overload"; assignments that consist of a single directive or only a couple of sentences are too short. One page is generally a good length. It is helpful to go over these directions in class and to seek student input in creating the evaluative criteria for assignments.

- Because interdisciplinary assignments are generally challenging for students, issue the assignment well in advance. Encourage students to consult each other about assignment ideas, visit a writing center, or approach you in office hours. Scheduling individual conferences with students or commenting on work-in-progress before the assignment is submitted for a grade can be an excellent way of ensuring that students are on the right track.
- Many times, students have never seen or studied interdisciplinary writing. Consequently, it is advisable to invite students to review and critique models of the type of assignment you are expecting them to complete. Discuss with them the codes, conventions, and assumptions of the disciplinary or interdisciplinary audience. You might want to put samples of model work on reserve in the library.
- Use or encourage peer groups so that students can motivate and educate each other. Workshopping drafts of student work (either in pairs, small groups, or as a whole class) or asking students to write critiques of each other's work-in-progress helps students to hone their critiquing abilities and to learn how to revise their own work. For interdisciplinary assignments, you might make sure that students with relevant disciplinary expertise are available to review pertinent interdisciplinary projects. (Caution: Peer review works best, if it is done regularly. Students must establish a comfortable and honest rapport with each other for the comments to be helpful.)
- Where possible, try to make your assignments approximate real communication situations, where the student communicates something to an audience who wants to learn more about it. (This is the reverse of the exam situation where you have set answers that students need to reproduce.) If possible, have students present their work to their intended audience (e.g., letter to the editor, proposal to a certain official, speech to peers).
- Because many students have never engaged in interdisciplinary work before, it will be important to discuss openly strategies for how to go about completing an assignment. One way to do this is to model this process yourself by completing one of your own assignments along with the students, and (if you have the courage) sharing the results with your students. Alternatively, talk honestly and openly about your own work habits, process, obstacles, and idiosyncrasies. Let them know through your example that interdisciplinary research is tough and idiosyncratic work. Point out that even accomplished interdisciplinary scholars seek help from others and must work through multiple drafts.

## ***Writing Assignments that Promote Integration***

*Note:* Many of these assignment ideas came from Marcia Bundy Seabury, "Writing in Interdisciplinary Courses: Coaching Integrative Thinking" *Innovations in Interdisciplinary Teaching*. Ed. Carolyn Haynes. Westport, CT: ACE/Oryx, 2002, 38-64.]

**Action-Reflection Assignments** begin with action (doing something new in relation to a course issue, topic or problem). Afterwards, students use course readings and discussions to reflect on what they have experienced. Example: Students visit a soup kitchen and apply theories about poverty to that experience.

**Reconstrual Assignments** invite students to reconstrue new material into their evolving understanding of the topic. Example: After reading Wordsworth and discussing their views of Romanticism, students view a variety of Romantic art and rethink their earlier understanding of the movement in light of these new works.

**Application of a Synthesis Assignments** ask students to apply a cross-disciplinary concept or method and apply it to a new setting or to new data. Example: Students apply Marxist theory to a piece of folk art or to the issue of pollution.

**Creation of a Product Embodying a Synthesis with Accompanying Comment**--Students take ideas learned in course readings, lectures and discussions and produce a creative work with written commentary that embodies those ideas. Example: After reading much scholarly work on acid rain, students create a play that conveys their understanding of the acid rain debate.

**Synthesis Paper**--After reading a variety of disciplinary sources on a topic, students communicate their holistic understanding of the topic. Example: After reading about the scientific, psychosocial, ethical and cultural aspects of AIDS, students conduct a public health campaign to teach others about AIDS.

**Zoom Lens/Wide-Angle Lens Assignments** guide students to look closely at a phenomenon using a particular disciplinary approach, then pull back and view what they have seen in relationship to other phenomena and/or disciplinary approaches. Example: Students closely analyze a poem about the ocean using standard literary techniques and then reflect on the larger ecological meaning of the poem. They then question whether the literary reading captured the full meaning of the poem.

**Playing with Metaphor Assignments** ask students not to build a concept by successive abstraction and generalization nor to move stepwise toward synthesis--but to play with figurative language and make discoveries. They try to come up with likenesses for a course concept, method or theme. Example: In a course on education, students write an essay in which they are asked to respond to the questions: What is a student like? What is a teacher like? They are coached to use metaphors from a range of disciplines.

**Translation Assignment** requires students to take work in one discipline and try it out in another. Example: After reading a short story, students might write about how it could be filmed or portrayed in a mural. Or perhaps give students the challenge of rewriting a highly technical paragraph or passage into prose that can be understood by anyone.

**Raising Questions Assignment** invites students to formulate good questions on a topic, theme, reading or experience. Students can be prompted to ask a range of different disciplinary questions on the topic at hand.

**Dialogue Assignment** asks student to create a dialogue with 1-3 speakers, each representing a different disciplinary viewpoint on a course topic.

**Double-Entry Notebooks.** For this assignment, students fold the facing pages of a notebook in half, creating four columns. Use one column for taking notes on a text or an idea. Use direct quotations, with citations. Use another column to make comments on the text and the original margin notes. This process can be extended by giving the notebooks to other students who add more entries in additional columns. You can invite students to take different disciplinary viewpoints on the quotations.

**Dream Writing** for problem solving asks students to concentrate hard on a specific idea before going to sleep. When they wake up, they should write down or audio-tape their ideas. Then discuss them in class and analyze the ways different disciplinary viewpoints are being incorporated (or not) into the dream. The dreams can be turned into narratives or essays or can be used as fodder for responding to any assignment.

**Imaginary History Assignments** asks students to imagine and put into words a future discovery or invention. Write a biography and history of the ideas of the imaginary inventor. What disciplines did he or she use? How did he or she make this breakthrough discovery?

**Place History Assignments** ask students to write about a place they know or are studying: a streetcorner, a business location, a river, a pond. Bring to it everything they know or can learn about that place, from its distant past to the most recent thing you know about it. Divide these facts into lines, like a poem, or write one big paragraph or essay of prose. Try to understand all of the metamorphoses it has undergone. Then, stop and analyze the different disciplinary angles that are incorporated into this history.

**Thirteen Ways Assignments** encourages students to write, in any writing form they choose, write 13 different ways of perceiving or approaching a specific course topic. The more specific—or even tiny—the approach, the better. Then ask students to identify which disciplines might use each approach.

**A History of One's Own Ideas Assignment** requires students to write a history of the development of ideas that relate to the course topic and that have influenced their understanding of that topic over time. Include diagrams, illustrations and other visual data. Ask students to note when other disciplines have influenced their understanding of the topic in question.

**Interview an Expert Assignment** asks students to interview a disciplinary or interdisciplinary expert on how they investigate a topic or come to understanding something. Share results. Then, as a class, compare the different ways of disciplinary knowing and understanding.

**Integrative Product Analysis Assignment** invites students to take an integrative text, image, journal, video or other product and analyze it for its contributions from various disciplines or its sites or levels of integration.

## ***Sequencing Writing Assignments to Advance Integration***

There are several benefits of sequencing writing assignments:

- Sequencing provides a sense of coherence for the course;
- It helps students see progress and purpose in their work rather than seeing the assignments as separate exercises;
- It encourages complexity and integration through sustained attention, revision, and consideration of multiple perspectives;
- It mirrors professional work in many professions.

The concept of sequencing writing assignments allows for a wide range of options in creating the assignment.

**Use the writing process itself.** In its simplest form, "sequencing an assignment" can mean establishing some sort of "official" check of the prewriting and drafting steps in the writing process. This step guarantees that students will not write the whole paper in one sitting and also gives students more time to let their ideas develop. This check might be something as informal as having students work on their prewriting or draft for a few minutes at the end of class. Or it might be something more formal such as collecting the prewriting or an outline and giving a few suggestions and comments.

**Submit drafts.** You might ask students to submit a first draft in order to receive your quick responses to its content, or have them submit written questions about the content and scope of their projects after they have completed their first draft.

**Establish small groups.** Set up small writing groups of three-five students from the class. Allow them to meet for a few minutes in class or have them arrange a meeting outside of class to comment constructively on each other's drafts. Providing the group with some guiding questions to consider can help to ensure that the feedback offered is helpful.

**Require consultations.** Have students consult with you, an upper-class or graduate student responsible for tutoring, or someone in the writing center about their prewriting and/or drafts. For interdisciplinary assignments, you might ask them to seek feedback from people with knowledge in the disciplines addressed in the paper.

**Explore a subject in increasingly complex ways.** A series of reading and writing assignments may be linked by the same subject matter or topic. Students encounter new disciplinary perspectives and competing ideas with each new reading, and thus must evaluate and balance various views and adopt a position that considers the various points of view.

**Change modes of discourse.** In this approach, students' assignments move from less complex to more complex modes of discourse (e.g., from expressive to analytic to argumentative; or from lab report to position paper to research article; or in an interdisciplinary course, from disciplinary forms of writing to comparison and contrast of disciplines to integrative assignments).

**Change audiences.** In this approach, students create drafts for different audiences, moving from personal to public (e.g., from self-reflection to an audience of peers to an audience of specialists) or from one disciplinary audience to another and finally to an interdisciplinary one. Each change would require different tasks and more extensive knowledge.

**Change perspective through time.** In this approach, students might write a statement of their understanding of a subject or issue at the beginning of a course and then return at the end of the semester to write an analysis of that original stance in the light of the experiences and knowledge gained from multiple disciplines presented in the course.

**Use a natural sequence.** A different approach to sequencing is to create a series of assignments culminating in a final writing project. For example, students could write a proposal requesting approval of a particular topic. The next assignment might be a progress report (or a series of progress reports), and the final assignment could be the report or document itself.

**Submit sections.** A variation of the previous approach is to have students submit various sections of their final document throughout the semester (e.g., their bibliography, review of the literature, methods section). If you are noticing that many students are not performing as well on major writing assignments as you would wish, try breaking down that assignment into its component parts. Between the time that an assignment is announced and the time that it is due in final form, help students undergo a series of activities and smaller assignments that prepares them to complete a larger, more complex assignment successfully.

# **Sample Assignment Sequence for an Interdisciplinary Course**

Course Topic: Family

## **Paper 1. Personal Narrative**

Take any family-related event, however trivial, that you still remember from your childhood. That you still remember it is one sign of its importance to you. In a paper of approximately two and a half pages, narrate and describe the event so that your readers - our class - come to feel and understand why it is or was important.

Narration aims not to tell us about an event but to give us the event. Description aims not to tell us about an object but to give us the object. Because your aim in both narration and description is to show rather than to tell, you will want to use specific details, especially sensory details that appeal to your reader's sense of taste, touch, sound, sight, and smell. Try to make your readers experience what you experienced.

### Evaluation Criteria:

a coherent and unified plot, sensory and concrete detail, a significant message or point, a vivid portrayal of the event, interesting characterizations, clear and lively prose style, interesting and fresh imagery, no clichés

### Learning Goals: The student will learn

- to differentiate between abstract and concrete description
- to identify and validate their own viewpoint and experience (breaks down the single authority model)
- to foster a relational classroom (through sharing these personal experiences)

## **Paper 2. Rhetorical and Disciplinary Analysis**

Select one of the articles about family in your course reader that sparked in you some strong interest. The more engaged you are with the article, the more powerful your writing will tend to be.

For this assignment, you will investigate how this article is constructed rhetorically and what it reveals about the discipline of its author. For example, if you select a historical article, your goal will be to understand better how this article is formulated and what specifically makes it a historical piece.

In order to accomplish these two interrelated tasks, you will need to consider the questions listed below. You may not answer all of these questions directly in your paper, but you should consider them carefully before writing it.

- What is the article's purpose? What is its thesis or main point?
- Who is the intended audience?
- How is the article organized? Why is it organized in that manner?
- What counts as evidence?
- What kind of language is used? What terms or expressions are commonly incorporated? Why are they important to the article's main point?
- What assumptions does the author hold (e.g., human beings are naturally good; society is slowly improving)?
- What biases does the author have (e.g., pro-capitalism, anti-American)?
- Of what discipline is the author?
- How would you define that discipline? What are its goals and purposes?
- How does the article's content and form support the author's discipline?
- What have you learned about the author's discipline from considering the article closely?

Now write a 3-page essay in which you analyze the article in terms of its form, content and discipline.

Evaluative Criteria:

good comprehension of article; significant understanding of the article's content, form and disciplinary framework; insightful analysis of the article; textual support of claims (paraphrasings and quotations); logical organization; unified argument; clear language

Learning Goals: The student will learn

- to understand the basics of close-textual/rhetorical analysis;
- to read an "expert's" text more carefully and critically (encourages students to think for themselves)
- to study a discipline-based text more self-consciously
- to begin differentiating between various components of an essay and to begin
- identifying what a disciplinary perspective is

### **Paper 3. Comparison-Contrast Essay**

In the past two weeks, we have read a number of articles addressing the disintegration of the nuclear family from three different disciplines: sociology, anthropology and psychology. Choose two articles from varying disciplines which you find interesting and which you believe could form an intriguing comparison and contrast.

For this assignment, you will compose a 4-5-page essay in which you compare and contrast the two articles' arguments and disciplinary perspectives. To get started, you may want to consider the following questions:

- How would you describe each article's rhetoric (e.g., its thesis and purpose; audience; organization; evidence; language; assumptions and biases)?
- How do the two articles' rhetoric compare? In what important ways are they similar?
- How do the two articles' rhetoric contrast? What are some significant differences?
- What does each article reveal about their authors' disciplinary perspectives?
- Is one disciplinary perspective preferable over the other? Is there a way in which the two perspectives can be combined to create a fuller understanding of the issue?

Evaluative Criteria:

insightful thesis; in-depth analysis; unified argument; demonstration of significant understanding of disciplinary differences; logical organization; supporting evidence; clear and lively prose

Learning Goals: The student will gain

- practice in comparing and contrasting
- exposure to divergent or contradictory views
- awareness that different views and perspectives can be equally valid (helps students to realize that knowledge is not always certain)
- practice in evaluation and analysis in addition to summary (promotes thinking over memorization)

### **Paper 4. Application**

The Bean family in Carolyn Chute's novel faces a number of serious obstacles and difficulties which threaten their survival and unity. Consider the sociological, psychological and anthropological articles we read two weeks ago. Using information (concepts, terms, ideas, facts) gleaned from at least two of the articles, write a 5-page essay that interprets why the Bean family is collapsing. Are there any possible solutions to the Bean family's problems? What message can we gain about the disintegration of the American family from the application of these social science articles onto this literary text?

Evaluative Criteria:

insightful thesis, unified argument; logical organization; appropriate and meaningful use of articles to interpret the novel; supporting evidence from the articles and novel; in-depth analysis or interpretation; significant message about the family; clear prose

Learning Goals: The student will learn

- to define a problem
- to relate one discipline to another in order to respond to a real-life problem
- to determine and use several different disciplinary concepts and terms to interpret a literary text
- to perform literary interpretation and textual analysis (to develop his or her own thought)

## **Paper 5. Proposal** (includes three parts: two drafts and a peer review)

### **PART I: FIRST VERSION**

Early in the semester, you selected a specific problem confronting the contemporary American family to research. For this assignment, you will use information gained from a variety of disciplinary sources to explain and analyze the problem and to propose a viable solution to it. The assignment calls for a number of steps:

1. Select at least 3 or 4 sources (articles, books) on your topic from your library search. Make sure that the sources come from at least two different disciplines.
2. Using those sources, define the problem that you have identified. (Because you are drawing from a variety of disciplines, you may initially have several definitions. Decide which one you will follow, or how you will combine several definitions to create one of your own.)
3. Using your sources, identify possible causes of and solutions to the problem.
4. Compare and contrast the causes and solutions presented in your sources.
5. Evaluate your findings. With which points do you agree or disagree?
6. Identify an audience who can act on your proposal or who can persuade that person or agency to act on your proposal.
7. Write a six to seven-page proposal (addressed to your chosen audience) in which you identify the problem and its causes, integrate relevant source material and discuss the solutions and their implications. Use the proper proposal format and documentation.
8. Exchange the draft of the proposal with a peer. Make sure the proposal is your best work.

### **PART II: PEER REVIEW**

Write a one-page review of your peer's proposal. Please provide your peer with honest, tactful and specific feedback. Cover larger concerns such as organization and logic before you begin to address minor ones, such as spelling or diction. Avoid vague statements such as "This paragraph is awkward." Instead, attempt to pinpoint the precise problem or the exact place where you think the wording becomes unclear or confusing. Here are some questions which you may consider before composing the review:

- Is your interest sparked and maintained throughout the proposal? At what point does your interest wane?
- Are the argument and language appropriate for the intended audience?
- Has meaningful and appropriate research been done? Are there some questions that still need to be answered?
- Are the sources incorporated smoothly and purposefully? Or, do they seem "tacked on"?
- Is the proposal organized logically? Does one point seem to move smoothly to the next?
- Is the thesis insightful? Is it too obvious?
- Does the author follow the proper proposal format?
- Are the sources cited with correct documentation procedures?
- Is the prose clear and engaging?

Return the proposal and your typed response to the author. Each author should submit to their instructor the first version and the peer review with the final revised proposal.

### **PART III: FINAL VERSION**

Re-read your proposal and your peer's review of it carefully. Put on your most critical and thoughtful mindset; and consider deeply what changes you should make to your proposal in order to make it the most persuasive and powerfully written paper that you have ever created. Then revise your paper at least once (but hopefully twice) basing the changes on those comments you feel are valid. Remember the most important revisions are often the ones that are the most substantive and that consequently require the most time and thought. Minor revisions which improve only spelling or word choice are not likely to improve the quality of the paper significantly. Submit all three portions of the assignment (the first version, the peer review and the final, revised version) to your instructor.

#### Evaluation Criteria:

selection of an interesting and pertinent problem related to the contemporary American family; thoughtful and in-depth research; appropriate use of research; insightful analysis of the problem; supporting evidence; logical organization; viable and creative proposed solution(s) to the problem; clear language; proper documentation of sources

#### Learning Goals: The student will have the opportunity

- to define and respond to a real-life problem of their own choosing
- to determine relevant and appropriate sources from a variety of disciplines
- to collate diverse ideas and confront contradictory views
- to assume the position of the "expert"
- to take into account the ethics of the problem and solution
- to become more self-conscious about their writing and thinking process
- to integrate information drawn from at least two disciplines
- to become involved in peer collaboration and establish a shared community of learning

### **Paper 6. Final Self-Evaluation**

For this assignment, you will compose a 5-6 page personal essay which explores the way in which your view of family and of interdisciplinary studies has developed over the semester. In other words, make sure that this essay discusses the way in which your knowledge of the course topic has expanded, been altered or been reinforced and the way in which your understanding of interdisciplinary learning has evolved. Integrate course reading material (through quotations and paraphrasing) when relevant and appropriate. Since this is a personal essay, you may use the first-person pronoun judiciously and incorporate relevant anecdotes and personal experience to support your claims.

#### Evaluative Criteria:

a significant thesis or controlling idea; a unified argument; a demonstration of significant knowledge of the course topic and course materials; supporting evidence (quotations, paraphrasing, anecdotes, exemplifications); a logical organization; a demonstration of a conscious awareness of interdisciplinary learning; clear and lively prose.

#### Learning Goals: The student will have the opportunity

- to utilize the personal voice and incorporate personal experience to support an argument
- to engage in self-reflection and self-evaluation (to be treated as an equal)
- to become more self-conscious of his or her writing and learning process
- to gain awareness of what constitutes interdisciplinary studies

# *Interdisciplinary Pedagogy*

## **Integrative Seminar Activities**

**Laundry List-** Initiate a class by asking students to nominate topics (related to the reading) for discussion. Then go over the list as a group. Combine items, categorize by discipline, prioritize, and then discuss.

**Brainstorming** is a powerful structure for opening the doors to creativity and problem solving for a group. It demonstrates the power of synergy.

- Create teams of four or five students. Fewer than four limits the flow of ideas; more than five limits the amount of interaction on a team. Select a topic for the class to brainstorm; the topic can be anything involving creative thinking and multiple alternatives.
- Assign roles to ensure full participation of each student (e.g., the scribe who combines and records all ideas; the timekeeper who encourages the team to stay on schedule and create more ideas; the encourager who makes sure everyone is participating and gives encouragement; the wild idea person who comes up with and encourages off-the-wall thoughts). Or you can ask different members of each group to represent different disciplinary viewpoints.
- Give students only 5-7 minutes to brainstorm. Too much time allows them to go off task. Stress that they need to move quickly, suspend judgment (all ideas are OK at this stage), be innovative and be willing to combine ideas.
- Have teams share results.

**Small Group Learning** - Give each group a different question to ponder or a different passage to paraphrase and analyze. Another variation is to assign them a certain disciplinary viewpoint on a specific issue, have them talk it out, and generate supporting points. Groups then reconvene with other groups and hold a large discussion with group members remaining loyal to their assigned viewpoint. After awhile, students can "shed" their viewpoints and discuss which perspectives were most convincing and why.

**Role-playing or Simulation** - Have students pretend they are various figures from the different disciplinary readings. You can have figures meet in a simulated situation (debate, event, speech), and before dramatizing the situation, students can prepare a mini-script or notes.

**Change Your Mind Debate** - Assign students a certain disciplinary position to adopt on an issue. Have students with different disciplinary positions divide into different areas of the room. Begin debating. When a student changes his/her mind on that issue, s/he can move to the appropriate place in the room. If a student comes to think an interdisciplinary perspective is more appropriate, he or she can move to the middle of the room.

**Concentric Circle** - Divide the class into inner and outer circles. The members of the inner circle begin a discussion on a controversial issue. The outer circle members observe. When an outer member feels she or he has something to add to the discussion, s/he can tap an inner member's shoulder which signals that the two will exchange places. The only rule is that an outer member can only tap an inner member's shoulder who has spoken already. For another variation on the concentric circle, have the inner circle conduct a discussion while the outer circle takes notes on discussion, paying attention to the different disciplinary angles incorporated or to the different moments of integration. A final variation on the concentric circle is as follows:

- Have the students form two concentric circles, one inside the other. The outside circle faces in, the inside circle faces out. Each student faces a partner. If you have an uneven number of students, have the extra student become a "twin" with one student.
- Now that each student is facing another student, they share information or survey each other on a course-related topic.
- After sharing, have each student in the outside circle move one person to the right to a new partner and repeat.

**Student-Led Discussions** - Have students write or bring in thoughtful, open-ended questions on the reading(s) of the day; base your large-group discussion on those questions. Or assign a student or several students to lead the section's discussion. The latter idea works best when student discussion-leaders are provided guidelines for what makes a successful discussion. Be sure to help them to find ways to move their discussion toward integration.

**In-Class Writing Prompts** - Before beginning the large-group discussion for the day, have students spend five to ten minutes doing a focused freewriting on the day's reading. You can also use these free-writes to encourage students to reflect on how disciplines shape knowledge or on different strategies for integration that they see in the course readings or material. Use those bits of writing as the basis for your discussion. You can also offer three or four questions or prompts from which students can choose.

**Round-Table Discussions** - Begin by asking a broad question or presenting a complex passage; have each student respond (moving systematically around the room). This format works particularly well when you begin with a question or passage which students can then relate to their own experiences or disciplinary backgrounds.

**Quotation Sheet Discussions** - Write out eight to ten of the most provocative passages in the day's reading. Have students divide into pairs or groups of three and paraphrase, analyze, evaluate and relate their selected passage to current events, various disciplines, their own experiences or other course readings. Then have the class reconvene and share their findings.

**Meta-discussions** - Every few weeks, allow students some time to discuss (in a constructive manner) their opinions and feelings about the course. Are they feeling overwhelmed by having to learn two or more disciplines? Do they think one discipline is dominating the others? This strategy will enable students to give voice to their views, and it may provide you with some new ideas on how to facilitate section meetings and on how to frame and evaluate future assignments.

**Flypaper Lists** - This exercise encourages students to think associationally and to generate new interpretations about a certain concept, issue, problem or text.

- Distribute a long, slender sheet of paper to each student. Each sheet of paper should have the name of the concept, issue, etc. on the top of the column.
- Ask students to write down the column a list of words as quickly as they can. The words should have some association with the character written at the top. Encourage them to be as wild in their word choices as possible. Compare lists, and discuss. Did this free-association exercise cause you to think in new ways?

**Visuals** - Ask students (in pairs or individually) to create a map, diagram, or series of visual images which illustrate what they see as the major structure or points of a text or series of texts. Tell them that the visuals do not have to be artistically appealing, but they must be thoughtful. Discuss, compare and contrast the visuals. How are the different disciplines represented in the visuals?

**Course Maps** - This activity provides a valuable opportunity for students to review and synthesize course materials mid-way through a term.

- Divide class into small groups. Pass out large sheets of "flip chart" paper and four colored markers (red, green, blue, black) to each group. Each color represents one of the disciplines involved in the course. The black marker represents points of integration.
- Invite each group to create a "map" of the first half of the course. Imagine that their audience is an incoming student to the course who needs to know what she or he has missed. Thus, their maps must be informative and clear. What kind of landmarks, signposts or directions would you indicate? Which disciplines are used most, and why?

**Comparison and Contrast Lists** - This activity can serve as a fruitful way of generating ideas for analytical essays.

- Divide class into pairs. Each team lists things the two concepts, texts, issues, disciplines, schools of thought, etc. have in common and things that are different between the two items. One partner writes down the similarities; the other writes the differences.
- All of the partners with the lists of similarities get together and share their findings. They assemble a master list, putting items in order of importance, on a large sheet of paper. Partners with lists of differences do the same.
- Hang the lists on the wall, and discuss the similar and different priorities demonstrated on each list.

**Tableaux Exercise** - This activity can serve as a good "ice-breaker" for a course and can demonstrate to students the power of visual communication as well as the ability to take differing but valid perspectives on an issue.

- Locate several terms that are integral to the course's topic and are difficult to define precisely.
- Divide the class into groups of four or five. Give each group one of the words written on a slip of paper. Select one of the most controversial words, and give that word to two different groups, so that students will create two versions of it. Ask each group to generate a "tableau" or static visual image representing that word.
- Have each group show the other students their tableau. Those watching should try to read the image by offering a concrete description of it. Then they should offer guesses. Discuss and compare tableaux.

**Close-Textual Analysis** - This may be a traditional literary activity but it still serves a useful purpose in encouraging students to examine the meaning of each sentence, phrase and word.

Divide class into small groups. Assign one short passage to each group (the shorter, the better -- then students will be forced to delve into each word). Ask them to consider the following:

- Name as many themes, subthemes, issues or problems that this passage brings forward in your mind. Be as liberal in your views as possible.
- Circle any words which seem unusual, confusing or compelling to you. What makes them that way? What images does each word conjure up for you? What do you typically associate with that word? How might that association impact the meaning of the passage?
- Underline any images (metaphors, similes, concrete visuals). Why do you think the comparison is being made between these two terms? How does the comparison alter your view of the first term? Of the second term?
- What are some of the possible meanings or messages underlying the passage? How does this passage function in light of the entire text? How does the surface meaning relate to or differ from the more "hidden" or subtle meanings?

**Guessing Game** - This exercise helps students to review course readings and to make unusual connections between different people's viewpoints.

- Invite 6-7 students to become "interviewees." Each interviewee should be given a different person's name (from the course readings) on a slip of paper. They will assume that person's point of view.
- The rest of the class should work together to generate a series of interview questions which will help them identify the identity of the interviewees. The questions must deal with course themes, issues and problems. Conduct the interview. Have the class guess the identities of the characters. Discuss.

**Community Circle** is an excellent structure for allowing each student to speak. Some Native American tribes have had similar traditions of passing a talking stick. All attention is given to the person with the stick.

- Have students sit in a circle facing the middle. Explain the rules: (1) Talk only when you have the stick; (2) use only affirmations; no put-downs; (3) pass if you do not wish to speak; (4) listen actively.
- Post a starter sentence on the board or overhead. Example: "The section of today's reading which appealed to me the most was . . . ." Teacher should model and pass the stick.

**Line-Ups** can be used as the basis for forming short-term groups and to teach concepts.

- Tell students what it is you want them to line up for. Tell them where the two ends of the line will be and what each end represents. Once you've given students the dimension they are lining up for, show them how to line-up. Actually move to the different places on the line, to model different responses.
- Have students line up by how strongly they agree or disagree with a statement. The students who believe strongly will line-up at one end of the room; those who strongly oppose the position will line-up towards the other end of the line.
- Have students discuss the reasons for their choices. Or, fold the line-up so that they can interact with someone at an opposite end. This is done by having the student who agrees the strongest walk to the other end of the line, while each person behind the agree person follows. When the student who agrees the strongest is across from the strongest disagree student, they become partners. Students continue to pair up as the line folds. Students discuss and paraphrase their partners point of view.

**Pairs** is simply having students pair up to work as directed. It might be used to discuss information from a lecture; or you might direct the students to pair-up and work on an assignment or discussion question. It's usually best to prearrange the pairs if you want the students to move into pairs and begin working quickly. If you are pairing for the first time, either pair up students sitting next to each other or have them move to assigned partners.

- Give directions for a task. While pairs are working, the teacher should monitor their progress. Answer questions only if both members of the pair ask. This gives the message that pairs must work together.
- Ask for feedback from the pairs. This holds them accountable for being on task. This feedback could be asking randomly selected pairs to respond to a question. If the question calls for a short response, have pairs write the answer down and share.

**Roundrobin/Roundtable** are two of the most frequently used cooperative structures. They both involve students in teams taking turns in order. Roundrobin is verbal, and Roundtable is written.

- In Roundrobin, make sure the information the students share is general knowledge. It is designed to move quickly, so it should not be used for difficult concepts. For example, you can have students move around the room and share an immediate reaction to a reading or pose a question they have. The important point is that everyone is sharing in order. An extremely verbal student cannot monopolize.

- In Roundtable, teams of four or five are sitting together with one sheet of paper and a pencil between them. The students are given a problem or a question to answer or a sentence to complete. Students take turns writing their answer as the sheet of paper and pencil are passed around the team. Sometimes Roundtable can be used for a simple concept, such as when students add items to a Venn diagram.

**Synectics** is a procedure for bringing together elements which do not seem to belong together. It is designed to make the familiar strange and the strange familiar. It is usually conducted in a group with the following steps:

- Group leader describes the problem to be solved;
- Group members spontaneously offer key words which reduce the problem to its basic elements;
- The group leader tries to find abstract definitions of the problem, using only a few of these key words;
- The participants suggest analogies to be found in everyday life, in nature, in industry, in technology, in other disciplines, and so on; and
- Participants imagine that they are a living example of the analogy mentioned in the previous step, and picture how they would feel in the situation in question.

**Three-Step Interview** allows students to interview one another in pairs on a topic, and then paraphrase the results of the interview to their teammates.

- Students begin in pairs. In each pair, one student is an interviewer and the other is an interviewee. Discuss and model what happens in a good interview (asking open-ended questions, showing you are listening, asking for details).
- After one person in the pair finished interviewing the other, the two switch roles; the person who was the interviewee becomes the interviewer.
- In roundrobin style, students then paraphrase what they learned in their interviews.



## ***Team Teaching in Interdisciplinary Courses***

[From J. Wentworth and J.R. Davis, "Enhancing Interdisciplinarity Through Team Teaching." *Innovations in Interdisciplinary Teaching*. Ed. C. Haynes. Westport, CT.: ACE/Oryx Press, 2002. 16-37.]

### **General Guidelines**

1. **Select faculty with appropriate characteristics.** Faculty who are willing to listen, learn, and change will make some aspects of team teaching much easier. Klein adds the following list of characteristics that have been found to promote interdisciplinary inquiry: "reliability, flexibility, patience, resilience, sensitivity to others, risk-taking, a thick skin, and a preference for diversity and new social roles."
2. **Confront personality differences.** The opportunity to get to know each other as people is crucial. Storytelling, gathering socially, meeting in a variety of configurations and settings to discuss topics other than the course all help, but the interdisciplinary team needs members who are willing to recognize and deal with personality differences.
3. **Work on overcoming expertise.** As faculty, we are trained to be experts--specialists in some domain. That domain is our turf, and we have been taught to respect (and tread lightly upon) the turf of others. We know the rules and boundaries. In the collaboration that is required of a teaching team, however, the participants must loosen the boundaries, break the rules, dare to venture onto another's turf, and become welcoming tour guides for their own turf. The boundaries are subtle, and the new ground is often unfamiliar territory. Academics often have stereotypes of people in other disciplines. A useful approach to overcoming expertise is to have some frank discussions among team members about how they do their work with the explicit, shared goal of becoming aware of differences and appreciating commonalities. The most important expertise any faculty member brings to an interdisciplinary course is not their expertise as a subject matter specialist but as an expert perpetual learner.
4. **Try to overcome status.** Clearly, to be interdisciplinary, team members must be willing to suspend any sense of the superiority of their own discipline's principles, methods, goals, and subject matter even though that sense is so often validated by one's immediate colleagues and one's own experience. If suspension of superiority can be accomplished, the team can begin to move toward the fullness and integration that characterize interdisciplinarity. Some members of the team may hold tenure and higher rank and may be well known scholars, while others are new assistant professors or adjunct faculty. Some members of the team may be more popular, more humorous, more approachable, or more interesting. Some may be males and some females, and unconscious patriarchal attitudes and practices are no less damaging for being unconscious. All these differences are possible sources of stress and should be acknowledged in the team-building process.
5. **Be aware of student game-playing.** Students are quick to spot differences among team members and sometimes will "play games" that exploit those differences. A team that works well together acknowledges and discusses differences and will be more likely to spot the games and refuse to play. For example, sometimes students exploit the gender differences on the team and treat faculty according to traditional gender roles. Another game is used by students to scapegoat the teacher with perceived weaknesses by appealing to the other teacher's need to feel appreciated. Another game pits one teacher against another and draws out perceived latent hostilities or expressed differences. Game playing is a threat to the cohesiveness of the team and needs to be addressed by discussing it within the team and exposing it to the students for what it is.



## Classroom Roles for Team Teachers

Even teams that function well in planning a course and integrating the content are sometimes puzzled about what to do when they enter the classroom. They frequently divide up the teaching task, assigning themselves to certain classes or units, thus engaging in what might be called serial teaching rather than integrated teaching. They teach what they have always taught, in the way they have always taught it. Sometimes they even choose not to attend the class when they have no major responsibility; and when they do attend, they are not quite sure what they are supposed to do. What can be more awkward than sitting in a class, wanting to contribute, but not knowing how?

Below are ten specific roles a teacher, who is not “presenting,” can play as part of a team to bring about greater collaboration in the classroom and more nearly approximate a process we would call integrated teaching:

1. Model Learner. A simple role for a non-presenting faculty member is to become a model learner, that is, to show students how to learn by the way you, as a teacher, learn. Being a model learner includes respecting the presenter by having read all assignments on time, doing extra research or reading, taking notes on assignments and presentations, asking questions in a respectful way, offering alternative ideas or interpretations for genuine discussion, listening carefully to the presenter and students, and accepting guidance from the presenter. A model learner does not dominate or engage in an exclusive dialogue with the presenter, play “one-upmanship” games, or rely on technical vocabulary or teacherly authority to maintain his or her position. The model learner’s questions and contributions can also show the multi-dimensionality of the topic. If, instead, all teachers in the team do their best to maintain their status as “experts” in their field and resist learning the other teachers’ fields, little integration will take place--either in the teachers’ conception of the course or in the minds of the students; and instead of fullness, the students will see fragmentation.
2. Observer. In a team, the presenter is free to concentrate on content while a non-presenting teacher can simply observe the process, keep track of time, note communication patterns, and offer a rundown of the process elements to the presenter after class so that the process can be improved. For example, the observing teacher can note non-participating students so ways can be found to include them in the next class, identify any gender biases or preferences that show up in the presenting teacher’s routine, observe how much silence the presenter allows after asking a question, or describe when and possibly why the students get restless during a particular activity. All these observations offered in a constructive way can lead to better teaching, and that reward bonds the team further.
3. Co-Lecturer. When a class calls for a presentation, explanation, or formal lecture, team members may wish to join forces in a co-lecture or dialogue. The subject in an interdisciplinary course often involves differing perspectives, and what better way is there to represent these viewpoints than by having faculty present them in the same class period? Sometimes the perspectives represent complementary viewpoints, but at other times differences run deep and provoke intense discussion. The psychologist on the team, for example, may suggest that sociologists are so caught up in the importance of social trends that they fail to account for individual differences, whereas the sociologist will point out that what psychologists assume to be individual differences are really part of larger social trends. This kind of disagreement is not easily resolved, but it is the very essence of interdisciplinary dialogue with the hope of a rich, both/and synthesis.

4. Panel Member. Sometimes a subject involves multiple viewpoints or levels of expertise, and a panel may be appropriate. The panel may consist of three or more team members, in which case the panel could discuss integrated concepts and processes related to the topic at hand. The panel may also be made up of selected team members and certain invited guests who will do best by having talked beforehand about interdisciplinarity in terms of process, fullness, and integration. In a course designed to help students work with children having special needs, it might be valuable to assemble a panel consisting of a school psychologist, social worker, pediatrician, teacher, and special educator to discuss what they do and how they work as a team. In this case, one of the regular members of the teaching team may play a critical role as moderator of the panel.
5. Discussion Leader. Many team-taught courses have arrangements for breakout groups, sometimes providing interesting opportunities for inquiry not always available in a larger class. If you use breakout groups, you may feel uncomfortable when the material under consideration raises a question for which you have no authoritative answer. However, this provides an opportunity to facilitate genuine inquiry. Your role shifts from expert about the topic to expert about the process of inquiry. Let's say the task is to provide interpretations of an assigned short story. Whatever your own discipline, you can bring it to bear on a story. This will broaden the students' view; and if you have prepared with the literature person on the team, you will be able to work at some level on the literary aspects of the problem and demonstrate respect for the material and the applicability of multiple perspectives.
6. Co-Discussion Leader. Sometimes a discussion is best with the entire class assembled. If so, the discussion can be led by more than one facilitator, each bringing his or her unique questions to the inquiry. For example, in an interdisciplinary course on ethics and values, one might wish to debate the feasibility of bringing a controversial speaker, such as a neo-Nazi, to the campus. The request raises the value of free speech, but also the university's commitment to protection of minorities from harassment and discrimination. As co-discussion leader, it may be your assigned role to ask questions and push for recommendations on one side of this dilemma, whereas your colleague may be assigned the task of seeing that the other set of values is not ignored. If the discussion generates a clear question, we suggest having students argue the side they do not believe so they can practice listening, stating the values inherent on each side, and then trying to find solutions that preserve some values from both sides (in this case, free speech and respect for diversity).
7. Case Co-Facilitator. Problem-solving and decision-making skills are often cultivated through cases. Cases are usually already multi-dimensional and often require interdisciplinary perspectives. A business case about service quality improvement, for example, may require perspectives from management, marketing, and accounting, but a psychologist and an attorney might add interesting dimensions. Having more than one facilitator or a team of facilitators available increases the likelihood that more levels of the case will get explored and in more depth. Co-facilitators may take turns, focusing first on one aspect of the case and then another, or they may work in tandem, responding spontaneously to issues that students generate about the case.
8. Group Facilitator. Group processes are often used for exploring opinions, attitudes and beliefs--what educators call the affective domain, but which might more simply be called matters of the heart. Sometimes a team-taught class can be broken into smaller groups with each member of the team taking on the role of group facilitator. A class session on right-to-life issues might begin with a carefully facilitated exploration of how participants feel about such issues and how their attitudes may have developed, or students can be led in storytelling about right-to-life incidents known to them. Having one team member to facilitate each group has its advantages for such a

topic. At other times, the class may be divided into even smaller “leaderless” groups, where the instructors for the course design group instruments, compose the groups, and keep an eye on the process but neither facilitate the groups nor appoint leaders.

9. Gadfly. In some instances, one team member may be assigned or take on the special role of gadfly. The gadfly has license to poke fun, raise irreverent questions, or suggest unthinkable outcomes--all for the purpose of moving the activity at hand along in a more creative and confrontational way. Socrates was perhaps the Western gadfly prototype, but there are also precedents in Shakespeare’s fools and the "clowns" of the Hopi tradition who question ritual behavior and unexamined assumptions. This irreverent role for a teacher, though potentially useful, is also risky; it needs to be discussed carefully by members new to a team, but can be done more spontaneously with old friends once everyone knows what is intended.
10. Resource. One goal of any class can be to empower students--that is, to return students to an awareness of their power. As mentioned in our discussion of meta-goals, a teaching team can slowly offer and expect more responsibility from students so that both student and teacher roles change during the course. The teachers can go from authority to guide to model learner to resource. As resource, they would only answer questions of a certain type or suggest where answers could be found but would not provide substance, structure, or judgment. Sometimes it is useful just to have an extra hand available as a roving resource. One teacher is able to stand by, troubleshoot, and respond to the unexpected, while other members of the team are busy with their agreed-upon roles for the day. Sometimes the help provided can be as mundane as finding another projector bulb or setting up the PowerPoint.

As you can tell from the above list, classrooms should be stimulating places where many strategies are employed and many roles are taken both by teachers and students. This is true for the one-teacher classroom but can be more fully realized in interdisciplinary, team-taught courses. The bottom line, of course, is that integrated teaching contributes to fullness and integrative learning. What teachers do either facilitates or diminishes integrative learning. Why go to all the trouble of developing interdisciplinary courses, if each teacher only intends to come to class to lecture, one at a time, on his or her specialty? Why would we expect students to go to the trouble to accomplish what we ourselves are not willing to attempt? Integrative courses deserve integrated teaching.



## ***Effective Lecturing for Interdisciplinary Courses***

Although many researchers focusing on student learning have criticized the use of the traditional lecture in higher education, lectures—if performed effectively—can fulfill an important role in advancing learning and in promoting integrative thinking. According to Cashin (1985) and Bonwell (1996), lectures have a number of strengths. They can communicate the intrinsic interest of a subject through their enthusiasm, present material not otherwise available to students, be specially organized to meet the needs of particular audiences, present large amounts of information to large amounts of persons, can model how professionals work through intellectual questions or problems, and present little risk for students.

Traditional lectures (consisting of 50-75 minutes of teacher talk), however, have some possible pitfalls. They can be boring, are not well suited to teaching complex and abstract material, encourage student passivity, and do not easily encourage higher order thinking skills (analysis, application, synthesis). They also often can be disciplinary in nature and not promote interdisciplinary learning.

Educational experts, however, have suggested the following guidelines for improving the learning that happens through lecturing:

- 1) Make the most of the opportunities when you have the whole group together. Useful benefits of whole-group experiences include setting the scene in a new subject, talking students through shared and known problem areas, holding practical demonstrations, facilitating panel discussions which bring in different disciplinary perspectives, and introducing guest speakers with new perspectives on the course issues.
- 2) When appropriate, veer away from having only faculty member talk for the entire lecture time. Bring in short videos or images to liven up the lecture. Other ideas include: demonstrations, simulations, panels, debates, performances, games or competitions involving the entire class or a portion of it, etc.
- 3) Make sure that the lectures are not just “transmit-receive” occasions where the instructor serves as a “talking head” and the students sit passively and take notes.
- 4) Make good use of your specific intended learning outcomes for each lecture. Explain the purpose and intended outcomes of the lecture to students at the beginning of each lecture. Make sure you show how each lecture supports the interdisciplinary nature of the course and how each lecture relates to the seminar sessions. In other words, make sure you place the lecture within the larger course context.
- 5) Give students some advice and guidance about note-taking.
- 6) When you begin the lecture, capture the students’ attention by dimming the lights or making a certain sound. Also captivate their interest by beginning the lecture with an interesting question, story or other fact.
- 7) Use handout material to spare students from copying down lots of information.

In addition to these guidelines, systematically incorporating brief active learning strategies into lectures can minimize many of the weaknesses of traditional lectures. Interspersing some active learning strategies into lectures can keep students from becoming passive and can keep their attentions focused on the material at hand. Bonwell suggests that faculty lecture for no more than 20 minutes before turning to one of these active learning approaches.

Below are some active learning strategies for these enhanced lectures:

- Pauses—Every 13-18 minutes, the faculty lecturer should pause or allow a short break. These breaks allow students to listen effectively for longer periods of time. In these pauses, students can stop to take notes on what was just being discussed or compare notes with their neighbor. Two people working together are likely to take better notes than one person working alone.
- Census-Taking—At various points in the lecture, stop and ask students to vote on an issue or question at hand; or you might ask them to pick the best option from several alternatives. This voting can take the “pulse” of the class on a topic and help you to shape your lecture comments accordingly.
- Short Writes—Punctuate your lecture with a short one-minute writing assignment. This is a great way to assess the degree to which students understand presented material. Simple assignments could be “What was the most important thing you learned in class today?” or “What questions remained unanswered?” or “What was the main idea presented in this portion of the lecture?” You might also ask students to cite examples from different disciplines that were brought up in the lecture. These short writes could form the basis for class discussions or could be submitted to the faculty member.
- Think-Pair-Share—Two students discuss together for 2-3 minutes what would be an appropriate answer to a question that has been asked. Or they might work together to solve a problem, prioritize the importance of issues or categorize points according to their disciplinary frameworks. Pairs then share their responses to the entire class.
- Formative Quizzes—Ungraded quizzes are used to easily and efficiently determine how well the students comprehend the material. You would use the same type of material that you would normally put on an exam, just in a condensed form. The question(s) could be put on an overhead or powerpoint and students are asked to respond to it. You might even discuss as a class how an interdisciplinary response is different from a disciplinary one.
- Lecture Summaries—Students can better synthesize course material if they are provided opportunities to summarize lectures during class. Some instructors do this by asking students to put their pens down and simply to listen to the lecture (which lasts about 2/3 of the class period). In the remaining time, students are asked to create a summary and share some of the main points with the larger group. The entire class can reflect on how the notes taken may be shaped by the disciplinary backgrounds of the note-taker. Or they can reflect on how different disciplinary perspectives offer in the lecture compare or contrast.
- Lecture Outline—The instructor gives students an empty or partially completed outline of the lecture and asks them to complete it. A variation on this is to give them a table with rows and columns that they should use to organize information and illustrate disciplinary or integrative relationships.

## ***Cooperative Learning to Support Integration***

Cooperative learning is the instructional use of small groups so that students work together to maximize their own and each others' learning (Johnson, Johnson, and Smith, 1991). Carefully structured cooperative learning involves people working in teams to accomplish a common goal, under conditions that involve both positive interdependence (all members must be involved) and both individual and group accountability for the final outcome. In an interdisciplinary course, it should help to promote greater integration of knowledge. Moreover, because so much integrative work gets done in teams, cooperative learning teaches students vital cognitive and affective skills.

### **Types of Cooperative Learning Groups**

1. Informal Learning Groups are temporary, ad hoc groups that last from a few minutes to one class period. They are used to focus students' attention on the material to be learned, to set a mood conducive to learning and participation, and to help students learn how to cooperate more effectively. An example of this would be the "Think-Pair-Share" opportunity in lectures (see handout on lecturing in this manual). Other ideas are listed on the handout entitled, "Integrative Seminar Activities" which is also located in this resource manual.
2. Base Groups are long-term, heterogeneous cooperative learning groups with a stable membership. Base groups stay the same during the entire semester or for lengthy periods within the term. Possible structures for base groups are explained below.

### **Elements of Effective Learning Groups**

1. Positive Interdependence—Only give assignments to groups that could not succeed unless all members of the group participate and work together. If an assignment could be done well by an individual, then it should not be a group project. Positive interdependence can be created by asking group members to agree on an answer for the group (come to a consensus), making sure that each member can explain the group's answer, and fulfilling assigned role responsibilities. Other ways of structuring positive interdependence are by having common rewards (such as a shared grade), shared resources or a division of labor.
2. Face-to-Face Interaction—Make sure students interact to help each other accomplish the task and promote one another's success. Do not assign projects that students can do alone and then simply paste together for the final product. Structure time inside of class to encourage interaction.
3. Individual Accountability—Hold students individually accountable for doing their share of the work. Some ways to encourage individual accountability include giving an individual exam to each student, randomly calling on individual students to present their group's answer or progress, dropping into group sessions to ensure that everyone is participating, asking group members to evaluate themselves and their group members.
4. Teamwork Skills—Be sure to teach students essential teamwork skills such as how to make decisions, manage conflict, build trust and communicate.
5. Group Processing—Allow time for students to discuss how well they are achieving their goals and maintaining effective working relationships with their peers. They need to describe regularly what is working and brainstorm ways to overcome challenges.
6. Careful Choices about Size and Membership of Groups—Most cooperative learning experts agree that smaller groups (with 2-3 members) tend to work better together, especially when working with students with little cooperative learning experience. Also, selecting the members of each group can be tricky. Some faculty find that the easiest way is to randomly select students for groups (by having students number off, assigning them based on their astrological sign, or picking names out of a hat). Others have found success in forming groups based on performance. Faculty look at past performance indicators and try to choose groups that group high-achievers

with some lower-achieving students. For interdisciplinary groups, groups can be created with students of differing disciplinary interests.

### **Formal, Complex Structures**

In *Student Teams-Achievement Division (STAD)*, students are assigned to four-member learning teams that are mixed in performance level, disciplinary background or talents, sex, and ethnicity. The teacher presents a lesson, and then students work within their teams to make sure that all team members have mastered the lesson. Finally, all students are tested on the material (through papers, exams), at which time team members may not help one another. Students' quiz scores are compared to their own past averages, and points are awarded based on the degree to which students can meet or exceed their earlier performances. These points are then summed to form team scores. STAD is most appropriate for teaching well-defined objectives, such as science concepts or mathematical computations.

In *Jigsaw*, students work together in small groups where they must rely on each other. Each group member becomes "specialized" in subject matter and thereby possesses critical information to contribute to classmates. Cooperation and mutual trust become necessary to academic achievement. Jigsaw involves four generic stages:

- Introduction - The teacher organizes the class into teams, introduces the topic or material to be covered, and the reason for studying it. The members of each team select, or are given, a part of the subject matter to be explored. Often, in an interdisciplinary course, each team represents a different discipline or cognate disciplines.
- Focused Exploration - Members from different teams with the same subject form pairs, get together and gather information.
- Reporting and Reshaping - Students return to their teams and report what they learned in the paired focused exploration. Team members pose questions and discuss ideas in depth.
- Integration and Evaluation - The teacher may design an activity or set of questions to help students begin to integrate their learning. Teams may present their findings. Some time should be spent evaluating the process of working together in groups.

*Group Investigation* integrates four basic features: investigation, interaction, interpretation and intrinsic motivation. Groups are divided into teams of four and follow six steps:

- Step 1 - Teacher presents the class with a broad, multifaceted problem that has no single right answer and needs various disciplinary perspectives to understand it fully. Teacher brings in a variety of resources to explore the topic; or s/he asks students to conduct research on their own. Class generates questions, determines subtopics and organizes into research groups.
- Step 2 - Groups meet and plan their investigations. Encourage students to take tasks which best suit them (e.g., interviewing, library research; visual research). Teacher meets with groups to make sure they are on task.
- Step 3 - Groups carry out their investigations by locating information from various disciplinary sources, organizing and recording data; reporting findings to groupmates; discussing and analyzing findings; determining if they need more information; and interpreting and integrating their findings.
- Step 4 - Groups plan their written or oral presentations. Groups should make sure that the main ideas and conclusions of the inquiry are emphasized, that everyone in the group takes an active part in the presentation; that the "audience" is involved as much as possible; that time limits are followed; and that all necessary equipment and materials are available.
- Step 5 - Groups make their presentations. Teacher and students should fill out an evaluation form as the presentation takes place.
- Step 6 - Teacher and students evaluate their projects through evaluation form reviews, exams or conferences.

## ***Interdisciplinary Inquiry-Based Teaching***

### **Stage 1: Create conducive climate.**

A conducive climate for interdisciplinary inquiry:

- Fosters a community in which participants trust and respect one another;
- Encourages risk taking;
- Respects and values disciplinary forms of knowledge;

Strategies for achieving the three objectives:

1. Trusting and respectful community can be gained through opportunities for informal exchange of ideas and information; faculty demonstrating enthusiasm and genuine interest in students; creation of shared set of expectations for the course; faculty keeping his/her mouth shut!
2. Risk-taking can be fostered by faculty admitting mistakes he or she has made in the inquiry process, rewarding students doing/saying unusual but thoughtful things both through verbal praise and through evaluation measures; bringing in examples of inquiries that were done in nontraditional ways.
3. Respecting and valuing disciplinary forms of knowledge can be achieved by taking time to compare and contrast the purpose, methods, and practices of 2-3 disciplines; setting up a panel of experts on one topic who come from different disciplines.

### **Stage 2: Select and explore a theme.**

Themes should be engaging and personally meaningful to students, and they should promote hands-on action and intellectual reflection. Generally themes come in one of the following forms:

- Place (a watershed, your local campus)
- Problem (acid precipitation, global warming)
- Concept (insect family, human sound)
- Relationship (water and legislation)
- Issue/Debate (right to die)

They can be explored in standard ways:

- Interactive lectures (quick pace, tone variations, interact with students, create tension)
- Close readings of primary and secondary sources. This must be guided in stages: (1) quick read for overall point; (2) read sentence by sentence underlining unclear parts and writing down questions; (3) review reading in class going over questions and confusions)
- Careful observations (noting similarities and differences, key traits, patterns)

But they can also be explored in less conventional science-oriented ways:

- Participation in a theme-related activity or event
- Conversing with key players or experts
- Engaging in nonlinear, nonrational forms of exploration (graphic organizers, associational thinking, visualizations, freewriting)
- Tapping into various media (Internet, videos, art, photography)

### **Stage 3: Form a Question or Problem.**

Despite students' innate curiosity, most students are not adept questioners. Some of their questions contain invalid assumptions. Other questions are so literal and text-bound that they elicit only a factual answer, and still others jump way beyond the topic. Students—of all abilities and levels—need to be taught how to question effectively. One important way to help students improve their questioning ability is to model good questioning and to regularly present to them a variety of different types of questions. Then try interspersing in your conversations and lectures with the following:

- *speculative* statements (e.g., “I wonder what would happen if ...”);
- *analytical* questions that challenge assumptions (your own and those of others) or that explore contradictions, oddities, analogies or differing perspectives on a topic;
- *comparative* questions that explores similarities and dissimilarities; and
- *synthetic* questions that express hypothetical relationships among variables (e.g., Does the process of boiling water rid the water of coliform bacteria?).

No matter what type of question students ask, I believe (and I make evident to students that) good interdisciplinary questions are focused, thoughtful and original, engage with two or more fields of knowledge, and are answerable with the time and resources at hand.

#### **Stage 4: Design an Investigative Plan.**

Because interdisciplinary investigations involve multiple research methods and literatures, some time should be spent discussing: How might the disciplines we are working with conflict and coincide? What common vocabulary will be used? What assumptions will we hold? While often time-consuming and difficult to do, these types of conversations are crucial in assisting students in learning how to cope with a world in which all beliefs are tentative in some way and to engage in the higher order thinking skills of application and synthesis. As Klein and Newell assert, “achieving synthesis requires proactive attention to process. That means examining how the elements to be synthesized are obtained and interrelated. ... The worldview and underlying assumptions of each discipline must be made explicit” (15).

In addition to selecting disciplinary literatures and experts to consult, students must also consider appropriate methods of investigation such as visiting an archives, researching on the Internet, conducting a field or laboratory experiment, interviewing or surveying people, studying representative cases, role-playing or simulating an event, engaging in participant-observations, doing a regression analysis, or writing an ethnographic narrative. Some of the best questions lend themselves naturally to two or more research methods. Once the methods are chosen, set up a timeline and plan of action. If students are working in small groups (which is what I most often do), you may want to assign roles or tasks to individuals (such as record keeper, library researcher, project manager, illustrator or photographer). What materials and supplies will you use? How much time will it take? Where should you do the investigating? When will you know you have found the answer?

Spend time with your students talking about what will lead to a “fair test” of the question asked. What will need to be done? How many times? Should we make comparisons with similar objects or events? What should we measure? What information do we need to know to conduct the test? What should we do if the tests produce differing results?

After your students begin the investigation, they may find that they need to alter or add to their original plan of investigation. Retesting, revising, and adding are part of every investigation. Although wrong plans and goof-ups can be frustrating, they often cause us to learn more and to come up with better questions and plans of action. Good knowledge is often hard to attain but can produce lasting satisfaction! The important point to remember is to stay calm and see each new attempt to find an answer as another means of learning, another way of getting closer to answering your question.

#### **Stage 5: Communicate and Reflect on Findings.**

Once your class has the results of their inquiry, the challenge is to interpret what they really mean. Part of the creative vigor of investigation is that not every method will yield comparable data and not everyone analyzing the data will agree on a single interpretation. Your students may well change their mind about what the real discoveries are in their investigation after talking with others. Invite students to spend time collating all data collected from the different disciplines and to evaluate their adequacy and relevancy. Compare and contrast the different analyses. How can the data be integrated to determine a pattern of mutual relatedness and relevancy?

In addition to having students create written reports or papers, there are numerous ways to elicit intriguing analyses and conclusions from your students:

- engaging in whole class or small group reflective discussions on the inquiry-in-progress (encourage discussion of intellectual issues, procedural matters as well as emotions and feelings);
- creating charts, graphs, diagrams and other visuals to assess their findings;
- keeping a log or journal (written or recorded on tape) of steps taken and findings at each stage;
- engaging in a simulation of the problem or creating a model; or
- communicating to appropriate people via the Internet or a class listserv.



## ***Interdisciplinary Service-Learning***

### **General Guidelines**

Service-learning is generally thought to include the following three key components:

- 1) *Collaboration with the community*—Well before the course is taught, special attention must be given to establishing community connections that will provide productive situations for students as well as genuine resources useful to the community. Students learn and develop through active participation in thoughtfully organized service experiences. These experiences meet actual community needs and are coordinated in collaboration with the school and the community.
- 2) *Integration of service into the academic curriculum*—Structured time is given within an academic course for students to think, talk about, and study the issues and problems that are expected or that arose during the actual service activity. Students must be well prepared to work with diverse populations and to take on meaningful responsibilities in the service experience.
- 3) *Reflection*—Students as well as the community members must be given numerous opportunities to step back and be thoughtful about the experience. Instructors must build in reflection time and activities to foster deeper reflection. Reflection should go beyond mere description and focus on integration, analysis and action planning. It should occur before and after the service experience and happen in different ways (journals, critical analysis papers, pre and post-interviews, large-group discussion sessions, faculty coaching sessions, questionnaires, evaluation forms).

Interdisciplinary service-learning courses attempt to achieve all of the goals articulated above, but there is special attention to critically evaluating and integrating disciplinary insights in order to enhance the understanding of the service-learning experience and the issues raised in that experience.

Below are some guidelines for organizing a service learning course:

- Think first about the learning goals and outcomes for the course. Ask yourself, “What do I want my students to learn or do in this course?” Then, decide whether and (if so) what type of service experience would help to promote those learning goals. Select service experiences that will help students to apply two or more disciplinary perspectives.
- Make careful choices and contacts with community members. Try out a variety of options, and then select the experiences that will be most productive for your students and the community members involved. With the community members, decide on the general parameters of the service experience (e.g., purpose, time and resources involved, transportation, expectations of all parties involved, assessment method, reflection activities) well before the course begins.
- As you design the course, select readings and other course materials that will help the students to gain multiple disciplinary insights into the problems or issues that relate to the service experience. Build in specific intercultural and ethical guidelines and strategies for helping students to interact productively with people who may be very different from themselves.
- Create multiple reflection activities and assignments that will occur before, during and after the service experience. Make sure that these reflection assignments ask students to think about differing disciplinary perspectives that relate to the service experience and to consider ways that the service experience integrated different modes of learning and disciplinary knowledge.



## Reflective, Integrative Journals

Most service-learning courses ask students to create journals which will prompt them to integrate knowledge and reflect on the learning gained from the experience. Below are some general suggestions for assigning journals.

1. Write out your instructions and purposes for the assignment so that students will have something concrete to refer to. In addition to a clear explanation of the purpose of the journal, include the following information in the written assignment prompt:

- what the journal will physically look like;
- the type and style of writing allowed or preferred (personal language, formal academic discourse, whole sentences or lists, images);
- the content you expect (unfocused—whatever comes to the student’s mind; focused—student is asked to write on a certain topic). In interdisciplinary courses, you may want to ask them explicitly to relate the experience to various disciplinary theories or concepts;
- who will be reading it (writer only, writer plus teacher, writer plus teacher and classmates);
- a definition of the students’ right to privacy;
- the expected length and quantity of entries (either in number of pages or amount of time spent writing);
- the grading or evaluation criteria used for the assignment;
- an explanation of how and when they can expect the journals to be returned to them.

2. To help students get a better sense of what you are looking for and how to integrate disciplinary knowledge, share some lively and not-so-lively samples of journal entries to the group before they head out to the field. Have the class as a group discuss and evaluate them.

3. Instead of only asking for conventional journals, you might also consider having the students (at some point) write a letter (as a journal entry) to you or email (journal entries) to one another too. Having an actual, immediate audience for their writing can help keep them on track, and can add some motivation for their writing.

4. Think about having them do something with their journal at the end of the term. *Example:* Students review their journal entries, create a table of contents, and write a final summary of the journal that synthesizes their growth or interdisciplinary learning over the term.



# *Interdisciplinary Assessment*

## **Assessing and Grading Student Performance**

Any faculty member knows that one of the toughest aspects of instruction is figuring out how to evaluate a student's work or performance. Fortunately, there are a number of different ways faculty can assess student performance, some of which are explained below. No matter which approach you use, it is important that you find ways to communicate to students the strengths of their performance as well as areas needing improvement. Good assessment also helps students to see their progress over time so that they are aware of the learning that has happened throughout the course.

### **Grading Using Specified Criteria and Rubrics**

Grading—or the assigning of a formal letter grade (A-F)—is the most traditional form of assessment. Yet, grades alone do little to help the student improve their writing. Thus, at the very least, you should include a narrative or short set of comments that explains your assessment of their writing to accompany the grade.

You can cut down on grade complaints and also improve students' learning by offering students a clear set of criteria for the writing assignment. This criteria should be clearly stated on the assignment prompt so that students are aware of how you will be evaluating the paper.

Another effective technique is to establish a rubric or scoring scale for each assignment. A scoring scale takes a lot of initial time to create—but it will help you to be more clear about what you are looking for in writing and thus to teach it better. It will also save you time when grading papers, and it will reduce grade complaints and help you be clear about your writing expectations.

To do this, you need to come up with traits that you deem important to succeed in a given assignment (e.g., organization, thesis, materials and methods). Then you set up a two to five-point scale for each trait. Below is a five-point scale. The scale consists of descriptive statements that identify what it means to perform that trait extremely well, moderately well, adequately, and poorly.

<i>Scoring Scale for Argument Paper</i>	
<b>Score</b>	<b>Trait</b>
5	Original and clearly stated thesis, persuasive, well-organized, imaginative use of source material
4	Clearly stated thesis, good use of sources, well organized
3	Obvious or general thesis; facts straight with a reasonable explanation of the subject under consideration
2	Poorly stated thesis, inadequate survey of available sources, poor organization
1	No awareness of argument or complexity

The instructor checks off where the student falls in each category, and this helps him or her arrive at a grade and a more detailed and exact idea of where the student is proficient and where she is deficient.

Many instructors also weight the traits to arrive at a grade so that certain traits count for more than others. For more information, see “Guidelines for a Rubric or Scoring Scale” in this handbook.

## **Margin Comments**

These comments are often questions, concerns, interjections or thoughts that occur to the faculty member as he or she reads the paper. Using questions or comments to prompt the student to think more deeply or reflect more on an area is an important way to improve students’ learning and to open up a dialogue between the instructor and student. Occasionally, some instructors use margin comments to point out mechanical or grammatical errors. In order not to overwhelm a student, try to limit the grammatical/mechanical comments to those errors most needing improvement. Look for one or two major problems, and focus on those.

Because margin comments are so brief, they should be accompanied by some comments at the end of the paper that summarize the instructor’s general evaluation.

## **Narrative Evaluations**

A narrative is generally one of the most preferred method of writing assessment because it generally allows instructors to create a conversation with the student about his or her strengths and weaknesses. Most instructors include a narrative at the end of each paper, but some type their narrative responses to student work.

Narratives (often written in a letter format) also can be used to accompany a mid-term or an end-of-the-semester grade. Although mid- and end-of-the-semester narrative evaluations can be time-consuming, they can be highly beneficial. To expedite the process of writing these evaluations, create a system (checklist, running file, a set of symbols) for making notes or comments about a student’s work throughout the semester. That way, every paper a student has written does not need to be re-read before composing the evaluation.

## **Contract or Criterion-Based Grading**

Some instructors have had great success creating learning contracts with their students. In this case, the instructor (or more often the student along with the instructor) creates a set of criteria for students to achieve or complete by the end of a semester. The grade is determined by how many and how well the criteria are met. Because students often work with the instructor to determine the items on the contract, contract grading is an excellent means of helping students to take ownership of their own learning. It is important that the contract not contain only clear-cut items such as “attended class” or “wrote three papers.” It should also include criteria that measure quality and improvement.

## **Portfolio**

In the portfolio grading system, students collect their work throughout the semester in a folder or binder. Portfolios encourage revision and help to gauge progress made over the course of a semester. Some instructors ask students to collect and submit all of their work: in-class writing, journal entries, drafts, and polished projects. Others ask students to submit a certain number of their best writing at the end of the semester.

One successful method of portfolio evaluation incorporates reflection by asking students to write a cover letter for each major project in the portfolio or for the whole set of materials in the portfolio. In these letters, students address the rhetorical strategies they used, how their thinking and writing changed from first draft to last (or from first paper to last), what strengths and weaknesses they perceive in their writing, and what they have learned about themselves as a scholar and writer.

## **Student Guided Instructional Description (SGID)**

In SGID, a colleague from the university comes into the classroom (generally in the middle of the semester) when the instructor is not present. That person asks the students two main questions: “What makes this classroom community a successful learning environment?” and “What would make this a better classroom community?” SGIDs are not a place for students to grouse about the professor or a course; it forces students to think constructively about how to improve the course and classroom dynamics. Instructors can invite someone they know to do this or ask the department chair or dean to recommend a neutral person who will do this assessment. Once instructors receive the feedback from the session, they should discuss the results with students as well as possible plans for improvement.

## **Class Dialogue**

A less formal way to receive feedback is to ask students to form small groups and discuss what they feel is going well in the course what they would like to see changed. This approach will probably not yield as honest feedback as when doing an SGID, but it is easier and quicker to implement. Instructors may ask students to hand in their lists from the small groups for the instructor’s private review; or, all of the results can be written as a master list on the board for further discussion. As in the SGID, steer students away from making a list of complaints and toward creating constructive suggestions.

## **Individual Conference**

Another highly effective, but time-consuming way of assessing students’ writing and performance in a course is to meet with them once or twice during the semester in an individual conference. Conferences allow the instructor and student to build trust and to focus on individual concerns in an in-depth manner. In a conference, the professor and student spend fifteen to thirty minutes together to exchange feedback.

Conferences can address a certain piece of student writing (discussing a draft in progress), a series of papers (discussing writing trends and the progress of the student overall), or the course itself (exchanging ideas on how both the student and faculty can improve). Sometimes, it helps if the instructor gives the student a list of questions or topics that will be covered in the conference so that they come prepared.

## **Self- and Peer-Evaluation**

The university requires students to complete an evaluation of the course and the professor, but rarely are students asked to assess their own performance at the end of the semester or at the end of a project. Asking students to assess their own performance and progress helps them to be more conscious of their learning and to appreciate the course assignments. Self-evaluations can be done by requiring a reflective essay at the end of the course, asking for a reflective memo or paragraph after each paper, or having students complete a short questionnaire after a project or at the end of the semester.

If you incorporate collaborative learning in your course, peer-evaluations can be an excellent means of receiving additional feedback. Give students a short questionnaire to complete on all of the members of their group.



## **Guidelines for a Rubric or Scoring Scale**

A scoring rubric or scale offers benefits for students and instructors. It can make grading more consistent and it can offer students more specific information about what they do well and where they are deficient. Also, once it is created, it can reduce the amount of time instructors spend responding to student papers.

Here's how to create a rubric or scale.

- Start with your knowledge of past student performance on similar assignments. Jot down, from memory, the typical strengths and weaknesses you see in student work.
- From these notes, identify your main categories. Categories are generally put in noun or noun phrase form, such as "Organization," "Choice of Information," "Thesis Statement," or "Analysis." The number and type of categories depends upon the nature of the course and the assignment.
- For each category or trait, construct a two- to five-point scale. These are descriptive statements. For example, in a five-point scale under the category of "Thesis," a "5" thesis is limited enough to treat the scope of the essay and is clear to the reader. It enters the dialogue of the discipline as reflected in the student's sources, and it does so at a level that shows original thought and synthesis.
- Weight the traits and scales. How much will each category and trait be worth?
- Try out the scale with a sample student paper, and revise for better accuracy. Remember these scales or rubrics are works in progress. You will need to revise until you believe that you are offering students grades and comments that accurately reflect your high standards.

Below is a draft of a rubric for short interdisciplinary papers (5-15 pages) that is being developed by Carolyn Haynes and Chris Wolfe (Miami University) in collaboration with Veronica Boix-Mansilla and Liz Dawes (Harvard University). Please do not reproduce or copy without permission of authors:

<b>Category 1: Grounded in Disciplines</b>	<b>Level 1 (Naïve)</b> <i>(intuitive knowledge but unreflective)</i>	<b>Level 2 (Novice)</b> <i>(mechanistic, simplistic, mimicking others)</i>	<b>Level 3 (Apprentice)</b> <i>(follows procedures and criteria of experts)</i>	<b>Level 4 (Master)</b> <i>(truly original, creative, critical)</i>
A. Use of examples and units of analysis to support generalizations, concepts, theories, claims	Disciplinary concepts are missing or are inaccurate; intuitive, folk, mythical or commonsensical beliefs prevail.	Disciplinary concepts are accurate but simplistic, superficial and general. Or writers do not support claims and generalizations consistently or relate examples to disciplinary theories consistently.	Disciplinary concepts and theories are informed and appropriate. Writers appropriately support generalizations, theories, concepts and claims with examples and other units of analysis (empirical, textual). However, the use of concepts, theories, and examples are not highly original or sophisticated.	Writers show a highly organized and sophisticated network of concepts and theories within the discipline. They use a rich variety of examples to support claims and broader disciplinary generalizations.
B. Use of disciplinary methods (e.g.,	No method for constructing knowledge is	Writers apply procedures mechanically or	Writers effectively use a single method or	Writers use a variety of methods effectively or use a

experimental design, conceptual argumentation, textual analysis)	apparent beyond engaging in trial and error, or asserting one's own opinion or simply summarizing others' ideas.	unevenly (e.g., analysis is superficial or uneven, design is simplistic or uneven).	procedure to construct knowledge in the discipline. Analysis, argument or design is solid, but not terribly original.	single method in a very, in-depth and sophisticated way.
C. Use of relevant, reliable sources	Writers do not take into account others' perspectives and interests. Or if they do use sources, they misuse them in a major way—e.g., relying on non-credible sources or misunderstanding the basic meaning of the source(s) used.	Writers do take into account other sources, but they do not do so in an uneven or mechanical way. Or they rely too heavily on one source.	Writers take into account other sources in a thoughtful way that advances their argument. They, however, misuse them in a minor way—e.g., using too many quotations or unnecessary ones. Or the use of sources is generally simple, or they are missing some of relevant, current sources.	Writers demonstrate a sophisticated use of sources. The sources used are relevant and current and integrated thoughtfully and purposefully to advance the paper's topic.
<b>Category 2: Advance Student Understanding</b>	<b>Level 1</b> <i>(disciplinary, poorly done)</i>	<b>Level 2</b> <i>(multidisciplinary, holistic)</i>	<b>Level 3</b> <i>(cross-disciplinary)</i>	<b>Level 4</b> <i>(interdisciplinary)</i>
A. Incorporation of appropriate disciplinary insights relative to the paper's purpose	Paper shows no evidence that different disciplines are used to address the paper's purpose. Or, various perspectives within one discipline or field are present, but there are no contributions from outside disciplines.	Writers bring in two or more relevant disciplines or fields but are not explicit about their use. Or writers fail to incorporate a disciplinary perspective that is crucial to pursue the topic of study. Or they are explicit about the disciplinary concepts, theories, and approaches and place them side by side but do not synthesize them.	Writers explicitly incorporate two or more disciplines, but they are primarily operating in one discipline and using only passing or simple ideas or approaches from another discipline(s). Or writers omit a disciplinary perspective that is not crucial but would advance the study significantly.	All relevant disciplinary insights are incorporated and writers use them in sophisticated ways to address the paper's purpose. Writers seem fully "at home" in the major disciplines used.
B. Use of integrative device (model, metaphor, analogy, or term) to advance student understanding	Writers do not demonstrate any form of integration.	Writers may explore the topic in a holistic way and even bring in multiple disciplinary	An integrative device is presented that is fairly obvious or draws in simplistic ways from two or more	Student presents an integrative device that is unique and draws in sophisticated ways from two or

		insights, but there is no overt recognition that insights from different fields or disciplines are being integrated nor is there use of a specific integrative device.	fields/ disciplines.	more fields or disciplines.
<b>Category 3: Critical Awareness</b>	<b>Level 1</b> <i>(no awareness or reflection)</i>	<b>Level 2</b> <i>(general or commonsense awareness)</i>	<b>Level 3</b> <i>(awareness of disciplines)</i>	<b>Level 4</b> <i>(highly sophisticated awareness of integrative process)</i>
A. Framing of problem to invite an integrative approach	Paper does not contain a clear purpose or thesis.	Paper contains or implies a purpose or thesis. But the purpose may not be stated as clearly as it could be or it is not clear that an integrative approach is needed to address it.	Writers present a problem which warrants an integrative approach. However, the student offers no clear rationale or justification for using an integrative approach.	Writers frame the problem clearly, identify the various disciplines or fields to be incorporated, and present a clear rationale for the integrative approach.
B. Awareness of intended audience(s) as evidenced by tone, language and organization	Writers seem unaware that specific genres and audiences require specific conventions. Paper lacks a clear organizational structure. Serious problems with tone, organization, grammar or mechanics mar the meaning of the paper.	Writers demonstrate a basic understanding of intended audience by using commonplace tone, language and organizational structures. Organization, tone and language are generally sound but lacking imagination. There may exist some errors which are distracting but they do not detract from the paper's meaning.	Writers show a sophisticated and graceful awareness of the intended audience. However, they may rely more heavily on one disciplinary set of conventions over the other. Or, there are a few minor errors or gaps in tone, organization, or language.	Writers self-consciously invent a new vocabulary or organizational structure or purposefully use neutral terms and tone to encourage contributions from more than one discipline/ field. Paper is free of grammatical and mechanical errors.
C. Awareness of limitations and benefits of the contributing disciplines	Writers show no awareness of differing contributing disciplines/ fields or their affordances.	Writers discuss in general or passing ways only the limitations or the benefits of the disciplines. Or, they only discuss the limitations and benefits of one discipline, but not the others.	Writers show some awareness of the benefits and limitations of all major disciplines/ fields used, but the awareness is general or obvious.	Writers show critical and in-depth awareness of limitations and benefits of all major disciplines/ fields used.

D. Evidence of self-reflection	Writers do not consider the strengths or weakness of their own work or approach.	Writers comment briefly and in general ways on the limitations OR the benefits of the paper but does not do both.	Writers comment on the limitations and benefits of the paper or his/her writing process in general ways. Or they go into depth about either the limits or the benefits of the work, but do not do both.	Writers demonstrate a sophisticated awareness of the strengths and limitations of the paper or his or her process in creating it. And they may also self-consciously comment on the integrative nature of the paper.
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See also the journal: *Issues in Integrative Studies* (published by the Association for Integrative Studies since 1982). For more information on AIS and for earlier volumes of *Issues in Integrative Studies*, consult <http://www.muohio.edu/ais/>. Back volumes are available for \$10 each (volume 8 for \$6) including shipping and handling.