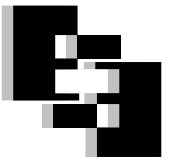
Language and Learning Across the Disciplines

A forum for debates concerning interdisciplinarity, situated discourse communities, and writing across the curriculum programs.



A New Heuristic for Planning WAC Programs:
Ensuring Successful Collaboration from All Stakeholders

Writing in Conservation Biology:
Searching for an Interdisciplinary Rhetoric?

Book Review
A Rhetoric for the Social Sciences: A Guide to Academic and Professional Communication

January 2000 Vol. 3, No. 3

LANGUAGE AND LEARNING ACROSS THE DISCIPLINES

Language and Learning Across the Disciplines is a joint publication of Georgia Southern University and the Illinois Institute of Technology, and follows the NCTE guidelines for non-sexist language.

Letter from the Editors

Sharon Quiroz
Michael Pemberton

This issue of LLAD brings you two solid articles which explore in considerable depth two complicated issues for writing instruction as it crosses the curriculum: interdisciplinarity, a major theme of this journal since its inception, and program development.

Carson, Sipple, Yahr, Marshall and O'Banion contribute an article on program development that once again addresses the distributed nature of our enterprise. "A New Heuristic for Planning WAC Programs: Ensuring Successful Collaboration from All Stakeholders" considers the question of how to structure a coherent program that cuts across disciplinary boundaries. The article offers a heuristic that can be useful not only for new programs, but for thinking systematically about the attributes of existing efforts to impact language and learning across various disciplines.

The Samraj/Swales article, "Writing in Conservation Biology: Searching for an Interdisciplinary Rhetoric?" reports research in applied linguistics done at the University of Michigan on an interdisciplinary master's program. The authors, happily, include a history of the program that tells a great deal about the intellectual history of the last quarter-century. The program is quintessentially a late twentieth-century movement: to reverse disciplinary fragmentation in favor of a more communitarian cosmology – environmentalism as a means of recovering our sense of wholeness. But as Samraj/Swales makes clear, we have a very long way to go in pursuit of this goal. Their research lays out serious obstacles to the development of an interdisciplinary rhetoric, even in a program committed to the concept. Or, they ask, is it?

And as a closing note for this issue, we offer Mada Morgan's review of Kristine Hansen's book, *A Rhetoric for the Social Sciences: A Guide to Academic and Professional Communication*.

A New Heuristic for Planning WAC Programs: Ensuring Successful Collaboration from All Stakeholders

Jay Carson, William Sipple, Mike Yahr, Thomas Marshall, and John O'Banion
Robert Morris College

As a result of the growing reputation of writing across the curriculum, college and university curricular revisions frequently involve exploiting WAC to improve students' skills, thinking, and ability to write in their chosen disciplines. Yet, our literature indicates that maintaining vital WAC programs permanently is difficult. Despite the popularity of the WAC movement as a whole, many programs continue to fail, even well established ones. Those that remain face a number of threats to their existence. These problems inherent in initiating WAC programs and keeping them alive have been most recently summarized in Barbara Walvoord's overview, "The Future of WAC." A larger historical and more gloomy perspective can be found in David Russell's *Writing in the Academic Disciplines 1870-1990: A Curricular History.* Here, Russell points out that a number of cross-curricular writing programs have been tried earlier in this century. All have failed.

In this article, we focus on the one problem we believe is most crucial for the survival and effectiveness of our modern incarnation of writing across the curriculum: planning. Difficulties in changing a university or college curriculum are too well known to teachers and administrators. The president of Rice University suggested recently in *The Chronicle of Higher Education* that such changes have "'all the physical and psychological problems of moving a graveyard'" (Schneider). Comprehensive college-wide reform programs, including effective writing across the curriculum programs, require intense ongoing planning that does and can continue to react to all the stakeholders in the school community. However, participation in the planning for such large undertakings is often limited to only a small number of those stakeholders, a group usually consisting of the institution's upper administration. How can a university broaden its base for understanding, and gain consensus and support during its planning and implementing of comprehensive programs?

This essay argues that Young, Becker and Pike's tagmemic discovery heuristic procedure is an ideal tool for planning a school-wide reform. Because of its systematic approach and insistence on looking at issues from a variety of perspectives, the procedure forces planners to take into account various stakeholders' points of view. We use a case study approach to examine how Robert Morris College has and continues to use a version of tagmemic rhetorical analysis as an approach to plan and implement effectively its new Communications Skills Program. Our argument seeks to shed light on the organizational problems inherent in WAC and to mine a powerful rhetorical heuristic for purposes of finding solutions to those problems and planning for success.

Tagmemic rhetoric was first fully explicated by its creators, Richard Young, Alton Becker, and Kenneth Pike in their seminal text, *Rhetoric: Discovery and Change*. The tagmemic discovery procedure, in its simplest terms, is based on the belief that in order to know anything well, one must see it from various perspectives: first, as a "thing" in itself or a particle; then, as something that changes over time, what Young, Becker, and Pike call a wave; and finally, as it is embedded in its context, or in its field. Additionally, tagmemicists argue that one can *best* know a thing by understanding three more aspects: contrast, variation, and distribution. These are summarized by Ross Winterowd as examining something from the perspective of: "(1) how it differs from everything else, (2) how much it can change and still be itself, and (3) how it fits into larger systems of which it is a part" (124). In Chapter 6 of *Rhetoric: Discovery and Change*, Young, Becker, and Pike present these perspectives in the form of a matrix with contrast, variation, and distribution across the *x* axis, and particle, wave, and field down the *y* axis. The authors also provide a number of questions relevant to each of the nine cells of the matrix. These questions are suggested by the two particular perspectives intersecting from each axis. For purposes of economy and simplicity, we have chosen to use, and suggest neophytes use, the version of the procedure as presented in Linda Flower's text, *Problem Solving Strategies for Writers*. Flower asserts that the heart of the approach can be achieved by using only the axis of the discovery procedure that focuses on viewing the thing under examination as a particle, a wave, and a field. This simpler analysis, combined with the perspective-appropriate questions suggested by Young, Becker, and Pike, can effectively and conveniently substitute for a using the full matrix.

Our case history includes the procedure's use in the Robert Morris College Communications Skills Program (CSP), especially an examination of how we applied tagmemics to analyze the needs of the Program and discover solutions to those needs, leading to the planning, design, and creation of the various components of the CSP Program.

A Field Perspective of Designing a Communications Skills Program that Responds to Field Stakeholders: Employers

Since the problem which gives rise to our program grows out of larger societal and educational problems, we begin our tagmemic analysis with a field perspective of the Robert Morris Communications Skills Program (CSP). One key question suggested by Young, Becker, and Pike in a field perspective is the following: *What is the position of the thing examined within a larger system* (127)?

A realization of the College's position within the larger system of which it is a part has become the driving force of the CSP. Robert Morris is a medium size business-focused college in the Pittsburgh area. Our graduates come, for the most part, from the city, surrounding suburbs, and tri-state area of western Pennsylvania, northern West Virginia, and eastern Ohio. This location is also home of the majority of the businesses which hire our students when they graduate. RMC's president, Edward Nicholson, keeps in frequent contact with this business community, who are the employers and managers of our graduates. As part of those contacts, he often inquires about their performance. For several years, Nicholson reports, he kept hearing the same analysis of our products/clients: Robert Morris graduates, their managers said, knew their subject areas and could perform job tasks well but were weak on communications skills.

This conclusion parallels that of the larger system of which RMC is a part, the postsecondary system of colleges and universities in the United States and the larger society which it services. Recent national studies concerning university education in America, as well as our own professional literature, echo the theme we found on our local level: too large a gap exists between student communications ability and employer communications need. In tagmemic field perspective terms, our position within the larger system is typical. Business and industry are now spending an estimated 40+ billion dollars a year on training for their employees (Eurich). Most of this training concerns subject material that should have been learned in high schools and colleges, and much of it concerns communications skills (Training).

As a business-focused school within the larger business/professional community and national university system community, we want to prepare students to lead active, productive professional lives in that business community. When that community, nationally and locally, tells us we are failing in a key area, we feel obligated to respond. Clearly, we were being told that our students need increased skills in communication.

Another field-perspective question posed by Young, Becker, and Pike asks, *What systematic features and components make the thing examined a part of the larger system?*

Here again Robert Morris College is typical of a larger system of educational institutions in this country. The College is made up of three major groups of people: students, faculty, and administrators. These groups are classified in the usual ways of classes, schools, and departments, each with their own features and varying priorities. One aspect of the field view that has become crucial to the survival of postsecondary education in general and our College in particular is the financial one. Any program, including a much needed Communications Skills Program, must also fit the financial realities of the school. How can such a program be afforded? If the College is responding to the needs of the business community, perhaps that community should take some financial responsibility underwriting programs it needs. RMC President Nicholson took this argument to the local Pittsburgh business community with good success. More than three and a half million dollars, specifically earmarked for the Communications Skills Program, have been committed to the College's development fund. Pledges to the school of another several million, while not earmarked for the CSP, are believed to be related to our facing head-on the issues of the literacy performance of our graduates. In short, the business community will support projects that solve real problems and have the potential to impact positively on their bottom lines.

The above field-view question and a related one also suggest a review of the relationship of the CSP to the rest of the school. The related question suggested by Young, Becker and Pike is *How are the components organized in relation to one another: how are they related?* The first part of the College that needed to be examined was that which was traditionally responsible for the communications skills of the graduates, the Communications Department and the closely related Department of Computer and Information Systems, which together make up the RMC School of Communications and Information Systems. As a result of these two departments working together, attempting to answer the above questions, we learned that we had contributed to the problem we were attempting to solve. That is, our rhetorical/communications theoretical approach, or at least its emphasis, was flawed. This difficulty was confirmed almost immediately in the Communications and the Computer and Information Systems Departments CSP Faculty Seminars. No single theoretical foundation for teaching communications skills to our students emerged. Our Communications Department curriculum approach, while rich and diverse, was too varied and fragmented to offer a unified approach to the teaching of these crucial skills. While not necessarily contradictory, teachers' various approaches toward communications presented students with a banquet of theory and related heuristics, styles, and beliefs, from neo-Romantic to neo-Classical, a buffet that offered too much choice for the average student to sample adequately, let alone digest completely.

A related difficulty was the lack of a theoretical connection on the undergraduate level between the Communications Department and the Computer and Information Systems Department. This disconnection was glaring and discouraging to faculty in both departments. Not only had those departments recognized that we live in an age where communications is intimately connected to computer information systems, but also the two departments had recently created a new masters degree program combining strengths of both to help solve the gap between communications and computer information systems.

How could the Communications and Information Systems Departments act together more cohesively on the undergraduate level to help students communications skills? In turn, how would those two departments work together with the other departments of the College to produce more literate graduates? The answer came from the Head of the CIS Department, who suggested *audience* as a unifying theoretical foundation, as well as the programs's organizing focus and practice. He and the Dean of the school also suggested much closer participation of the Computer and Information Systems Department in the entire program, in tagmemic field terms, a closer relation between the components in the system.

Out of further collaboration among the CIS and Communications Department Heads, along with the Academic Vice President, the Dean of the School of Communications and Information System, and the Director of the Robert Morris WAC program, the outline of the delivery system emerged: every student at Robert Morris would take twenty-seven credit hours in nine communications-intensive courses, five in the Communications Department and four in students' major course of study. Rather than continue the common practice of teaching each communications skill in isolation, each course presents students with structured, sequenced opportunities to practice all communications skills: reading, writing, presenting, and listening, along with appropriate technological aids and group work. Students thus gain a better understanding of how complementary these skills are in the modern job environment. Professionals must read and research closely, listen actively and carefully, write purposefully and effectively, and present clearly and cogently, often on the same project and usually working in teams with their co-workers.

We not only had to relate departments to each other and skills to each other. For an effective delivery system, we also needed to relate the courses within the program to each other. *How are the Communications Skills Program Courses organized in relation to one another? How are they related?* Let us look first at Communications Skills Program Courses I-V, those taken in the Communications Department in the students' freshman and sophomore years. To allow for the gradual mastery of the difficult concepts of audience, the first five courses are carefully sequenced.

We wanted the parts to be connected in a logical way, from the simple to the more complex. Communications I introduces students to audience by emphasizing the deceptively simple idea summarized in the title of the course, "Audience as Self and Others." This course allows beginning college students to realize that whereas the self is often the first audience for communications, it should rarely be the last. Writing to the self is a rich way of understanding, refining, and defining issues and problems. But audiences outside the self have needs far different than our own. Students must move from egocentrism to an awareness of the demands of public discourse. This "me-first" approach has been an effective way to allow students to understand communications as a process that begins and continues in the individual before it takes its usual course of more formal audience consideration, often through the use of team tasks and other collaboration. This initial introduction to audience enables students to understand Standard American English as one of the benchmarks of public discourse.

Communications II presents students with the concept of the "Audience as Fixed and Singular." Students learn to focus on singular public audiences, primarily the professor. They see researching, speaking, listening, writing, and reading as joining in professional discussions. In Communications III, students are introduced to "Audience as Multiple and Complex," where they learn more about how success requires working in groups as well as the use of professional dialects. Students come to understand how persuasion/argument is a process of negotiation. They learn how adjusting to different audiences occurs frequently, even within a single discipline. Students learn that these various audiences have different expectations.

Course IV introduces students to the concept of "Audience as Varied and Multi-Cultural." Faculty emphasize how difficult the concept of "We" is when variations of individuals and groups are considered. Students learn to view audiences as having ethnic, gender, linguistic, occupational, and cultural differences. Students learn more about group processes and the difficulties of achieving consensus in changing situations. Students are made aware of research as a quest for alternative viewpoints, including those of other countries and cultures.

In Communications V, students learn about "Audience as Organizational and Professional." Communications V examines audience in business contexts, preparing students for the disciplinary writing they will do for audiences in their major field courses where, in their junior and senior years, they will take the last four courses of the program. Students are made aware of the differences in disciplinary (and professional) discourse, including jargon, patterns of organization, and issues of proof.

The relationship of Communications Skills Program Courses VI-IX is different. Students are required to take four more communications intensive courses in, or closely related to, their major area of study. These are not new courses, but fully re-conceived versions of the same courses that have been required in subject area majors across the college. Faculty from all disciplines are trained in semester-long seminars to integrate the CSP goals into their courses through assignments that pay close attention to various specific audiences, both expert and novice, that graduates will face in their professions. Accountants, for example, must communicate with their managers, fellow accountants, and a number of other expert audiences including banks and the Internal Revenue Service. But accountants must also communicate with their clients, most of whom, despite some expertise gained from participating in the recent stock market boom, are novices in the discourse of finance and accounting. This emphasis on audience is reflected in assignments that are, as much as possible, authentic tasks of the kind that graduates will face on the job. So accounting teachers are required to make assignments that ask students, for example, to produce ledger notes to colleagues and letters to non-expert clients. The importance the College places on integrating communications skills in subject-area courses is underscored by the fact that 50% of the grades in these courses must be based on students' demonstration of their communications skills.

Subject-area teachers become cognizant of the communications skills needs of graduates, including the professional audiences they will encounter, by doing interviews. Each faculty member confers with a professional now practicing in their field, preferably someone who has managed new RMC graduates. (See Appendix A: Professional Practitioner Interview.)

An additional advantage that grows out of this audience-centered approach to communications skills is a better understanding of our own pedagogy. Some of the benefits of a theoretical base focusing on audience include:

1. freeing English and other teachers from the tendency to view language and literature as audience-free creations;

2. providing the means for integrating other disciplines, once associated with rhetoric, such as psychology, sociology, philosophy, logic;

3. integrating new disciplines such as information science,

4. incorporating global contexts into communication instruction, releasing faculty from the assumptions that attention to immediate local context is sufficient.

Young, Becker, and Pike's tagmemic field perspective has helped us to develop a curriculum that fits into the larger context of the professional work environment which students will shortly enter. Our systematic theoretical approach also lends itself to seeing and achieving integration

of purpose, context and pedagogy, both within the curriculum itself and the curriculum viewed as a larger system of needs in the work world.

The Dynamic Nature of WAC: A Wave Perspective of One Campus.

To do a wave analysis, the tagmemic discovery procedure asks the user to view the concept as a dynamic event, or process, and as part of a larger dynamic context. Young, Becker, and Pike encourage the user to ask the following questions of the thing studied: *"What is its nucleus? How is it changing? How does it interact with and merge into its environment? Are its borders clear or indeterminate"* (127)?

The Communications Skills Program is the second writing-across-the-curriculum program at Robert Morris College. At the time of the CSP's inception, the College already had a vital ten year old program focusing on writing to learn. By many measures, this first WAC program, Writing Across the Business Disciplines (WABD), has been a success. WABD can claim one of highest percentages of faculty participants in the country: more than 50% of RMC faculty from across the College's disciplines have completed WABD, implementing re-envisioned courses that integrate writing to learn. One of the most evaluated WAC programs in the country, WABD has been assessed by an analysis of hard data from a series of protocols taken of both faculty participants in the program and non-participants. In this study Blakeslee, Hayes, Sipple, and Young used talk-aloud protocols to show that knowledge of and attitudes toward the epistemic functions of writing improved significantly among the trained faculty. Knowledge and attitude surveys, again taken by outside evaluators, of participating faculty and non-participating faculty as well as their students showed similar positive knowledge and attitude improvement among trained faculty and their students. These survey results are examined as part of an extensive case study of the program, which found that, while not without flaws, WABD achieved its goals (Carson). Besides these studies, each of the re-envisioned Full-Course Plans contains a faculty developed formative and summative evaluation plan, some of which have been published. (See, for example, Richard Lesnak's evaluation study, "Writing to Learn: An Experiment in Remedial Algebra.")

This extensive, multi-measure evaluation was instrumental in Robert Morris College winning in the fall of 1996 a U.S. Department of Education Fund for the Improvement of Postsecondary Education (FIPSE) grant to disseminate WABD as a proven reform to six other colleges and universities across the United States. In addition, the program was recognized in 1998 with a certificate of excellence in the Hesburgh competition honoring faculty development programs that enhance undergraduate teaching and student learning.

The tagmemic wave analysis focal question, "How is the nucleus of writing across the curriculum changing at Robert Morris?" leads from writing to learn to writing, speaking, listening, and reading to communicate. We could see that while the Writing Across the Business Disciplines has proven itself at Robert Morris, we also needed a Communication Skills Program. Despite the successes of the write-to-learn program, we needed to respond more directly to the reactions of the business community mentioned above: employers thought our graduates knew the subject matter of their disciplines well, indicating, in fact, that students were benefiting from WABD's saturation of the campus with *writing to **learn***. However, RMC graduates still had difficulty with the latter part of the communication process, the skills that make effective *language to **communicate*** or finished prose. In short, our graduates were not paying enough attention to audience.

Additional wave analysis prompts us to ask the following questions: *How else is WAC changing at Robert Morris? How does the nucleus of the CSP merge into the RMC environment?* The second major change in writing across the curriculum at Robert Morris is a more thorough and organized integration of the Communications Skills Program into our students' course of study. We believe that, after intensive preparation in the first five courses, students should have ample opportunity to practice the use of the epistemic and communicative functions of language as naturally as possible; that is, in the processes and products their major subject-area disciplines. The first WAC program, WABD, did not do this; however, we discovered through our heuristic questioning that a fundamental principle of the CSP must be "time on task." In order to advance student skills in writing, listening, presenting, and reading, we had to afford them more opportunities than those available in the traditional composition and speech courses, even when those courses are combined with an effective write-to-learn program. Students need more time to develop and practice these skills, and they need feedback. Thus we dropped the traditional composition and speech courses and replaced them with the nine course sequence of the Communications Skills Program, which also integrated the write-to-learn WAC program. This integration is accomplished in the last four communications-intensive courses by our own faculty who re-envision already existing courses required in the various majors. All students participate in the last half of the program by experiencing it through these re-envisioned courses. CSP faculty in every department become responsible for the integration.

How has our write-to-learn program, WABD, been folded into the CSP? The focus of WABD was the successful integration of writing to learn into subject-area courses, often at the goal level. Faculty began by specifying a rationale for their courses, thus connecting these courses to

the goals of their individual departments, which, in turn, grow out of the mission of the college. Faculty went on to identify course goals (which grow out of that rationale) and material to be covered in their courses. Using a matrix, participants bring these goals and material to be covered into active learning tasks that are often opportunities for writing to learn. Participating faculty next developed a detailed syllabus that could act as a contract between them and their students (Henderson). The course was then completed with a plan for formative and summative evaluation that allows faculty to identify what is and is not working in the course so they can adjust accordingly. This structural approach, originally created for WABD, has been adopted by the CSP and is now the model for the integration of both language to learn and language skills into subject-area courses. Our approach thus integrates the recognized major emphases of WAC: write to learn, writing in the disciplines, and, now, improved student skills (Freedman, Dyson, Flower, and Chaffee).

A more difficult question is how the Communications Skills Program interacts with the rest of its curriculum environment, namely the various disciplinary departments and courses. A basic issue concerns the intrusiveness of the CSP in individual these subject-area courses. The intense emotional nature of turf questions are familiar to us all. Such questions were at the heart of Duke and Rice Universities' recent efforts to change their curricula (Schneider). One of the first difficulties raised by Robert Morris faculty was the question of how they could maintain "coverage" of necessary course material while at the same time allocating 50% of students' grades to CSP goals. Part of our planning had to include seminar/workshop time for training in basic rhetorical principles, including especially the centrality of the rhetoric of individual disciplines, active learning, and the questionable nature of facts or principles devoid of some method of relating them. The tagmemic approach helps us define and understand the new CSP in constant relationship with the subject-area departments of the school. The very act of requiring that faculty re-envision their courses, looking closely at rationales, goals, and connecting them to instructional objectives and evaluation, has had a beneficial effect on all courses in the CSP. Our evidence for this beneficial effect lies in the course plans themselves, each a careful study of how students may best learn and communicate individual disciplinary course material. We believe we have reached a good balance of allowing language use in classes to enhance student learning as well as communication in their subject-area fields. The Communications Skills Committee, a group made up of faculty from across the curriculum, decides, course by course, that such integration has been achieved, since they must approve course plans before they can be taught in the CSP program. For one faculty participant's view, see below, "A Particle View."

Another issue related to how the CSP interacts with the rest of the RMC curriculum is the teaching of effective communications strategies, as well as some writing-across-the- curriculum theory and practice. English and Communications teachers are the beneficiaries of 30 years of process writing research and practice and only somewhat shorter experience with writing across the curriculum. The general tendency of many subject-area faculty, when confronted with the need to include more communications skill in their courses, is to assign a number of graded papers. This has been especially true of faculty who did not participate in our write-to-learn program. Because of time constraints, faculty are reluctant to grade more papers than necessary. By facing this question, we were prepared to include training in strategies for reducing the time faculty spend grading, while at the same time including practice and writing to learn for students.

The short answer to the tagmemic wave question of how the CSP interacts with the rest of the curriculum is that, while subject-areas, including the Communications Department, remain independent, we now have designated courses where communications and subject-area disciplines meet to share ways of knowing, learning, communicating, and evaluating.

The Particle Perspective: A Faculty Participant's Course View and Communications Skills Seminar Experience

Our multi-perspective view of the Robert Morris Communications Skills Program concludes with a particle perspective. The particle in this case is the individual course along with the experience of the faculty member who created it in the Communications Skills Faculty Seminar. For this part of our case study, we have selected a Department of Management course, MG 304 Organizational Behavior. The course was prepared and is now taught by one of your authors, who was a participant in the first CSP Seminar.

To achieve a particle perspective Young, Becker and Pike ask the user to "view the unit as an isolated, static entity." To fully achieve this view, the researchers suggest we ask the following questions: *"What are the [the unit's] contrastive features; i.e. the features that differentiate it from similar things and serve to identify it?"* (Young, Becker, and Pike 127)**.** What chiefly differentiates Mike's communications-intensive version of Organizational Behavior and all other CSP courses is its shift of focus and purpose and the consequent careful planning of the course. The general purpose of CSP courses is to prepare Robert Morris students with the knowledge and skills to isolate, analyze, and solve problems in the workplaces in which they will carry out their professional lives. Mike and other CSP faculty explicitly deal with the fact that much of this problem-solving activity will be intimately connected to our graduates' com-

munications skills. Hence the Communications Skills upper-division subject-area courses, CSP courses VI-IX, have a communications-intensive focus that attempts to create real-world, authentic tasks for representative audiences. Building on the work students have begun in the first five courses delineated above, CSP Courses VI-IX challenge students to continue practicing communications skills in all four "strands" of reading, writing, presenting, and listening, along with group work and appropriate technological hardware and software support.

Similarly, CSP courses differ from their usual counterpart in their means of achieving these ends. To plan these communication-intensive courses, Robert Morris faculty participated in a 17-week curriculum development effort, comprised of three-hour weekly workshops to re-envision targeted upper-division courses. These and later workshops featured presentations and discussions on communications and writing-across-the-curriculum theory, learning modalities and strategies, rubrics and assessment, goal setting, effective assignment design and evaluation, and more. As noted above, faculty interviewed practitioners in course-related fields to determine the types and specifications of communications that were most valued in new hires in their organizations. One commonly heard response from these professional practitioners, for example, was the need for concise communications. This reenforced the necessity to teach students to clearly analyze and synthesize data to be communicated with brevity. Input from practitioners was processed into specific course assignments and integrated into the new courses.

The tangible result of the workshops for each participant is a Full-Course Plan that includes the following:

1. a to-the-teacher section that explains the course plan to teachers new to the program and shows them how to use the document most effectively;

2. a course rationale delineating the purpose of the course as well as the benefits to students of this communications-intensive version;

3. a set of cognitive and affective course goals stating what students will be expected to know, do, and feel to achieve the overall purpose of the course;

4. a matrix that brings together course goals and material to be covered into active learning tasks that are often opportunities for language-to-learn. These tasks are briefly explained in the cells of the matrix, which also list the appropriate Communication Skills goals for upper level courses to indicate which assignments cover which specific goals;

5. the detailed assignments (developed from the matrix cells) of the course, specifying authentic work tasks, performed for particular real-world audiences, under specific conditions, and due at specific times;

6. criteria or rubrics for assessing the authentic tasks;

7. a plan for course evaluation employing both quantitative and qualitative measures; and

8. various appendices that provide additional suggested reading, more detailed assignment sheets, and other teaching aids and rubrics, such as audience analysis check lists, suggestions for group formation and operation, etc. A more specific, particle view of the first five components of a CSP Full-Course Plan follow.

1. In this particle isolated for study, CSP Course MG 304, Organizational Behavior, our co-author, Professor Mike Yahr, begins his course plan with a To-the Teacher" section that explains the course to other faculty, new hires, for example, who might not have experienced the CSP Seminars, but who will teach Yahr's communications-intensive version of the course. Professor Yahr tells these teachers that, although not all sections of MG 304 Organizational Behavior do, this communications-intensive section includes specific CSP goals that require students to practice the CSP "strands" of reading, writing, listening, and presenting, as well as appropriate group work and support technology.

Mike also explains that students must be given informal, ungraded assignments in Organizational Behavior that allow them to use language to learn, often in preparation for more formal assignments where students are evaluated on their mastery of course and communications skills. In preparation for an exam, for example, students may be asked to take five minutes to describe, in writing, the "culture" of their workplace, employing terminology from the text. Or, as a prelude to a discussion of values, students are asked to respond to the following questions: "Why are you in college? What value do you place on education?"

Mike points out to a teacher new to the course that if she substitutes an assignment, she must make sure that the new task meets appropriate CSP as well as course goals. He explains how the course matrix may be used to see exactly what goals a substitution assignment must meet. For example, one matrix assignment brings together the topic of "Organizational Change" with the course objective, "to restate, compare, and apply Organizational Behavior theories and concepts via essay exams, case studies, and written and oral assignments." Mike suggests that students draw on Kurt Lavin's model of change and explain its parts to a consulting client. This assignment also fulfills the Communications Skills goals "to apply and analyze the principles of audience analysis to a variety of audiences and situations," and "to demonstrate self-confidence in the application of communications skills to professional groups." But if another teacher does not find that assignment congenial, these goals could be equally well met with an alternative task such as the following: a student, acting as a manager, describes her role as "change agent" in

introducing a new performance appraisal system to a marketing department.

In this "To-the Teacher" section, Yahr also points out that all assignments must meet the *ABCD* criteria. Since it is the major focus of the CSP program, assignments must pay particular attention to *audience*, including some instruction in analysis of both expert and non-expert audiences. Students must also know exactly what specific *behavior* the assignment calls for, the *conditions* under which they will perform (such as in class, in twenty minutes, as a first draft, etc.), and the *degree* of proficiency that is expected of them to meet the criteria for satisfactory or excellent work. For example, in the consulting scenario above, a student would have to consider that a professional manager (an audience that the teacher and class will role play) will want to hear and see a fifteen minute, bullet point, perhaps PowerPoint, demonstration of the change model (behavior expected and condition under which it will be performed). To meet the satisfactory performance level and earn a"C" grade (degree of proficiency), the student would demonstrate an understanding of all three parts of the model as she presents it visually and orally, with fewer than three major communications errors. For an "A," and excellent performance ranking, the student/consultant would, in addition, define the client's problem and suggest a detailed solution for each step on the model. The difference between an "A" and a "B" would lie in the level of relevant detail and other communication skills such as organization, unity, and especially attention to audience needs, such as audience knowledge and values. While some subjectivity remains in the grading process, both teacher and student, as a result of this specific assignment process, have a better understanding of what is required to reach each grade level.

In this To-the Teacher section, Professor Yahr goes on to underscore the fact that assignments should be, as much as possible, authentic tasks that students might encounter on the job as new hires (tasks, for example, gleaned from the Professional Practitioner Interview [see Appendix A]).

A management trainee, for example, could be asked to write for her boss a one-page or less report describing the highlights of a recently attended training workshop (translated in Mike's class as an in-class lecture). The evaluation of the report will, of course, emphasize our ABCD criteria.

Each student in Mike's Organizational Behavior class, like students in all CSP classes, will be expected to include some of the course assignments in a portfolio which will meet departmental needs as well as CSP guidelines and which other teachers and prospective employers may want to see. For example, a typical student in Organizational Behavior might want to include the Workshop Report assignment to show a prospective

employer as well as other teachers in the RMC CSP her ability to listen, write, and communicate to a specific audience under specific conditions.

Mike also tells his audience of teachers new to the CSP program that all CSP Full-Course Plans must include a plan for formative and summative evaluation, including quantitative data, some of which must evaluate assignments suggested by the professional practitioner's interview, for example, that students are writing in the disciplinary genres of change model or workshop report suggested above. Mike concludes his To-the Teacher Section with the comment that all these requirements are necessary because the College has made a commitment to its students and the business community that we will graduate students who are literate in the professional fields in which they will practice.

2. Mike's Rationale for Organizational Behavior grows out of his department and school goals, which, in turn, grow out of the Robert Morris College Mission Statement. The Rationale for MG 504 further accentuates that Organizational Behavior is a natural transition from Communications Skills Courses I-V as its content focuses on influencing others through communication at the interpersonal, group, and organizational levels. Mike's O.B. Rationale includes the statistic that approximately 80% of a manager's time is spent communicating.

A communication enriched Organizational Behavior is, therefore, an applications-oriented course that directly accomplishes the goals of the RMC CSP through the development of interpersonal skills, its emphasis on communications topics, and its use of pedagogical approaches that allow the student to actively experience and practice, as well as being evaluated on, their communication skills.

3. Mike's course goals grow out of his Rationale. To help in both cognitive and affective goal statement, CSP faculty use Benjamin Bloom's and David Krathwohl's *Taxonomy of Educational Objectives* as resources for the creation of their course cognitive and affective goals. To achieve the above Rationale, Mike has decided that students will have to know and be able to do the following:

I. Employ the vocabulary of Organizational Behavior;

II. Identify potential strengths and weaknesses through standardized instruments and/or journal writing;

III. Restate, compare, and apply Organizational Behavior theories and concepts via essay exams, case studies, and written and oral assignments;

IV. Accept and manage individual differences in group situations;

V. Predict and influence others' behavior within groups and across a variety of situations.

In terms of Bloom's taxonomy, the first and third goals foster knowledge and comprehension, while the fifth and sixth goals draw the student

to analysis, synthesis, and evaluation. The second, fourth, and, to some extent, the sixth goals are affective in nature, taking the student from the level of receiving and self awareness to one of valuing individual differences.

In addition, Professor Yahr's students will have to master a number of Communications Skills goals appropriate to the third and fourth year of RMC education (see appendix B).

4. One difficulty faced in all course planning is the synthesizing of the course goals and the material to be covered in the course. The RMC CSP faces the additional difficulty of the integration of various specific communications skills goals. To solve the problem, CSP planners began with a course matrix as delineated by Algo Henderson in "The Design of Superior Courses." Henderson suggests that along one side of the matrix faculty list the course goals; along the other faculty arrange the material to be covered in the course, segmented in some sensible way such as the chapters in a book, the novels of a course, or the themes of a course. Where a goal and a part of the subject matter intersect, the teacher writes an instructional objective or assignment that both meets the course goal and covers the material. We exploited this approach further by including (at the point of intersection, below the assignment) the specific Communications Skills goal(s) that the assignment also meet(s), as noted in the consulting scenario above.

One great advantage to this approach becomes apparent if a faculty member, especially one new to the CSP, decides to change an assignment. To see what course or communications skills goals the replacement assignment must meet, she need only consult the matrix.

An additional benefit has accrued to the Robert Morris CSP Faculty Committee which must pass on all CSP Full-Course Plans before they can be taught. A simple check of the matrix shows if all communications and course goals are being met, a crucial decision since participation in the program mandates that 50% of students' grades in a CSP course must be based on achievement of CSP goals. A quick look at Professor Yahr's matrix confirms that he has included virtually all the CSP goals for years three and four.

5. At this point the CSP faculty member is prepared to write the syllabus: the detailed assignments that are, to the students, the course. Whereas the previous sections of the Full-Course Plan were directed to administrators and other faculty who might teach the course, this section is directed to students. Faculty should practice what they preach and analyze their audiences' knowledge and values, avoiding, for example, overly complex and confusing jargon.

The assignments and an introduction to them as well as other important information about the course, make up the part of the course

plan that Henderson calls an agreement between the students and the professor specifying what each will do in the course. "For the instructor, [the syllabus] becomes a plan of action, for the student . . . an aid to his learning" (108). So the faculty member will want to include at least the following: her name; the course name, number, and section; the location of class and instructor's office; class meeting times; instructor's office hours, telephone number, and e-mail address; and a statement of special accommodations. A statement of the course rationale, a list of goals, and grading procedures should also be included. Any other information that the faculty member deems important, such as a statement on plagiarism, should, of course, also be included. For example in Organizational Behavior, Professor Yahr includes a specific make-up exam policy, honesty policy, and list of helpful hints for writing and research projects in the course.

The remainder of the syllabus consists mostly of the assignments of the course. As mentioned above, these are a synthesis of the goals, both course and communications, from the matrix above. But in the syllabus they are stated in the much greater detail required to meet the ABCD criteria mentioned above.

All CSP Full-Course Plans contain sections providing rubrics and course evaluation methodologies. Mike's Organizational Behavior plan supplies model rubrics for evaluating cases, group dynamics, peer contributions, oral presentations, research, and journal writing. Additionally, Mike has included observer/reactor guidelines and suggestions for non-traditional forms of feedback (e.g. audiotapes) that provide rich reaction to student work but avoid copious and time-consuming corrections and comments. A section of the course plan concerning course evaluation delineates a half dozen methodologies ranging from surveys examining how comfortable students feel with various management disciplinary genres (as gleaned from the Professional Practitioner Interview), to class-by-class journals observations to portfolios of students writing to class grade comparisons. Mike suggests that at least two of these methods be employed each semester.

We would be remiss if we did not include, as part of our particle view, the perspective of the RMC faculty who participated in the Communications Skills Program. What do faculty think of this communicating-across-the-curriculum effort? An obvious but critical observation concerning the communications transformation process was the centrality of faculty implementation to the success of the CSP program. As one might expect, our inquisitive faculty raised many questions about both the ends and the means. A classic force field developed, where the forces of change confronted the forces for the status quo. Many of the faculty assumed they were adopting a field view when they demanded answers to questions with which the deans were struggling: How would transfer students

be managed? Would we have appropriate hardware and software to implement the project? How could class sizes be kept to a maximum of twenty? Self-interested but realistic faculty wanted assurances that if student evaluations of the new classes were not favorable, faculty chances for merit pay would not be lessened.

But perhaps the strongest force to maintain the status quo was the inertia of an already overworked faculty. This inertia, for some, was accompanied by a cynicism about the project. A small number of faculty asserted the effort would fall short of its purpose. Under-prepared students and poor implementation could derail the process. And many business faculty believed that the Communications Department was becoming too powerful. New Communications faculty would be hired to teach the first five courses, but it appeared unlikely the same would be true in the business unit. For some, the force field collapsed when the sizable monetary allocation (for stipends for faculty participation, for the creation of five [and the planning of five more] state-of-the-art presentation classrooms, for example) made apparent the RMC administration's commitment to the CSP. For most, the realization that the change was inevitable dovetailed with the genuine desire to improve communications skills and led to restrained optimism that the program would succeed.

This restrained optimism was reflected in a survey measuring cognitive and affective outcomes of the CSP process, administered a few weeks after the workshops ended (see Appendix D). Most of the responses were statistically favorable toward the CSP Faculty Training workshops. While many participants indicated that they were "encouraged to participate," a strong belief in the program's goals was cited as the second most frequent response to the question asking why they joined the seminar. Faculty participants found the practitioner interviews to be valuable. Participants better understood audience and active learning as well as why they were integrating those foundation concepts into their courses. The level of participant involvement in the workshops was high, and they better understood the problems and possibilities of teaching communications skills. Furthermore, faculty were able to mesh course goals with communications skills goals.

Two questions garnered less favorable statistical results. The response to the statement, "Overall, the seminars met my expectations" yielded a bimodal frequency distribution with a mean of 3.5 on a 7 point Likert-style scale. Qualitative comments revealed that while many faculty enjoyed the workshops and the sharing of pedagogy, many did not appreciate the 17-week format. The latter assertion was supported by responses to a statement that the 17-week format was the "best approach." Participants clearly would have preferred a shorter format.

Faculty expectations are now more realistic. We understand that the course and program development processes are nonlinear and dynamic. Corrections, revisions and modifications will, no doubt, have to be made as we implement the course plans. And, ultimately, it will be the student particles that accept or reject our efforts.

Conclusion

Skeptics might argue that our tagmemic heuristic procedure is no more than common sense. Clearly, when good administrators begin new programs, they plan and try to take into account stakeholder issues such as need, cost, and impact. However, we maintain and believe our case proves that the tagmemic heuristic procedure is more than the good intentions or experience of seasoned administrators. A particle, wave, field analysis such as the one outlined here is a repeatable system that allows program planners to examine a program from various stakeholder perspectives. The exhaustive nature of the heuristic, one that we could only suggest in this article, provides some redundancy, but allows analysis from micro to macro levels and rarely leaves issues unexamined. We recommend it heartily.

Works Cited

Blakeslee, Ann, John R. Hayes, Jo-Ann Sipple, and Richard Young. "Evaluating Training Workshops in Writing Across the Curriculum: Method and Analysis," *Language and Learning Across the Disciplines*, (Oct, 1994): 1-30.

Bloom, Benjamin et al. *A Taxonomy of Educational Objectives, Vol. I, The Cognitive Domain.* London: Longman, 1956.

Boyer, Ernest. Forward, *Corporate Classrooms: The Learning Business* by Nell Eurich. Princeton NJ: Carnegie Foundation for the Advancement of Learning, 1985.

Carson, John S. *Writing Across the Business Disciplines at Robert Morris College*. Diss. Carnegie Mellon, 1991.

Cornell, Cynthia, and David Klooster. Writing Across the Curriculum: Transforming the Academy?" *WPA* 14. 1-2 [1990]: 7-16.

Freedman, Sarah, Anne Dyson, Linda Flower, and Wallace Chaffee. "Research in Writing: Past Present and Future." Center for the Study of Writing, Berkeley: University of California, 1987.

Henderson, Algo. The Design of Superior Courses," *Improving College and University Teaching.* Vol. 13, No. 2 (Spring 1965): 106-109.

Krathwohl, David et al. *A Taxonomy of Educational Objectives, Vol. II, The Affective Domain.* New York: David McKay, 1956.

Lesnak, Richard. "Writing to Learn: An Experiment in Remedial Algebra," *Writing to Learn: Mathematics and Science*. Paul Connelly and Teresa

Vilardi, eds. New York: Teachers College Press, Columbia University, 1989.

Russell, David. *Writing in the Academic Disciplines 1870-1990: A Curricular History.* Carbondale and Edwardsville: Southern Illinois University Press, 1991.

Schneider, Alison. "When Revising a Curriculum, Strategy May Trump Pedagogy," *Chronicle of Higher Education*. February 19, 1999. A 14.

Training, Industry Report. October, 1997.

Walvoord, Barbara. "The Future of WAC." *College English*. Vol 58 - 1 (January 1996):58-79. (See also Carson. "Recognizing and Using Context as a Tool of Survival for WAC." *WPA* 17 - 3 [Spring 1994]:35-48; McLeod, Susan. "Whither WAC," *WPA*. 20 - 3 [Spring 1997]: 46-65.

Winterowd, W. Ross. *Contemporary Rhetoric*. New York: Harcourt Brace, Jovanovich, 1975.

Young, Richard E., Alton L. Becker, and Kenneth L. Pike. *Rhetoric: Discovery and Change*. New York: Harcourt, Brace, Jovanovich, 1970.

Appendix A
Professional Practitioner Interview

ROBERT MORRIS COLLEGE
Communications Skills Opinionnaire/Expert Opinion Survey
for Relevant Field Practitioners

_____
Name of RMC Faculty

_____
Number and Name of Communications-Intensive Course (6, 7, 8, or 9)

_____ _____
Name of Practitioner Corporation Position Title

_____
Date

Directions:

The faculty participant summarizes ("walks through") the salient features of the Communications Skills brochure, then places his/her course (names the course) in the context of the required 27 hours (i.e., one of four courses taken at the upper-division level in the major). Following a brief discussion of the impact of this curriculum reform on graduates from Robert Morris College, the faculty participant then asks the following series of pointed questions about the five emphases; writing, speaking, listening, reading, and the use of information technology skills as they pertain to the specific course (name it again) in relationship to the profession. The faculty participant writes answers to the questions during the interview or audiotapes the interview and at a later time fills in the questionnaire form. The faculty participant submits at least a copy of the completed written questionnaire and, if available, a copy of the audiotape to their dean, department head, and the Director of the Communications Skills Program, Courses VI-IX.

QUESTIONS

WRITING: WRITTEN DOCUMENTS

1. What kinds of written document (e.g., proposals, budgets, marketing plans, etc.) do new hires typically have to produce in this position?
2. How long do these documents usually have to be?
3. What audiences (e.g., internal vs. external, professional vs. lay, specialist vs. non-specialist, supervisor vs. peer) do these documents address?
4. What specialized vocabulary do these documents usually contain?
5. What ways do producers of these documents use to prove their position (e.g., logic, mathematics, scientific method, appeal to values)? What are the key parts to the argument?
6. Will you supply me with a sample of any of these documents or instructions for them?
7. What are some specifications for format/structure (e.g., combination of numbers and words, charts, and text) required for written documents in this field?

SPEAKING: MAKING PRESENTATIONS

1. What kinds of oral presentations do new hires in this job typically have to make (e.g., large public speeches, small group meetings, board meetings, sales presentations, etc.)?
2. How long do each of these presentations usually have to be?
3. What audiences (e.g., internal vs. external, professional vs. lay, specialist vs. non-specialist, supervisor vs. peer) do these oral presentations typically address?
4. What specialized vocabulary do these presentations usually contain?
5. What ways do producers of these presentations use to prove their position (e.g., logic, mathematics, charts, graphs, scientific method, appeal to values)? What are the key parts to the argument?
6. Will you supply me with a sample of any of these in video, audio, or written text format or instructions or criteria for them?
7. What are some specifications for format/structure (e.g, without visual aids, with visuals, etc.)

READING

1. What kinds of documents do new hires typically have to read, i.e., interpret, for this position?
2. How long are these documents typically?
3. For what audiences are they written (professional, non-professional)?
4. What specialized vocabulary do readers need to know to understand these documents?
5. In what ways do readers of these documents use the information (e.g., for writing other documents, for speaking, for knowledge application, for analysis, for synthesis, for evaluation purposes)?
6. Will you supply me with an example of typical reading required?
7. What are some specifications/structure (e.g., balance sheets, graphs and charts, tabular data, etc.) are contained in this reading?

LISTENING

1. In what kinds of situations do new hires most need close/careful listening skills (meetings, phone conversations, etc.)?
2. How long at a time do these situations typically last?
3. What audience role does the listener usually have to play in this situation (e.g., follow instructions, understand general information, provide feedback)?
4. In what ways do listeners have to respond to prove that they have understood and absorbed the messages (e.g., repeat back, follow up with notes, follow instructions, nod)?
5. What specialized vocabulary does the listener need to have to listen knowingly?

USE OF INFORMATION TECHNOLOGIES (including computers, video, CD-ROM, telephones, etc.)

1. What technological instruments must new hires be able to use in writing, presenting, reading, and listening (e.g., computers, videos, telephones, CD-ROM, etc.) in this field?
2. How do these technologies interface with the writing, speaking, reading, listening (e.g., computers for tabular reports, graphs, and word processing)?
3. Toward what audiences are these technologies directed (e.g., internal vs. external, professional vs. lay, specialist vs. non-specialist, supervisor vs. peer)?

4. What specialized vocabulary does the user of any of these technologies require?

5. What are appropriate, typical uses of the individual technologies?

6. Will you supply me with a sample of a document or presentation or assignment requiring use of one of these technologies?

7. What typical software or formats do these technologies require (e.g., WordPerfect 6.1, Harvard Graphics, Lotus 1-2-3, teleconferencing, telecommuting, etc.)?

GENERAL QUESTIONS

A. Is there any other thing you would like to add (such as a skills deficiency), which we have not discussed and which you believe needs to be addressed?

B. What advantages do you think the Robert Morris college graduate presently has or will have after the implementation of this skills program?

Appendix B
Communications Skills Goals for Years Three and Four

Goals for Communications Skills Courses VI-IX

Skills for Critical Reading, Research, and Thinking

Students will demonstrate their knowledge of and ability to:

- 3a. analyze self-concept and explore its impact on communication
- 3b. analyze the effectiveness of their own and others' communication strategies
- 3c. analyze the source of communication problems, including cross-cultural misunderstandings
- 3d. apply and analyze the principles of audience analysis to a variety of audiences and situations in order to determine appropriate communication strategies
- 3e. perform sustained library research using both print and electronic sources for in-depth projects such as case studies, critical essays, and reports

3f. select appropriate media for communicating with others, including intercultural audiences.
3g. demonstrate self-confidence in these skills areas as related to their majors and their career goals.

Skills for Communicating

Students will demonstrate their knowledge of and ability to:

4a. apply, analyze, and evaluate communications appropriate to their disciplines or professions and develop strategies for resolving communication problems, including cross-cultural misunderstandings
4b. create communications that are clear, coherent, and logically sound
4c. demonstrate a command of standard written and spoken American English, including accuracy in spelling, grammar, and pronunciation
4d. prepare all writing necessary for job searches including resumes and letters of application, and conduct themselves effectively during the interviewing process
4e. use appropriate computer software and other electronic media to create professional reports and presentations, including illustrations and visual aids
4f. use computer software to create appropriate support materials for presentations
4g. demonstrate self-confidence in these skills areas as related to their majors and their career goals.

Skills for Communicating in Groups

Students will demonstrate their knowledge of and ability to:

5a. apply communication principles that underlie group problem solving and decision making
5b. apply principles of leadership to motivate groups to achieve organizational objectives
5c. apply strategies for managing apprehension, aggression, and conflict in group interactions
5d. apply strategies for negotiations in group interactions
5e. participate appropriately in all kinds of professional groups.
5f. demonstrate self-confidence in their applications of communications skills in professional groups.

COURSE OBJECTIVES	Bloom's Taxonomy C = cognitive A = affective	TOPICS: How do we know what we know. The evolution of management thought. Communication.	TOPICS: Individual Attributes, Motivation, Job Design	TOPICS: Values, Attitudes & Ethics	TOPICS: Groups, Decision-Making & Creativity	TOPICS: Leadership, Power, Conflict	TOPICS: Organizational Culture, Change & Stress
To employ the vocabulary of Organizational Behavior/Management in written assignments and oral presentations.	C Knowledge	Write definitions of laboratory, field and non-experimental research. 4b. 4c.	List 3 hygiene and 3 motivation factors, according to Herzberg? Do you agree with his categorization? 4b. 4c.	What does Allport mean by aesthetic and political values? How would you manage someone who is high in each value? 5a. 5f. 3a.	Explain social loafing and group polarization in terms a friend would understand. 3d.		Differentiate among artifacts, values and assumptions. How might they affect communication in a firm? 3c.
To identify potential strengths and weaknesses through standardized instruments and/or journal writing.	A Receiving Responding	Describe in your journal your attitude toward learning about history. 3a. 3g.	Determine your Myers-Briggs typology. What does it imply about your strengths and weaknesses? 3a. 3b.	Do you consider yourself an ethical person? Describe a personal action that you consider ethical. 3a.	Engage in the "Creative Problem Solving" exercise on p.305. 3a. 5b.	Take the Thomas-Kilmann Conflict Mode Instrument to determine your preferred conflict resolution style. 3a. 3b.	In your journal, describe the culture at your workplace. Do you fit the culture? 3a.
To restate, compare, and apply O.B. theories and concepts via essay exams, case studies and written and oral assignments.	C ComprehensionApplication	Create a testable hypothesis about worker productivity. Identify the independent and dependent variables. 4a.	How does Alderfer's ERG theory differ from Maslow's hierarchy? Explain their use to a new manager. 3d. 3f. 4a. 4b.	Explain how values relate to attitudes. 3a. 3c.	Compare and contrast brainstorming, nominal group technique, devil's advocate and dialectical inquiry. 5a. 4b.	Which type of power is the strongest? Why? What is your preferred type? 3b. 3a.	Draw Lewin's model of change and explain its parts to a consulting client. 3d. 5f.

To accept and manage individual differences in group situations.	A Valuing		Explain how externals differ from internals. How would you manage each? 3d. 5b.	Play devil's advocate to your group's decision in The Alligator River Story. 5a. 5c.	Employ a "role negotiations" form to resolve problems in your group. 5d. 5c.	What type of leadership style would be appropriate in an O.B. class? Explain. 4a. 4b. 4c.	Write a dialogue between a manager and a subordinate who resists change. 5c. 3d.
To predict and influence others' behaviors within groups and across a variety of situations.	C/A Application Analysis Organization	Provide effective feedback to a member of your group. 5a. 5f. 4a.	Identify high and low monitors in your group. How do they differ in their approaches to group work? 5d. 5a.	How dd you manage a worker who exhibits indifference to her job? How wuld you communicate your feelings? 3d. 3f.	Engage in an oral, group presentation to teach the class on O.B. topic. 4f. 5f. 3f. 3e.	Identify a leader in your group and describe the pluses and minuses of his/her style. 3b.	How would a memo to a superior differ in an adaptive and nonadaptive culture? Write a memo for the former. 3d. 3c. 3f.
To mentally construct and state, in writing, frameworks for solving practical and ethical business problems.	C Analysis Synthesis Evaluation	Suggest a research design for testing the hypothesis in item 3 above and explain it to your boss. 3d. 3f. 4f.	Draw the Job Characteristics Model and explain how "core job dimensions" might lead to the "critical psychological states." 4b.	Write a one and one-half page essay resolving a "What would you do?" scenario from the periodical Business Ethics. 4e. 4c.	Explain to a Board of Directors how TQM would change your firm. 5e. 5f. 3d.	Read Robert Jackall's Moral Mazes and write an essay describing what makes for power or powerlessness in an organization. 4a. 4b. 4c.	

Appendix C
Course Matrix for Organizational Behavior

Appendix D
Communication Skills Project Survey
N•30 n=19

1. Why did you volunteer to participate in the communications skills seminars? (Indicate all that apply and prioritize your responses with "1" designating the most important reason.)

2 strongly believe in the program's goals(8)
4 personal improvement(5)
1 was encouraged to participate(11)
__ promotion/PDR value
__ stipend
3 other: expected of me; to meet people from other departments; prefer over teaching another class; only one in department; required to participate.

2. At this time, are you less or more optimistic about the success of the communication skills program?

very pessimistic mode(8) very optimistic
1 2 3 4 5 6 7 (range=2-6)
x=4.2

State your reason(s) and why:

-need to see outcomes from first five courses
-the program refuses to address transfer students, the majority of our student body
-if it does what it sets out to do there will be a significant benefit
-lacks clear model; too broad and unfocused
-somewhat optimistic because there are a lot of people in the seminar who are committed to improving communication skills and working hard; somewhat pessimistic because the program doesn't seem well organized.
-no planning done
-faculty will make it happen
-need time to see if what we designed is realistic
-inertia difficult to overcome
-I have reservations about the availability of resources
-discussions with faculty teaching the first two courses have lead me to believe they will not give students adequate incentives to use Standard American Edited English in their work.

-commitment of (1) leaders, (2) dollars and (3) institution
-it will boost enrollment
-top down - Machiavellian

3. Overall, the seminars met my expectations.

did not meet expectations			mode(4) met expectations			mode(4) exceeded expectations	
1	2	3	4	5	6	7	(range=1-6)

x=3.52

In what ways were your expectations met or not met?

-speakers and sharing info great
-able to get to know the faculty better
-I might have liked a standardized format for the whole project. When I finally finished it there were others that I liked better than mine!
-We wanted to work on our courses but were continually forced to listen to inappropriate talks.
-professors are opinionated and we already know a lot about communication skills
-text, handouts helpful, but not used well
-goals foggy; sessions repeated too much; no clear answers given to questions
-I thought I would get a lot more guidance.
-It really didn't teach me anything new
-The whole idea is a rehash of twenty years ago
-The emphasis was on "putting" your time in for the week
-Wonderful seminars at times-those allowing lots of give and take especially.
-attempts to directly apply WABD criteria confused participants
-got good ideas for my class
-good, collegial cross-discipline assistance
-talking down to faculty, most of whom were more qualified than the presenters.

4. The 17-week workshop format was the best way to approach course development.

				mode(5)			
strongly disagree						strongly agree	
1	2	3	4	5	6	7	(range=1-6)

x=3

4a. What other format(s) would you suggest?

-shorten it
-the few times that we had to work on our own was good
-could do in 12 weeks
-better material, sequence of content
-4-5 week seminar with a couple of weeks of working; I would have preferred one speaker [not 2-3] and then work/discussion time.
-more instruction on design of writing syllabus and less time on presentations
-smaller break out groups where problems and issues could be defined, researched and presented back to the group
-17 weeks is good; suggest more small group projects as opposed to lectures
-help from comm. people when necessary
-good pacing
-in truth, we need continuous training from experts
-The problem with the seminar was not the format. The problem with the seminar was the lack of content in many presentations
-Do it over the intersession

5. Information from the practitioner interview will enhance my course.

strongly disagree mode(7) strongly agree
1 2 3 4 5 6 7 (range=1-7)
x=4.7

6. I understand how to incorporate the concept of audience in my targeted course.

mode(6)
strongly disagree strongly agree
1 2 3 4 5 6 7 (range=1-7)
x=5.5

7. I understand the anticipated level of development that students will have achieved in the first five courses of the program.

mode(6)
strongly disagree strongly agree
1 2 3 4 5 6 7 (range=1-6)
x=4.2

8. I would describe my level of involvement in the seminars as:

mode(8)

very low very high

1 2 3 4 5 6 7 (range=1-7)

x=5.1

9. I see how to relate the objectives of my targeted course with the skills objectives for years three and four.

mode(7)

strongly disagree strongly agree

1 2 3 4 5 6 7 (range=3-7)

x=5.3

10. I have integrated materials from the seminars, including active learning, in my course.

mode(7)

no integration some integration much integration

1 2 3 4 5 6 7 (range=3-7)

x=5.6

11. I better understand the problems and possibilities involved in designing and teaching communications intensive courses.

mode(7)

strongly disagree strongly agree

1 2 3 4 5 6 7 (range=4-7)

x=5.4

12. What did you like the most about the seminars?

-Faculty sharing info about the way they have handled the "task"
-Texts, handouts
-Presenters/presentations (Dr. Graham)
-Listening to what people were doing in their classes
-Getting time to think about course
-Refreshments
-group work
-active learning methods
-training in course design
-working across disciplines

13. What did you like the least about the seminars?

-When the session is finished, it's finished. shouldn't keep faculty to a set "finish" time.
-Constant belly-aching from some quarters.
-Some condescending from Communications faculty
-Lack of model for project
-Repetition (3 weeks on a grid!)
-Lack of evaluation data/feedback on courses I-V.
-Too much wasted time
-Attitude among participants/instructor-treated without professionalism
-Some presenters were not in tune with the seminar
-Why did some people get excused?
-Not well organized or focused
-Presentations not very helpful or relevant
-Venting of political frustration
-initial negative attitudes of some participants
-The presentation by Dr. Burley-Allen of warmed over 1970s psycho babble was the low point of the seminars.
-the lack of respect the planners of the seminar had for the audience was often evident.

14. What difficulties do you anticipate in teaching your redesigned, targeted course?

-Getting through all the material in the discipline
-Dealing with students who have not mastered communications.
-Most of my students are not going to be properly prepared as the program is presently designed
-Media, resources, classroom design
-I need to keep focused on how students are reacting to the ideas.
-None
-The incorporation of communication skills would be okay, if we had a better caliber student
-The discomfort of change...that will disappear with time and experience
-Wondering whether we've overdone it-too many expectations
-innovation will be experimental; fine tuning of courses may take semesters
-more work on evaluation means less time for content
-locating or creating appropriate textbook

-only difficulties if my colleagues award passing grades to those who do no communicate clearly and effectively.
-class size must stay at 20!
-the first four courses will not produce what they promised

15. What difficulties do you anticipate in preparing others to teach the communications intensive courses that you designed?

-None. No one else will teach it.
-None. Will adjust
-Time
-Implementation takes work
-That they'll believe the whole idea to be a waste of time/effort
-They will see the incorporation of communication skills as an attack on course content
-Will other faculty understand the activities in this course?
-Some find change difficult
-no way to convey all that discussed in 17 weeks; ideally all should go through this process.
-I would expect others to accept the premise of communication skills without accepting how I chose to approach its goals.

16. Please list the distributed materials that were most helpful to you.

-session on rubrics
-Hendersonian grid (C. Woratschek's style)
-listening skills
-soft back text (Bean)
-different learning styles
-affective/cognitive goals
-handouts (active listening, rubrics)
-Blair Handbook
-syllabi/grids that were shared
-could have been told about Journal of Business Communications (Library)
-effective writing
-handbook from accountant
-all presenters/materials were informational

Writing in Conservation Biology: Searching for an Interdisciplinary Rhetoric?[1]

Betty Samraj
San Diego State University
John M. Swales
The University of Michigan

Writing in a new or emergent field, especially one with an interdisciplinary ethos, is generally reckoned to be problematic; certainly more so than in areas where there has been a historic accrual of conventions for writers and expectations for readers. Bazerman (1988) argues, for example, that political science "has yet to forge a consistent nature" (p. 288) because of its struggle to accommodate science and political philosophy. Similarly, Wignell (1998) ascribes the heterogeneous nature of sociological discourse to a lack of synthesis between the discourses of science and the humanities. More self-evidently interdisciplinary fields tend to be newer and smaller. Commenting on a particularly complex web of intertextual links in urban planning, Dunlap (1992) notes that:

> the newness of the field, its changing mandate, its eclectic disciplinary identity, its needs to communicate with both academics and those immersed in practice, its possibly precarious future — all affect planners' conceptions of themselves and their discourse. (p. 215)

On an individual level, Journet (1990, 1993) offers telling historical case studies of pioneering struggles for interdisciplinary discourse. In the earlier paper, she states that to achieve an emergent discourse of neuropsychiatry Luria and Sacks "blurred the genres of neurological and psychological writing, combining the analytic exposition of neurological data with psychological narrative and story" (p. 182). In the later one, Journet analyzes the role of Jelliffe (1866-1945) in creating a new genre of the neurological case study by fusing exposition and narrative and by combining abstract generalizations with the unique specifics of particular patients.

The growing importance of work in interdisciplinary rhetoric is clearly seen by a fairly recent issue of *Social Epistemology* (1995) devoted to this topic. The four case studies reported therein focus on texts straddling

genetics and natural history, genetics and paleontology, paleontology, statistics, and astrophysics, and on an unsuccessful interdisciplinary text in geophysics. These studies explain the interdisciplinary nature of these texts not just in terms of rhetorical constructs such as the ethos created or the types of appeals made to a heterogeneous audience, but also in terms of more specific textual features such as the presence of definitions and explanations, and the types of intertextual links made by the authors (Ceccarelli, 1995; Journet, 1995; Sullivan, 1995; FalerSweany 1995).

Environmental discourse, the focus of the present study, has also been examined in terms of its complex and conflicting rhetorical exigencies, perhaps in response to the fact that such discourse on the environment somehow seems central to late twentieth century political, scientific and educational life. The genre of environmental impact statements has come under particular scrutiny (Miller, 1980, 1984; Killingsworth and Palmer, 1992a, 1992b; Killingsworth and Steffens, 1989). Miller (1984, p. 164) claimed that "the imperfect fusion of scientific, legal and administrative elements" prevents an interpretation of the documents as meaningful rhetorical action. Killingsworth and Palmer's *Ecospeak* (1992a), the only monograph known to us on environmental discourse, traces the history of environmental rhetoric and provides a comprehensive description of various types of environmental writing ranging from newspaper reports to research articles. The results of textual analyses of several different genres are related to the ideological beliefs of various environmental constituencies such as "deep" ecologists, economists, scientific ecologists, and government officials. Generic comparison is carried out in terms of such oppositions as natural history versus theoretical science, familiar language versus scientific language, human interest versus natural science, applied research versus basic research, and "gray" literature versus refereed literature. Killingsworth and Palmer thus provide an interesting picture of "several distinct ethical and epistemological perspectives on environmental issues" (1992a, p. 11) via the analysis of texts produced by groups involved in environmental affairs.

More recently there has been an edited volume on environmental rhetoric (Herndl and Brown, 1996), which mainly includes studies of various types of environmental oral and written discourses such as apocalyptic narratives, nature writing, risk communication, and public discussion sections in hearings. These studies provide insights into the rhetorical strategies employed in each type of environmental discourse and the functions of these strategies in the contexts in which the texts are used. Although, like *Ecospeak*, most of the articles are not directly concerned with the possible interdisciplinarity of the texts studied, two of the studies do point to the hybrid nature of one common type of environmental writing, nature writing. Slovic (1996) presents an account of this genre's

combination of natural history and spiritual autobiography and considers the tensions that arise from the use of rhapsodic and jeremiadic rhetorical modes within the same text. To a smaller degree, the interdisciplinary nature of Leopold's nature writing is also discussed by Ulman (1996), who focuses on the complex personae, and ethos created by Leopold in the experience-based ecological essays he wrote.

As we have seen, several different types of environmental discourse have been discussed with clarity and lucidity in the literature. Even so, researchers in this area have had so far little to say about the discourses produced by students in environmental science. In principle, therefore, investigations of student writing in environmental fields would add to the little that is known about the writing practices students engage in when seeking to enter an interdisciplinary community, especially if they could be directly compared with the writings of post-apprentices in the same area. To date, only a few studies on writing in interdisciplinary courses at the graduate level have apparently been conducted. One is Henry's (1994) analysis of writing in a class on landscape design theory, triangulated to encompass the students' written texts, the comments of the instructor and the graduate teaching assistant, and the uncertain history of the field. Another is that of Dunlap (1992), referred to earlier, which discusses the problems that students in urban planning face as a result of the contradictory and yet-to-be established norms.

We have selected five papers to illustrate the rhetorical exigencies of interdisciplinary writing in the environmental area. All five come from the field of Conservation Biology. There are three final term papers written by students taking a 500-level masters course in this subject (out of a class enrollment of 25). The first of the student texts presented was judged by the instructor as being unsuccessful, the other two as being broadly successful. The fourth text is a book chapter by the instructor herself, at the time of writing a relatively junior professor (Root, 1993). The final text, which is partly based on the fourth one, is co-authored by the instructor and a well-known climatologist from another institution (Root & Schneider, 1993).

Thus, we offer a "ladder"of five texts onto which we can map textual and contextual analyses. In so doing, we can explore how attempts at interdisciplinary "bridging" are variously made, such as via the integrating of theory and practice, of scientific finding and environmental recommendation, of small-scale and large-scale studies, or of concepts drawn from two or more fields of inquiry. However, before discussing the texts themselves, we feel it may be helpful to situate them within the evolving perceptions of graduate education in our research site, a School of Natural Resources and the Environment (henceforth SNRE) at a large public midwestern university, and how these perceptions relate (or do not relate)

to the struggles toward interdisciplinary status in the sub-field of conservation biology.

The Emergence of Environmental Studies

Environmental studies or environmental science has a somewhat confusing intellectual history, brought about in part by differing views as to whether ecology is best conceived as a theoretical or applied field. However, one common conceptualization is to see environmental science as having developed from ecology, itself an offspring of the two original branches of natural history, botany and zoology. As the field of ecology has developed, it has turned its attention to more applied concerns, at least partly in response to mounting evidence of environmental change and degradation in many areas of the world. So today, environmental science, from an original base in ecology/applied ecology, now encompasses fields such as resource economics, resource policy, environmental ethics, and conservation biology.

However, this potted intellectual history (or any variant of it) is not in any close or isometric relation with the history of environmental education at our research site. While there have doubtless been intellectual influences, a stronger set of determinants of change appears to have been shifts in the occupational, administrative and legislative landscape. These latter effects are well captured in the changes in nomenclature for this activity during this century:

1901 — Department of Forestry formed.
1927 — School of Forestry and Conservation established.
1950 — A separate Department of Conservation created and the school renamed the School of Natural Resources.
1966 — Department of Landscape Architecture transferred from the School of Architecture and Design.
1970 — Departments disbanded and replaced by Concentrations in Resource Ecology and Management, Resource Policy and Behavior, Forestry, and Landscape Architecture.
1992 — Name of school changed to the School of Natural Resources and the Environment (SNRE).

These changes in organizational structure and self-designation seem to show the school adapting primarily to changing job opportunities for its masters and doctoral students and only secondarily to increasingly inter-connected ways of presenting and producing professional environmental knowledge. This evolution thus privileges exogenous interdisciplinarity, which originates outside the university because of problems in society, rather than endogenous interdisciplinarity, which is con-

cerned with the production of new knowledge per se (Klein, 1990). However, it is endogenous interdisciplinarity which was highlighted by the dean of SNRE in the 1991/92 Annual Report, which could claim, with that level of modesty characteristic of the genre, that "For more than 50 years the School has set the standard in teaching and research, and we're a model of interdisciplinary learning and teaching, with biologists, foresters, social scientists and landscape architects all under one roof" (p. 42). But having diverse types housed "all under one roof" does not, of itself, interdisciplinarity make. While many in SNRE-type institutions have recognized that environmental studies has needed to develop into an interdisciplinary field, if only because environmental problems are "multi-faceted" (Hay, Todd & Russell, 1986) and do not come in "disciplinary-shaped blocks" (Petrie, 1992, p. 305), the ways in which this has worked out in educational practice seem for the most part indirect. As one of our instructor informants commented: "The hope is that students acquire knowledge for different disciplines while they are here, and they get some skills that let them function in a workplace that forces them to do some integration" (interview data). Interdisciplinarity thus seems more of an occupational opportunity than of a directly-structured educational goal.

So, in SNRE itself there is ostensibly considerable waving of the interdisciplinary flag, such as the use in many courses of guest lecturers from other disciplines. However, in our experience, these occasional migrations rarely impact much on assigned readings, on the ethos of the main lecture series, or on the types of course assignments expected of the students. For the most part, the masters students seem most akin to sea-rovers voyaging from one disciplinary course-island to another, accumulating knowledge capital of a different currency on each.

That said, at least one of the so-called interdisciplinary courses in this institution announced itself as taking its "interdisciplinary responsibilities" seriously: the 517 class in Conservation Biology taught by Terry, a recently-promoted associate professor. It is perhaps not surprising that a stronger integrative ethos should have been located in this course (rather than in Resource Policy or Wildlife Behavior), since conservation biology is a "crisis discipline" whose goal is to "provide principles and tools for preserving biological diversity" (Soule, 1985, p. 727) and acts as "science in the service of conservation" (Noss, 1993, p. 215).

Conservation biology thus appears, at least potentially, to be triply articulated: it attempts to co-manage theory and practice; it is catholic in its incorporation of elements ranging from pure science to social science; and it is integrative. In terms of this last, it is worth noting Petrie's (1992) distinction between multidisciplinary and interdisciplinary research, where the former is additive rather than integrative and the latter involves a change in some key elements of disciplinarian's use of concepts and tools

and hence is integrative. This putatively seems to be the position adopted by Terry, the central figure in our story; for her, multidisciplinary activities in SNRE and elsewhere represent "the bare minimum" (Root, 1993, p. 291) and are but a waystage to somewhere else — and somewhere better. This paper, therefore, focuses on the 517 class in Conservation Biology and selected writings of the instructor.

Observations on the Primary Research Site

Terry stated at the beginning of the semester that the goal of her 517 course was to move the students from a multidisciplinary perspective to an interdisciplinary one. Though she did not explicitly define the difference between these two stances, she did mention early in the semester the different disciplines that contribute to conservation biology, such as botany, ecology, economics, and politics, and also pointed out that interdisciplinary study is difficult to undertake as integration is never taught (c.f. Petrie, 1992). Even though we could recognize that Terry perceived interdisciplinarity to be integrative and saw this to be the goal of the course, the course itself in reality bore a greater resemblance to the encyclopedic approach associated with multidisciplinary education, as characterized by the additive juxtaposition of disciplines (Klein, 1990, p. 56). This course indeed included topics ranging from biological issues such as calculating allele frequencies to social ones such as overpopulation. There were also several guest lectures by lecturers from such fields as cultural anthropology and paleontology. However, no interdisciplinary synthesis was provided either throughout the course or at the very end.

There was only one major writing assignment for this course. A list of possible topics was given to the students and they were instructed that papers "could not be all policy and had to be at least 50% biology." Terry also discussed the overall organization of their papers, making it clear that they needed to specify a problem in the introduction and that the writing had to be concise. Though Terry spent class time discussing the nature of the students' peer critiques, the structure of their papers, and features of the oral presentation of their papers, none of her comments addressed the interdisciplinary dimension of the research papers.

The instructor allowed the first author to attend all her lectures for a semester, make copies of evaluated student papers (with the students' consent), talk to the students about the papers they produced for the course, and discuss the papers and grading criteria with her teaching assistant and her. There were two principal reasons for attending all the classes. First, it allowed the first researcher to become familiar with the subject matter so that there would be less content ignorance when analyzing the written texts. Second, attending the classes provided important information on the ways in which the writing task was framed and dis-

cussed, allowing the investigator to explore possible connections between " classroom contexts, students' texts and professor's responses" (Prior, 1992, p. 282).

22 out of the 25 students taking this course agreed to be part of the study. (See Samraj 1995 for a complete discussion of the methodology and full analysis of all 22 texts.) Copies of the graded papers were made before they were returned to the students. Thus, we had access to the instructor's and teaching assistant's assessment of the papers, including the grade or score, as well as to the written comments and evaluations which proved indispensable in providing the specialist's view on the strengths and weaknesses of each text. In fact, none of our own judgments was used to determine the success of the papers written in this course.

Five Texts

The first three texts are term papers from the course in Conservation Biology, the first judged to be unsuccessful (written by Jessie), and the other two deemed successful though in slightly different ways (written by Adele and Ned). The last two texts consist of a book chapter by the instructor (Root, 1993) and an article co-authored by the instructor and a climatologist (Root and Schneider, 1993). None of the five texts has the format of standard research papers, such as an Introduction-Method-Results-Discussion (IMRD) section arrangement (Hill et al., 1982). Although all five certainly contain passages that reflect scientific style as discussed by Bazerman (1988), Swales (1990) and Montgomery (1996), they also contain elements of exhortation and advocacy. Because the student Conservation Biology papers were not reporting original research, we might not expect them to be organized like published research articles, but to have more of the character of reviews. Indeed, Johns (1995) has usefully shown that coursework papers, which she refers to as classroom genres, have different communicative purposes compared to published research articles and this results in different overall organizations. Likewise, the published papers in our study also do not have the IMRD structure since they also do not report new empirical findings, but rather present their own previous work to readjust research priorities.

Jessie

Jessie's paper illustrates some of the difficulties graduate students without field experience have with producing interdisciplinary writing. Her paper "Influence of Sex Ratios on Fitness in Reptiles" mainly discusses the explanations that have been offered by researchers for the persistence of skewed sex ratios in adult reptile populations. This paper refers exclusively to articles in biology and ecology, there apparently being no references to sources from the social sciences. It looks at first sight

as though this is a disciplinary text and not an interdisciplinary one; in fact, Jessie's paper, in both topic and treatment, seems to have migrated from one of the other graduate courses in SNRE such as Wildlife Behavior and Ecology.

Jessie's paper can be said to have the Problem-Solution structure, by far the most popular type of organization among the student papers (18 out of 22) from Conservation Biology. However, the "Problem" in her paper does not concern some factor surrounding a species' diminution or problems with solutions currently being offered for a conservation problem. Rather, in her paper she problematizes the theoretical explanations that have been offered for skewed sex ratios in reptiles (as indicated by her heavy use of negative evaluation). Though skewed sex ratios in a species is undoubtedly a conservation concern, her paper is organized around the problem of how ecological theories might or might not account for such behavior instead of the nature and extent to which this phenomenon is a problem to conservation. Consider the opening sentences of her paper:

> Many taxa are known to exhibit significantly skewed sex ratios in adult populations (Mrosovsky and Provancha 1991). This clearly contradicts Fisherian theory, which suggests that an equilibrium sex ratio of one male to one female will be maintained by selection (Fisher 1930). (Jessie 1-2)

The problem presented in the first sentence is thus immediately related to a theoretical consideration. This rhetorical strategy continues throughout the paper, resulting in an organization centered around three explanations that have been offered for skewed sex ratios in reptiles. The structure of this paper thus appears similar to that of review papers with a cyclical structure (Belcher, 1995, Samraj, 1995), where an aspect of a theory or a finding of some study is reported and then commented on. This pattern of description-comment can be seen in the following two short extracts (our emphases):

> Several researchers have observed that some species with TSD lay clutches of eggs which prove to be nearly or completely unisexual (Mrosovsky and Provancha 1991; Vogt 1984). *This is advantageous if both the cost and potential of brother-sister matings are high*....Ewert and Nelson have suggested that some freshwater reptiles (such as turtles or crocodilians) might be regularly restricted to this breeding situation. For instance, a population of turtles may consist only of those found in a single pond or a small group of ponds, and in fact most such populations of turtles are female

> biased (Schwarzkopf and Brooks 1987). *In such cases, inbreeding would be common, and a loss of herterozygosity should be expected in wild populations*. (Jessie 13-14, 25-27)

As might be expected, the Problem-Solution Conservation Biology papers written by students generally end with recommendations for conservation actions as well as recommendations for future research. The extract below contains the last two paragraphs of Jessie's paper, where her recommendations appear (our emphases):

> If this happens, *then conservation efforts will need to focus on maintaining historically correct sex ratios of adults*. Sex ratios of juveniles can be easily manipulated by controlling the incubation temperature in a hatchery. Size of hatchlings may be controlled as well by other factors, such as moisture, which will not influence sex determination (Ast, unpublished). *Thus, unbalanced sex ratios due to differential fitness could be overcome by careful control of hatchery conditions.*
>
> Unfortunately, it is not known whether the juvenile sex ratio will remain stable up to and through maturity. Furthermore, true sex ratios of wild adult populations are largely unknown, and whether present-day sex ratios are historically correct is also unknown. Any attempt to change sex ratios, without a knowledge of the forces responsible for them in the first place, could have severe consequences for the population. *Further investigation into the evolutionary and environmental factors producing skewed sex ratios is clearly needed*. (Jessie 54-61)

In the first paragraph conservation effort is advocated. The first sentence states in general the need to maintain historically correct ratios. The second sentence then tells the reader how this can be done, that is, by controlling the incubation temperature. The final sentence restates in general terms what can be done to overcome unbalanced sex ratios. Unfortunately for Jessie, the author claim in the final paragraph in this paper makes it clear that the conservation effort advocated is in fact based on assumptions that are unverified. In consequence the writer then retreats to stating the need for further research, since she has in fact already negatively evaluated the action advocated — to change sex ratios — in the previous paragraph. This paper, then, does not in fact suggest any conservation action, let alone come up with a conservation scheme (because the only conservation action advocated is negatively evaluated).

This lack of resolution doubtless underlies Terry's final written comment that "the link to conservation was ... not too strong."

Even with these brief extracts, we hope to have communicated that Jessie establishes her persona in the text mainly through her discussion of implications of ecological theories and not by recommendations for conservation actions. Though the paper appears to have the Problem-Solution structure that characterizes many of the more successful student Conservation Biology papers, a closer analysis of the text reveals that the problematization concerns theoretical matters and not issues surrounding a species' diminution. In this paper, Jesse has yet to cross the bridge from biological science to conservation biology.

Adele

Adele majored in psychology and geography as an undergraduate and, in contrast to Jessie, produced a paper that was quite highly ranked in this course. Her paper focuses on the importance of educating and involving the public in wildlife migration. In doing so, she does not only discuss biological factors but also investigates socio-political factors that affect the migration of species, especially of the gray wolf.

Adele's paper is comparable to Jessie's paper in that it too has the Problem-Solution structure. The problem focus of the 18 papers with such an overall organization is typically some factor surrounding a species' diminution or inadequacies with the solutions currently offered for a conservation problem. Most of the papers then go on to deal with solutions to problems faced by an endangered species or concern themselves with debates about possible solutions or lines of action. In consonance with this model, Adele's section headings indicate clearly enough the paper's basic organization in terms of its Problem-Solution structure:

1. Introduction
2. Migration of the Gray Wolf: A Case Study
   History
   Obstacles affecting migration
   Overcoming the obstacles affecting migration
3. Global Warming and Wildlife Migration
4. Educating and Involving the Public
5. Conclusion

Further, the Problem-Solution pattern is fleshed out by the fact that section 2 is a case study that itself functions as a problem-solution structure embedded within the larger one.

As already noted, the Problem-Solution Conservation Biology papers written by students generally end with recommendations for conservation actions as well as recommendations for future research. However,

as can be deduced from the instructor's comments elsewhere in other papers, the recommendations for conservation actions are of primary importance. In Jessie's paper, the failure to establish the basis for making a conservation recommendation is criticized. In other cases in the database, the instructor shows impatience with any suggestion for further research. In one case in a paper on macaws, the instructor reacts to a research recommendation by stating, "If we wait, they all may be extinct," echoing the view that conservation biology is a crisis discipline, where action has to be taken immediately.

Adele does provide a number of recommendations for management actions and thus establishes her stance as a conservationist (in contrast to Jessie):

> If global warming occurs rapidly, as predicted, mass migrations of wildlife species may occur, affecting all people, either directly or indirectly. Therefore, it is imperative that wildlife managers become adept at understanding the interactions between humans and migrating wildlife, and at managing not only wildlife recovery programs, but also public education and involvement programs. (Adele 101-103)

As the above extract shows, Adele's paper is suitably integrative. She draws on ecological information concerning the behavior of wolves, information on global warming, and sociological theory on the nature of human behavior in order to present suggestions for the problem of wildlife migration. Some of this is an integration already well-addressed in the conservation biology literature (and in Terry's lectures) but relating sociological theory of human behavior to wildlife behavior is a new synthesis produced by Adele in her attempt to suggest solutions to the conservation problem. It is not surprising that Adele's balanced and competent literature review caused Terry to comment that she had chosen "a good topic" for her paper.

Ned

The third selected paper was written by Ned, a native speaker of Swedish. It stands out from the majority of the student Conservation Biology papers by being one of two case studies produced. It mainly focuses on a Swedish eagle conservation project, but also briefly examines the strengths and weaknesses of other eagle conservation projects in Finland, Scotland and the US before providing recommendations. As both the topic and paper suggest, he has had prior experience in conservation biology. This is a paper that the instructor said should be published, but as far as we have been able to ascertain the student finished his masters program without reworking it for possible publication.

A main difference between this paper and the Problem-Solution papers lies in its focus on evaluating the conservation strategies used in a specific case study. Both positive and negative local evaluations are made, and these then form the basis for the author's own local management and research recommendations, creating a Situation-Evaluation-Recommendation sequence. Ned's evaluation of actual conservation programs seems to exhibit considerable familiarity with conservation actions taken in the real world in his area of interest. For example, in the excerpt below, Ned reports a positive evaluation of the work of the Swedish Association for the Conservation of Nature (SNF), this evaluation then leading to a closing recommendation:

> SNF effectively used media and mobilized volunteers to work on the project. Being the largest environmental organization in Sweden, SNF reaches a large part of the population through its campaigns and publications ... Thus, involvement of NGOs in the planning and implementation of similar projects is likely to be beneficial. (Ned 115-120)

Ned not only presents evaluations and recommendations about actual conservation programs but also is able to add to the disciplinary conversation on biological issues. In one place, Ned makes the claim that a certain piece of biological information, effective population size (Ne) for a species, is important for species management. This claim is supported by the student's own calculations, which are positively evaluated by the professor with an "excellent" and "nice":

> Although the major objective of the Project Sea Eagle is to increase the total number of individuals (Helander, 1986d), estimates of Ne can help in determining critical management decisions. Yet, I have not seen estimates of Ne in the literature. My own estimates based on data from Helander (1985c:424; 1991b:8), indicate an effective population size of 126 individuals from the Baltic sea population in 1990 (see appendix 1). This number is higher than the Ne of at least 50 individuals proposed by Frankel and Soule (1981) as the minimum for the short-term preservation of reproductive fitness. However, if calculations of Ne are made using population numbers from 1990 and juvenile survival rates similar to those before the winter feeding program started, the effective population size is only 36.5 individuals. The supplemental winter feeding may thus create an illusion of unrealistically high Ne if its effect on juvenile survival is not controlled for in the calculations. *In*

> *the future when deciding on whether there is need to continue the project, calculations of Ne are essential*. (Ned 90-96) (our emphasis)

Ned's claims in this paper show him contributing both to the theory and practice of conservation biology. The projected image of a young but experienced practitioner as created by his evaluations of conservation programs is complemented by the image of a biologist able to challenge previous calculations of effective population size and propose more accurate figures of his own. Thus, unlike Adele, Ned does not just provide a number of recommendations based on findings from various disparate fields relevant to the conservation project, but can show a personally-engaged and integrative expertise.

Finally, Ned is particularly successful in intertwining recommendations for research with recommendations for conservation actions. The extract below provides a splendid example of the advocacy of both research and conservation actions (our emphases):

> The Baltic Sea and Lappland populations are regarded as separate based on observations of banded birds (Helander, 1990a). *Researchers could use electrophoretic studies to further test this assumption and to determine the extent of gene flow*. If the low number of birds the last hundred of years has resulted in higher inbreeding than normal, the Swedish sea eagles may face risk of inbreeding depressions. *In this case, active translocation of birds or eggs may be necessary*. (Ned 84-87)

Terry

The fourth paper appears as a 13-page chapter in a 1993 volume entitled *Biotic Interactions and Global Change*, the outcome of an interdisciplinary workshop held in 1991 on San Juan Island (Washington). Terry's paper (Root, 1993) reviews contemporary or near-contemporary studies of climate change, stresses the problematics of rapid temperature increase, inserts within that some empirical data on the likely effects on selected trees and birds, discusses possible ways forward in terms of both species studies and realignments within the scientific community, and closes by reminding that community and those outside it of their joint responsibilities. In some sense, the paper accords well with what the editors say about the volume as a whole: "The book is divided into six sections and includes synthetic literature reviews, critical commentaries, arguments for particular research directions, and the results of original research aimed at the challenge we posed to the authors" (p. 2). However,

it will become clear that her paper does not do just one of these four things, but rather attempts most of them.

The overall organization of Terry's paper does not lend itself to an easy description. A quick review of the text shows that it is not a research paper of any standard or traditional sense. For instance, it does not display any new empirical data collected and analyzed by the author, and in both choice of section headings and in substance it does not, like the student papers, follow the standard IMRD format. We can see the overall shape of the paper from its section headings (and can note in passing the similarity with Adele's headings):

1. Untitled Introduction (Problem Specification)
2. Ecosystem Response to Rapid Change is Problematic
   Vegetation
   Birds
3. Forecasting Potential Change in Species Communities
4. Outreach
5. Summary

This paper is also similar to Adele's paper in having a Problem-Solution structure with an embedded case study, but here the ornithological findings are taken from a major study by the author herself, rather than gleaned from the literature.

Though Terry instructed her graduate students not to be overly concerned with research recommendations per se, they play a prominent part in her text. However, of the various research recommendations, a substantial proportion deal with the organization of the research effort. Here is one of several examples:

> Additionally, the reward system within the scientific community is such that interdisciplinary work is not valued as highly as disciplinary work (e.g. ...). Such barriers are common at the cutting edge of problem-solving, but they must be breached before the complex problems caused by global climate change can be adequately addressed. (Root, 1993, p. 291)

In this way, she concentrates her strongest recommendations for what her own scientific community should be doing and avoids lambasting obvious anti-environmental forces in the wider world. The opportunity she takes to re-frame the discussion within the context of the sociology of environmental science (its reward systems, hierarchical structures and border disputes, etc.) is one presumably that junior graduate students are unlikely to be able to contemplate. Although policy recommendations are not missing from the paper, their secondary status is indicated

both by their placement (following the research recommendations) in the section "Outreach" and by their lack of specificity.

Terry's article seems to be a mix of an empirical and review paper. It is similar to the papers by Adele and Ned in being grounded in a conservation problem. Though the paper may at first appear to bridge a connection between two fields, climatology and ecology, it mainly deals with the latter. In this chapter, which Terry acknowledges to be "something of a new departure" for her (personal communication), the transitions between research and policy as well as those between macro- and micro-environmental features (such as the climate and the ecology of birds) seem at times incomplete or abrupt (see, in particular, Fig. 1 below). For a resolution of these problems, we turn to the final paper.

Terry and Steve

Terry's "new departure" paper concentrated on ecological research (showcasing therein her own major ornithological study), prefaced by an opening discussion of global change prognostications and followed by a statement of the implications for environmental research. With the addition of Steve, their two research agendas are brought into conjunction and a paper with a greater degree of interdisciplinarity is produced (Root and Schneider, 1993).

On one level, both published papers can be seen as having the same three linked parts: the environmental problem of global warming with its effects on plants and animals; the problems of mismatch in scale between climatic modeling studies and ecological studies; and the role of the scientific community in solving environmental problems. However, in the joint paper, the object under study (Bazerman, 1988) more obviously transmogrifies from intrinsically environmental concerns to those of how to conduct suitable studies that would enhance the quality of policy making. This agenda first achieves prominence as early as the final paragraph of the Introduction:

> The purpose of this paper is to discuss approaches that attempt to reduce the mismatch. We also provide examples of successful "bridging" studies that examine and suggest avenues for future work. These studies provide examples of how such work can be used as a foundation upon which the small-scale biological studies and large-scale climatic studies can be coupled to clarify further the possible biological consequences of global climatic change. (Root and Schneider, 1993, p. 258)

A preliminary understanding of the development of this paper from the single-authored one can be obtained from a comparison of the section

titles of the two papers (see Fig. 1). Two features of the overall organization of the joint paper are evident from the section headings. First, the addition of Steve as co-author has enabled the paper to achieve a carefully-stepped general-specific-general movement characteristic of many research articles (Hill et al., 1982), which we have attempted to display visually in Figure 1. Second, many of the subsections explicitly appear to link climatology and ecology. Note, for example, "Global Warming Scenarios Relevant to Ecosystem Studies" and "Forecasting Large-Scale Vegetational Response to Rapid Climatic Change."

Figure 1: Announced Structures of Terry and Terry & Steve

Terry
- Introduction (unlabelled)
  - Ecosystem response to rapid change is problematic
    - Vegetation
      - Birds
  - Forecasting potential changes in species communities
- Outreach
- Summary

Terry and Steve
- Introduction
  - Global Warming Scenarios Relevant to Ecosystem Studies
    - Narrowing the Mismatch between Ecological Studies and Climatic Model Scales
      - Unpredictability of Time-Evolving, Transient Climates in Regional Areas
        - Forecasting Large-Scale Vegetational Responses to Rapid Climatic Change
          - The Importance of Triangle Linkages between Plants, Animals, and Climate on a Large Scale
            - Specific Example Using Wintering North American Birds
          - Possible Physiological Constraints Facilitating the Bird-Climate Linkage
        - Forecasting Potential Changes in Species Communities: Integrating Field and Large-Scale Studies
      - Outreach
    - Implications for Policy

general _____ specific

A close analysis reveals that Terry and Steve's paper is itself a comprehensive example of a successful "bridging" study that can link micro and macro issues. Most of the first seven sections after the introduction integrate climatology and ecology. The level of integration seen here therefore goes beyond that found in the student papers or the single-authored paper. Notice the degree of integration in the sentence from the section "The Importance of Triangle Linkages between Plants, Animals, and Climate of a Large Scale"(6):

> If the climate changes more rapidly than the dispersal rate of the plants, resulting in extensive die-offs in the South before individuals can disperse and become established in the North, then the ranges of animals relying on these plants could become compressed. (Root and Schneider, 1993, p. 118)

As already mentioned, a significant proportion of the recommendations in this paper pertain to research. Not only are recommendations made concerning individual research areas, but a re-visioning of research activities as a whole is also advocated. Advocacy of this research to reduce "mismatch" and to construct "bridges" is interestingly similar to Bazerman's conclusions about the writer of the sociology paper in *Shaping Written Knowledge* (1988), namely, the sociologist's need to persuade the readers of not just "the specific claims of the essay, but of the author's larger framework of thought in which his claims are placed" (1988, p. 35). Bazerman goes on to note that in such a situation language "must be carefully shaped by the author to turn his own vision into a shared one of the discipline" and also seems to imply that this trait may be more common in the social sciences where authors are noted for "a point of view or method of perception rather than a specific claim" (ibid, p. 39). Likewise, an attempt to project a visionary search for a discipline-combining methodology would seem to be part of author persona in conservation biology, at least at the professorial level.

Discussion

If both student and published papers are intended to be interdisciplinary, we can then return to the most important of our research questions, "Is a different sort of interdisciplinarity seen in these two sets of texts?" Interdisciplinarity does indeed seem to be conceived of rather differently. The successful student papers achieve interdisciplinarity primarily in exogenous terms, that is, in terms of problems in the real world. Interdisciplinarity here is almost synonymous to the application of theory to practice. The published papers, on the other hand, move from exog-

enous interdisciplinarity to endogenous interdisciplinarity, which is concerned with the production of new knowledge, in this case, an integration of ecology and climatology. Interdisciplinarity in the published papers also concerns integrating the goals and activities of scientists and policy makers. Finally, Terry and Steve's paper stands apart from the other papers through its explicit discussion of interdisciplinarity in environmental science.

Only the paper by Terry and Steve does seem, in its creative remaking of itself out of two separate single-authored chapters, to be constitutive of interdisciplinarity when described as an "overarching conceptualization that transcends the epistemological and methodological perspectives of the constituent disciplines" (FalerSweany, 1995, p. 169). And it will doubtless not have escaped the reader's notice that this high-achieving paper was the only one to be co-authored. Therefore, if this study has a modest practical message for Terry and her teaching of the 517 class it would be for her to reflect upon the possibility of encouraging collaborative writing, especially in cases where students coming from differing disciplinary backgrounds can be paired up.

Terry's Conservation Biology course took its interdisciplinary ambitions seriously, even though interdisciplinarity as measured by current concepts such as "interpenetration" (Fuller, 1993) was not a distinctive or pervasive feature of the actual student writing. This seriousness on Terry's part is very apparent in the following E-mail response to our query about her educational practice:

> I agree it is a learned skill to be able to integrate disparate info in a way that addresses a real world problem. Most undergrads are never taught how to do this. Indeed they are taught to narrowly examine problems and hence have not learnt to "see" connections. In my class and with the assignments, I am trying to teach them to broaden, make linkages between fields and info in the various fields. The first step is to see how "basic" research (like population genetics), that is quite disciplinary-focused, can be broadened to address real world problems. That is hard and takes new training (not only of students, but of those disciplinary folks that are threatened by the broadening (they call it "sloppy science") of their work).

It indeed turned out hard for some of her SNRE 517 class.

As we have seen, in the case of our two professional scientists, one way to attain interdisciplinarity lies in being able to form a bridge (Journet, 1995, p. 123) between the "micro" and the "macro" by creating a new kind

of scalar continuum onto which research of very different types can be coherently attached (as shown in Fig. 1). However, this was a strictly professorial achievement, and it turns out not surprising that the graduate students were unable to recognize, problematize or scaffold such mismatches of scale in their own papers. Although the issue of scale mismatches among studies conducted in various subfields of environmental science was discussed in one class very early in the semester, the methodological and epistemological problems created by disjunct scales were not raised when instructors from such fields as anthropology, sociology, paleontology, and policy science presented guest lectures in the class. Nor was class time spent on relating the epistemologies of the contributing disciplines after the talks had been given. The graduate students then didn't have much of an act to follow. We have identified scalar continuity as one solution to the interdisciplinarity problem. In fact, Terry and Steve promote their scalar bridges as methodological necessities for solving important real world problems, rather than offering them as mere connective devices supporting the framework of some kind of integrative review paper. Thus, theory and practice are also aligned. The students revealed through their course papers that they had been successfully trained to draw from more than one field to address a conservation problem. In doing so, they articulated the application of theory to practice. However, what appeared a more arduous task for them was conceptual integration of knowledge from more than one field. Since exogenous interdisciplinarity has led to "an appreciation of conceptual ties" (Klein, 1990, p. 42) in some other areas, we could perhaps predict with some certainty that these fledgling members may manifest more conceptual interdisciplinarity as they become more established members of this disciplinary community.

Works Cited

Bazerman, C. (1988). *Shaping written knowledge: The genre and activity of the experimental article in science*. Madison, WI: The University of Wisconsin Press.

Belcher, D. (1995). Writing critically across the curriculum. In D. Belcher & G. Braine (Eds.*), Academic writing in a second language: Essays on research and pedagogy* (pp. 135-154). Norwood, NJ: Ablex

Ceccarelli, L. (1995). A rhetoric of interdisciplinary scientific discourse: Textual criticism of Donzhansky's *Genetics and the origin of species*. *Social Epistemology, 9*, 91-111.

Dunlap, L. (1992). Advocacy and neutrality: A contradiction in the discourse of urban planners. In A. Herrington & C. Moran (Eds.), *Writing, teaching, and learning in the disciplines* (pp. 213-230). New York: Modern Language Association.

FalerSweany, M. L. (1995). Spanning rhetoric for a holistic science: James Lovelock's geophysiology. *Social Epistemology, 9*, 165-174.

Fuller, S. (1993). *Philosophy, rhetoric, and the end of knowledge: The coming of science and technology studies*. Madison, WI: The University of Wisconsin Press.

Hay, P. R., Todd, J. J., & Russell, J. A. (1986). Teaching the "Human in Environment": A postgraduate approach at the University of Tasmania. *Environmental Education and Information, 5*, 119-126.

Henry, J. (1994). A narratological analysis of WAC authorship. *College English, 56*, 810-824.

Herndl, C. G. & Brown S. C. (Eds.) (1996) *Green culture: Environmental rhetoric in contemporary America*. Madison, WI: University of Wisconsin Press.

Hill, S. S., Soppelsa, B. F., & West, G. K. (1982). Teaching ESL students to read and write experimental research papers. *TESOL Quarterly, 16*, 333-347.

Johns, A. M. (1995). Teaching classroom and authentic genres: Initiating students into academic cultures and discourses. In D. Belcher & G. Braine (Eds.), *Academic writing in a second language: Essays on research and pedagogy* (pp. 277-292). Norwood, NJ: Ablex.

Journet, D. (1990). Forms of discourse and the sciences of the mind: Luria, Sacks and the role of narrative in neurological case histories. *Written Communication, 7*, 171-199.

Journet, D. (1993). Interdisciplinary discourse and "boundary rhetoric": The case of S. E. Jelliffe. *Written Communication, 10*, 510-541.

Journet, D. (1995). Synthesizing disciplinary narratives: George Gaylord Simpson's *Tempo and mode in evolution*. *Social Epistemology, 9*, 113-150.

Killingsworth, J., & Palmer, J. S. (1992a). *Ecospeak: Rhetoric and environmental politics in America*. Carbondale, IL: Southern Illinois University Press.

Killingsworth, J., & Palmer, J. S. (1992b). How to save the earth: The greening of instrumental discourse. *Written Communication, 9*, 385-403.

Killingsworth, J., & Steffens, D. (1989). Effectiveness in the environmental impact statement. *Written Communication, 6*, 155-180.

Klein, J. (1990). *Interdisciplinarity: History, theory, and practice*. Detroit: Wayne State University Press.

Miller, C. (1980). *Environmental impact statements and rhetorical genres: An application of rhetorical theory to technical communication*. Ph.D. Thesis. Rennselaer Polytechnic Institute.

Miller, C. (1984). Genre as social action. *Quarterly Journal of Speech, 70*, 151-167.

Montgomery, S. (1996). *Scientific voice*. New York: Guilford Press.

Noss, R. F. (1993). Whither conservation biology? *Conservation Biology, 7*, 215-217.

Petrie, H. G. (1992). Interdisciplinary education: Are we faced with insurmountable opportunities? In G. Grant (Ed.), *Review of Research in Education, 18* (pp. 299-333). American Educational Research Association.

Prior, P. (1992). *Contextualizing writing and response in graduate seminars: A sociohistoric perspective on academic literacies*. Unpublished Ph. D. Dissertation. University of Minnesota.

Root, T. L. (1993). Effects of global climate change on North American birds and their communities. In P. M. Kareira, J. G. Kingslover & R. B. Huey (Eds.), *Biotic interactions and global change* (pp. 280-292). Sunderland, MA: Sinauer Associates Inc.

Root, T. L. & Schneider, S. H. (1993). Can large-scale climatic models be linked with multiscale ecological studies? *Conservation Biology* 7, 256-270.

Samraj, B. (1995). *The nature of academic writing in an interdisciplinary field*. Unpublished PhD disseratation. The University of Michigan.

Slovic, S. (1996). Epistemology and rhetoric in American nature writing: Embedded rhetoric and discrete rhetoric. In C. G. Herndl & S. C. Brown (Eds.), *Green culture: Environmental rhetoric in contemporary America* (pp. 82-110). Madison, WI: University of Wisconsin Press.

Soule, M. E. (1985). What is Conservation Biology? *BioScience, 35*, 727-734.

Sullivan, D. L. (1995). Migrating across disciplinary boundaries: The case of the periodicity paper of David Raup and John Sepkoski. *Social Epistemology, 9*, 151-164.

Swales, J. M. (1990). *Genre analysis: English in academic and research settings*. Cambridge: Cambridge University Press.

Ulman, H. L. (1996). "Thinking like a mountain": Persona, ethos, and judgment in American nature writing. In C. G. Herndl & S. C. Brown (Eds.), *Green culture: Environmental rhetoric in contemporary America* (pp. 46-81). Madison, WI: University of Wisconsin Press.

Wignell, P. (1998). Technicality and abstraction in social science. In J. R. Martin & R. Veel (Eds.), *Reading science* (pp. 297-326). London: Routledge.

Notes

[1] We would like to thank one anonymous reviewer for a number of very useful comments.

Book Review

Hansen, Kristine. *A Rhetoric for the Social Sciences: A Guide to Academic and Professional Communication*. Upper Saddle River, NJ: Prentice Hall, 1998. 492 pages.

Reviewed by Mada Petranovich Morgan, Ph.D., Southern Oregon University

One of the pleasures of WAC's acceptance in the academy is the growing number of books that explore both its theory and practice. One of the discomforts of the same phenomenon is trying to organize my bookshelves. Kristine Hansen's *A Rhetoric for the Social Sciences: A Guide to Academic and Professional Communication* exemplifies this dilemma. This rich book needs to be cross-referenced in my filing system under at least 6 categories: "Texts for Upper-Level Social Science Classes"; "Texts for Professional and Tech Writing"; "Rhetorical and Composition Theory for Teaching Assistants"; "Training Issues for Social Science TAs"; "Writing the Research Paper"; "Literacy Issues in WAC." The problem is not of recommending this text: I can do that wholeheartedly. The issue is who I would like to see reading it.

Hansen writes that the textbook is intended for "college juniors and seniors who are majoring in the traditional social sciences as well as related fields that study humans and their behavior. . ." (xv). Her purpose is to provide a comprehensive guide to writing in the social sciences; her assumptions are that the writing is related to the goals and epistemology of the discipline and that students need instruction on all phases of the knowledge making. Her belief in the rhetorical nature of writing in the social sciences opens the door to the thinking, researching, and writing that back up claims of knowledge. Hansen notes in the "Preface" that the book has taken more than 10 years to complete, and the seven parts—20 chapters in all—show how inclusive her "rhetoric" becomes.

Part I is Hansen's "bedrock," as she supplies the assumptions and definitions that her readers—either students or colleagues—need to understand. Clearly and convincingly, she integrates a view of rhetoric and

the social production of knowledge into the "public" persona of the social sciences. Throughout the discussion, she illuminates the social sciences' stance toward knowledge, linking the questions, observations, instruments and methods, interpretations, and claims. The reader understands that the rhetoric of the social sciences is clearly more complicated than "packaging 'objective' truths in 'neutral' language" (17). Chapter 2 moves the rhetorical discussion into the specific acts of composing, and here, again, the influence of language, audience, and genre are explained through the lens of a social science discipline.

Hansen describes Chapters 3 through 8 as the "heart" of her book. For her intended audience—the juniors and seniors majoring in the social sciences—the discussion is vital. She uses "disciplined inquiry" to describe how the research methods reflect the standards and assumptions of a discipline. Descriptions of quantitative and qualitative methods (including ethical concerns), interpretive strategies, interviews, observations, surveys, and experiments warrant separate chapters. But Hansen does more than explain: each method has an example of both a professional and student document, annotated to show how the choices of the authors exemplify their discipline's rhetoric.

Part III, "Finding and Using Existing Knowledge," is the requisite "library" and "Internet" search techniques. The discussion is brief but informative, and the useful annotations of the student paper at the end of Chapter 9 work better than most of the examples found in several handbooks. Hansen acknowledges that the information on Internet searching changes rapidly, and her approach is general and basic.

Parts IV and V are devoted to discussions of common social science and career-related genres. These chapters could function as a handbook, with underlying assumptions and principles of the genres explained and illustrated. As with the examples throughout the book, these models—a proposal, prospectus, position paper, opinion piece, abstract, critique, book review, resume, letter, and memo—are well chosen and annotated.

"Visual and Oral Rhetoric" is the focus of Part VI, and I found this section a welcome addition. The straightforward pointers on page layout, type sizes, and headings cover the basics of the primary documents for school or work, as does the chapter on graphics. It addresses some issues—such as using consistent heading levels and choosing graphics with both efficacy and ethics in mind—that perplex many students. Chapter 18, "Oral Presentations," squeezes "rhetoric" back into public speaking, with reminders and guidelines on presentations that combine the basics usually found in a communication studies' public speaking course with practical tips on visual aids.

The last two chapters, listed as "Style in the Social Sciences," address "Institutional Style" and "Documentation Styles," the final chapter

covering the usual ground of APA and Turabian documentation. Chapter 19, on institutional style, is a curious mix of APA guidelines on how to use references to gender, racial and ethnic groups, or research participants and a general nod toward "detached persona" and "jargon." Considering how thoroughly Hansen addresses so many issues of writing as a social scientist, I was disappointed in the scarcity of concrete examples of "writing" choices the student in the social sciences must make.

Good reasons for this too-brief discussion are probably many, and Hansen offers one in her introduction when she warns that "the social sciences do not all sanction the same style" (436). In addition, a textbook taking over 400 pages to even get to this point of writing has to set limits.

Another reason could be the paucity of concrete ways to talk about the differing writing styles in the academy. As knowledgeable as we have become on the "rhetorics" of the disciplines, we are still struggling both with the specifics of describing the sentence patterns that reflect the rhetorical choices and with helping the students become proficient at the manipulation. The usual workhorses are the active/passive verb choices and the use of agency in the subject position, usually simplified to the use of "I" or "we." From the first-year composition course that introduces some of the disciplinary conventions to the capstone course in writing in the majors, we need to be consistent in explaining the "it depends" of writing choices. Unfortunately, those guides to consistency are few, and we are finding that in addition to the definition of "good writing" that changes as it crosses the discipline, so do many of the components that usually go into "good writing," such as voice, stance, complexity, clarity, and evidence.

Some of the answers may be coming from the research and scholarship of more specialized fields of study. Studies from linguistics, anthropology, functional grammar, discourse analysis, and genre continue to add models and insight. Helpful analysis on specific strategies is starting to accumulate: metadiscourse, coherence, voice, clause modification, subject choices, presupposition triggers, and hedges are all promising venues for describing the writing choices that a student must make.

One book cannot cover everything in the complex arena of writing in the disciplines, just as one course cannot make an expert out of the novice. But Hansen's *Rhetoric* comes closer than most. One of the major benefits of Hansen's book is the challenge to other "teachers of the disciplines" to define themselves as thoroughly as she has the APA-governed social sciences. I found myself wondering if the English studies teaching assistant could identify similar rationales behind the "disciplined inquiry" in an agonistic literary criticism; I question if the physics TA has the same understanding as the more experienced professor of what makes a lab report "good writing," when that writing had to start with assumptions

about truths and knowledge. Often these are the teachers in the lower-division classes when undergraduates are first introduced to their discipline's epistemology.

Early in her textbook, and after the explanation of the "big picture" of rhetoric, Hansen reminds the reader that "rhetoric" has also been the definition of a book that serves as a guide for using language. Her textbook becomes both: an expansive look at the hows and whys of researching and writing like a social scientist and a specific handbook for teaching the practical applications. I think I need at least six copies for my bookshelf.