

1 Preview of the Book

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What looked once to be a matter of finding out whether savages could distinguish fact from fancy now looks to be a matter of finding out how others, across the sea or down the corridor, organize their significant world.

—Clifford Geertz

The six of us who coauthored this book represent writing and four other disciplines—business, history, psychology, and biology. Although we come from four different institutions of higher education in the Baltimore area, we had worked together in writing-across-the-curriculum workshops before this study began. Virginia Johnson Anderson, John R. Breihan, Susan Miller Robison, and A. Kimbrough Sherman, the four teacher-collaborators who specialize in disciplines other than composition, collaborated in this research because they wanted to know more about how their students thought and wrote, and about how their teaching methods, influenced by the writing-across-the-curriculum workshops, were working. Thus, between 1982 and 1989, writing specialist Barbara E. Walvoord paired with each of the four, and, using similar methods to gather and analyze data, each pair conducted a naturalistic study of the thinking and writing of the students in that teacher's classroom. Lucille McCarthy, a writing specialist who joined the team in 1985, helped to shape and guide the data analysis, and critiqued the emerging chapter drafts written by the pairs. With Walvoord, she also coauthored the introductory and concluding chapters.

In our model, then, a writing specialist pairs with a teacher from another discipline to study the students in that teacher's classroom.

Elsewhere McCarthy and Walvoord have called this type of collaborative structure the "focused pair" (1988, 80).

PURPOSES OF THE BOOK

In this book, we, the six members of the team, have two purposes:

1. We present the results of our investigation of writing and thinking in each of the four classes taught by members of our team: classes in business, history, psychology, and biology.

2. We illustrate a model of collaborative, naturalistic classroom research in a college setting. This model proved, in our cases, to be not only a way to investigate how students thought and wrote, but also a powerful impetus to teacher growth and change.

Generalizations from our study to other classrooms must be cautious because, as James Britton reminds us, classrooms are places where "every variable is actively varying" (Britton et al., 1975). To help readers judge the applicability of our findings to other settings, we have provided detailed descriptions of the classrooms and the students we studied, and also of the methods we used to construct what Lincoln and Guba term "trustworthy" findings in naturalistic research (1985, 290–331).

Also applicable to other settings, we suggest, is our experience that systematic investigation of students' thinking and writing can result in discoveries that are likely to change teachers' understanding of their classrooms and, consequently, their teaching practices (Goswami and Stillman 1987). We suggest that even a limited investigation such as collecting students' logs or analyzing their drafts can be useful. Further, in our experience, interdisciplinary collaboration can lead each teacher to insights she or he might not achieve alone.

In addition to our collaboration with each other, a broader kind of collaboration must exist between us and those of you who are teachers. Dell Hymes (1972a) warns that an outside researcher's interpretation of a classroom

does not suffice to change it. . . . If information and ideas from [classroom studies] are found useful and are implemented, it will be because the teachers in an actual situation, through their observations and insight, have made them their own. (xviii)

THE NEED FOR OUR STUDY

A number of researchers and theorists in composition have called for investigations about how students think and write in college. Langer (1985) calls for investigations that seek to explain the interaction of student writers and their social contexts (327), and Frederickson and Dominic (1981) call for research on the meaning of literacy to people in various situations (17). Herrington (1983) recommends research on a wide range of students' experiences with writing and speaking (76), and Collins and Gentner (1980) suggest research on novice writers' "difficulties" (53). Bartholomae (1985) proposes research on the conventions of the academic community and on students' writing to see the "points of discord" that arise when students try to write in the university (147). Odell (1986) outlines several reasons for studying student writers and suggests a list of questions about what constitutes good writing in academic contexts and whether students need different strategies for writing and thinking in various disciplines. Cooper (1983) suggests a similar list of research questions.

Our study thus responds not only to our own needs as teachers and researchers to know what is going on in our own and others' classrooms, but also to calls from a variety of quarters for research into college students' writing in academic settings outside the composition classroom. A few such studies have been conducted (Berkenkotter, Huckin, and Ackerman 1988; Faigley and Hansen 1985; Herrington 1985; McCarthy 1987; Meese 1987; Nelson and Hayes 1988; North 1986). However, these studies have covered smaller numbers of students and disciplines than our study, and they have emphasized the *differences* among classrooms, the differences among students in the same classroom, or both. Our study looks at more than 100 students in four disciplines at three institutions, and it concentrates upon the *similarities* among classrooms as well as the differences.

THE TEAM'S RESEARCH QUESTIONS

The immediate context for our research questions is the *four classrooms*. Like any community, the classroom encompasses complex interactions involving not only teaching and learning but dynamics of race, gender, culture, and power. Interaction within the classroom, as well as any study of the classroom, is historically and culturally bound, mediated by language, and infused with the ideologies of the classroom partic-

ipants and the researcher. However, among the various ways of viewing the classroom, each of which would highlight different interactions, *we chose to view the classroom as a discourse community in which, under the guidance of their teacher, students learn the ways of thinking and writing that are deemed appropriate in that classroom by that teacher.* Our theoretical framework and our methods for data collection and data analysis are explained more fully in the next chapter.

As Walvoord and each teacher began the study of a classroom, they attempted to get as full a picture as possible of the context, but they focused on a single, salient event—students fulfilling their writing assignments. They collected a variety of data, including notes, drafts, finished papers, and logs from all or most students in each class; tapes of students thinking aloud as they worked on their assignments; tapes of student-peer response sessions; interviews of students; classroom observations by Walvoord and by paid student observers; teacher logs; textbooks and classroom handouts; and student characteristics such as SAT scores, gender, race, and age. The team then used various quantitative and qualitative methods to analyze the data.

As the study progressed, the team members came to focus on these research questions:

1. Within each classroom setting, what were *teachers' expectations* for “good” writing, thinking, and learning in the writing assignments?
2. Within each classroom setting, what *difficulties* arose as students tried to meet their teachers' expectations?
3. How did *teachers' methods* and *students' strategies* appear to affect, contribute to, or help overcome those difficulties? (Definitions of “strategy” and “difficulty” appear below.)
4. What were *differences*, and, especially, what were *similarities* among the four classes in each of the areas under 1–3 above?
5. When the biology teacher, in a subsequent section of the same course, changed her teaching methods to address the difficulties she and Walvoord had observed in her first section, *did the performance of the later students improve?* (The quantitative methods for answering this particular question are explained in Chapter 6.)

DEFINITIONS

We defined *strategy* as any action by a student (including a mental action we inferred from the data) that seemed intended by the student

to help complete the written assignment. For example, considering a topic choice, using a model one has learned elsewhere, and making an outline are all strategies.

We defined *difficulty* as a point of tension between the teacher's expectations and the students' attempts to fulfill those expectations. A difficulty is present when the data show either or both of the following:

- *Struggle*: the student spent extraordinary time or effort or expressed "this is hard" or some other frustration.
- *Failure*: in the judgment of the teacher, the student failed to meet the teacher's expectations for learning, for thinking, or for the final written product.

The Concept of "Difficulty"

We don't think that a difficulty is necessarily counterproductive. Learning, in our view, often grows out of the difficulties of struggle and failure. Exploring these positive sorts of difficulties helped us understand how our students learned. But we also focused on those less positive points at which the struggle seemed harder or more time-consuming for students than was necessary, or where the struggle did not produce the learning or the texts the teacher had hoped for.

We do not view difficulties as solely the outcome of either teachers' or students' actions, but rather as the result of complex interactions across time among teacher and students in a particular setting, involving cognitive, cultural, academic, physical, and emotional factors. Some of these factors are outside the scope of our study. In constructing the factors that contributed to students' difficulties, we thus focused on those that teachers could most readily influence—teaching methods and students' strategies.

We recognize that our focus on difficulties reflects our own view of the classroom, and our own teacherly roles and interests. As teachers, the research team was accustomed to identifying and addressing what we think of as difficulties that our students are experiencing in learning. Another reason we focused on difficulties was that an important goal of our research was teacher growth and change. A teacher who understands the difficulties that arise in his or her classroom, we reasoned, would be able to shape teaching methods that challenged students, that helped students learn through their struggles, and that helped avoid unnecessary frustrations and failures.

We chose, in this study, to grant to individual teachers the validity of their expectations. For example, we do not ask whether the biology

teacher's expectation that her students would learn to use the scientific method was a wise or justifiable one. Instead, we focus on the difficulties that arose as she tried to teach the scientific method.

Broadly, then, this book is our exploration and construction of students' thinking and writing in four of our classrooms, of our interactions with students, and of the difficulties that arose within those interactions. It also tells how we six teacher-researchers collaborated over a seven-year period in order to learn, in Geertz's terms, how the people "down the corridor organize their significant world" (1983, 151). And as we've learned about others' worlds, each of us has come to better understand our own.

SIMILARITIES AMONG THE FOUR CLASSROOMS

METHODOLOGY

We arrived at a number of similarities among the classrooms under study by comparing and contrasting our findings from them, using two operations:

1. Searching for common elements, even when teachers and students may have been using different language to describe those elements,
2. Stating similarities at a sufficiently high level of generality to cover all four classrooms.

We were aware of two possible problems resulting from these operations: first, a common language might too narrowly represent our findings, and, second, similarities might be stated too generally to be useful. We tried to guard against these dangers by bringing all our team members, with their different perspectives and detailed knowledge of their own classrooms and disciplines, into our discussion of similarities. In our discussions, we consciously tried to challenge each other's constructions of the similarities, and we also checked our constructions carefully against our data. So that the constructions would not overly influence our ongoing data analysis and interpretation, each pair completed most of its data analysis before we finally settled on the similarities.

Our construction of similarities among the classrooms does not deny the many differences that we also discuss. However, because other researchers (Fagley and Hansen, 1985; Herrington, 1985; McCarthy,

1987) have convincingly established that classrooms, even those within the same department, differ in many ways, we decided, rather, to try to construct similarities.

SIMILARITIES IN TEACHERS' ASSIGNMENTS

Good/Better/Best Questions

We realized, after data collection was completed, that *twelve of the fifteen major assignments in the four classes asked students for evaluation and/or problem-solving in the form of what we call good/better/best questions:*

Good: Is X good or bad?

Better: Which is better—X or Y?

Best: Which is the best among available options?
What is the best solution to a given problem?

According to the survey literature, good/better/best questions may be common in college classes.* Among our teacher-collaborators there had been no prior plan to ask good/better/best questions; they appeared as part of the teachers' normal course planning.

Our good/better/best questions include "evaluation" and "synthesis," the highest levels in Bloom's taxonomy of educational objectives (1956, vol. I). In other words, these good/better/best assignments required complex thinking. The major assignments in our four classes were never merely the "review" writing that Langer and Applebee (1987) found common in high schools, writing which valued "accuracy of students' recitations of newly learned material" (137). Rather, in our four classes, the students were asked to apply discipline-based categories, concepts, or methods *to new data and new situations*. For example, in Sherman's business class, students read a textbook chapter that described how to choose a location for a manufacturing business. In the writing assignment, Sherman asked them to apply those prin-

*Bridgeman and Carlson's (1984) study of faculty in 190 academic departments at 34 institutions showed that instructors favored two questions that resemble our good/better/best questions: "Compare/Contrast plus Take a Position," and "Argumentation with Audience Designation." In addition, Rose's (1983) survey of 445 essay and take-home examination questions and paper topics from 17 departments at UCLA found that most questions and topics required "exposition and academic argument," presumably tasks that would include our good/better/best questions.

ciples to choose a location for a different kind of enterprise—the proposed new Baltimore baseball stadium, a hotly debated issue in Baltimore’s barrooms and boardrooms at the time.

Generally, the four teachers held, with Peter Elbow (1986), that what constitutes “real learning” is the ability to apply discipline-based concepts to a wide range of situations and to relate those concepts to the students’ own knowledge and experience (33). Our four teachers shared the quality that Langer and Applebee (1987) found in the high school classrooms they studied, where “writing was effectively used to enhance student learning.” In those classrooms, as in ours, “the teachers’ criteria for judging [students’] learning changed from the accuracy of students’ recitations to the adequacy of their thinking” (137).

SIMILARITIES IN TEACHERS’ EXPECTATIONS FOR STUDENTS’ ROLES

What did teachers expect students to do as they addressed good/better/best questions? As our data analysis progressed, we came to the notion of “role” to help us summarize the many expectations. Basically, then, *all four teachers expected students to function competently in the role of “professional-in-training.”*

We define *role* as a set of behaviors associated with a given position or status in society (Banton 1985; Corey 1984). To adopt a role implies that one relates in certain ways to “role-others.” For example, the role of “doctor” implies also that there will be “patients.” A person may also assume multiple roles—a doctor may also be a parent. Then again, people may fulfill a role only partially; they may also combine characteristics of several roles, and role expectations or role behaviors may differ among people.

Our concept of role provides throughout the book a conceptual lever with which to view our classrooms—a lever that emphasizes the social aspects of students’ behavior and allows us to construct relationships among the wide variety of teachers’ expectations and students’ strategies.

The Professional-in-Training versus the Text Processor and the Layperson

All four teachers expected students to adopt the role that, as data analysis progressed, we came to call “professional-in-training.” The

two teachers of majors courses (Sherman in business and Anderson in biology) were educating their students as business decision makers and entry-level scientists in industrial research and development laboratories. The two teachers of CORE and elective courses (Breihan in history and Robison in psychology) saw their students more broadly as preparing for professions in a variety of fields and for participation in society as citizens.

Professional-in-training, then, means either a professional in the teacher's own field or a professional in some other field who would be able, as an informed citizen, to employ knowledge about the teacher's discipline. Although the specific characteristics of that role differed in each classroom, in all four classes the professional-in-training role always meant:

- focusing on the issues or problems outlined in the assignment
- using, not ignoring, the knowledge and methodology being taught in the course to address those issues/problems

All four teachers viewed the professional-in-training role as distinct from other student roles they often witnessed—roles to which, as our data analysis proceeded, we gave these names:

1. *text processor*: the student focuses centrally on processing texts in some way (summarizing, synthesizing, reviewing, commenting) rather than on addressing the issues and solving the problems outlined in the assignment.
2. *layperson*: the student addresses the issues and problems, but does not use the knowledge and methodology being taught in the course.

One example of a layperson role occurred in Sherman's stadium assignment. The students who addressed the problem as baseball fans, rather than as business managers-in-training, did not use the methods of business decision making being taught to them in the course.

The difference among the three roles is the student's *focus*. The professional-in-training must not only process text but must also make some use of what has been learned outside the course. Though teachers in some high school or college settings may sometimes ask merely for text processing, Anderson, Breihan, Robison, and Sherman were consciously trying to move students from text-processing or layperson roles to professional-in-training roles.

Role Categories in Other Frameworks

Categories similar to our three roles have emerged within other research frameworks. In a college freshman class called "Reading to Write," Flower (1990) asked students to write a "research paper" using source texts she provided. She deliberately kept the instructions ambiguous, to see what kind of overall "organizing plans" students would generate for composing their papers. Among students' plans were those we have linked to the text-processor role—plans to "summarize" or to "review and comment" or to "synthesize" the source texts. (The operations students performed on the texts might be more-or-less sophisticated but, in our configuration, they were all text processors because the focus of their attention was to process the texts in some way, not to address an issue.) Another group of students addressed an issue, but, like our layperson students, without much reference to the texts that were supposed to be the basis for the paper. A final group of Flower's students "interpreted" the information in the source texts for a "rhetorical purpose." Like our professionals-in-training, they focused on using information in the source texts to address an issue or problem.

Flower's study reveals the models her freshman students already knew and could use, or could construct, when instruction was deliberately vague and open-ended. Our study, however, is different in three important ways: First, it explores what roles were expected of students doing their usual classroom assignments in four different disciplines. The teachers did not change or construct the assignments with our study in mind. Second, the assignments were not deliberately ambiguous, as in Flower's study. Third, we did not operate within the cognitive process model that Flower used, but instead adopted the concept of role as our conceptual lever. Nonetheless, working from different perspectives, both we and Flower seem to be constructing similar categories of students' behavior in college classrooms.

Nelson and Hayes (1988) developed some categories that are both similar to and different from ours. They studied how sixteen paid college-student volunteers responded to the researchers' request to write a research paper for a hypothetical Latin American History course. Their assignment was to write on the topic of "some aspect of the relationship between the United States and Chile during the overthrow of President Allende in the early 1970s."

Although the study was conducted in a much more artificial situation than ours (the students were not actually enrolled in a political science class) and the instructions, again, were vague, Nelson and Hayes

identified two “approaches” that in some ways may relate to our text-processor and professional-in-training roles. In what they call the “content-driven” approach, the students focused on finding any usable information on the broad topic of the relationship between the United States and Chile during the overthrow of Allende. In the “issue-driven” approach, the students focused on choosing “some aspect” of the topic, as the assignment had requested.

Nelson and Hayes’s categories may be somewhat similar to our text-processor and professional-in-training roles if one interprets their findings to mean that their content-driven students focused on merely processing the text, while their issue-driven students, like our professionals-in-training, focused on addressing the specific task proposed by the assignment.

In that same 1988 technical report, Nelson and Hayes recounted a second study from which we want specifically to *distinguish* our findings. This time they did a naturalistic study of eight college students writing their assigned research papers in eight different courses at Carnegie Mellon University. In this study, Nelson and Hayes identified two groups “high investment” (of the students’ time, energy, and caring) and “low investment.” They do not equate, but seem to link, the content-driven approach from the first study with the low-investment group of the second study, or the issue-driven approach from the first with the high-investment group of the second.

On the basis of our data, however, a distinction should be sharply maintained between students’ investment and students’ adoption of the text-processor or professional-in-training roles. Some of our text-processor students invested a great deal of time and energy in taking copious notes from sources and summarizing them arduously in their papers. The text-processor role, then, is not always linked to low investment of time, energy, and caring.

Relevant Issues in Recent Literature

In addition to these studies, our notion of “role” is relevant to the current discussion in the literature on the “ethos of academic discourse,” to borrow a phrase from Bizzell (1978). Aristotle focused on how the speaker creates ethos *in the text* by using rhetorical devices to portray the self as a person of good character. But contemporary discussions of the ethos of academic discourse have been linked with discussions of the self *outside of the text*—for example, Bizzell advises that students should ask “what kind of person the intellectual work of college seems to be asking them to be” (353). The notion of role allows us to sidestep

the sticky question of whether or not there is a “real” self while also allowing us to go beyond the self as merely an artifact of text.

Our data show that students, aside from some tinkering with vocabulary to make themselves sound more academic, did not consciously manipulate textual features to construct a self in the text; rather, their construction of self in the text seemed to proceed from what we term their roles—their behaviors in a number of areas such as collecting information, relating to teacher and peers, planning the paper, and reading source texts. For these reasons, then, we propose that the discussion of the “ethos of academic discourse” and the “self” that a student must “be” could profitably employ the concept of roles that are expected and adopted in academic communities.

SIMILARITIES IN TEACHERS’ EXPECTATIONS FOR GOOD/BETTER/BEST REASONING

The Five Tasks of Good/Better/Best Reasoning

What, then, did teachers consider “good” reasoning as students addressed good/better/best questions? *In all classrooms, students addressing good/better/best questions had to perform five tasks:*

- Task 1. Define “good” so as to accommodate a number of variously weighted factors and address the issue of “good for whom?”
- Task 2. Observe and analyze causes of the problem, aspects of the situation, and/or alternative solutions to the problem.
- Task 3. Bring that information into disciplined relationship with the definition of “good” so a single judgment can be made.
- Task 4. Integrate values/feelings with reasoning so as to reach a defensible position.
- Task 5. During the process, conduct simultaneously the processes we term “solution-searching” and “rationale-building” (see explanation below).

Solution-Searching and Rationale-Building

To explain Task 5 a bit more fully: In all four classrooms, the good/better/best questions were what psychologists call “ill-structured” problems—that is, open-ended problems for which there is no “right” answer and for which all necessary information may not be available.

Because solutions to ill-structured problems cannot be tested in the scientific sense, they must be supported by a rationale (Voss, Tyler, and Yengo 1983). In studying how social scientists solve ill-structured problems such as how to increase Soviet agricultural productivity, Voss, Greene, Post, and Penner (1983) found that their subjects employed simultaneously two operations—looking for a solution to the problem and building a rationale for a particular solution they wanted to defend. Not only Voss and his colleagues in problem-solving research, but researchers in critical thinking have identified two intertwined elements in critical thinking: “the context of discovery,” which is the inventive, creative part, and “the context of justification,” which is the presentation of the argument (Kahane 1980; McPeck 1981). Similarly, all four of our team’s teachers expected students, as they made good/better/best decisions, to integrate the two elements we call solution-searching and rationale-building.

An Example of the Five Tasks in a Classroom Setting

Another example from the stadium assignment illustrates how all five tasks apply in one situation. Sherman’s business students had to choose and weigh factors they considered important in defining a “good” stadium—factors such as transportation, land costs, and tax revenues (Task 1). Then they had to analyze various possible stadium sites (Task 2). Next, the information about the sites had to be related to the definition of “good” so that they could decide which stadium site they would recommend (Task 3). Values and feelings, in Sherman’s class, were integrated as the student chose and weighted the factors that they thought would constitute a “good” stadium (Task 4). There was no single “right” location that the student could determine merely by considering evidence in a “solution-searching” mode, but neither could the student merely seek a rationale for a favorite site without considering evidence; solution-searching and rationale-building had to be combined (Task 5).

Scardamalia (1981) has summarized research on children’s cognitive development in terms that reflect the five tasks:

Much of the story of cognitive development may be construed as taking progressively more variables into account during a single act of judgment. (82)

Our study shows how this ability to account for variables in making a single judgment translated into five identifiable tasks that were

performed somewhat differently in each of the four classrooms we examined.

SIMILARITIES IN AREAS OF DIFFICULTY

Given teachers' expectations that students, in addressing the good/better/best questions, would adopt and implement the role of professional-in-training, and, in doing so, would perform the five tasks of good/better/best reasoning—what difficulties, then, arose in the classrooms as students attempted to meet their teachers' expectations?

In each of the classrooms, difficulties arose in six areas of students' thinking and writing processes:

1. Gathering sufficient specific information
2. In the paper, constructing the audience and the self
3. Stating a position
4. Using appropriate discipline-based methods to arrive at the position and to support it with evidence
5. Managing complexity (i.e., avoiding what the teacher considered overgeneralization or oversimplification; considering various aspects of an issue; discussing alternative solutions to problems; acknowledging and answering counterarguments and counter-evidence; in science, designing an experiment with appropriate operational definitions and control of variables)
6. Organizing the paper.

We use these six areas of students' thinking and writing processes under which to discuss the difficulties. We do not imply, however, that the difficulties belonged only to the students; rather, as we have said, difficulties resulted from complex interactions between the students and their teachers.

The survey literature suggests that many college teachers value students' performance in these six areas (Behrens 1978; Cooper et al. 1984; Gere 1977; Shih 1986). Our study seeks to help teachers and researchers better understand the difficulties that arose in our four classes as students attempted to meet their teachers' expectations. Particularly, we focus on how students' strategies and teachers' methods affected the difficulties.

ORGANIZATION OF THE FOUR CLASSROOM CHAPTERS

As Table 1.1 illustrates, the four classroom chapters are organized according to our research questions. The second and third classroom chapters cover only some, not all, of the six areas of difficulty. The first and fourth cover all.

A subhead such as "Students' and Teacher's Differing Approaches to the Textbook" appears under several areas of difficulty in each chapter. Each time the subhead occurs, we explain how the differing approaches to the textbook affected that particular area of difficulty in that classroom. The chapter organization thus allows us to explore differences among the four classrooms in students' and teachers' approaches to the textbook while also emphasizing that approaches to the textbook were a factor in many sorts of difficulty within all four classrooms.

Within the common plan as outlined above, each classroom chapter has a special focus, and its organizational pattern may vary accordingly (Table 1.2).

In the final chapter of the book, Chapter 7, we summarize similarities

Table 1.1 Basic Organizational Plan for Classroom Chapters

Topic	Research Question	Chapters Discussed
Teacher's expectations	1	3,4,5,6
Areas of difficulty		
Information gathering		3,6
Nature of the difficulties	2	
Teacher's methods and students' strategies	3	
Constructing the audience and self		3,5,6
[Subsections as above]	2,3	
Stating a position		3,4,5,6
[Subsections as above]	2,3	
Arriving at (and supporting) a position		3,4,5,6
[Subsections as above]		
Managing complexity		3,4,5,6
[Subsections as above]	2,3	
Organizing the paper		3,6
[Subsections as above]	2,3	
Similarities and differences among the classrooms are explored throughout each Chapter	4	3,4,5,6
Changes in teaching methods and improvement in student performance as a result of this research	5	6

Table 1.2 Special Focus of Each Classroom Chapter

Chapter	Class	Focus
3	Sherman's Business	How teacher's methods and students' strategies affected all six areas of difficulty
4	Breihan's History	How Breihan's teaching methods helped students overcome difficulties
5	Robison's Psychology	How the multiple roles Robison modeled affected the difficulties
6	Anderson's Biology	Changes in Anderson's teaching methods based on study of her 1983 class; improvement in performance of her 1986 class

and differences we found among the four classrooms, focusing on our research questions about teachers' expectations, students' difficulties, and the ways in which teachers' methods and students' strategies appeared to influence those difficulties. We conclude by reflecting on our team's seven-year research collaboration, its challenges and satisfactions.