

# 4

## Research on WAC Teaching and Learning

The programmatic and pedagogical developments in Writing Across the Curriculum are closely associated with three different approaches to theory and research. The first (examined in this chapter) looks closely at classroom practices and student learning to write within disciplines. This research develops detailed ethnographic investigations of students' experiences in writing in various disciplines as well as studies of writing practices in classrooms. This approach has been more closely tied to a concern for the demands of academic writing within university classrooms but includes some studies of K-12 schooling and schools as sites of disciplinary learning. A related research agenda examines reading-writing relationships, addressing the fact that much academic writing is based on materials that students read and then use as a resource or discuss critically. The second, writing to learn (see Chapter 5), grows out of a concern for student-centered engagement with disciplinary materials and thought to be achieved through writing. This approach to writing across the curriculum has been tied to a more general concern for writing to learn in all forms of writing. The final approach, the rhetoric of inquiry (see Chapter 6), grows out of various disciplines' reflections on their own practices and the recognition that forms of writing in a discipline are closely tied to practices of investigation and thought. These approaches are not necessarily opposed and often worked in tandem. But they do show distinct lines of development.

Writing Across the Curriculum has been primarily a programmatic and pedagogical movement, aimed at changing practices in the class-

room, increasing the amount of and attention to writing in all classes, improving the assignments, and changing the awareness of teachers in all fields to the role of writing in learning. However research was needed to identify the writing-related practices of students in a variety of classrooms, to determine the way students understood and undertook writing in their subject courses, and to understand how students' writing developed over a series of writing experiences in different courses. Research was also needed to understand how subject-matter teachers assigned and supported writing in their classes, and with what effects. Finally specific interventions carried out in the name of Writing Across the Curriculum needed to be evaluated in their effects on both students and teachers. The following reviews some of the high points of this research literature, but also see Russell's (1994, 2001) two excellent reviews of this material.

### Writing Across the Curriculum in K-12 Schooling

The initial and founding study of the WAC movement, Britton, et al's *Development of Writing Abilities*, researched what existing writing practices were occurring in disciplinary classrooms (see Chapter 2). More recent research into writing across the curriculum in K-12 classrooms, however, is for the most part tied to educational interventions. These studies ranging across the K-12 spectrum have found that writing has supported subject area learning and thinking, in line with the Writing to Learn theoretical orientation (see Chapter 5). While the sophistication of the subject matter engagement changes over the course grades the use of writing to increase understanding, involvement, subject learning, and disciplinary thought remains consistent.

#### *Primary School*

Wollman-Bonilla (1998) introduced scientific writing into a first grade classroom in the form of Family Message Journals, wherein students a variety of texts to be read and responded to by their families, including poems and fiction as well as informational texts about what they learned and did in school. Writing the science parts of the journal would typically follow a hands-on science activity in the class; the writing prompt would simply be to write to your family what the class had just done. While the teachers offered no formal instruction on

how science should be written, they did model the kinds of phrasing the students might use. In this context it was found that first-graders were able to write original texts about science that incorporated a number of the genre features of science reports, explanations, and experimental recounts and procedures, including appropriate text structure, lexical choices and grammatical forms.

Winograd (1993) studied eight fifth graders as “they composed original mathematics story problems.” Usually math problems are authored by adults for students to solve; students seldom have an opportunity to develop problems of their own. Winograd suggests that his study can provide “a theoretical and practical point of departure for problem-writing approach to school mathematics” (Winograd, 1993, p. 372). He observes that students developed three strategies to compose problems: they asked questions to identify the general topic; they created a final question to which they addressed their texts; they worked to increase the difficulty of their problems. This study suggests that “students may be able to collaborate effectively with teachers in writing mathematics curriculum” (Winograd, 1993, p. 369).

Johnson, Jones, Thornton, Langrall, and Rous (1998) also studied fifth graders writing in the mathematics classroom. The students did journal writing before and after each probability task where they described their thinking and reasoning about probability. At the completion of the program five of the eight target students made gains in both probability and writing. Although the team was not surprised to find that students used both writing and mathematical symbols as they wrote about probability (see Bruner, 1964; Biggs & Collis, 1991), they had not expected the solutions of these fifth graders to rely so heavily on these two types of representation. They attribute these outcomes to the use of a cognitive apprenticeship model by the teacher who encouraged the students to write up their mathematical solutions in the same way a mathematician at work would.

### *High School*

Kathleen McCarthy Young and Gaea Leinhardt (1998) observed five high school students in an AP History classroom. The teacher used primary and secondary sources instead of an authoritative but “authorless textbook” in her effort to introduce these students to a more sophisticated way of knowing history—not as a list of facts but rather as constructed and interpreted from various artifacts and documents.

The students engaged in four major Document-Based Question writing tasks. The authors analyzed both the tasks and the texts produced by the five students to assess their progress in mastering not only the content but also the rhetorical strategies of the discipline

Young and Leinhardt argue that academic literacy requires both knowledge in the specific domain and understanding of the rhetorical practices of that domain. The primary purpose of this study was to “explore what was involved in writing from primary documents and in learning to do so, rather than to examine empirically the question of whether students learned more history by writing from documents” (Young & Leinhardt, 1998, p. 27). Young and Leinhardt view discipline-based reading, writing, and reasoning as situated processes and forms. These specialized ways of knowing are not always easily accessible to those who need to learn them and recognize that students are brought into the ways of the discipline through “enculturation, apprenticeship, and scaffolded participation” (p. 27).

The authors recognized that the teaching practices of the subject teacher that engaged the students in the discipline of history do “support the development of complex writing skills even when these writing skills are not the object of explicit instruction” (Young & Leinhardt, 1998, p. 59). But they argue that because of minimal in-class writing opportunities, the students need to negotiate written arguments and explanations without benefit of models or coaching. They recommend that excellent instruction practices like these coupled with writing instruction, in-class writing, peer review, opportunities for revision and teacher feedback, would further support the development of academic literacy.

Olga Dysthe’s (1996) qualitative research study of three high school classrooms examines how the interaction of talking and writing affects learning. The study presents a writing centered dialogic model of teaching strategies informed by the theoretical work of Bakhtin (1986), Vygotsky (1986), and Nystrand (1990). Inspired by the resistance of classroom teachers to pedagogical reform movements (demonstrated by the research which indicates that in the classroom, teachers talk 75% of the time, students 25%) Dysthe observed two American classrooms (American History and AP European History) and one Norwegian (social science). The article follows Nystrand and Gamoran’s (1991) distinction between common classroom interaction (what is sometimes called IRE—initiation, response, evaluation) and

the interactive, dialogic pattern of interaction. This dialogic interaction includes “authentic questions,” (where the teacher asks open-ended questions); “uptake,” (student response is incorporated in her subsequent questions); and “high-level evaluation,” (the teacher elaborates on the student response and builds on it in following interactions). Teachers’ ideologies and practices are discussed and the lessons presented and evaluated within the framework of the dialogic model. Dysthe provides examples of how interrelating writing and talk promotes student participation and a greater diversity of student voices. Because it values students as thinkers and their texts as legitimate “thinking devices,” students gain academic self-confidence.

### *Talk and Writing in Secondary Science*

Rivard & Straw (2000) investigate further the roles of talk and writing for science learning for a group of Francophone Canadian eighth graders, instructed in English. This study uses a mix of qualitative and quantitative methods in a quasi-experimental design, studying students under four conditions. Following lessons on ecology, groups of students engaged in discussion-only activities, writing-only activities, combined discussion and writing activities, or a control group with no supplementary activities. The supplementary activities involved solving ecological problems that relied on concepts presented in the lessons. Students’ knowledge was assessed immediately after the learning activities and again after six weeks. Overall, the authors found that a combination of talk and writing provided the greatest improvement—with talk serving to share and clarify knowledge, and writing serving to refine and consolidate knowledge with prior knowledge. Writing further seems to serve to aid retention of co-constructed knowledge. Interestingly there were strong indications that the value of talk and writing may vary with student ability. Those students most skilled in the subject area benefited most of individual writing without discussion, while those least skilled benefited most from discussion. This finding is consistent with the overall view that discussion and writing serve different functions, with skilled students able to gather information on their own and benefiting from refinement and consolidation, and less skilled students needing support in gathering and understanding the information.

Keys (1999) reviews the literature that suggests the need for more attention to writing in the science classrooms for purposes of science learning. In a follow-up study Keys (2000) investigates more deeply into the kinds of thinking students do in the course of writing experimental reports. She used think-aloud methods to examine the thought processes of sixteen eighth grade science students writing up a laboratory activity on the topic of erosion. While five of the sixteen students engaged in no reflective thought and simply recording information, the remainder engaged in a variety of forms of thinking. Two focused on rhetorical planning of organization and sequence, and the remaining nine engaged in forms of scientific problem solving. These problems included generating hypotheses and developing general claims, identifying evidence and finding patterns in the data. They found they needed to solve these problems in order to determine what they should be writing.

Prain and Hand (1999), in an ethnographic study of writing in secondary science instruction in Australia, similarly found that writing served different thinking and learning functions for different students on different occasions. Using semi-structured interviews along with observation and text collection, found that writing provided students opportunities to “reorder, synthesize, elaborate, and reprocess concepts and ideas central to each topic, to hypothesize, interpret and persuade” (p. 151). Students perceived that with writing their engagement was more active and involved higher order cognition. Because of the variety of functions served by writing, the authors suggest diversification in writing types assigned.

To foster more reflective thinking and enhanced student learning from laboratory activities, Keys, Hand, Prain, and Collins (1999) have developed a Science Writing Heuristic. This heuristic has a teacher component and a student component. The teacher component provides an eight-step structure for teacher-designed activities that provides for exploratory preliminary activities using concept mapping, informal writing, and brainstorming. It also provides for a multi-stepped series of writings following the laboratory activity help students determine the meanings of the experiment, interpret the data, and relate the results to the textbooks or other literature. The student component gets students to reflect on their questions, actions, observations, claims, evidence, reading, and what they have learned. The Science Writing Heuristic was found effective in advancing student

knowledge and thought over an eight week learning sequence in two eighth grade classes. Follow-up studies have found the Science Writing Heuristic effective in both secondary (Hand, Wallace, & Yang in press; Hand, Prain, & Wallace 2002; Hand & Prain, 2002) and higher education science courses (Rudd, Greenbowe, Hand, & Legg, 2001; Rudd, Greenbowe, & Hand, 2001).

### *Subject Organization of Secondary Schools as an Obstacle to WAC*

According to Siskin and Little's *The Subjects in Question: Departmental Organization and the High School* subject organization of high schools has proven to be remarkably enduring and resistant to interdisciplinary cooperations such as Writing Across the Curriculum. This volume comes out of a five-year study by the Center for Research on the Context of Secondary School Teaching (CRC). While not directly addressing Writing Across the Curriculum, this volume provides valuable insight into disciplinary organization of high schools which any secondary WAC program must address. Siskin's opening chapter on Subject Division, in particular, finds that the departmentally divided social worlds of secondary educators strongly limits teacher interaction, Length of teacher's employment at one school and school size correlate with departmental orientation. Not only time and space arrangements reinforce subject divisions but also the almost magnetic pull of subjects on teachers who wanted to discuss the specifics of their work. The volume then examines this dilemma from the perspectives of organizational theory, professional identity and response to institutionally imposed reforms, and ideology and politics. The functional strengths of departmental culture are also explored. Case studies are drawn from English, social studies, and other departments. Proposals and implemented projects to foster collaborative and interdisciplinary cultures among secondary teachers are also examined.

### Writing Across the Curriculum in Higher Education

While some studies of writing across the curriculum in higher education have examined the impact of specific interventions in WAC environments, the larger number of studies have focused on the experiences and development of students involving writing in their disciplinary courses and of teachers as they have come to employ writing

in their courses. This difference in focus perhaps reflects the different culture of higher education, the more developed identities and skills of students, and the greater academic freedom of professors to set goals for, design, evaluate and change their instruction. Consonant with the differences in research focus, higher intervention studies have tended to be more ethnographic, often over extended time, rather than quantitative studies of changed outcomes after intervention.

MacDonald and Cooper's (1992) study of writing to learn in a Chinese Literature course, discussed in the next chapter, indicates that use of journals must be well-matched to the goals and tasks of the major assignments by which the students will be evaluated. Herrington's (1988) study of writing in a literature class again suggests that students will learn what they are asked to do and will adopt the writing elements they are asked for, which are practiced, and which are given support. Students' perceptions of the assignment and the tasks they must accomplish are shaped by the assignments, the roles instructors project, the interchange of the classroom, as well as the interpretive strategies that they are taught and practice in class discussion. In this case the teacher of literature through the student-choice built into the assignment and the exploratory atmosphere of class discussion was able to lead students into independent inquiry, which was her pedagogic goal. Where the class fell short was in providing sufficient tools to carry that inquiry forward, and the prior familiarity of the students with these tools accounted for the differential success on the papers.

The implicit messages and goals of a course may be so effective in defining the writing asked for that motivated students will adopt the valued forms of writing even without instruction—taking their cues from the modeling provided by the professor, the readings, and the general cultural understanding of the domain. This at least is the conclusion drawn from Freedman, Adam, and Smart's 1994 study "Wearing Suits to Class." They found students in an undergraduate financial analysis course designed to simulate workplace experiences adopted outward signs of workplace behavior and carried out analytical tasks typical of the workplace on case materials. Moreover the form and format of their written reports, oral presentations, and documents accompanying the presentation bore a resemblance to workplace presentations. All this was accomplished without specific writing guidance by the instructor, but with substantial modeling of tasks and language in classroom lectures and activities. Freedman, Adam, and Smart fur-



ther report that “a stance and an ideology were realized through the writing that—like their suits—were more like the stances, values, and ways of constructing, construing, and persuading common to the work world to which these students aspired” (1994, p. 220). The students seemed keen to adopt the professional manner and substance offered by the professor and were motivated to socialize themselves into a professional world they wanted to be part of. This motivated anticipatory socialization was a powerful force for students to align with the models of communication presented in class.

### *Student Goals and Course Goals*

Research on other writing in other classrooms, however, finds that such congruent alignment often does not exist. The lack of alignment to the professional world offered by the course then creates distance between students and their writing assignments, which they do not see as meaningful. The mismatch of the alignment and motivation of students with the goals of the courses, is an underlying problem that emerges from a number of ethnographic studies of undergraduate writing within disciplinary classes. The initial and landmark study of student writing in a variety of courses is Lucille McCarthy’s (1987) “Stranger in Strange Lands.” This study uses observation, interview, compose-aloud, and text analysis to follow a single student through writing in three courses over his first two years in college: composition, introduction to poetry and cell biology. The writing experience in each of these courses was distinctive, requiring different kinds of writing in different learning contexts, although each of the teachers had similar goals of developing students academic thinking and writing in disciplinary appropriate ways. The difference was that each represented a different disciplinary perspective. The student’s response to the differences of disciplinary perspective was to see little continuity in the writing across the three classes and he had very different success in each. In two of the cases he saw four personal, professional, and institutional functions for the writing, different for each course, but congruent with each instructor’s goals. But in the third course he saw the only purpose was institutional: to demonstrate his academic competence. Consequently he found little personal meaning from the assignments in this third course He summed up his experience of writing in cynical terms: “First you have to figure out what your teachers

want. And then you have to give to them if you're gonna' get the grade. [. . .] And that's not always easy." (McCarthy, 1987, p. 362)

For teachers of writing it is also not easy to determine what disciplinary faculty want. That is the conclusion drawn by Faigley and Hansen's (1985) study of writing in two social science classes. They found that while English teachers responded to the form, disciplinary instructors were more concerned with familiarity with disciplinary knowledge and modes of reasoning, and thus looked to the conceptual depth and evidence of the argument, as viewed through disciplinary lenses. Schwegler and Shamon (1991) looked further into the criteria eight sociologists used in grading student papers and found the professors had a highly developed model of what kind of work counted as good sociology. This model rested on analogies with existing studies, such that in grading the professor would quickly identify the student as trying to accomplish a particular kind of study and would measure the paper against the kind of evidence and analysis appropriate to that kind of work. The professors were stricter in evaluating the design, evidence and analysis of the study than they were in evaluating the introduction and review of literature. They could identify the point of the study even if the students were not able to articulate well what they were aware doing or did not have good command of the literature. This study suggests how particular and discipline bound are disciplinary evaluations of student work. (See Chapter 9 for further discussion of evaluation of student writing within WAC courses).

But what disciplinary faculty may want to teach and evaluate students upon are not always what students want to get from a course or excited by Herrington's 1985 study of writing in two chemical engineering courses. She found first that the instructors of the two courses in the same discipline had different goals, assignments, purposes for assigning writing, roles for student to adopt in their writing, and criteria for evaluating work. Second, she found that students' perceptions of what was required differed from the instructors', in part because of the conflicting expectations presented by the two instructors and what was necessary to fulfill the expectations. As a result there were distinctive differences in the papers of the two courses, and uneven student success. Further because of the structure of one of the courses, the students could not form a consistent communication with a single instructor, could not develop a common set of roles and stances, and found the assignments frustrating and not engaging. In the other

course where students could develop a stability of expectations, there was greater satisfaction and engagement.

Similar problems of student lack of engagement appeared in Greene's 1993 study of upper division history students. Students felt the assignment did not ask or invite them to go beyond displaying familiarity with the set readings, so they neither drew on background knowledge nor engaged in analysis. Even when given a problem-based assignment, students tended only to report information from resources rather than using information and resources to construct an argument. They viewed the assignments as school exercises rather than occasions for professional inquiry. Lack of student alignment to instructor set goals and tasks are also examined in Marsella, Hilgers, and McClaren (1992), Nelson (1990), and Herrington (1981).

Dias, Freedman, Medway, and Pare's (1999) comparative study of academic and workplace writing in four areas (public administration, business, social work, and architecture) found that the instructional and evaluation aspects of writing within college courses consistently shaped how students responded to writing assignments, even when courses were designed as workplace simulations. The teacher as evaluative always remained the most important audience. Thus university writing could only call on a limited part of students' anticipation of professional identities and attraction to the work and rewards the profession would offer.

Similar alienation from the tasks of academic writing was encountered in Chiseri-Strater's longitudinal study of two undergraduate students reported in the 1991 book, *Academic Literacies*. Both students were academically capable but did not find much meaning in most of their assignments. One near the end of her undergraduate career manages to finally locate a personal engagement with a paper in art history, helping explore her own aesthetic commitments through the examination of a painter she admires. The other student spends much effort in clever displays of skill, but develops an increasingly cynical, distant and power-based view about knowledge and reason. This corresponds to his migration to political science. But underneath the struggles and frustration with the academic languages of these two students is a struggle to come to discover what it is they know, what it is they are committed to, and how those perceptions and commitments can be enacted in professional and academic ways.

It is these personal journeys of students through the years of their undergraduate education that becomes the theme of *Persons in Process*, by Anne Herrington and Marcia Curtis (2000). This study follows four students through the undergraduate years, each working through personal issues of identity, career and commitment. The papers they write for their various courses all are part of that personal journey, and get their meaning and motive from it. Nam, a Vietnamese immigrant, works to be able to explain himself and his beliefs to others in his new language. This means a commitment to learning the conventions, but also to discovering the genre of essay as a site for expressing himself. Not only does he work through issues of identity, emotion, and ethnicity, he starts to articulate his religious beliefs. As he encountered his academic subjects such as psychology and philosophy his wariness about the secular knowledge they offered and his difficulties with the subtleties of language kept his work sticking close to the facts, formally correct but without substantial engagement. He soon transferred to a seminary, which he found more satisfying. Yet it was his experience of coming to know himself through the essays in the writing class, and recognizing the disengaged experiences in his other course that helped him articulate what it was he wanted and where he needed to go.

Another student, the child of an alcoholic family, entered the university lacking confidence. Her journey through the university was also one of understanding and growing confidence. Her journey led her to an honors thesis in psychology on how the young adult children of alcoholics cope with intimacy. For her the study of psychology provided tools to understand her family and herself, and each essay she wrote, whether in her major or another area, if it helped advance that self-understanding, was engaging. If not, it seemed pro forma. She found a paper for a women's studies course meaningful but not another on globalism, and she did not do nearly as well on it. Each of the four detailed case studies in the volume is nuanced and revealing about the meaning and motivation students find in college writing, and thus what challenges they address in fulfilling the assignments. From the student's perspective, writing is best understood not so much in the terms of the course where the assignment is made (although that forms the occasion and provides the discipline specific tools and resources) but in the terms of their lives. Even each distanced relationship they construct when they let an assignment pass by on the periphery of their attention has a particular flavor and a particular sense in relation to their life paths.

Geisler (1994) similarly found that undergraduate students in philosophy courses approached their papers differently than did graduate students or professors. While the professors and the professionalizing graduate students understood philosophic texts as addressing problems, situated within a long literature and needing an abstract solution that would persuade other philosophers, students viewed philosophic texts more personally and practically. They used their readings and writing assignments to help them address personal ethical issues in their own lives and used their experiences to help them understand what the philosophers were saying.

While students often find meaning, value, and motivated commitment in personal issues, professors typically design courses around goals of developing disciplinary or professional knowledge and skills. In some situations, students seem to have more professionalized identities than others. Jolliffe and Brier (1988), for example, in a pilot study examining the performance of nursing students and political science students on a writing task of abstracting professional articles, found that the more professional experience the students had the better they did these tasks. Further that given the structure of the programs the nursing students had both more experience and professional training, and correspondingly overall did better on the task. Similarly, Haas (1994) found that a biology student over the four years of her undergraduate experience found that the student developed a more sophisticated style of reading as she became familiar with the field. This sophistication would have an affect on the stance she would take in her own writing. She not only gained content knowledge and thus could understand the biology more easily, but she began to read the articles rhetorically. She began to see the scientific authors as agents, arguing for claims within specific historical and intertextual contexts. In reading more as a professional scientist, she identified more as a working member of the profession, and understood her own work to be similarly making situated arguments.

Medway, in studying the writing of architecture students both in and out of class saw writing being part of developing professional commitments and identities. Writing bears a very different relation to the training and professionalization of architects (Medway 2000). While architecture students did much writing, the writing was not the primary student product nor the basis for evaluation. It was the design projects and other graphic artifacts that were the basis of evaluation.

Nor did the writing resemble the writing they would do as professional architects. Rather the writing was part of thinking through and explaining designs, a by-product of the primary work—but nonetheless an important necessity. As the students were committed to their profession and found the writing necessity, and as the writing was never evaluated or even examined by standards extraneous to the task, it was not seen as a problem. Moreover the students grew in articulateness without especial monitoring of their language, but rather as part of their deeper engagement in the profession. The personal sketchbooks they kept (Medway, 2002) strikingly exemplifies the role of writing in forming their architectural identities, styles, and creative imaginations. Although not assigned or part of any course, nor a practice generally followed by professional architects once they completed their training, most of the architectural student in the group studied kept one. In it they kept everything from addresses and personal diary entries to sketches for design projects. They recorded quotations from readings and lectures, principles that struck them as important; they pasted or interleaved photos and prints of art and architecture, business cards, maps; they drew what they saw and were designing and included explanatory notes and captions; they wrote evaluations of things they saw and developed arguments their ideas and proposals. The drawing, writing and collecting was all done aesthetically and together developed a personal style. In providing a personal place for the students to draw, imagine, plan, evaluate professionally, these sketchbooks represent the fusion of personal and professional, where students display emergent professional selves to themselves.

### *Studies of WAC Instructors and Instruction*

While most studies of WAC in higher education have focused on students and student writing, a number of studies have looked at the way teachers across the disciplines use writing in their classes and have modified their instruction under the influence of WAC programs.

WAC seminars and other faculty supports have been shown in several studies to have influenced faculty participants in adopting WAC beliefs and use WAC strategies in their courses (Smithson & Sorrentino, 1987; Kalmbach & Gorman, 1986; Hughes-Weiner & Jensen-Cekalla, 1991). More detailed case studies reveal something of the personal transformation that instructors undergo as they participate

in WAC workshops and programs (Sipple, 1987; Kipling & Murphy, 1992), although accounts also note faculty resistance (Swilky, 1992) or other failure to fully implement a WAC orientation (Johnstone, Johnstone, & Balester, 1994).

An in-depth study of 300 writing intensive courses in the natural and applied sciences on one campus found that instructors of these courses adopted a range of stances to the writing, from corrector to journal editor to collaborator (Chinn & Hilgers, 2000). Instructors that adopted more of a collaborative stance assigned a wider range of activities and writing tasks with more varied audiences; provided more explicit guidelines for writing; had students consider professional contexts for writing; and encouraged interaction, collaboration and peer-reviewing among students. Such instructors also tended to be more successful in engaging students in writing and gaining student approval.

Russell and Yanez (2003), however, have found that writing in general education courses, in this instance one in Irish history, suffers a contradiction between the specialist disciplinary activity systems of disciplinary training and the lay orientation of non-majors in general education courses. This contradiction makes it difficult for students to reach beyond fact-based rote writing and leads to student alienation. Skillful and attentive instruction is needed to guide students toward meaningful higher order thinking in the writing without expecting them to take on the disciplinary roles appropriate to committed majors in the discipline.

A nuanced and in-depth study of instructors' experiences in implementing WAC in their classrooms is presented in Walvoord and McCarthy's *Thinking and Writing in College* (1990). This ethnographic account examines writing assignment, support and instruction along with student difficulties and success in university courses in business, history, sexuality, and biology. Through a detailed examination of the courses the researchers identified the distinct professional-in-training roles: in business the decision maker; in history the arguer using historical evidence; in psychology the social scientist or counselor; and in biology the research scientist. They also found distinct differences in the kinds of evaluations the students were expected to make. However, in all courses the researchers were able to identify student difficulties in the same six areas: "gathering sufficient specific information; constructing the audience and the self; stating a position; suing ap-

propriate discipline-based methods [...]; managing complexity; [and] organizing the paper” (Walvoord & McCarthy, 1990, p. 231). From the investigation they derived nine principles for guiding thinking and writing in disciplinary courses.

1. Make the teaching methods fit the writing and thinking processes of the high achieving students.
2. Present procedural knowledge procedurally.
3. Define clear goals for informal, ungraded writing.
4. Guide peer response.
5. Make teacher draft response consistent with the writing process and the reward system.
6. Craft the assignment sheet with care.
7. Give explicit instructions and guidance, especially when designating a peer audience and/or a familiar setting and topic for student writing.
8. Offer early guidance.
9. Use language in the modes you want students to use. (Walvoord & McCarthy, 1990, pp. 238–241)

Walvoord then led another research team to look at the long-term effects on faculty of continuing participation in WAC programs on three different campuses (Walvoord, Hunt, Dowling, & McMahan 1997). They found that the primary effects of participation were to deepen faculty’s reflective understanding of their teaching philosophies and choices, rather than to adopt a particular set of beliefs or classroom practices. Faculty came to the seminars already primed with their own issues, goals, and reflective practices. While they adopted some WAC strategies presented, they chose selectively depending on whether it work for them in creating community in the classroom, in furthering student learning, in being feasible within the organizations of their classroom, and in matching their own priorities and teaching style. Over the years their engagement with WAC followed different patterns, ranging from leaving it on the back burner or displacing it for another mode of teaching reform to offering a radical turning point in



their teaching and/or other aspects of their career. In the middle were patterns of selective choice and gradual evolution.

The most detailed examination of the effect of WAC on an instructor comes from the long-term collaboration between Stephen Fishman, a philosopher, and Lucille McCarthy, a writing researcher. Over a number of years as McCarthy has observed and done studies of Fishman's introductory courses, they have engaged in a reflective dialogue which has led Fishman to look more deeply into his goals as a teacher of philosophy, what his students were learning, and the nature of the classroom interaction. They document the observations and thinking that develops over the course of this collaboration in a series of articles (Fishman, 1993; Fishman & McCarthy, 1992, 1995, 1996; McCarthy & Fishman, 1991, 1996) and finally two books *John Dewey and the Challenge of Classroom Practice* (Fishman & McCarthy, 1998) and *Unplayed Tapes* (Fishman & McCarthy, 2000). As researcher and teacher look ever more closely at his classroom practices, Fishman finds his assumptions constantly being overturned and ever more doubt about what he believes the students are learning and expressing in their class discussion and their writing. Using Fishman's commitment to Dewey as a starting point and continuing touchstones, Fishman and McCarthy uncover the intricacies of truly establishing a truly student-centered curriculum engaged in serious dialogue about those things that matter to students, so that they will come to see the value of a philosophic and experimental examination of their own lives and will develop the skill to engage in it. .

### *Studies of Graduate Students*

In graduate education students have to address more directly and completely the professional writing of their disciplines, often within a more closely supervised and mentored environment. Blakeslee (1997, 2001) investigates such graduate learning through apprenticeship in physics, where a professor assigns the student real, but calibrated significant tasks in the course of research, provides detailed feedback on drafts, and creates situations that will extend the student's scope. On the other hand, when time or other exigencies press, the professor takes greater control of the texts. Schryer, Lingard, Spafford, and Garwood (2003) offer another example of students learning agency in their profession, in this case medical students in learning how to present cases

on rounds. Although this is an oral task, it is as composed and rhetorically designed to be professionally useful as any written report.

While one might think that in graduate situations there would be few problems of professional commitment and alignment with the values of the discipline, several studies have found such difficulties indeed arise as students work examine the how well the values and work of the field match with their own personal commitments and goals, particularly in the earlier years of graduate training (Casanave, 1995). Also students need to find their own interests and questions within the field, which then leads to differential engagement with different assignments as well as exploration of how to develop some conjunction of personal with professional to pursue within assignments (Prior, 1998).

Even when aligned to tasks and discourses grad students not only need to synthesize more materials, frame complex problems, juggle more data, and develop deeper arguments they must also sort through the various judgments and potential influences offered by their professors and peers. And they need to develop a responsibility and confidence in their choices that allows them to make their arguments clearly and forcefully. They need to come to an understanding of what professional authorship means and how they can enact it. Further all this is located within historically evolving disciplines and the students' biographies and emerging careers. Paul Prior investigates these complexities of writing oneself into a discipline and thereby remaking the discipline are investigated in a series of detailed studies brought together in his book *Writing/Disciplinarity* (1998).

### *Reading/Writing Connection: Specialized Forms of Reading*

The teaching and study of academic writing, and particularly writing across the curriculum has led to an understanding about the relationship between reading on writing, based on the concrete uses academic writers make of their reading in their textual productions. In academic and disciplinary writing students and professionals specifically refer to and cite material they have read as well as implicitly rely on other ideas and knowledge gleaned from reading. Thus summary, paraphrase, synthesis, response, critique, and research writing are important reading-based writing skills. Moreover, the exercise of these forms of writing relies on accurate reading and displays the quality of the writer's

reading. Further, the need for materials to write about and one's commitment to making a statement can motivate and direct interpretation in reading. (Bazerman 1980, 1981).

Flower, et al. (1990) examine more deeply what happens when students read-to-write. They find that for many students, source texts are not transparent repositories of information which can be extracted and then recreated in the student's own writing. Even when students have little trouble accessing information from a source text, they have several more steps to navigate before they can begin to create a new text. Flower, et al. call this "building a representation of the source text" (p. 125), and argue that students use this representation to create a representation of their own original text. In addition, Flower argues that the mental construction readers make of a text, even when reading for the "simple" task of comprehension, is in itself a significant piece of work that "can do much of the work reading-to-write calls for" (p. 247). (See also Spivey, 1990.)

Risemberg (1996) found there is a relationship between the length of time students spend reading information related to their writing assignments and the quality of the writing produced. Students who engaged more extensively with models of an essay similar to the one they were writing and/or a set of guidelines for writing that kind of essay—an activity he called task-information seeking—produced better writing. In addition, Risemberg found that this factor has a paradoxical relationship with reading ability and other variables. On the one hand, task-information seeking uniquely predicts writing quality when other variables such as reading ability and self-efficacy are included; on the other hand, reading ability and task-information seeking themselves showed no correlation. In fact, task-information seeking correlated with none of the other variable, only outcome. Thus, it was not necessarily the weaker or stronger writers who engaged in this activity, nor was there a relationship between task-information seeking and self-efficacy. Another related finding was that the stage at which a writer seeks task information seems crucial. Those who consulted the informational texts during the note-taking and reading stage were produced better texts than those who did so during the writing stage.

Similarly, Johns and Lenski (1997) found that the organization of student writing is influenced in part by the reading they do in the course of researching. This influence was found to emanate not only from the kinds of reading students in their study did, such as refer-

ence books versus trade books, but also the kinds of reading behaviors students engaged in—skimming versus reading—the number of texts consulted, and the pattern of searching, reading, and writing that the students exhibited. The strongest relationship seemed to occur with the pattern of researching and the resulting text. The researchers found three distinct patterns—sequential, spiral, and recursive—and correlating patterns in final texts.

Finally, WAC researchers have noted that students need to learn to engage in specific forms of reading in different subject areas. Haas (1994) observed that over the four years of an undergraduate major a biology student became a more sophisticated interpreter and user of texts in biology as she became involved in the networks of activities, people, and knowledge that were part of the communal enterprise of biology. Geisler (1994) found that not only did philosophers have very particular readings and uses of the philosophic literature in their own writings, but that these differed significantly from the readings and uses displayed by undergraduates. The differences were not simply explainable by the level of sophistication and knowledge, but also had to do with the difference of stance, with students reading philosophy in relation to their personal life issues, while philosophers read texts as presenting positions in an abstracted argument about knowledge.