CURRICULUM

Plymouth State College Journal on Writing Across the Curriculum

Volume 1, Number 1
June 1989

Editorial Board:

Mary-Lou Hinman, Chair

Bonnie Auslander
Dennise Bartelo
Warren Mason

Plymouth State College
Plymouth, New Hampshire 03264

Requests for copies:

Mary-Lou Hinman, Chair
Writing Task Force
Plymouth State College
Plymouth, New Hampshire 03264

Reproduction of material from this publication is hereby authorized for educational use in non-profit organizations.

Cover: Sally Grand

Copyright © 1989 Plymouth State College
Printed by Clifford-Nichols, Plymouth, New Hampshire

Preface

The motivation to publish *The PSC Journal on Writing Across the Curriculum* came last June during a "second-phase" faculty-training workshop led by Toby Fulwiler, Writing Coordinator at the University of Vermont. As faculty participants shared writing activities from their courses, Toby Fulwiler kept repeating, "Write an article. Let others know what you are doing." Later, the Writing Task Force decided to create this journal as a forum where faculty and students could share ideas and practical suggestions for using Writing Across the Curriculum techniques. The papers in this journal reflect the activity at Plymouth State College in Writing Across the Curriculum.

The idea of creating a Writing Across the Curriculum program at Plymouth surfaced five years ago during the deliberations of the General Education Committee, a faculty committee formed to study and revise Plymouth's General Education requirements. The Committee sought a program which would expose students to "the breath of knowledge that has shaped human culture" *and* guarantee proper skills levels in several areas, including communication. Consequently, the Committee placed particular emphasis on writing when they proposed a new W-Course plan.

Academic requirements for all students already included a freshman-level, skills-oriented composition course. In addition, the General Education Committee proposed that each academic department offer a required W-Course with a "significant writing component" for its majors (ideally at the junior or senior level). The W-Course would not be a course in writing skills but rather a course in which students used writing as a tool for learning in their field. Thus a variety of writing activities could fulfill this requirement: journal entries, multiple draft essays, imaginative and ex-

pository writing, and non-graded as well as graded work.

To train faculty to devise and teach W-Courses and to address faculty concerns about writing in general, the General Education Committee appointed a Task Force on Writing Across the Curriculum during the fall term in 1985. Only one member of the original Task Force was from the English department; others came from the departments of Business, Education, Health and Physical Education, Math, and Natural Science. The diverse composition of the group reinforced the idea that writing would be the concern of all disciplines.

The first year the Writing Task Force surveyed the faculty to determine the role writing already played in classes across the curriculum. The survey revealed some deep-seated frustrations but also widespread interest in increased emphasis on writing. The Task Force then read and discussed recent pedagogy on Writing Across the Curriculum, concentrating on works published since 1980 to take advantage of the experiences of other institutions with programs already in place. Based on that reading, the group organized and distributed a two-page bibliography to faculty before their summer break.

With that accomplished, the Task Force turned to its most pressing concern—training faculty from all disciplines who would be teaching W-Courses. In the spring of 1986, Toby Fulwiler came to campus to run the first workshop. Hiring an outside consultant lent credibility to the program, but, more importantly, Toby Fulwiler provided the Task Force with a model for subsequent faculty-training workshops. The three-day workshop covered many traditional topics such as revising, editing, and evaluating writing, but primarily focused on writing as a tool for learning through journal writing, short freewrites, and multiple draft essays.

That first workshop was successful not only because faculty found new ways of incorporating writing into their classes but also because they had time to discuss teaching techniques in general. During the final sessions of the workshop, over half of the participants volunteered to be actively involved with the Writing Task Force during the next academic year. From that group came the leaders and presenters for subsequent faculty-training writing workshops.

The Writing Task Force continued to offer workshops every January and May for the next two years. To date, over 60% of the Plymouth faculty have attended the two-day sessions. In two of those workshops, PSC faculty were joined by teachers from secondary schools, establishing ties that still exist between PSC and two local high schools.

The Writing Task Force also sponsored a number of follow-up sessions for workshop participants and twice held "reading parties" where faculty worked together on their own writing in progress. On the group's recommendation, the college adopted the *Borzoi Handbook for Writers* as a reference for use across the curriculum. For two years now, all freshmen have received the handbook as part of their freshman "package." Finally, the Task Force has established this journal which we hope will be an annual forum for discussion of Writing Across the Curriculum at Plymouth.

As the articles themselves testify, there is no "party line" in the publication, and a healthy debate over Writing Across the Curriculum continues. Members of the same department differ over issues in theory and practice. (See, for example, the two articles written by Robert Hayden and Paul Estes of the Math Department.) Furthermore, Dennise Bartelo and Robert Morton have suggested in their article, "Iconology: An Alternative Form of Writing," that the very definition of "writing" needs to be expanded. Finally, two articles by Richard Chisholm and Robert Miller that explore collaborative writing and learning activities suggest new possibilities for Writing Across the Curriculum techniques. The evolution towards new approaches in teaching and learning represents one of the most satisfying qualities of the program. We present these papers in the hope that others may profit from the experiences of their colleagues and will join the continuing dialogue about Writing Across the Curriculum at Plymouth.

Mary-Lou Hinman, Chair
Writing Task Force

Plymouth State College Journal on Writing Across the Curriculum

Volume 1, June 1989

Contents

Reflections on Theory

Strategies

Reviews and Reactions

New Directions

Acknowledgements

The Editorial Board would like to thank the following:
Dean Theodora Kalikow for her support of this project; Leroy Young for his supervision of the cover design; Beth Kondos for designing and typing the text; Sandra Perkins for her patient supervision of the budget; and the remainder of the Writing Task Force—Paul Estes, Richard Fralick, Joel Goldfield, John Gregor, Ellwyn Hayslip, Russell Lord, William Taylor and William Taffe—for their interest and hard work.

Reflections on Theory

Using Writing to Improve Student Learning of Statistics

Robert Hayden

This paper discusses student writing assignments (and my goals for same) in Math 230, Introduction to Statistics, and Math 330, Applied Statistics Using the Computer. What I have done can most readily be extended to other courses in which mathematics is applied to the world around us. It can less readily be extended to courses in pure mathematics or to courses that stress computational techniques or algebraic manipulations.

I want to begin with some discussion of the reasons why I feel a need for writing assignments. This is as much directed at those already convinced of the importance of Writing Across the Curriculum as it is at those who are unconvinced. In talking with the unconvinced, I often find disagreements about the goals and nature of education to be the key differences. Even among the convinced, different sources of conviction lead to different writing assignments with different goals. By making my goals explicit, I hope to stimulate interest among the unconvinced and reflection among the convinced.

Let me tell you about the experience that first showed me the need for student writing in applied statistics. I had written an examination question that required my students to do a hypothesis test. It ended with a poorly worded question that students interpreted in a variety of ways. Some simply provided the results of their calculations along with a number they had extracted from a statistical table. Others included some

jargon about "rejecting the null hypothesis" while others stated a conclusion in more practical terms such as "the tested drug is probably more effective than the standard treatment." Some students provided two or even all three of these responses. In fact, all three constitute restatements of a single fact in different language. Unfortunately, I found little or no correlation between the different answers of students who gave multiple answers. If the numbers clearly indicated that the null hypothesis should be rejected or the treatment declared effective, students were just as likely to say the opposite.

Reflecting on my students' answers, I reached a number of conclusions.

1. Since their final conclusions were no better than what they might have reached via a simple coin toss, all the complex computations I had taught them were of no real value.
2. My students' lack of understanding was mostly no fault of their own. Their textbook spent pages and pages showing them worked examples of how to do the computations, but far less space discussing what the computations meant. Exercises asked them to perform computations but rarely asked them to explain their results. Nor were they ever required to select an appropriate technique. The appropriate technique was always whatever technique was described most recently.

This led to some serious thought about what my students needed to learn in a statistics course, and how I might help them to learn those things.

I next asked myself what my students were likely to need to do with statistics after graduation. I tried to order these needs on the basis of how many of my students might have them. I hope you will pardon my listing those needs here, because they are relevant to all kinds of "book learning."

1. Virtually all of my students would need to evaluate quantitative information presented to them in newspapers, at zoning board meetings, by their doctor, or by numerous other sources. These students need to know what a mean or a standard deviation is or means. They need to know the strengths and weaknesses of these numbers as summaries. They need a healthy scepticism toward quantitative claims.

2. A smaller group of my students would need to evaluate the meaning and propriety of more technical statistical techniques that might be used by researchers in their own field.
3. A still smaller group of my students might need to evaluate statistical work done by subordinates or provided by consultants.
4. A very small group of my students might actually carry out a statistical study themselves. These students would certainly need to know how to pick an appropriate technique. They would almost certainly use a computer to carry out the mechanics of data storage, editing, and analysis.
5. An even smaller number of my students might one day need to carry out a large scale statistical study while stranded on a desert island, or at a remote wilderness location, or in some other situation in which a computer would be unavailable. These students would need to know how to perform the computations by hand.

If we look at most statistics books, and most statistics courses, we find them organized as if my last group of students were the norm. Indeed, the whole pyramid is inverted. Few textbook problems deal with meaning or interpretation rather than computational technique.

So, I resolved to try to spend more time on meaning, evaluation, and interpretation. However, my new found idealism was tempered by a basic fact of schooling: the students won't learn anything that does not appear on the exams. The simple conclusion is that questions involving meaning, evaluation, and interpretation must appear on the exams. Once we reach this conclusion, the need for writing is obvious: the answers to questions of meaning, evaluation, and interpretation are verbal, not numeric. Thus writing becomes not just another subject to teach, nor even a tool for achieving traditional goals, but rather a necessary path to developing higher-level quantitative skills.

These, then, are the values and experiences that have shaped my interest in Writing Across the Curriculum. Let me now deal with some of the practical problems of implementation. The most important piece of advice is: **start slow**. Your students have had an average of 14 years of

experience with teachers who preached the importance of higher level skills but tested only on memorization and manipulative skills. Your best sermons will therefore have no effect, and your students will all fail that first exam when you ask them all those questions exercising skills they have never developed. You will become discouraged, curse their stupidity and your own idealism (how silly at your age!), and return to rote drill. Actually your students can do far more than you imagine, but they need your help. There follows some advice on providing that help. Bear in mind that it is based on all of the above. If your reasons for using writing assignments differ from mine, you may prefer a different approach.

The first thing you need to change is your teaching. Deemphasize mechanics. Assign only enough computational problems to get the ideas across. Keep the numbers **very** simple. Encourage the use of calculators or computers for any computations beyond the bare minimum needed to grasp the concepts. Spend lots of class time on interpretation and meaning.

Next, **provide sample test questions!** This communicates the nature of your expectations and the fact that you are not kidding. Once you have taught the course this way a few times, you will have a bank of old exams. Share them freely. Let students see for themselves that you really do ask embarrassing questions on exams. Distribute these old exams well in advance. Students cannot change their study habits the night before an exam. Indeed, you will find that they will initially, but very strongly, resist changing their study habits at all. There really is not much you can do about that except to fail those who do not perform at the level you desire. Things will improve as word gets around and students enter your class with expectations already tempered by your reputation.

Then there is the matter of writing exam questions. Start small. Problem 1 on Exam 1 should not be

> Compare and contrast the methods, assumptions, uses, and histories of parametric and nonparametric statistical techniques, giving special attention to their impact on the methodology of the social sciences.

A more reasonable start might be

For the data 3,1,4,1,21, find the mean, mode and median.
Which of these would best summarize this data? Why?

Since I am hoping that many of my readers **do not** teach statistics, I do not want to give a large number of statistical examples. The principles should be clear.

Keep in mind that the main goal is to force the students to **think**. Forcing them to write is just a tool, a way to hold them accountable for thought. You do not have to make them write a lot of words as long as you get them to think a lot of thoughts. One-sentence answers may meet your goals. Also keep in mind that reading and writing may often be interchanged. Instead of asking students

Find the slope in y=2x+3.

Or even

Interpret the slope in y=2x+3.

You might ask

How much does y change for a unit increase in x when y=2x+3?

Now the answer is a single number—much easier to grade than a student-written sentence or a paragraph on the subject.

Sometimes teachers are discouraged by the quality of writing they get or discouraged from asking for writing by fears of what they might get. In my experience, lack of mastery of subject matter will far outweigh any writing flaws. Indeed, you may discover that your students know far less than you thought about the meaning of those numbers you taught them to calculate. This can be taken as a sign of either the futility or the importance of your work, depending on your outlook on life. You should work on teaching your discipline until the content of the answers is better than the expression. In the process, you will find that the expression improves by itself. No one communicates well when they have not the faintest idea what they are talking about.

Yet another issue is grading student writing. Here my solution is as simple as it is radical: **don't**. I grade them only on such knowledge of statistics as they are able to communicate to me. As long as their mastery

of the mechanics is good enough so I can understand what they are saying, they can get full credit. The only grammatical advice I ever give is, "Never start your first sentence with a pronoun." Many of my students are as anxious about grammar and punctuation as they are about statistics. For better or worse, I try to handle things so they never notice they are in a "W" course. My exams are meant to reflect what statistics is all about, not to reflect what writing is all about.

However, there are some things on the border line between statistics and rhetoric that I do take into account. I prefer short, direct answers. (Often students are amazed at how short an answer I will accept.) Ambiguity or vagueness is taken as a sign of uncertainty and costs points. So do irrelevancies. I insist that students read the question carefully and stick to it. Indeed, the biggest problem I find (other than lack of knowledge of statistics) is failure to answer the question asked. This, of course, is a problem of thought rather than syntax.

I have been writing as if all the writing I require is on exams. That is very nearly true. Remember that I am trying to find ways to get students to think and ways to hold them accountable for thinking, and exams are the ultimate accountant. I have experimented with projects where students analyze a set of data and write up a report, but I have not had a great deal of success with this. Just worrying about what the numbers mean is a wrenching change for many students. Asking them to consider the meaning of dozens of numbers and integrate them into a report is really too much to ask. Perhaps this will change as other instructors, especially those in the high schools and grade schools, start to emphasize meaning and interpretation.

Perhaps I should close with some sort of "evaluation" of the success of what I have been doing. This is impossible. I have no idea of what students thought a standard deviation meant before I started asking them. Based on their answers during the brief transition period, before they expected such questions on exams, my suspicion is that it never dawned on them that a standard deviation **had** a meaning. It was just a cue-word used to Pavlovically stimulate a certain computation. On the other hand, I have often noticed that mathematicians and statisticians are among those least compelled to quantify everything, perhaps precisely because they **do**

know the meanings of numbers — which entails knowing which numbers are meaningless. For me it is enough that today much of my students' attention is directed toward the parts of statistics that I consider most worth knowing. A decade ago almost all their attention was devoted to the parts least worth knowing. I cannot quantify that change, but I can tell you it is a very important change, and a change that could only have been brought about by making students write.

***Robert Hayden** is an associate professor in the Mathematics Department. He has been an active participant in the Writing Across the Curriculum program at Plymouth, serving on the Writing Task Force and presenting in faculty-training writing workshops.*

Writing Across the Mathematics Curriculum

Paul L. Estes

In discussing Writing Across the Curriculum, mathematicians and non-mathematicians alike are inclined to ask when and how, if at all, would we use writing in mathematics courses. To begin answering that question, I would say that writing can indeed be incorporated into most of our courses and that we should be making more use of it than we currently do. Furthermore, I would break down the writing in college-level mathematics courses into three categories: ordinary narrative, technical writing, and the writing of proofs. I hope the discussion of these three types will be helpful to mathematics faculty as well as to others who may simply be curious about where writing might fit into the mathematics curriculum. Finally, I have some material of interest to elementary school teachers (and faculty who prepare them) based on observations of mathematics classes in West Germany.

There are two basic themes which emerge in what follows: the use of writing to clarify one's thinking, and the role of writing in helping students express themselves in a precise manner. Both are of concern in all disciplines but are especially crucial in mathematics.

Ordinary Narrative

Let us begin with the mundane considerations. (Warning: English faculty please skip this section. It contains reactionary thoughts about

stress on mechanics—the stuff that has been boring you to death for years.) In certain courses (e.g. History of Mathematics) we assign papers on topics such as the life and contributions of some highly creative mathematician. These papers call mainly for ordinary narrative as well as some technical writing (discussed below). About ten years ago, my first attempt at assigning such papers did not bring the results that I had hoped for. I naively thought that I would be reading papers that were well thought out, carefully written with proper grammar and correct spelling, documented, typed, and proofread. The results in many cases were none of the above. The attitudes of some students seemed to be that since this was a math course, attention to such matters was not important.

In the intervening years, I have learned that it is necessary to explicitly spell out one's expectations and to reinforce the initial instructions with timely reminders about careful attention to all of the fundamentals mentioned above that make for a paper that is at least readable and possibly even informative. This small amount of extra effort on my part has paid dividends. The papers have been of increasingly better quality. The simple lesson is that in mathematics courses, the forceful laying out of expectations seems to be especially needed to counter that "this-ain't-English" attitude on the part of the students.

Technical Writing

The explanation of some mathematical or statistical procedure or result comes under the heading of technical writing. My students have done a limited amount of this as part of many of the papers described above. Considerable technical writing is also employed in our Applied Statistics course. In that course, students conduct a variety of statistical analyses (hypothesis tests, the fitting of regression equations, etc.) and then report on the results. Such an assignment calls for a written explanation of goals, procedures, and results. This writing, more than ordinary narrative, taxes the writer's abilities to explain technical material in a manner that is precise, yet clear to the reader. This of course is difficult for anyone—not only students—still struggling to fully comprehend all aspects of the material at hand. But then, this leads to one of the most beneficial uses of

writing: its use as a thinking clarifier. When confronted with the need to put certain ideas down on paper, one is forced to first clarify those ideas in one's own mind.

And this in turn leads to a very effective use of writing in almost any mathematics course: short verbal explanations asked of students on selected test questions. (Lest this appear too burdensome come correcting time, I hasten to emphasize the word 'selected.') A typical question might read, "If two variables have a correlation coefficient of -0.98, explain the meanings of the negative sign and the absolute value of 0.98." Or we might ask students to verbalize the geometric significance of a gradient vector. Some additional good examples are given in the references. (See King, 1982 and Schillow, 1987.) Telling students in advance that they should expect interpretive test questions will direct their study toward a fuller understanding of concepts as well as computational procedures. It will thus help them realize that critical thinking is more than churning out numbers— that a numerical result is worthless if one is unable to interpret its significance. Reading the responses to these questions also serves the purpose of providing eye-opening feedback on student misconceptions.

The Writing of Proofs

Courses designed mainly for mathematics majors carry a heavy emphasis on proof. Currently at Plymouth State College, the most proof-laden courses are Euclidean Geometry, Non-Euclidean Geometry, Linear Algebra, Algebraic Structures, and Advanced Calculus.

Proofs are far the most difficult writing assignments in mathematics courses. There are several reasons for this, and analyzing those reasons is an instructive exercise in finding ways to help our students become better proof writers. First of all, a good proof can *not* be a rambling discussion, but rather it must be a carefully constructed sequence of logical statements whose end result is the desired conclusion. Each statement must be precise and be a logical consequence of previous statements or other agreed-upon assumptions. This is not easy for anyone who is still struggling to fully understand and sort out all of the interconnections in his or her own mind. And of course most of our students are adolescents who are more accustomed to teenspeak ("It was like totally awesome.")

than to the more demanding task of expressing themselves in a precise manner.

Even when instructed to be precise, and assuming that the reasoning is understood in the student's own mind, there is still a great leap forward required in transcribing those thoughts into a well-written proof. And for this, our students have had very little practice. One obvious reason for the dearth of prior training is the inordinate amount of time needed to teach and correct proofs. But there are other reasons not so readily apparent.

For most of us, our first experience with proofs came in high school geometry. And while we generally had competent teachers, many of our students have been taught by people unqualified for the task due to the chronic shortage of mathematics teachers and the resultant filling of positions with "temporary" help.

Even if a student had good instruction in high school geometry, the format of proofs taught in that course does not usually involve the writing of ordinary English sentences. A typical high school proof might look like the following:

Statement	Reason
p	given
q	Theorem 5
r	Axiom 3
s	SAS

where p,q,r, and s would be statements such as $\angle 1 = \angle 2$.

It is actually a straightforward process to convert such a proof into an English paragraph that does the same job, namely lead the reader from the premises to the conclusion. For the two-column proof above, one equivalent verbal proof would be:

> It is given that p is true and q follows from Theorem 5. Furthermore, Axiom 3 implies statement r. Finally, our conclusion s is a consequence of the Side-Angle-Side Theorem.

I recently tried a modified version of one of Toby Fulwiler's techniques in Algebraic Structures (a course for junior or senior math majors). The

particular Fulwiler technique is to have selected student writing samples on transparencies and then project them onto a screen for class discussion. My class was small (twelve students) so I asked the entire class to write out proofs on transparencies (no copying required on my part). As each proof was flashed on the screen, we discussed strengths and flaws. The names were not shown, but of course each student recognized his or her own work so interest was intense. The exercise was enlightening for all concerned, including me. I discovered that the biggest problem was not the write-up, but rather determining what logical steps were needed. They hadn't yet mastered the material underlying the theorem to be proved, and this I believe is an important key to the problem.

We mathematicians often express dismay at the inability of our students to write proofs and frequently imply that proper grounding was not provided in previous courses. Clearly, good prior training is needed, but some elementary material in each new course must be assimilated before one can write a proof incorporating that material. Euclid may have been a master of deductive reasoning but would surely have failed to make sense in a calculus proof before learning a little basic calculus.

Can the above disparate thoughts help us formulate an effective strategy for teaching our mathematics majors to construct well-written proofs? I would suggest that the best approach is to insure that all majors receive instruction on the fundamentals of logic in some early course and then get ample practice with proofs in a variety of contexts throughout the major program. But we must keep in mind that proofs are not created in a vacuum. In order to construct a proof which makes sense, a student must have a clear understanding of the preceding material, and fully comprehend what is to be proved.

Epilogue: Should we start in first grade?

Part of my sabbatical project in 1985 involved visiting mathematics classes in West Germany to determine why German students are so far ahead of their American counterparts. My wife, who is native German, worked with me on this project, thus preventing any possible communication gaps due to my less-than-perfect German. We discovered that the

differences were apparent already at the elementary school level. German children are taught more than their American peers in the first grade, and then the gap widens with each successive school year. Multiplication, for example, is a second-grade topic in Germany, whereas American children normally learn their multiplication tables in the third grade. We found that the setting and maintaining of higher expectations has a lot to do with the more rapid progress of German children. However, there are other factors involved, including a variety of teaching techniques.

One of those techniques is the integration of writing and mathematics starting in the first grade. We visited a first-grade class that was getting its initial introduction to fractions. The teacher whetted appetites for what was to follow by bringing to class a chocolate cake which needed to be divided for the birthday of a pair of twins. She used a can of whipped cream to make a line across the middle and then introduced the notion of halving. She then proceeded to explain the following sequence of sentences which she wrote out (in German) on the chalkboard.

Half of ten is five.	Half of six is three.
Half of 10 is 5.	Half of 6 is 3.
1/2 of 10 = 5	1/2 of 6 = 3
1/2 • 10 = 5	1/2 • 6 = 3

The point I wish to emphasize here is the early age at which a German child learns that a given mathematical equation is equivalent to an ordinary verbal statement. Thinking, writing, and speaking precisely are activities that cut across the curriculum. If they are integrated as in this German first grade math class, a multidimensional stretching of each child's intellectual capacity takes place, and there is no reason why this integrated verbal and mathematical growth cannot also begin in an American first grade. And if this growth can start in the first grade, think of the possibilities for what can be accomplished in the grades that follow.

References

Estes, Paul L. and Estes, Gisela B. "Mathematics Education in West Germany." *The Mathematics Curriculum: Issues and Perspectives* (1987 Yearbook). Pennsylvania Council of Teachers of Mathematics.

Fulwiler, Toby. *Teaching With Writing*. Portsmouth, NH: Boynton/Cook Publishers, 1987.

Geeslin, William E. "Using Writing about Math as a Teaching Technique." *Mathematics Teacher* 70 (February 1977) :112-115.

Johnson, Marvin L. "Writing in Mathematics Classes: A Valuable Tool for Learning." *Mathematics Teacher* 76 (February 1983) :117-19.

Keith, Sandra Z. "Explorative Writing and Learning Mathematics." *Mathematics Teacher* 81 (December 1988) : 714-19.

King, Barbara. "Using Writing in the Mathematics Class: Theory and Practice." *New Directions for Teaching and Learning: Teaching Writing in All Disciplines*, no. 12, C. Williams Griffin, ed. San Francisco: Jossey-Bass, December 1982.

Lochhead, Jack. "Faculty Interpretations of Simple Algebraic Statements: The Professor's Side of the Equation." *The Journal of Mathematical Behavior* 3 (Autumn 1980) :29-37.

Schillow, Ned W. "Writing in Mathematics--Long Overdue." *The Mathematics Curriculum: Issues and Perspectives* (1987 Yearbook). Pennsylvania Council of Teachers of Mathematics.

Watson, Margaret. "Writing Has a Place in a Mathematics Class." *Mathematics Teacher* 73 (October 1980) :518-19.

***Paul L. Estes** is a professor in the Mathematics Department. He has been a member of the Writing Task Force since its inception four years ago.*

Writing in the Computer Science Curriculum

William J. Taffe

Why Writing Is Necessary

College students in career-oriented majors such as computer science have two curricular thrusts, professional studies and general education. Writing is an important component of each.

Led by the ubiquitous freshman composition course, writing has long been prominent in American general education. Following this introduction, the term papers usually assigned in literature and history courses build additional skill in a particular type of writing -- the research paper. Recently, however, many academics have recognized that writing education cannot be isolated to a few courses and have advocated a much broader approach called "Writing Across the Curriculum." Ideas advocated by Writing Across the Curriculum proponents are beginning to influence Computer Science curricula.[1]

Unfortunately, in some science and engineering curricula, the importance of writing is not yet recognized. Perhaps it is because some faculty in technical curricula feel that writing should be taught in general education or that they are not competent to teach writing. Perhaps it is because some technical students have more difficulty with writing than do humanities or social science students, suggesting that more, not less, writing instruction is needed. Perhaps it is because technical students sometimes tend to concentrate more on symbolic expression and less on the develop-

ment of natural language. In addition, programming language skill development or communication with machines may crowd out the development of human-to-human communication and possibly lead computer science students to shortchange this facet of their education. Indeed, the stereotypical "nerd" is often portrayed as impoverished in written and oral human language skills.[2]

However, our computer science students need strengthened communication skills, not only for personal enrichment, but also for professional activity. Computer scientists must communicate with each other as clearly as with their machines. And, an extremely important Computer Science subdiscipline, the "man-machine interface," clearly rests on a thorough understanding of human communication.

Modes of Writing in Computer Science Courses

There seem to be three categories which adequately describe most of the writing used in Computer Science courses: writing to develop facility with the specialized language of the discipline, writing to explain results of a study, and writing as a process for clarification of fuzzy ideas. The first two categories are the most common, but the distinction between them is frequently lost. This is unfortunate because they require different skills. A student's lack of facility with the technical language can be mistaken by the instructor for an inability to organize thought; likewise, disorganized thinking may be passed off as merely a lack of writing skill.

The last category, clarification of thinking, although possibly new to computer science faculty, has important pedagogical potential. Teachers of writing recognize that the process of writing about a topic helps clarify the writer's thinking.[3] The simplistic model:

1. Collect all thoughts
2. Write them down

has yielded to the recognition of a feedback loop in the thinking-writing process. Attempting to express an idea often sharpens and clarifies the concept, frequently exposes lacunae in the thought chain, and possibly creates new questions. Thus, writing to clarify thinking may be an emerging tool for the Computer Science educator.

Developing Professional Language Facility

In a specialized discipline there are many new terms, phrasings, and modes of expression which have evolved to allow specialists to communicate more efficiently. When abused they create jargon, but their proper use is necessary if students are to fully join the professional community. This cannot be done passively; students must practice professional writing on a regular basis.

Since learning two things simultaneously is difficult, learning to use this new professional language and concurrently learning to organize professional material is often too large a first step for many students. For them, the first writing assignments in the discipline should be straightforward. An assignment I have used successfully is the writing of summaries.[4] Students are asked to choose an article from a recent issue of a technical journal and summarize it. Although students must be able to abstract essential points, the original article generally provides the organization for the summary and examples of using the professional language. Students learn to express themselves professionally by mimicking professionals in their use of specialized terminology. Plagiarism is clearly a concern and needs to be discussed with the students straightforwardly. Happily, this assignment also has several beneficial side-effects which are described in the reference cited.

Learning to Organize and Present Professional Results

A second level of technical language skill is organization and presentation of the results of a study. In the natural sciences, this is often a laboratory report. In Computer Science, it can assume several formats and is currently used in a variety of courses.[5] In the laboratory portion of my Computer Architecture course, I generally give an experiment which is somewhat open-ended and ask for a standard laboratory report. In addition to specialized language and organizational skills, students learn to combine text and graphics to explain their results.

This term in Computer Graphics, I am attempting a similar approach through an open-ended programming project. The students are asked to

develop three "typeface characters" in two different fonts and examine various problems associated with rendering these fonts on a computer screen. They are asked to explain what they did, what problems resulted, and how the problems were (or weren't) overcome.

Systems analysis courses are "naturals" for writing, and several authors have described the written assignments given to their students.[6] The discipline demands written materials of varying types, such as user questionnaires and diaries, formal specifications, project correspondence, system documentation, requests for proposals or quotations, the final report, and standards for the analysis process itself. Technical writing is crucial for the systems analyst and "Systems Analysis and Design" courses often require the preparation of technical material.

Because oral communication skill is equal in importance to its written counterpart, Computer Science students also need opportunities to enhance their presentation skills.[7] In our curriculum several courses present the occasion for brief oral reports, but the best opportunity to practice presentation skills is in the required senior-project course, "Directed Study in Computer Applications." In a multi-presentation colloquium at the semester's end, each student presents a 30 minute project report to an audience consisting of the department faculty and fellow seniors. Faculty coach students in the preparation of their talks, showing them how to develop effective presentations.

Development of Thinking

Earlier I described the feedback loop that exists in the thinking-writing system. The writing process forces the writer to clarify thinking by exposing the holes in a progression of ideas and frequently raising new questions. Presenting an idea improves the idea, a concept familiarly expressed through the teachers' adage "the best way to learn a subject is to teach it." Computer Science faculty are beginning to use writing to help their students understand Computer Science better.

Assignments which require students to express their thinking about problems and concepts may help the student sharpen their understanding of concepts.[8] Getting students to carefully pose questions about the

subject may lead them to think about the answers. I have assigned as a homework problem, "Write a potential question for the next hour exam, and explain what this question measures about knowledge of the subject." In addition to the wonderful side-effect of giving me some great exam questions, answering this question helps students focus and clarify their own knowledge.

My colleague Peggy Eaton formalized this approach last spring during her "Organization of Programming Languages" course. She broadened the traditional concept of the course notebook by requiring her students to keep a Programming Languages Journal. The journal contained lecture notes, but also notes taken while studying. More importantly, in the journal students wrote down concepts or ideas they didn't understand. In the process of explaining what confused them, they often removed the confusion, and if not, they had a well-focused question for class discussion. Writing helped students learn Computer Science.

Summary

Writing is both an end and a means. Computer Science students need to write to communicate, and professional writing must be taught in Computer Science courses as a continuation of the more general writing instruction of general education courses. But also, through the process of writing, writers are forced to clarify their thinking. By this means students have an additional tool for learning Computer Science.

Notes

[1]Hartman, Janet D., "Writing to Learn and Communicate in a Data Structures Course," *SIGSCE Bulletin*, February 1989 : 32-36.

[2]For example, see the Dick Tracy comic strips for the weeks of February 25 and March 5, 1989.

[3]For example, *New Directions for Teaching and Learning: Teaching Writing in All Disciplines*, Jossey-Bass, San Francisco, 1982.

[4]Taffe, William J. "Teaching Computer Science Through Writing." *SIGSCE Bulletin* June 1986 : 82-83. See also Flaningam, Dona Lee, and Warriner, Sandra "Another Way to Teach Computer Science Through Writing." SIGSCE Bulletin September 1987 : 15-16.

[5]See Quirk, James R. F. "Teaching Computer Networks and a Writing Intensive Course." *SIGSCE Bulletin* June 1988 : 30-35, and Brown, Dale A., "Requiring CS1 Students of Write Requirements Specifications: A Rationale, Implementation Suggestions, and A Case Study." *SIGSCE Bulletin* February 1988 : 13-16.

[6]For example, Jordan, Donald L., "Integrating Desktop Publishing into a Systems Analysis and Design Course." *SIGSCE Bulletin.* February 1989 : 74-77.

[7]Cote, Vianney. "Teaching Oral Communication in Computer Science." *SIGSCE Bulletin* June 1987 : 58-60.

[8]Hartman, p. 34, The microthemes on "supporting a thesis" and "quandary posing."

***William J. Taffe** is Chair of the Computer Science Department and a member of the Writing Task Force. He frequently writes and speaks about his use of Writing Across the Curriculum techniques in computer science courses.*

Writing for Visual Communication

William Haust

Communication is the essence of learning. A child communicates with others and interacts with the environment through many languages: through movement, through speech and through visual imagery. The spoken word competes with other forms of communication throughout childhood and, as the word is more universal and a more socially interactive language, speech becomes the language of choice as a child grows and learns. The written word becomes the externalization of speech and becomes an essential means of communication as a child develops an understanding of the structure and organization of writing. Thus, the written word is the primary means to communicate with others and to document our experiences and interactions with the environment. The visual image, often in the form of random marks, was the child's first documentary language and is often pushed aside in favor of the more acceptable and universal languages of communication, speech and writing, which provide the child more encouragement and support from parents and teachers.

A college student who enters an art studio with a lifetime of experience and skill in verbal and written communication often receives the same uncomfortable feelings that one experiences when traveling in a foreign country without an understanding of the native language. It is an experience that initially places a block in the eventual success of a student who desires to communicate through a visual medium. The problem lies with an unfamiliarity of the language of the visual arts and not with a lack of ability or lack of potential to achieve success. For the non-art student, this response becomes a negative experience directly related to this initial

reaction with art, placing a block in the way of future artistic expression and communication. The solution to the problem is a gradual and transitional withdrawal from the dependency on the written word as the only means of communication toward a comfortable familiarity with the language of the visual arts. This goal is achieved through the use of writing to describe the visual creative process.

The procedure to integrate writing into the art curriculum described here was developed for the course titled, "Developing Artistic and Perceptual Awareness," a course required of Elementary Education majors and often elected as a general education Fine Arts Perspective. The basic premise of the course is that art is an essential experience in the education of all young children and that the elementary classroom teacher will become a more effective teacher across the curriculum if the creative processes essential to art are integrated into the academic content areas of the elementary classroom. The course familiarizes the student with the media, techniques, processes, history and vocabulary of the visual arts so that teachers may effectively integrate the visual arts into elementary classroom experiences. Writing, integrated daily into art studio experiences, has proven to be a successful technique to ease the transition from verbal to visual communication, to build confidence, to develop group unity among class members and to emphasize the interrelated nature of all creative forms of communication.

Students entering the studio for class each day find a statement written on the board related to the artistic experience which they will be exploring during class that day. Students are expected to write a reply to the statement during class as they begin to develop a response for the day's problem and its relationship to the posted statement. The length of the statement is insignificant, however; what is important is that during the actual process of creating visual works and writing about the experience, students will begin to see the interrelationships between verbal and visual communication and will begin to develop the ability to transfer their skills from one medium to another.

At the close of the class, students sign their statements and submit them to the instructor. The signature is essential to the experience as it encourages students to make a personal commitment to their own state-

ment and avoids anonymity which would allow students the opportunity to evade their pure involvement with the experience.

The collected statements on the daily topic are typed as a single group statement on the theme, duplicated and returned to the students during the next class. The collected statements of each day's class become a valuable document of the creative visual art process and of the ability of the written word to express the visual experience. The statements are also valuable as an evaluation tool as it can be clearly seen which students fully understand and experience the day's activity and which students need additional work to develop a full understanding.

As this daily experience continues throughout the first several weeks of the semester, students will slowly build confidence in their ability to communicate effectively through visual imagery as well as to understand the relationship between words and their related images. As understanding is gained through this experience over time, the written statements are withdrawn, often without notice.

Writing as a component of the creative, artistic act becomes a record of the experience and the process. One thinks, one imagines, one explores and expresses through many different languages. The visual and written documentation becomes the record which can be analyzed, dissected, studied or exhibited. B.F. Skinner has said that learning is behaving; the record of that behavior, either written or visual, is the path of the exposed ideas unfolding.

Sample Student Statements

What interests me about drawing is...

The way that a person is able to look at something, or formulate a picture in their minds and put it down on paper. When this drawing is seen by a person it will bring feelings and emotions to an individual in either a positive or negative way.

How different people view things. One object can look so different when various people draw it.

The fact that everything that goes down on paper was influenced by the creator, intentionally or not. The ability to draw well means refining abilities and improving flaws: being able to be oneself while working so that intention, style and ability outweigh flaws.

Drawing and Teaching is...

Drawing is an expression, expression is necessary to everyone, student and teacher alike. After something is learned, it usually needs to be expressed and drawing is one of many ways to express it. Drawing can work the other way and be the way of teaching an idea.

Visual thinking is:

Perceiving spatial relationships in everything one does.

Analyzing a problem by creating a mental image of the problem, then seeing yourself solving the problem before actually attempting it.

Perceiving ideas objects or images in the mind which can be expressed through drawing, writing, speaking, etc.

An artist is...

Someone who is mentally, physically and emotionally aware of their environment and can express it in many visual forms.

A person who uses their mind and body to create and conform an idea or feeling into some type of medium.

Someone who can take an idea and turn it into a tangible object.

Anyone who can be creative in portraying their message or image using their given media, be it music, paper, etc.

My vision is...

Two inputs, two views, which when put together in a dynamic world add up to much more than the sum of the two.

Vision is the basis of movement, imagery and perception.

Very different from others. Sometimes it can be simple and other times complex.

***William Haust** is an assistant professor in the Art Department where he teaches photography and art education courses.*

Iconology: An Alternate Form of Writing

Dennise Bartelo and Robert Morton

People approach writing from a traditional point of view because the very term writing implies letters into words, words into sentences, and sentences into paragraphs. We propose that there are many forms of writing and traditional writing is only one of them. Scientists write formulas and draw molecular representations. Musicians compose using musical scores. Mathematicians write equations and construct geometric drawings. Choreographers use the system of labanotation to record movement. The most obvious to us is the drawing of images, which we believe to one of the most primal forms of human language. In this paper, we will discuss how the artist uses drawing as a form of communication of ideas.

From what seemed to be unrelated fields, we, an artist and educator, met one afternoon to view and discuss a piece of the artist's sculpture. To explain the method of construction, the artist used drawings from his sketchbook that revealed more to us than just the construction methods. The notations, the language necessary to develop the work of art, revealed a complex process, and we recognized this process as a specific form of writing. In our discussion, this visual form of writing contained all the elements of the writing process. The process in writing and in iconology was identical but was labeled differently by each of us according to our disciplines. Brainstorming was explained by the artist as a combination of

random drawings, fantasy drawings, and drawings made during random encounters. Drafting, revising, and editing were similar to developing an image through a series of drawings where the intention was to clearly resolve the idea. Through this discussion, we came to the conclusion that there are many forms of writing, all using similar elements through different modes of expression.

This obvious form of communication is often overlooked. Yet, homeowners make drawings for builders, people draw maps for directions, and most people doodle while talking on the telephone. These are just a few of the forms of visual language we use daily without actually considering the images as language.

The Artist's Approach to Writing

In the fine arts, this area of expression is explored in the form of a sketchbook, which is simply a collection of drawings. These drawings are notations on the development of ideas, the realization of ideas, and the storage of ideas. To the student and the mentor, these drawings are perfectly legible and can be read easily and accurately. Like poetry, the images contain many levels. The sketchbook is an artist's daily visual diary. Since its organization reflects a personal attempt at capturing and exploring thoughts, the book is multifunctional. It serves as a mental stimulus and repository for those visual events that the artist finds important to note: landscapes, still life, people in action, etc.

A very primal thematic imagery can be perceived over long periods of time. (Our study spanned only 12 years of drawings, yet we could see some strong basic themes emerge.) The sketchbook contains short cyclical images that are introduced, resolved, and abandoned, as opposed to long term images that are introduced, resolved, and revisited. We grouped the sketchbook drawings into these broad categories listed below.

1. **Practice Drawings** -- Drawings that reinforce skills in perception and hand-eye coordination. These are the simplest kinds of drawings. The drawings in Figure 1 show evidence of this fine-tuning skill process. The life class in which these drawings took place is a formal practice situation. These drawings increase the

range of skill the artist needs for expression and experimentation with new techniques.

2. **Random Drawings** -- Pleasure drawings, drawings for the "fun of it," doodles, and perhaps subliminal ideas. These often occur when one is relaxed and not thinking about a particular subject matter or image. The drawings happen very spontaneously. Figures 2, 3, and 4 are different kinds of random drawings. Figure 2 is the artist's "doodle" during a faculty meeting. There is evidence of playing with perspective, composition, and light and dark. Figure 3, the dragon, is the kind of spontaneous image that is difficult to identify in terms of its source. A word, a conversation, even a situation can trigger this type of drawing. In reflection, one may find the source, but it isn't apparent when the drawing appears. The dragon was drawn during a lunch break. Figure 4, the "Redneck," appeared from reflections about a paradox: the contemporary young man and the image of a '60s hippie. The drawing occurred long after the reflection.
3. **Fantasy Drawings** -- Fantasizing to realize an image, a playing with images, and/or recollections of images. Figure 5 reveals the very origins of a later sculpture called "Spirit of Flight." This image cannot be observed in nature, but the imagination allows the artist both to draw the image and to experience the sensation of flying while making the drawing.
4. **Developmental Drawings** -- A series of drawings whose primary aim is to bring an idea to maturity. In one case, the process is the focus. In other cases, it is the application of the image to a formal work of art, i.e. sculpture, painting, print. After the drawing of Figure 5 occurred, the sculptural possibilities of the flying figure were explored, as seen in Figure 6.
5. **Analytical Drawings** -- Study drawings which clarify ideas and are often very detailed, with scale, sizes, material considerations, construction, and dimension. Figure 7 is an example of an analytical drawing not drawn from life, but actually drawn from parts of an incomplete sculpture. The intent of this drawing was to assist the artist in seeing the unfinished parts of the sculpture

and make visual conclusions.

6. **Experiential Drawings** -- Drawings made about life experiences. These drawings record the exploration of feelings, personal interest, and sentiments. These drawings consist of images which were of enough interest to compel the artist to make a visual note. The drawings in Figure 8 were drawn directly from the experience of attending a lecture at Stratford-on-Avon. The lecture was dull, but the participants attending the lecture were fascinating.

These example drawings were identified with some difficulty since often they contained elements of several categories. Their placement was made by identifying the most characteristic category.

Sketchbooks differ from any kind of formal prose but are most closely related to a diary. In fact, they are a visual diary. The images recorded in them are personal, intimate, and revealing. The intention of the sketchbook is to provide information solely for the artist.

Content Analysis Evaluation

The sketch book is a diary of an artist's selection and compilation of ideas. The expressions found in the sketchbook illustrate key turning points of an artist's imagery in the journey from the moment to moment ideas to the broad periods of time required for major themes to develop. Recurring themes, although often separated by years, appear here. For example, the theme of "Flight" has appeared in this artist's work over a 12 year span (See Figures 5, 6) in drawings and sculptures of flying persons and images of birds and kites.

The handstand figure and the crucifixion (Figures 9 and 10) reflect this same general spatial concept. The outspread arms and arched back provide the artist with the same aesthetic concepts while introducing what seems to be unrelated thematic material. This idea of recurrent themes has also been seen in children's drawings as they progress from the process of labeling to narrative. Although this is a rudimentary example, it is interesting to note that the process, although more sophisticated for adults, remains substantially the same.

Summary and Conclusion

In discovering that the sketchbook is a sensitive visual language that can be read by the artist as well as others, it seems appropriate that this concept of visual literacy be recognized in Writing Across the Curriculum programs. The way language processes — in this case drawing and writing — are used to reflect thinking and meaning should be the primary concern. The sketchbook captures the internal monologue of the artist. It is the "never seen" foundation for those formal public works.

There are many ways to approach the task of writing, and one should not impose artificial forms of writing on any discipline. It is not the form of language nor the amount, but that the form of writing is appropriate to the purpose. A Writing Across the Curriculum program must recognize and encourage all forms of expression. The differences in the ways to approach the task should be recognized as strategies used to process information and communicate meaning. Drawing should be recognized as a form of expressive language. It is not a substitute for written language, but rather an additional form, an augmentation to that form of communication.

The categories developed in this study are a beginning step in classifying the dimensions of meaning displayed in the sketchbook. Continued study of this visual literacy and the relationships among the language processes is suggested to help gain an awareness and understanding of the many features of communicative media.

***Dennise Bartelo** is an associate professor in the Education Department. She is a charter member of the Writing Task Force and one of the editors of this journal.*

***Robert Morton** is Chair of the Art Department where he teaches courses in sculpture and design.*

Stategies

Using Faculty Histories in a History of Psychology Course

H. David Zehr

Introduction

Dr. Walter Weimer, who taught a history of psychology course while I was an undergraduate at Penn State, was very straightforward in his assertion that history is never boring. Certain texts, he stated, will often fail to stimulate interest in the subject matter, and certain professors are quite effective at reinforcing students' negative perceptions of the past. However, he was adamant in his conviction that history, as a decided human enterprise, is engaging, relevant, and intellectually rewarding. I left his course with no doubt whatsoever that he was correct.

When I came to Plymouth in 1985, with memories of my own undergraduate experience still fresh, I volunteered to teach our department's offering of history and systems of psychology. I did this with full cognizance of the fact that my attitude toward the course was quite different from the attitude of students enrolled in it. To many, the course was nothing more than another hurdle toward a bachelor's degree in psychology. Because students so often fail to even appreciate events that, historically speaking, are relatively recent, I was prepared to face a hostile crowd, a body of students who felt that they were only taking the course because it was required. Many times I overheard comments like, "I would never take this if I didn't have to," or "This course doesn't seem necessary for undergraduates." On occasion I was certain that such remarks were made expressly for my benefit.

Despite my worst fears, my first offering of history and systems was far from a debacle. The students (or at least most of them) and myself gave it our all, and we ended the semester on a positive note. The course was not, by any means, what I wanted it to be, but I was optimistic. I felt that if I could begin to develop projects that would engage the students in the history of psychology, I would accomplish two things: a heightened sense of relevance for the student and an enrichment of my own knowledge of my discipline.

The Project

In the Spring of 1987, I offered the history and systems course for the third time. During my Winterim preparations for it, I found an article describing the use of faculty genealogies as a means of enhancing student involvement in the history of psychology (Weigel & Gottfurcht, 1972). After finishing the article I knew immediately that such a project, if implemented properly, would have the potential to significantly transform students' attitudes and promote their success at mastering often difficult material. For once, a syllabus was fun to put together.

During the planning stage I also decided that, in addition to constructing a faculty genealogy, I wanted students to discover what psychology was like at PSC during the periods of its birth and subsequent development as a scientific discipline. Toward that end, students were required to trace the development of the psychology curriculum at PSC.

Method

During the first class meeting of the semester students were assigned in pairs to research teams. Each team selected at random the name of a current member of the psychology faculty. At that point students were told to set up an interview with their faculty member in order to obtain relevant biographical data. The interviews were structured through use of a brief questionnaire, which was modeled after one originally prepared by Wiegel and Gottfurcht (1972). Questions were designed to elicit information regarding educational and employment histories, teaching and research specialties, viewpoints on issues of historical interest to psycholo-

gists, professional influences (e.g., Ph.D. advisor), and motivations for entering the profession.

Armed with these data, students then contacted, by mail, faculty members' doctoral advisors. A questionnaire similar to the one used with PSC faculty was employed. When that information was received, students attempted to make contact with the mentor's mentor. This was done as far back as time (and mortality) allowed. When students hit a dead end (no pun intended) through the mails, they were given a copy of an article by Boring and Boring (1948) which documents student-mentor relationships during the early history of psychology. This allowed them in many cases to trace current department members' lineages to some of the more prominent pioneers in the history of psychology.

Tracing the psychology curriculum at PSC was somewhat more challenging. Each student team was assigned a time period covering anywhere from a decade to twenty years. The first era was the 1880s and 1890s, and the remaining years were doled out to cover the curriculum up to the present. Students were to begin by outlining the general cultural outlook of their particular era. Specifically, I wanted them to report on developments in science, arts and literature, history and politics, and entertainment and sports. They were also to describe, to the best of their abilities, the nature of campus life at Plymouth College (Normal School). To do this they consulted past issues of the college bulletin found in Lamson Library, past editions of the Conning Tower, and texts that examine the history of Plymouth State (Jim Hogan's volume comes to mind as an example).

Students were further required to identify psychology courses that were found in the curriculum, and, when possible, instructors of those courses. The main sources of information for this task were, once again, available editions of the college bulletin. Obviously, students who surveyed the more recent past had better luck with this aspect of the assignment, but those who covered the earliest years were also successful. For example, the team assigned the 1880s and 1890s discovered that Charles Round offered psychology instruction as early as 1894, and that psychology was first mentioned under its own heading in the college handbook in 1895.

Evaluation

Looking back on the experience, I wish that I had planned a formal evaluation of the project; unfortunately, I did not. My comments regarding the success of the project are therefore necessarily subjective. I am convinced, though, that impressions conveyed to me by students, as well as my own biased perceptions, bear out the value of the exercise.

Students frequently commented to me that they enjoyed working on the project. They indicated that it not only helped them better understand the history of psychology, but also allowed them to feel a part of it. Developing a connection between their own instructors and many of the greatest names in psychology made them more aware of the notion that history is not a static collection of facts, but rather, an interpretation of the successes, failures, triumphs, and tragedies of real people.

Another index of the project's success was the sheer length of many of the papers. Some of the teams went well beyond my wildest expectations in producing documents that obviously required a tremendous effort. One team, for example, submitted a 40+ page paper (not counting references and appendices) that included photographs and drawings of historical figures, as well as charts comparing those figures to their contemporaries who differed in methodological and theoretical orientations.

Conclusion

I cannot say with certainty that every student in the class enjoyed and benefitted from the project, but my guess is that the majority did. In the future I hope to revive the project, picking up where the 1987 class left off. Since that time, the psychology department has lost four members and added three. Also, there was a great deal left incomplete the first time around. Some teams, for instance, were unable to locate adequate biographical and curricular data. Hopefully, the next time I use this assignment I can expand the base of available resources; we—both teacher and students —still have much to learn.

References

Boring, M.D., & Boring, E.G. (1948). Masters and pupils among the American psychologists. *American Journal of Psychology*, 61, 527-534.

Weigel, R.G., & Gottfurcht, J.W. (1972). Faculty genealogies: A stimulus for student involvement in history and systems. *American Psychologist*, 27, 981-983.

H. David Zehr is an associate professor in the Psychology Department. His regular teaching schedule includes introductory psychology, cognitive psychology, and experimental psychology.

Writing to Learn Economics

John Gregor

From its inception, the PSC Writing Across the Curriculum program has involved students in the learning process through a variety of writing activities. The program has proven particularly well-suited to the economics classroom. While all writing assignments (short or long, graded or not graded) provide invaluable practice in basic writing skills, the primary focus of those assignments is to improve the learning of economics—to have students start thinking like economists. In the process, student writing skills do improve significantly. More importantly, however, students are converted from passive notetakers to active learners.

The examples of student writing assignments discussed below require little, if any, additional work on the part of the instructor. What they do require is a different type of work and a willingness to try new approaches to achieve a given goal.

Sample Writing Activities

The following list provides an overview of the types of assignments used:

1. Classroom Freewrites: Toward the end of a class the students are asked to briefly explain the topics covered in the lecture or to illustrate how these tools could be applied to a current issue in the newspaper. These writings are collected but not graded. At the beginning of the next class an overview of these freewrites is used as a summary of the last lecture or as an

introduction to the current topic. This feedback is important because it allows the students to see how their writings help to tie together the various parts of the course. Some typical freewrites would be to ask the students if Larry Bird is worth $1.5 million to the Celtics or what impact will a $10-a-barrel tax on imported oil have on sales at the local mall.

2. Question/Suggestion Box: Near the classroom exits a box is placed into which students may put their questions, comments or suggestions. This box was originally only used in large freshman classes as a way to get some quick feedback from those reluctant to participate orally. The success of the question box in getting students to put their questions into writing has led to its use in all of my classes. Comments received have ranged from "Please slow down" and "I need help" to several pages critiquing McConnell's treatment of fascism. Responding to the questions at the beginning of the next class is crucial.

3. Thought Questions: About once a week I give each class an optional question or paradox to answer. (For example, comment on and evaluate the following statement, "Economics should teach you to think marginally and not marginally think.") The students must submit their answers before the next class. These answers are *not* graded, but students do receive comments on how their answers could be improved. Some of these questions are found on future exams.

4. Letters Home: Students in the survey course are required to write three "letters home" to explain the Economics of. . . . The assignments are keyed to the book of readings, but they could be based on any of a variety of sources. Before submitting their letters the students must have them reviewed by a specified classmate. A grade is given (+,0,-) to each letter and to the peer review. After the letters are submitted, the topics are reviewed in discussion classes. Some of the issues will then be repeated as exam questions.

5. MICROSIM Reports: Students in the microeconomics and intermediate microeconomics classes are required to write three brief reports on their current status and future plans for the MICROSIM market simulation. These assignments ask students to explain how the student-managed firm arrived at its current position and what their plans are for the future. In order to write these letters, the students must do detailed analyses of production, pricing, advertising, capital investment, and product development.
6. Journals: Students in the introductory courses are asked to keep a journal in which they explain or evaluate a current article from a newspaper or magazine in light of that week's material. These journals are collected and reviewed on a monthly basis. The students receive a grade (+,0,-) depending on how complete their journal is. Journal entries range from reviews of housing for the homeless in Washington, D.C., to the impact of increasing user fees as a means of balancing the budget.
7. Exams: All exams have at least twenty-five percent of their content devoted to summary evaluations of readings and/or lectures.

Responding to Writing is Essential

The key to effective usage of these and all Writing Across the Curriculum related writing assignments is to respond quickly to the students. For the non-graded types of assignments (1,2,3), brief class discussions will typically suffice. What is important is that the students recognize that the assignments are an integral part of the learning process.

The graded assignments (4,5,6,7) are critiqued in more detail on the papers themselves. Usually, I share with the class some of the better examples of these assignments so they can use them as guides for their future efforts.

Assessment of Writing Across the Curriculum in Economics

The Writing Task Force will not complete a formal assessment of Writing Across the Curriculum at Plymouth until the end of 1989. Nonetheless, I know the "writing for learning" assignments have made a significant difference in my economics courses, for my students are beginning to think like economists. I am most pleased, however, when recent graduates tell me, "You were right. In my job I not only have to work with statistics but explain their meaning in a report people can understand."

John Gregor is an associate professor of Economics in the Business Department. A recent convert to the Writing Across the Curriculum program at Plymouth, he is currently a member of the Writing Task Force.

The QCS Method

Joel Funk

During my early years at Plymouth State College, I encountered two clearly related problems: first, many students had apparently not done the assigned reading prior to class; and second, when I attempted to provoke class discussion, a relatively small percentage of students seemed willing to participate. Some means was needed to ensure that the material was read and to democratize class discussions.

My colleague Boyce Ford provided one very workable solution to both problems: the QCS. A QCS, which stands for Question, Criticism, or Statement, is essentially a reaction to some aspect of the assigned reading, thought out and written at home, and due when the reading is due.

Assume the assignment deals with Freud's theory of personality. I tell the class that, inevitably, they will come upon at least one idea (if not more) that strikes them as either good, bad, inspired, bizarre, or provocative. They are asked to respond to this idea. They can ask a question about Freud, criticize him, offer a comment or statement, make a comparison to some other theorist, offer an illustration from their own experience, cite an experiment or an observation that supports/disconfirms Freud, and so on. The important things are that they a. think critically about Freud, and b. write down what they think.

This gives me several options for the following class. With 8-15 students ready with prepared QCS in hand, I can begin by covering Freud, leaving the latter portion of the class for QCS reading (or paraphrasing) and ensuing discussion. Alternatively, I could cover the entire Freud

chapter, albeit in somewhat haphazard fashion, by plunging directly into the QCS's. Any major points that do not get covered can be brought up at the end of class. If time is short, I won't have QCS's read in class that day, but I will read them on my own before the next class. I can then single out the better ones for comment during the following class. This last technique guarantees quality but does violate the principle of democracy.

Obviously a student has to have read all or a good chunk of the reading in order to write a sensible QCS. And, should certain shy students not volunteer their QCS, I feel justified in calling on them to share their ideas, thus solving the participation problem. I find that students who hesitate to speak up in class spontaneously, perhaps feeling "on the spot," are much more assertive when it comes to reading a pre-thought-out paper.

On occasion students will ask not to read their QCS on the grounds that either the same points have been already covered by a previous QCS, or the material is too personal, a situation that often comes up in "soft" Psychology courses. I am amazed, though, that many students feel comfortable enough to *write* about very personal issues (e.g., having been abused as a child) as long as the QCS is for the professor's eyes only.

I have on occasion used other techniques which also involve "forcing" the students to write reactions to the book, but usually they involve doing exercises prefabricated for the students by the textbook author (e.g., analyzing dreams for the presence of anima/animus figures). Although these exercises ought to generate enthusiasm and sometimes do, students too often resist being constrained. The advantage of the QCS is that it lets the student *choose* the topic for exploration, thus ensuring a greater likelihood of ego-involvement. In fact, many QCS's revolve around the students' own experiences vis-a-vis the reading (e.g., bulimia, depression, birth order, suicide, drug use, and peak experience).

Some Nuts and Bolts Issues

I use an evaluation system I refer to as "semi-grading." Students receive five points for doing a "decent" job and getting the QCS in on time. They can then earn up to five additional points by writing a particularly good QCS, although two-three bonus points are more common. Examples

of QCS's of varying quality are included below. Students who volunteer to read their papers in class are given a slight edge in grading; the occasional less-than-adequate paper earns fewer than five points; and late papers lose the option for bonus points. Dr. Ford argues that late papers should receive no credit at all since the major purpose of the QCS is to provide a basis for discussion. While conceding this point, I still feel that the written work itself deserves some credit. The teacher clearly has options here.

I do not number grade QCS's, feeling that this focuses attention too atomistically on the points earned and not on the overall quality of the essay. Instead, I employ a more impressionistic system, akin to letter grades: an adequate QCS receives a "check," a better than average QCS a "check" with a stripe across it, a very good QCS a "check +," and the rare superb QCS a "+." The occasional inferior QCS, exhibiting little thought or care, receives a "check" with a squiggle (the mathematical symbol for "almost"). Only when I compute the grades at the end of the term do I transform the checks into numerical grades.

Another problem is class size. Above I noted that I aimed for 8-15 QCS's per class, but what happens in a class of 30 or 35? Since most chapters require two-three classes for adequate coverage, I typically divide the class in half. For example, assume I have 30 students in my Tuesday/Thursday Abnormal Psychology class. Fifteen papers are due Tuesday, the other 15 on Thursday. Assignment to groups is usually alphabetical.

Over a semester, a typical upper-level course may require as many as a dozen QCS's, the combined point total often equalling or more than equalling the points earnable on an exam in that course. Thus, I caution students that failure to submit QCS's is equivalent to getting an F or D on an exam.

Typically I allow students to miss or flub one or two QCS's per term. If 12 are assigned, I may take their 10 or 11 highest scores and total them. This allows some flexibility. On the other hand, students who do poorly on tests and ask for a way to bring up their grade can be assigned extra QCS's. One semester, in which I had a class divided into two QCS groups,

one ambitious student handed in QCS's for *both groups*, thus partially offsetting a tendency to get C's on exams.

The length of the QCS can be varied depending on the course. Typically, a QCS will run from a minimum of half a page up to a page or so. Some dedicated students seem to lose control and go on for pages, running from idea to idea, although I try to remind them to focus on a single pertinent theme! On the other hand, in two honors courses dealing with Psychology and Film, the reaction papers (one per film) were *expected* to be two typed pages or longer, with a much more encompassing approach.

Edited Examples

The following edited examples were all written for the identical reading assignment, a chapter in Abnormal Psychology dealing with personality disorders. I have received both better and worse QCS's than those presented here, but it seemed appropriate to pick a set of QCS's at random, to illustrate a "typical" crop of papers.

1. This "average" QCS (no bonus points) makes a point, but there is nothing particularly insightful here; there are no connections drawn. The student essentially confesses confusion over a distinction already made fairly clear in the text/class. Furthermore, the writing itself is rather uninspired:

   > While reading . . . the obsessive-compulsive personality disorder, I thought I was reading about the obsessive-compulsive disorder . . . . The only difference between them seems to be that the o.c. disorder is rare and . . . stronger than the o.c. personality disorder . . . . it is confusing to distinguish between the two.

2. Slightly better (but no bonus points) is the following QCS that at least makes a connection, albeit a rather obvious one. This issue has been hotly debated not only by psychologists, but by the popular media for years:

> I remember seeing a film in Intro Psych that showed part of the 'Bobo Doll' experiment [a famous study showing how children will model aggressive behavior] . . . . I was . . . wondering if there have been any conclusive findings from studies of children and violence on TV . . . . Perhaps children who are more violent to begin with will be more likely to watch violent shows on TV.

3. More interesting is the following QCS (two bonus points), which relates the text material to the real-life situation:

> Merton's theory of anomie claims that societies which value material objects (and only certain groups have such luxuries) acquire a state of 'anomie' . . . in disadvantaged groups . . . . I am currently working on a project . . . regarding adolescents . . . I recently spoke with the detective of youth crime. He informed me that one factor that leads adolescents toward crime is economic pressures . . . . It is the detective's belief that these kids feel cheated by the society and this is a major reason for their behavior.

I frequently give extra credit to the student who can apply the abstractions of the text to real-life situations in an appropriate way. The writing style is also a bit more sophisticated than in the examples cited previously.

4. Better yet (three+ bonus points) was a QCS which proposed a somewhat original etiology for the "borderline" personality disorder. After first describing his friend in some detail and matching the symptoms to the text, the student concludes:

> Later on I discovered that his parents actually encourage him to act out his moods instead of repressing them . . . . I also found out that they would punish or reinforce him on a completely

> random basis, regardless of what he was doing. This also lends support to the theory of modeling because he saw his parents being unpredictable, so in turn he became unpredictable.

Above and beyond points earned for being a good case study, creativity deserves reward! Modeling theory had been proposed in the text, but in another context; it had not been applied to the borderline personality.

5. The best of the lot (3+ bonus points) was the following QCS which relates a recently seen film to a disorder described in the text:

> The . . . Masochistic personality disorder is characterized by a desire to be controlled and hurt by others . . . . typically a sadist. An example of a masochist-sadist relationship is seen in the movie *9 1/2 Weeks* where the woman is controlled for the sexual pleasure of the man . . . . the man blindfolds the girl and trickles a melting ice cube all over her body. Later in the movie we see him purchase a whip . . . . At one point . . . he asks her if she has looked in his closet, and when she admits she has, he . . . punishes her by forced sex and violence . . . . it is obvious that she is greatly enjoying her submission . . . . this was sick and
>
> . . . deviant. However, I am glad to see that a woman who enjoys being abused is classified as having a mental disorder . . . . this woman is not so far gone that she can't get out of this relationship (though she puts up with 9 1/2 weeks of abuse) . . . . I don't think this disorder can be called an excuse for blaming the victim. A victim of abuse should not be blamed whether it is caused by a mental disorder or not.

This paper is excellent for a number of reasons. First, it connects the textbook not merely to real life, but to a product of culture (a film), a rarer

and more difficult feat in my teaching experience. Furthermore, the student exhibits a certain amount of commitment to, even passion concerning her beliefs about people and society. Yes, I factor in such non-academic elements, where appropriate! Finally, the paper touches on a political issue raised in the text, "blaming the victim." This QCS is well beyond being just another case study.

Also included in this set were a discussion of one student's rejecting father and the aftermath, another of an abused boy's developing antisocial tendencies, several descriptions of antisocial personalities known to various students, and a proposal to inject sociopaths with adrenaline [to increase their anxiety and make them more tractable]! Overall, the set provided some interesting, personally relevant material for the class to chew on.

As it happened, the next batch of QCS's brought a rare five bonus-point effort ["+"] by a non-traditional student. The assigned chapter was on addictive disorders and she wrote about a new method for treating addictions using electronic frequencies applied to the brain. She even included a tape of a lecture explaining the method more fully! This was totally new and very exciting to me, so she received top score.

Future Considerations

I plan to continue using the QCS method in my upper-level classes. Discussion of the QCS technique with colleagues generated several potential means for enhancing its utility in the future:

1. It often takes students a few tries to get the hang of writing a QCS. For example, some students persistently summarize rather than react critically. Modeling would be one means of circumventing this problem. On the first day of class I could hand out examples of fair, good, very good, and excellent QCS's written on the identical topic. Each example could also include my comments as to what makes this QCS fair, good, or excellent.
2. Writing Across the Curriculum emphasizes the importance of rewriting. The QCS stands somewhere between journal-keeping and related spontaneous writing techniques, and the formal essay

which often requires several drafts. It would be helpful if students would write their QCS on a word processor, thus making editing a relatively simple affair. I could encourage this. I could also pair students, who would be responsible for proofreading and criticizing each other's papers.

3. Thus far, I have not gathered any formal student feedback on the value of the QCS itself. Informally, my sense is that student response is normally quite positive, with a high correlation between overall grade received and liking for QCS's. Yet it might be worthwhile to examine student reactions to QCS writing, not a particularly forbidding task. Some workable modifications might even emerge.

***Joel Funk**, an associate professor in the Psychology Department, has been teaching at Plymouth since 1975. His interests include humanistic and transpersonal psychology, creativity, psychology of music, adult development and abnormal psychology. His penchant for interdisciplinary learning has involved him in both Honors and Integrative courses.*

Using Drafts in History 231: American Economic Development

William L. Taylor

When first confronted with the concept of using drafts in history courses, I believed that it would result in much more work for me and only limited results for students. After attending the first Writing Across the Curriculum workshop, I was willing to take a chance and try it in the critique assignment required in HI 231: American Economic Development.

What convinced me to experiment and continue after the first effort in the classroom? In the workshop conducted by Toby Fulwiler, concepts discussed and experiences shared persuaded me that the potential extra effort would be more than offset by the final results. First, instructors did not necessarily have to read entire drafts, but only the first page or, depending on length, pages. Second was the likelihood that students would be willing to work on improving their writing. Third was that second or subsequent drafts by students would prove far more literate than the first.

My original concept in assigning a critique was to encourage students to improve their writing and analytical abilities which are so essential in a world ever more dependent on those able to understand and to convey information. Frustration in grading this assignment occurred regularly because of the seemingly wasted effort of correcting and commenting on papers at the end of the semester. Despite extensive commentary, I had the distinct feeling that the comments were ignored and that all of my

efforts went in the the "circular file." Upon altering the process a couple of years ago, I had a quite different sense of the consequences of my efforts. Now students could use my comments and suggestions in their revisions with the result that the final effort would incorporate thoughtful revisions and careful review of what the student sought to achieve.

The overall conclusion from this effort over the past two years is not only positive but also reinforces my sense that students have recognized the benefits for themselves. Course evaluations conducted in December 1988 confirm this observation. What seems to occur is the sense that writing can be done initially without incurring any penalty. This reduces ~~any~~ anxiety and allows students to take risks without any immediate fear of failure.

The final results are usually much improved—sometimes after two, even three, revisions. When I grade the final submission, I retain a sense that my efforts have resulted in positive reactions which brought about actual efforts to improve the writing. The students seem to recognize that they have the opportunity to improve their work and do so in a non-threatening environment.

I do not wish to imply that this format is less work than the old way of only commenting and grading a "final copy." What makes it worthwhile is the sense that students become motivated to improve their work and that my comments and efforts are used in a way that enhances the learning process. Isn't that why we sought a career in teaching?

William L. Taylor is a professor of history and Chair of the Social Science Department. He is an active member of the Writing Task Force and has been a presenter at several faculty-training writing workshops.

Novel Writing Assignments in the Psychology of Learning

John Kulig

For years I have observed the difficulty many undergraduates have applying psychological terminology to real situations. In the field of learning, for instance, phenomena such as "extinction" and "stimulus generalization" or terms such as "temporal contiguity" and "predictive contingency" are often explained within the context of laboratory and/or animal research. Learning theorists then attempt to explain complex and naturalistic human and animal behavior through these mechanisms. Some undergraduates, however, do not believe that more complex human behavior can be so explained, while others simply have difficulty applying learning terminology to human situations.

One approach to helping these students would be to focus the course material more exclusively on human learning rather than on laboratory research. This approach, however, would merely substitute one context for another, and the field of learning has a strong comparative basis which seeks generalities in learning processes across the species. My solution to the problem has been to use novels in conjunction with writing assignments which integrate the animal learning findings into a realistic, if fictional, human context. I accomplish this by having students read one novel in addition to the standard texts and then evaluate the learning by the characters.

In selecting novels, I avoid those with preexisting psychological interpretation, since the students will be providing their own. Similarly, I

avoid abstract writing styles in favor of novels which provide rich, concrete, realistic descriptions of characters and events. Within these constraints, I then select the best literature. Several years ago I used Salinger's *Catcher in the Rye;* this past year I have used Knowles' *A Separate Peace.* Students are instructed to view the novel as a naturalistic human laboratory ripe for an objective analysis. One advantage of a novel over actual naturalistic observation is that we can recheck facts and events after the fact, preserving some degree of objectivity.

Last semester the students located instances of terms such as "positive reinforcement," "extinction," and "stimulus control" within the novel. Their writing assignments were paragraph-length essays documenting their examples from the novel, explaining the definition of the term, and then defending their example as an instance of the term or phenomenon. As any person involved in Writing Across the Curriculum already knows, it was difficult to separate their writing skills from their analytic skills. Nor did I try. My feedback focused directly upon the psychological material under the assumption that writing follows the structure of thought.

The results from last semester were interesting. While most students enjoyed reading *A Separate Peace,* they found the assignments a challenge. Some students tried unsuccessfully to find examples that superficially resembled a laboratory rat pressing a bar for food reward. I encouraged students to think instead of human reinforcements such as praise and peer support. Another common problem was the students' failure to look closely at language. We defined "positive reinforcement," for instance, as "a stimulus which, when delivered soon after a behavior, increases the likelihood of that behavior reoccuring." Here is a faulty example. Gene, a hard-working student from the novel, begins a competition with Phineas, an athlete. Gene never quite beats Phineas, though many students made the claim that the positive reinforcement for Gene's competitive behavior was the hope (or desire) of getting even with Phineas. I pointed out that something must actually occur before it can act as a reinforcer.

Those areas in the writing which produce the most errors help me to pinpoint the places to focus our efforts. In the past some of these have been obvious. Sometimes terms were not read carefully. At other times

students didn't seek the boundaries of similar sounding yet distinct terms—problems rectified by spending more time working and writing (though students sometimes seek more imaginative answers to their woes). Last semester students were given opportunities to rewrite essays in their lab manuals. Again, improvements were noted.

This semester I have made a few changes in the assignments. First, we are compressing all the novel writing into two weeks rather than spreading it across the semester. This way we can have a block of time without distractions from other assignments. Second, only three essay questions will be used. One question asks them to detail what motivates a character (this will clarify "reinforcement" for a character). The second asks them to explore the relationship between the characters' behavior and their reinforcements, and how this relationship leads to behavior change in the novel. The final essay is open-ended, allowing the students to explore any other learning process.

Students receive one overall grade for their laboratory work. The novel writing assignment is the equivalent of one laboratory project or about 10% of the total lab grade. In spite of constant tinkering with different approaches, I have no plans to drop the novel and writing assignments. It would be fun to spend more time on the novel, but the course has other components which also need attention. (In addition to the regular text and lecture material, I have run real learning experiments, and this semester I have added some computer work which simulates recent developments in theory.)

I have always maintained that writing assists formation of critical thought. After numerous ambitious projects, I am convinced that no single assignment, with or without hints, admonitions or tricks, has lasting value in the absence of a college-wide and cultural commitment to fundamental writing and thinking skills. As I occasionally remind others, sometimes you just have to bite the bullet. And after you bite the bullet, you have to chew on it a while.

John Kulig is an assistant professor in the Psychology Department. He has a long-standing interest in Writing Across the Curriculum theory and practice.

Reviews and Reactions

How I Started Using Writing Across the Curriculum and Ended Up Taking Algebra Again: A Review of Useful Works on Writing Across the Curriculum

Sally Boland

(Toby Fulwiler, *The Journal Book*, 1987; Robert P. Parker and Vera Goodkin, *The Consequences of Writing*, 1987; Karen Spear, *Sharing Writing*; Toby Fulwiler, *Writing Across the Curriculum: Research into Practice*, 1986. All published by Boynton-Cook/Heinemann)

As it enters its second decade, Writing Across the Curriculum in the United States is supported by an increasingly sophisticated literature which offers a great deal of hands-on, how-to advice, as well as a solid theoretical basis in linguistic and learning research. Generally, this work is free of jargon, accessible to any interested person, whatever their academic discipline. The four books reviewed here are typical in their blending of the theoretical with the practical; two are more valuable for their discussion of Writing Across the Curriculum theory and for their histories of the movement than as sources for classroom strategy.

Writing Across the Curriculum Theory

The most theoretical of them, Parker's and Goodkin's *The Consequences of Writing*, both presents an account of Writing Across the Curriculum history and explains the learning and linguistic theories underlying the technique.

The movement began in England in the late 1960s with the work of James Britton and Nancy Martin. They examined educational practice in light of the linguisitic theories of Edward Sapir, Suzanne Langer, and Lev Vygotsky. These theorists asserted that, in Sapir's words, "The purely communicative aspect of language has been exaggerated...language is primarily a vocal actualization of the tendency to see realities symbolically." In other words, for Sapir, et. al., language is far more than just a system of signs we manipulate to achieve certain ends. It is the medium with which we construct our symbolic representation of who we are and of the world around us.

Considering the implications of this for learning and teaching, Britton and Martin concluded that we "construct knowledge from experience by transforming that experience symbolically" through language when we learn. In classroom research, Britton and his colleagues found that children in all grades, studying all subjects, learned better when all kinds of language activity — from note-passing and conversation to formal written and oral reports — was the basic instructional vehicle. Informal expression, or expressive writing — journals, letters, lists, impromptu poems — were found to be particuarly valuable. Expressive writing in the child's everyday language has remained an important part of British pedagogy.

This was the origin of LAC (Language Across the Curriculum), a technique favored in Britain that uses all forms of language activity (reading, writing, speaking, and listening skills) to help students learn subject matter more quickly and effectively. WAC — Writing Across the Curriculum — was but one branch of this larger concern; U. S. educators embraced it at a time when criticism of student writing abilities was more than usually scathing. Unfortunately, we in the United States have often ignored the larger context of LAC and the benefits it can offer. Instead, our

general tendency has been to embrace WAC as an alternative way to reinforce the forms and skills of standard English writing instruction.

To remedy this confused application of WAC, Parker and Goodkin devote the second part of their work to a survey of current theory on the connections between thinking and language, especially the work of Piaget and Vygotsky. In Part Three, they draw out the implications for learning theory. Parker and Goodkin believe that much is gained from using the full range of language activity as a means of teaching people the content of disciplines. The final section presents brief case studies of people who use LAC and WAC to teach mathematics, applied psychology, entomology, and clinical nursing.

Indeed WAC is so widely applicable that it can easily move beyond the English department and may even alter entire institutions. That is the primary message of the Young-Fulwiler collection of essays. The workshop techniques we learned from Fulwiler here at PSC were developed between 1977 and 1984 when he taught at Michigan Technological University. The selections here, all composed by MTU faculty from several departments, demonstrate the many ways a WAC program, if undertaken seriously, can change institutional priorities. While there is some material here that will help in the classroom, the book's chief value is its account of how — despite some difficult faculty politics — MTU created a successful program. Thus it will be useful to those trying to establish a new program of their own. And for us at PSC, it will be helpful now that we are ready to begin documenting and assessing our program.

Members of our WAC Task Force, General Education Committee and Writing Program Assessment Committee will find reassurance and useful advice in Section II, "Evaluation: Assumptions and Discoveries." Anyone interested in undertaking classroom research on WAC's effects on student learning will rejoice in Margaret E. Gorman's essay, "Mucking Around," which explains that credible and responsible studies can be constructed even by those of us who don't actually remember college algebra and never even thought of taking statistics. (Gorman's advice: if you don't have statistics, you can enlist the help of a faculty statistician or educational measurements expert.)

Theory Into Practice

Every publishing season brings us new, down-to-earth books on how to use WAC in the classroom. Fulwiler's *The Journal Book* is one of the best. The journal has emerged as a mainstay of WAC practice, and Fulwiler's collection offers a fine selection of new ideas. I'd like to hear from colleagues who attempt some of them, such as the ones proposed by Verner Jensen ("Writing in College Physics"); George Meese ("Focused Learning in Chemistry Research: Suzanne's Journal") and Stephen BeMiller ("The Mathematics Workbook").

This is a good book to sample from. Last semester in Composition 120 I adapted a project recommended in Christopher Burnham's "Reinvigorating a Tradition: The Personal Development Journal." The informal, ungraded, expressive writing students did for the personal development journal led many to greater clarity and power when they came to write the more formal, finished language of the personal essay. At the same time my students were keeping their journals, we read about how professional writers use journals, deal with writer's block, develop expressive writings into formal essays, and so on. In time, many students began to think of themselves as writers rather than as captives in Composition 120 — a change I deduced from their behavior in conferences about their work. Instead of asking what *I* thought of their essays, they would begin by telling me what *they* thought and by asking my response to specific places in their work that they thought especially difficult or especially good. They became active, took the initiative in shaping their own work, which is how writers (as opposed to captives) behave. *The Journal Book* is rich in suggestions for getting this kind of satisfaction for students and teachers.

The success of last fall's journal experiment has given me the heart to try again — probably for the dozenth time — to incorporate peer response groups into my class. It's the kind of thing that sounds like it should work — it just stands to reason that students should be able to critique one another's writing and learn from the process. But so far, I haven't been able to get it to happen.

This time, however, with the help of Karen Spear's *Sharing Writing*, I

may succeed. She admits that peer response groups are usually ineffective. The reason, she says, is that students lack the social and interpersonal skills to make them succeed. As often happens in WAC literature, she spends the first half of her book on theory, relating the peer response problem to students' lack of expertise in discussing, listening, reading, giving or receiving feedback — that full range of language activity encouraged by LAC.

Spear then shows, however, that highly-polished — or, at least, much-improved — final drafts will come from groups that work consciously to improve their interpersonal skills. The second half of *Sharing Writing* explains how Spear developed such groups in her freshman composition courses at the University of Utah. Instructors interested in developing peer response in any class — whether in writing or in a content area — will find much here to ponder: many interesting revision checklists (ones that work, ones that don't); strategies for improving reading and listening; ways to teach groups to monitor their own effectiveness.

I'm planning to try Spear's method, with a few modifications, on my technical writing students in spring semester. Technical Writing is an upper division course populated by juniors and seniors, most of whom have a strong professional orientation. Nearly all writing done in a professional setting these days requires some degree of peer collaboration. So I want my tekkies to learn two things: how to respond constructively to other people's writing and how to use other people's responses to their own work. In setting up the course, I'm borrowing freely from Spear.

Making peer response a priority has substantially altered my usual way of presenting the course — one that has worked pretty well for the last eight years. If it doesn't work, I'm going to ask Karen Spear for a refund. If it does, I'll make some big changes in next fall's Composition 120 sections and some little ones in my literature courses, making peer response central to the writing course and using it to help the literature students in their writing assignments.

And after that — well, maybe I'll attempt some classroom research so I can reliably demonstrate what's been going on in my classes, and why. I'll follow Margaret Gorman's advice and find a statistician to help me design a study. Because I'm embarassed... all that bragging about last

fall's composition students and their wonderful journals is a true account of my impression of what happened. But if you want evidence... well, I did save a few papers and some journals, and I meant to save more and do an attitude survey, but I forgot. . . .

I want to get out of that embarassing spot, even if teaching writing means I do an algebra review next summer and take a stats course in the fall.

***Sally Boland** is a professor in the English Department. She was active in the General Education curriculum reform and in establishing Writing Across the Curriculum at Plymouth. Her interests include Canadian studies, the English Romantics, and creative and technical writing.*

Musings on Writing Across the Curriculum

Russell Lord

Since writing is an integral part of many English courses, an English teacher might seem to be in an awkward position in a program which fosters Writing *Across* the Curriculum. Yet many of us in the English Department have found ourselves not only adapting to the concepts of this program, but enthusiastically adopting some of them, and we have been pleased with the results. It shall be the purpose of these notes to recount a few experiences with Writing Across the Curriculum concepts in English classes, both those oriented toward "writing," and those whose emphasis is primarily a study of "literature."

First, let me list some of the most salient features of the "new" orientation as I conceive it. Most of these swung into my ken during workshop sessions in May of 1986 with Toby Fulwiler. Here we who had been holding absolute sway over our tiny city-states in Rounds Hall for a not inconsiderable period suddenly found ourselves confronted with the need for self-analysis and an introspective examination of pedestals upon which we had set our rather shaky thrones.

Freewriting

I had, of course, heard of it, but had dismissed it as a tool a bit too close to a psychiatrist's bag of tricks to be useful in my ever so much more humanistic trade. But here I found myself stooping to try it out myself,

and lo, volleys of thought shot forth from my heretofore sluggish and minutely critical pen, now so apparently novel and fecund that I wondered how they could have come from what was after all a very familiar and seemingly uninspired consciousness. Perhaps a beginner's fluke? No, we tried a number of these ten-minute expressions, and although varied both in structure and in my own satisfaction with what appeared, in every case some unexpected idea arose. Here, indeed, was a device for inclusion in my own classes.

Journals

Here at least was a tool from my own heritage, although, to be sure, I had not seriously adopted it: too time consuming, and the students were sure to consider it "busy work." I don't recall now to what degree we actually practiced it in the workshop, but I do know that its suggestion set off threads of memory of journals and diaries of Pepys, Evelyn, Swift, James, Woolf, Didion, and so many more through literary history. I remembered too how I had myself kept a diary-journal through high school and college years, not at all conceiving it a task from an assigned course, but rather a labor of love, a record of discovery and a sounding board for critical analysis. I called to mind the first time I was conscious of the wonder of Beethoven: I tuned in late to a radio broadcast (it had to be quietly, since it was by my bedside "after hours") and copied into my journal the notes, as well as I could, of the long melodic lines of the second movement of Beethoven's Fifth Symphony, not knowing what they were, and having to turn the set off before it could be announced. But I had captured them long before the advent of tape recorders and such marvels. Could this labor of love become the object of a classroom experience? I could see at once its pedagogical potential if it could, but I could also perceive its degradation if it became a mere mechanical task.

Small Group Sessions

Here was a method I had tried a long time before in a class which, I recalled, had not used them to the best advantage. Moreover, the activity might lead to that old bugaboo, *groupthink*! But now, among us who were

educators, the device was certainly valuable. We could exchange ideas readily without formal hand-raising or frustration over not being recognized. And new concepts did follow from the groups I attended at the workshop.

Revision

One other most valuable attitude remains in memory from the workshop: the idea of writing as process. Revision becomes perhaps the most valuable adjunct to creativity, and for most of us, a precondition to any successful production. Developing a critical sense is a process taking time and exposure to criteria which certainly for us took years to mature. It is perhaps here that the Writing Across the Curriculum concept is chiefly valuable, for it gives at least four years of potential exposure to the criteria needed for critical awareness. A freshman composition course is hardly adequate for such development, and yet that, with perhaps the addition of an advanced composition class, has been nearly the sole source for critical awareness among all but a few writing majors.

Application

Such, then, are the valued insights from the Writing Across the Curriculum workshop I attended. How have I applied them in my classes since the workshop? I must confess that application has been somewhat varied. In some classes I have been most diligent to pursue them fervently. In others, I have been less zealous to carry forth the torch. Let me begin by relating experiences with the class in which I most successfully followed all the concepts noted above.

In a Freshman Composition course I taught in the Spring of 1988, I worked especially diligently to develop significant journal entries and effective small group sessions. At first, I found the most effective method was to examine journals monthly, not for style or mechanics, but for developed reactions to surroundings and events. I found a primitive grading system needed to maintain student effort: grades of √+, √, √-, 0 were adequate to produce daily entries, with occasional examples used as the basis for themes. The results varied, of course, but nearly all became

more verbally sensitive to their surroundings. Although our text suggested loose-leaf notebooks for ease of correction, I found that bound notebooks, dedicated to journal entries, were more effective in making students proud of their accomplishments.

The small group sessions, however, turned out to be the most challenging, and yet the most rewarding aspect of the course. The tendency of students at the beginning was to take the groups too lightly, with the danger that they would become mere social cliques. At the beginning I asked each group of four or five to choose the best work for a particular assignment and read it to the class as a whole. Initial results were not promising, but as I began assigning definite criteria for choice, the quality of submissions improved. At times I varied the tasks, asking each group to improve a given paper, or even to work out the development of some idea. At the end of the semester I did feel that a degree of critical judgement had begun to appear.

Sometimes I had individuals develop class freewriting on a topic at home and then present the results to the group for evaluation and helpful criticism. In all cases, the products of any writing were looked upon as tentative, to be reworked for later submission and grading. In most cases, the third rewriting was the one graded.

Successful? Possibly. But the primary benefit was to achieve a vital classroom environment and a group of responsive and responsible students. My current Freshman Composition class has not yet moved into an adequate critical approach to each other's work, but half a semester is left, and I have hope.

In Introduction to Literature classes, I have introduced a more limited application of Writing Across the Curriculum techniques. Since these courses emphasize reading rather than writing, they are in some ways less free to develop writing techniques than Composition classes; but for that very reason they are closer to other Writing Across the Curriculum courses and offer perhaps more valid examples of just what can be done in the program as a whole. I have so far introduced journal writing, freewriting in response to in-class reading, and quiz questions that approach freewriting in effect. I have not yet introduced group criticism, partly because the size of the class makes it logistically more difficult than

in the smaller writing classes. Nor have I attempted revisions of papers yet this semester, although I plan it as an extra-credit option. It is as yet too early to assess effects, although the journals keep the class actively responsive to readings, and the freewriting seems to make students more alert to what they read.

In summary, I have found these four techniques from the Writing Across the Curriculum workshops substantially helpful in one Composition class, and promising to be so in another. A more limited use of these techniques in a Literature class has offered promise, but needs to be more thoroughly explored before I make any evaluation of its effectiveness.

***Russell Lord** is a professor in the English Department. He is a member of the Writing Task Force, Director of the Writing Assessment Project, and Editor of* Probes, *a publication of writings from freshman composition classes.*

"What Does the Professor Want and Why?": A View from the Reading/Writing Center on WAC Teachers' Assignments

Bonnie Auslander and Lucie Lepine

Bonnie's Story: Tutor as Teacher

Five years ago a student came up to me after a class I was teaching in freshman composition and said sheepishly, "I'm trying to work on the paper that's due tomorrow, but I'm not sure what you want."

It was my first year teaching. I didn't say anything out loud, but inside I blamed the student for not reading the assignment closely and for not paying attention in class. *I* knew exactly what the assignment was about and why I had assigned it. Why couldn't the student figure it out?

Now, five years later, as a tutor in the Reading/Writing Center, I've seen assignments through student eyes. I've seen what a difference stimulating and well-crafted writing assignments can make, not only for the students, but for us, the tutors. Good writing assignments make it easy for Lucie and me to be good writing tutors, this is, conduits for successful writing ideas and strategies that will transfer to future writing situations.

Our goal here is to describe some of the features of assignments we've seen that are, from our standpoint, particularly successful. Such assignments contain clear audience and purpose, and reflect the idea that writing is a process.

Bonnie and Lucie: Tutors in the Reading/Writing Center

We've found that students whose assignments have a clearly stated audience and purpose produce better papers, as in this assignment from Warren Mason's Organizational Communications course in PSC's Business Department. Here is one example from a list of twelve that students can write on:

> Fax machines are the newest addition to the well-equipped office. Your insurance company wants you, a mid-level manager, to examine this product, and write a report on which of the many models would be best for your busy 100-person office. In addition to the cost of the machines, consider service and reliability of the product. Submit your report to the purchasing manager.

Students can easily identify the audience as the purchasing manager and the purpose as aiding the purchasing manager's decision about which fax machine to buy. Warren's concern for clear audience and purpose in communication stems from a tradition that began with Aristotle's *Rhetoric*; certainly, as writers, we make decisions all the time about shaping a paper (or lecture or memo) to suit a specific audience or to make a particular point. Yet in the Center we often see writing assignments where it's difficult or even impossible for the writer to imagine either *who* would be interested in reading the proposed text or what possible *effect* on that audience the text would have.

Such vagueness leads to frustration on the students' part because they are unable to imagine a situation where they would be called upon to write in *that way*. And it's hard for us to be good tutors as well, because we rarely have the time to both introduce and reinforce the principles of good writing—in this case, the principle that good writing almost always has a defined audience and purpose.

On the other hand, an assignment that defines a rhetorical situation by containing a clear audience and purpose makes it remarkably easy for us to be successful tutors. For example, last semester we worked with a student on Warren Mason's fax machine assignment. She talked while pointing to a thick and glossy stack of brochures and flyers on fax machines. Product X, she informed us, could fax two documents per

minute. Product Y could fax only one, but the faxed document was of higher quality. Then there was product Z. Its features . . .

We stopped her gently and said, OK, we're your purchasing manager and we're pretty busy. We know some things about the office, but not everything, so we need you to remind us—what does the office need a fax machine for? This raised the broader question of why insurance companies need fax machines in the first place, a question which the student had not researched. But she understood our nudge, made a phone call to an insurance company, and learned a very important rule—writers must shape their material to suit their audience and purpose. Even better, she did this with minimal intervention from us, because the assignment contained a strong rhetorical situation to begin with.

In Warren Mason's assignment the audience was one person—the purchasing manager. Another approach is to have the students write to different audiences. Here are some assignments from a course called *Writing in Physics*, designed by William Mullin, a professor at the University of Massachusetts at Amherst:

1. Write an essay explaining to a freshman Physics 141 student why an airplane flies. (Physics 141 is an introductory mechanics course without calculus.) Assume that the student has already seen the Bernoulli equation in class and now wants to know why it works.
2. Write a newspaper article for the Science Times (the Tuesday Science section of the *New York Times*) on the subject matter of Eugene's Golowich's talk (Golowich was a guest lecturer who spoke to the class about strings in elementary-particle theory.) Assume the audience is made up of college-educated non-scientists. The title of the essay should be a headline.

Assignments like these, in essence, ask students to teach what they've learned to someone else—to someone other than the teacher. They work by building on the idea that when you're able to teach a subject to someone who knows less than you, you've effectively mastered it. This approach also eliminates a major—and perfectly valid—complaint students have about assignments that they consider regurgitation: "The professor al-

ready knows this stuff, so why should I have to tell her?"

William Mullin's assignments could be played with further. For example, after the students write the second one for the Science Times, they could rewrite the article for a high school textbook, reshaping the material yet again in the process.

We do not wish to imply here that a formal business report presents a more "real" writing situation than a paper which asks for an analysis of, for example, Toni Morrison's *Beloved*. Academic writing does indeed contain a rhetorical situation; in the case of Morrison, for example, the audience is the community of literary scholars, and the purpose might be to convince the reader that *Beloved* builds on a tradition of slave narratives.

As we've tried to suggest, we believe helping writers find a clear audience and purpose is important, but our philosophy as tutors extends beyond that. Reinforcing the idea that writing is a process is also crucial. We all know that final products don't spring impeccably crafted, Athena-like, from the writer's head (word processor?), yet this myth about writing is so widespread students need the weight of the assignment's authority to combat it. Accordingly, as Toby Fulwiler suggests, a writing assignment ideally allows time for all the stages—thinking, incubating, revising with peer feedback and teacher feedback, editing, and proofreading.

Writing assignments can convey the idea that writing is a process in many different ways. Several faculty members here at Plymouth State have developed writing assignments that allow the early stages of writing to flourish, that is, thinking and incubating. Art Fried of the English Department has his students write down their reactions to that week's reading in a journal, which he reads but does not grade until the end of the semester, when students are required to revise four entries for a grade. Dick Fralick's students in biology write down major ideas from the reading in the beginning of every class. He then calls on students and uses their responses to organize his lecture. John Gregor of the Business Department uses a question box for all his classes, an anonymous and non-threatening way for students to communicate with him. All of these approaches show students that most good writing begins with what James Britton calls "expressive writing" (or "generative writing"), that is, writing

Writing assignments can also be designed to reinforce the revising and editing stages. Some teachers require one revision; others, like Bill Taylor of Social Sciences, allow students to revise their essays as many times as they want. Some professors, like Janice Kitchen of the Business Department, use peer feedback groups to help their students revise.

Even if faculty develop writing assignments replete with audience, purpose, and revision time, students still may have questions about what the results should look like. Showing them models of writing that successfully address the assignment can help. To this end, the Reading/Writing Center has started a file of "A" student papers collected from various WAC professors. The idea is to show students what successful writing is in a variety of disciplines. Some professors strongly encourage their students to visit the Center to read these samples; others also go over sample papers in class. This way students have the benefit of seeing exactly what, in fact, you're "looking for."

A side benefit of the notebook is that the staff of the Reading/Writing Center are able to review samples of good writing in different disciplines first-hand and to see that, for example, the style and conventions of a good physics article often differ from the style and conventions of a good piece of literary criticism.

Back to Bonnie: Tutor as Teacher

Lucie and I have been talking as if developing good writing assignments is a matter of applying a few simple rules. But of course it's not that simple. As Donald Murray comments to students in his textbook, *Write to Learn*, "Writing directions may be the most difficult form of writing there is. I certainly know I do it badly. I know what I mean, and it is hard for me to put myself in the shoes of a person who does not know what I mean." So he warns students, "Make sure you understand the purpose of the assignment, not just what you are expected to do, but why you are expected to do it. The reason for an assignment will often help make the assignment clear"(47).

I think Donald Murray's advice to students can help professors as well. I know I wish I'd had his counsel five years ago.

Works Cited

Britton, James, Tony Burgess, Nancy Martin, Alex McCloud, and Harold Rosen. *The Development of Writing Abilities, 11-18.* London: Macmillan Education, 1975.

Fulwiler, Toby. Unpublished handout from Training of PSC Faculty in Writing Across the Curriculum.

Mullin, William. "Writing in Physics." *The Physics Teacher.* May 1989: 342+.

Murray, Donald. *Write to Learn.* (2nd ed.) New York: Holt, Rinehart and Winston, 1987.

***Bonnie Auslander** is a full-time instructor in PSC's Reading/Writing Center. She received her MFA from the University of Massachusetts – Amherst, where she taught freshman writing for four years. She is a member of the Writing Task Force and one of the editors of this journal.*

***Lucie Lepine** won the spring 1989 Fellowship to tutor in the Reading/Writing Center. She graduated from PSC magna cum laude in June 1989 with a degree in geography.*

The authors presented a version of this paper at the New England Writing Centers Association conference in March.

Teaching Freshman Composition -- Getting Started

Bonnie W. Epstein

My first semester as a Freshman Composition instructor has ended. The anxiety has also subsided. I can now look back with some new-found confidence to see what worked and didn't work for me in the teaching of writing.

Determining What To Do

How does a new instructor determine what to do? First, I thought about a course objective. What skills do beginning students need to learn? One thing I believed then and am more sure of now is that freshmen must have help learning how to write in ways that other instructors will expect of them: summarizing readings, synthesizing sources, critiquing assigned materials and preparing the typical research essay. Perhaps nothing confirmed the correctness of this belief more than the evaluations of my students, one of whom said:

> . . . this was an in depth course. I'm not complaining at all because what I have learned will give me an edge on other areas, like when I have to summarize an article or evaluate a piece.

Choosing A Text Book and Setting It All Up

Determining what I wanted to do sent me on to the next step: finding a structured textbook and creating a syllabus that would provide such skill-building. Colleagues were most helpful in offering options, but I learned the hard way that nothing is more paralyzing to the new instructor than information overload. So I just decided to work with a text and syllabus recently used by a more experienced instructor.

Following a pre-set syllabus as a framework allowed me to focus my time more on the assignments and the actual preparation of lesson plans and materials. There just wasn't enough time to agonize over what text to use and what content areas to cover.

The use of a more structured text was a plus in another way as well: it did some of the work and planning *for* me. Seasoned instructors who are comfortable with both the material and the method of presentation can work from a more open-ended text or no text at all. For a new instructor, however, difficulties come in learning how to lecture, how to initiate and sustain class discussion, and how to motivate and keep interest in assignments that students may not wish to do. So, the more prep time devoted to familiarizing myself with course materials, the better.

As a last comment on the value of a structured text, I am never comfortable with ambiguity, and my fears about effective presentation of material were allayed somewhat by knowing exactly what to cover in each class meeting.

Hand in hand with a textbook selection was choice of method. Again, colleagues in the department pointed to the success of the portfolio method which views writing as a "process." The portfolio method allows students to prepare multiple drafts of each assignment and submit them to the instructor for comment and revision. No grade is given until a final copy of each assignment (with all previous drafts attached) is submitted in a portfolio. Students have praised this technique for allowing the chance for improvement prior to final submission of the work.

Most likely, no method will succeed, however, unless the course objectives and requirements are clear. A syllabus designed to achieve

these aims will focus the course. Vital information such as required texts and materials, grading, and attendance policies must be clearly outlined. Individual class assignments should then be listed. Ordinarily the syllabus will be less structured as the semester progresses.

Some Caveats

No textbook, syllabus or amount of preparation can speak to the unexpected. Each class of students is different and requires renegotiating and thinking on your feet. However, here are some well-tested thoughts I gathered from more experienced instructors:

- Be sensitive to the fact that writing is a difficult skill to perfect. Allow sufficient time to learn techniques and to practice them. Everything takes longer than you think, and squeezing in too much material can overwhelm and discourage students.
- Be prepared to expect a wide range of student skills and preparations. The variety will require that you adjust your materials and the pace of your classes.
- Be consistent. If you say one unexcused absence is allowed, be sure that is all you allow. Classroom decorum disintegrates quickly when students perceive the instructor vacillating on policies and procedures.
- Be sure to communicate your expectations to the students; also be sure to find out what the students' expectations are. If you require students to keep a journal in the course, this would be a fine place to ask them to communicate their expectations.
- Be aware that conducting class discussion is tough on a new instructor. Know your textbook and your material well; being comfortable in the classroom depends on it. Build slowly, including more discussion as instructor and class members become more comfortable with one another.

As A Last Point...

Remember that someone has been there before you. Colleagues are usually more than happy to offer suggestions and sample materials. Indeed, a faculty member is usually pleased to be approached as one who knows the craft.

Bonnie W. Epstein is the Assistant Dean of Academic Affairs. She has recently become an adjunct to the English Department where she teaches freshman composition.

New Directions

Collaborative Writing in Social Psychology: An Experiment

Robert S. Miller

The topic of student collaborative writing received considerable and enthusiastic discussion at the Writing Across the Curriculum Workshop led by Toby Fulwiler June 2, 1988, at Plymouth State College. Until then I had never seriously considered assigning collaborative writing in lower-level courses. As I listened to that discussion, however, I realized that such an experience might be incorporated very naturally into my sophomore-level course Social Psychology. This course deals with group processes, and it occurred to me that a collaborative writing experience might be useful in its own right and also provide an example to which students could apply ideas from the course. As I began to explore how I would put this into practice, I realized it might also solve several problems I had been having with the course.

When I first taught Social Psychology at Plymouth in 1977, we offered just one section annually, and it drew about 25 students. As our major has grown and as other departments have come to require or recommend the course, it has steadily expanded until now we offer seven or eight sections a year, and they enroll between 30 and 35 students each. In recent years I have typically taught two sections each semester. One problem I have with the course is finding the time to read all of the writing I want to assign.

Because of this practical problem I have actually reduced the amount

of required writing somewhat over the years. The hour exams continue to be composed of short answer questions and short-essay questions, and the final exam goes beyond these questions to include several longer essay questions requiring integration of material from the entire course. When the course was smaller, however, I also required four short (two- to four-page) thought papers. When it had expanded to the point where I was teaching two full sections a semester, I reduced the number of papers required to three.

Two or three years ago as use of journals became popular on this campus, I decided to cut the papers back to two and add a journal. I actually thought—silly me—that this was going to reduce the amount of time I had to spend reading student writing. It had the opposite effect. Although I enjoy reading journals more than papers, certainly by the end of the semester they have taken me considerably longer to read than a set of papers would have. So as of last year, a problem I had once again was too much grading in Social Psychology.

I was reluctant to cut out the journal, however, because some students seemed to enjoy it and to profit so much from it. However, there were always others who did not take it seriously, and a few who actively resented it. So a second problem I perceived was the need to make the journal more meaningful for those who did not enjoy it.

A third problem I had was the nature of the paper assignments. Because the reading in this course is already heavy and because my primary goal in the course is to teach students to think as social psychologists do, I assign thought papers rather than research papers. I try in these to make students think about either methodology or applications of social psychology. Years ago I created an assignment that works so well for the first paper in the course that I have used it ever since. I give students a saying or an adage from folklore, such as "Absence makes the heart grow fonder," "Gentlemen prefer blondes," or"Opposites attract," and ask them to derive a testable hypothesis about social behavior from the saying, to design both an experiment and a correlational study that could be done to test the hypothesis, and to evaluate which would be the better approach. I have five or six adages that I rotate across semesters. I have never come up with an equally successful assignment for the second paper, however,

and thinking of one each semester is always a problem.

Finally, it happened to be the case that because of another change in my teaching assignment, I was scheduled to teach Social Psychology in Fall of 1988 on a Tuesday/Thursday schedule for the first time. My teaching technique in this course had always been a mixture of lecture and discussion, with lecture predominating. This had worked well on a Monday/Wednesday/Friday schedule. Most of the material in the course is interesting enough to stimulate attention for 50 minutes, but I was worried about the 75-minute format. I had decided to try to introduce more activities of some kind to break up the longer sessions.

During the June workshop I realized that replacing one of the usual short paper assignments in Social Psychology with a collaborative writing assignment might have a number of advantages. It would provide students with an example of group interaction to which to apply concepts from the course and would provide me with a modest reduction in the amount of grading. I realized that if the collaborative paper were a part of an on-going small-group experience, I might address the other problems as well.

The plan I formulated was this: early in the semester the students would be divided into groups of four or five. Groups would sit together throughout the remainder of the semester and participate in various small-group exercises in class. They would write the first of the two thought papers collaboratively. The second paper would be written individually and its topic would be an analysis of the student's small group experience. Students would know from the beginning of the semester what this assignment would be and would be instructed to keep an on-going record of their group's interactions in their journals. The small-group experience provided me a natural format for introduction of new class activities. The change also suggested an appropriate assignment for the second paper, and one that might be used semester after semester, since depending as it would on one's own group experience it could not be plagiarized from past papers. The nature of this assignment had also suggested a new use for the journal, which I hoped would provide a focus and sense of purpose to those students who seem to lack direction in journal keeping.

Method

I put this plan into effect for the first time in my two sections of Social Psychology in the Fall of 1988. The syllabus I distributed at the first meeting described the small group experience the students would have. It informed them that they would write the first of the two papers as a group and that the second would be their personal analysis of how the group had functioned, based on entries they had regularly made in their journals.

At the start of the second week of the semester (the first class after the Add Period ended, when the enrollment had presumably stabilized), the classes divided into groups. I considered making group assignment a random matter, but hoping to get groups that would be congenial, I tried letting the students form their own groups. To do this I sent them all out of the classroom into a nearby lobby area and told them to mill around and organize themselves into groups of four or five. While they were doing this I quickly reorganized the furniture in the classroom into clusters—in each octant of the room I grouped four or five chairs.

By the time I was done they had formed their groups. This seemed to have gone smoothly. No one had been left out. In the larger of the two classes one group did have only three members. I decided that rather than disrupt another group I would let it be a group of three. In that class I ended up with the group of three, three groups of four, and four groups of five. The other class was somewhat smaller, and there the students had formed six groups, three of four and three of five.

I returned one group at a time to the classroom to pick an octant to be its own for the rest of the semester. The remainder of the period that day I devoted to a group decision making exercise I had formerly done very late in the semester as a one time only group experience. I knew that it typically produced lively discussions and gave people a chance to get to know one another a bit. So even though it was two months before we were going to study group decision making, the exercise seemed like a good way to break the ice in the small groups. Indeed, it seemed to be: the discussions were lively, and most of the students reported in their journals that their groups had had a good beginning.

For the next three or four weeks, I arranged for each group to participate in some kind of in-class exercise at least once a week. In several cases I modified exercises I had done with the entire class to be done within the small groups. For example, before I went over a homework exercise on methodology with the group as a whole, I asked each small group to discuss it individually and try to reach consensus on the correct answers.

I also devised several new exercises to provide activities for the groups. On days when we had read fairly complicated and challenging research reports, for example, I had each small group discuss and prepare answers to questions about the articles. Sometimes all groups worked on the same set of questions, so that when the class as a whole considered them, the discussion took the form of groups debating the conclusions they had come to. Other times, especially when the reading had been long, I gave different groups different questions to prepare, so that in the final class discussion, each group was the expert on different parts of the problem. I designed some of these purposefully to illustrate certain group phenomena we study in the course: cooperation, competition, the jigsaw technique. It pleased me to note that a number of the students came to realize what I was doing and to comment on this in their journals.

About three weeks after the groups were created, they were given the assignment for the collaborative paper. They were allowed 15 minutes in class that day to discuss it and plan but then were expected to do the writing outside of the class. Because I realized that some groups might experience logistical problems, I gave them four weeks for the assignment, more time than I would have had the students been working alone. The assignment was the one I had been using for years: to design an experiment and a correlational study to test a hypothesis derived from an adage. It happened to be time to use the adage, "Gentlemen prefer blondes."

The collaborative paper was due the eighth week of the semester. The formal written assignment for the individual paper was given out about a week later. The students were asked to write a paper about how their group had functioned throughout the course and particularly how it had functioned while writing the collaborative paper. The assignment was

first to describe what had happened and then to analyze this in terms of concepts from the course. This paper was due one week before the final exam.

Results

To assess this experiment in collaboration, I have several sources of evidence to consider. There is the quality of the collaborative papers. There is also what the students had to say about their groups in their journals and in the second paper. Finally, there are the results of a supplement I created to the usual student course evaluation form: here I asked direct open-ended questions about the innovations I had tried.

The quality of the collaborative papers was very high and was on the average higher than individual performance on the previous analogous assignment had been. On the collaborative papers, 3 groups received a grade of A and 2 more an A-; there were 2 B+'s and 3 B's; 2 C+'s and 2 C-'s. Since there seemed to be no reliable method of discriminating performance on this assignment within individual groups, all members received the same grade. The result was that 37% of the students received a grade in the A range, 37% a grade in the B range, and 26% in the C range. These percentages can be compared with those from the previous semester when a comparable number of students wrote individual papers on the same assignment (except that the adage was "Opposites attract.") That semester only 13% received grades in the A range; 38% got grades in the B range, 18% got C's of some kind, 8% got D's, and 10% F's. Another way of making the comparison is to note that the median grade on the collaborative papers was B+, whereas it had been B- the previous semester on the comparable individual papers.

Of course, since this assignment requires a certain amount of creativity, the quality of a group paper may be determined by the talent of the best group member. If each group deferred to its strongest member and let that person do most of the work, average grades on the assignment would be expected to be higher than average grades on individual papers would have been. On the other hand, it may be that group discussion of ideas stimulates creativity, and that better ideas sometimes emerge from the

collaboration than would be produced by even the best group member working alone. That the latter possibility is viable is supported by what students had to say in their journals and in Paper #2 about the process of writing the paper.

Those sources suggested that in almost every group true collaboration had occurred. It is noteworthy that very few groups seemed to perceive themselves as having a single leader. Several groups reported having co-leaders who shared responsibility and contributed more than the other two or three members. Two or three groups reported power struggles between two individuals for the position of leader, but in none of these cases did one of the individuals seem to win out; instead in each case the group seemed to find a compromise between their ideas. It is true, however, that a number of groups did contain one or sometimes two "social loafers," as we call them in Social Psychology, who contributed next to nothing.

It is interesting that three of the four cases where the paper was of C quality involved groups with serious interpersonal conflicts. In each case there was an extreme social loafer who others said contributed absolutely nothing to the paper and who in some cases disrupted the process by reneging on commitments to do certain tasks, failing to show up for group meetings, and making others too angry to function.

The fourth group who received a C was in many ways the most interesting of all the 14 groups. On the basis of oral work and performance on exams, this appeared to be the strongest combination of people in either class. This was the group that I had expected to produce the best paper of all; instead it produced one of the worst. Based on their journal and Paper #2 reports my guess is that they shared my perception that they were the top group and were absolutely confident any paper they wrote would be fine. Thus, effort was low. In fact, they were the only group who admitted writing the whole paper in a single evening session. It was also interesting to learn that this group apparently ignored its strongest member who had warned the others of the paper's weaknesses—they had out-voted him about the design of one of the studies, only to learn later that he had been right and the rest of them wrong.

The other 10 groups all seem to have had positive experiences writing the paper. They produced papers of good or excellent quality. In their journals and second papers they reported that the writing process involved cooperation by at least a majority of the group members. Many of them felt that the group effort had stimulated creativity and that they had learned more and had produced a better paper working together than they would have working alone.

Student responses to the course evaluation supplement provide further evidence that the collaborative experience was a success. Students were asked on this form to write evaluations of several aspects of the course including the experience of being in a group and the specific experience of writing Paper #1 collaboratively. The results were remarkably positive. Of the 59 students who completed the form, 56 (95%) evaluated the experience of participating in the group positively. Those who elaborated most often explained that being in a group had indeed allowed them to learn about group processes, indicated that they had profited from hearing others' ideas, or said that they liked the chance to make friends. The specific group experience of collaborative writing was not quite so well-received, though again a strong majority found it a worthwhile experience: 46 of 59 students (78%) evaluated it positively. They argued that they had learned more and produced a better paper and made more friends than they would have doing the assignment alone. Of the 13 whose evaluations were negative, about half complained that others in their groups had not done a fair share. A few others cited the logistical problems of getting the group together outside of class as their reason for not enjoying the experience. Two argued that it is unfair for grades to depend on others' performance.

Conclusion

I was much impressed with the overall quality of Paper #2, in which students were to analyze their group experiences in terms of ideas encountered in the course. Many did an excellent job. They drew up concepts of group dynamics to explain the collaborative writing process, concepts of interpersonal attraction to explain the feelings that had developed within

the groups, and concepts of social perception to explain the inferences they had made about the other members. An advantage of this assignment was that those who had been actively involved in their groups had more to say and so did better than those who had been social loafers. Hence, the grades on this paper tended to correct any inequities that may have resulted from the group receiving a common grade on Paper #1.

On the basis of all of this evidence, I regard my first experience in the use of collaborative writing as a success. I am now enthusiastically replicating this Writing Across the Curriculum experiment.

Robert S. Miller *received an A.B. from Amherst College and a PhD from Dartmouth College. Since 1976 he has taught psychology at Plymouth. Currently his special interests are psychology and literature, the psychology of humor, and the psychology of cats. He was recently named the 1989 Distinguished Teacher at PSC.*

Using Collaborative Techniques in a Speech Class

Richard Chisholm

> "Collaborating with total strangers was a good way to test out my speech. The guys I was with had good speeches and we worked some problems out so that they would be better speeches....At least I know two people will like and understand what I have to say."

That comment from a student in my course in Speech (English 240) summarizes the experience of most of the students who participated in pre-speech collaboration.

The speech of introduction in my Speech course gives students their first experience in front of the class. Students can talk about things they find important, and they get a chance to know each other. This is a standard assignment in speech classes, and I have been doing it for years, but I have always felt that the experience was less successful than it ought to be. The technique of collaboration has helped me help students make this introductory speech more successfully.

For years, I have tried to help students over initial difficulties by giving them a clear idea of expectations, providing them guidelines, having them fill out a Personal Inventory form to re-discover their own experiences, and giving them adequate time to prepare. In addition, I have tried to lower fears by not grading the first speech. But I still found three problems

with the first speeches: student anxiety and stage fright over exposing themselves to an unfamiliar group; uncertainty about choice of the anecdote or experience from their life to talk about; and thin, unsubstantial presentations.

This semester, having read Karen Spear's *Sharing Writing*, I began to use the technique of collaborative preparation to overcome most of these difficulties. Students form groups of three, make their presentations orally to this small group, and ask for and receive supportive feedback from them.

As a result, the quality of the speeches has gone up, evidence of nervousness has declined, and students have felt much more confident and positive about their first experience speaking in front of the class. Though Spear's book is about collaboration in the writing process, her ideas work well in helping students to collaborate in preparing speeches. This technique of collaborative preparation helps students more than anything I've found in a long time.

Preliminary Preparation

To prepare for their collaboration, I gave students explicit specifications for their speech (Appendix 1). The assignment was to prepare a 5-minute presentation in which they give background information about themselves and tell an anecdote or experience they have had or explain an important aspect of their life. They then completed a Personal Inventory form (Appendix 2) to review the major events of their lives. At the beginning of the next class, they wrote an outline of a speech to introduce themselves, including the anecdote or interesting aspect of their life. In addition, they read two chapters on audience analysis and on making the first speech, and I lectured briefly on stage fright and how to control it, as well as on my expectations for the course. Thus, by the time they came to the collaborative part of their preparation, the students had already thought about the material several times and had received explicit instruction in several important aspects of speech preparation and presentation.

Collaborative Procedures

The purposes of the following collaborative procedures are to help students shape their presentations by reconceptualizing the form and content of their statements and to gain confidence in speaking frankly about their experiences.

The collaborative process took up one class period. Here are the procedures we followed on the day of the collaboration:

5 minutes:

Freewrite -- At the beginning of the class the students made a journal entry as follows: "Choose something you know about and write down everything you can think of about it (anecdote or aspect for Speech #1)."

3 minutes:

Introduction -- I then explained the purposes of the small group collaboration: 1) to give you practice for Speech #1 (Introduction); 2) To let you get acquainted with the audience; 3) To help you learn to collaborate: give information and get a response, see what got through to our audience, and respond to others' presentations.

3 minutes:

Procedures -- I explained the procedures, showing the following information on a transparency.

Give your speech of introduction

Ask for feedback from your colleagues:

1. Ask for praise, positive feedback (What did you like?)
2. Ask for description (What did you hear as my main idea? What points stick in your mind? One person retells.)
3. Ask for questions (What questions do you have?)
4. Ask for suggestions (Where do I need more information? How should I change the organization?)

3 minutes:

Principles -- I explained the principles, showing the following points on a transparency:

Give your presentation to get practice.

Give your presentation to receive help.

Give friendly collaboration and cooperation.

(Collaborators simulate the larger audience)

Get feedback to help reconceptualize.

Don't defend or respond to the suggestions.

Be sure the product remains your own.

1 minute:

Form Groups -- I had students form groups of three by counting off, then assigned parts of the room for them to meet, and told them to give each person 10 minutes — 5 for their presentation and 5 for feedback.

30 minutes:

Group Meetings -- (10 minutes for each of the three persons in the group.) This was the heart of the session. The classroom buzzed for thirty minutes.

5 minutes:

Freewrite -- At the end of the class the students were asked to make a final journal entry. They wrote for five minutes on "How collaborating helped me compose my introductory speech." I emphasized the idea of reconceptualizing the speech.

30 seconds:

Final Word -- Just before dismissing the class, I commented that the

keys to effective oral communication are preparation and practice with a live audience. "Ask others to help you prepare," and "Form part of a mutual support group," I said.

Evaluation

The speeches that students produced as a result of these procedures were superior to those of any previous class. The subject matter of most of them was extremely personal and confidential, yet the students spoke without hesitation and without either boasting or embarrassment about their successes and failures in life. They spoke confidently, gave pertinent details, and made trenchant generalizations. And although all of them confessed to having been nervous, they showed few signs of nervousness — fewer signs than students who had not collaborated with a small group of peers. Perhaps most significant is the fact that these procedures helped students see that I took this assignment seriously and expected them to do so as well. As one student put it, "Nobody blew it off."

As encouraging as my observation of their success was, I believe that the comments from the students reveal the importance of this collaboration even more pointedly. Here is a sampling of remarks from the final 5-minute freewrite at the end of the class period. I think that they speak with the authentic voice of students who are involved in fruitful collaboration.

> "The girls I worked with ... seemed to be interested in some of the things I was saying and had some encouraging things to say rather than discouraging me because of my major as so many others do. I feel much better about my speech now and feel that the confidence I have gained from collaboration will make my speech even better."
>
> "It helped me to see what others thought about what I was planning on saying in my speech."
>
> "It was good to see them interested and to respond to what I had to say.... Now I can go over my speech again and improve upon it."

"I can go up to the podium now and I will also know two more people and feel a little more comfortable. I think collaboration helps bring out the good points and the bad points of the speech so you know what to expand on and what you should dismiss."

"Collaboration has helped my speech tremendously. I hear the good part such as the story itself. . . . I am going to rearrange my story so that it is one story instead of two. . . . I am a lot more relaxed now about the speech than before. Maybe because I know two new people."

"It helped — I'm not nervous anymore because the group next to us was silent while I was speaking and it was kind of like I was talking to them too. . . . I think it was a great idea to do this. Thank you."

For the Future

I think that in the future I will give students more opportunities for collaboration. What I have used so far is a highly compressed and simplified form of Spear's procedure; in fact, I used a whole semester's worth of ideas in one class. As I implement more of the ideas that Spear outlines, I will give students handouts that describe the tasks that groups are to perform and give them space to write down the results.

This collaborative technique promotes involvement by students, both as speakers and as hearers. Thus instead of indifference, casual approval, passive affirmation, or boredom, the collaborative technique helps to build active participation and commitment to achieving the aims of the course. That is an important harvest for a few days' labor on my part and a few minutes' collaboration on the students' part.

As another student wrote, "This is a good method of easing our minds about being nervous — Keep it."

I plan to keep it.

Appendix A

Instructions for a Speech of Introduction

The Assignment

Present a 5-minute speech to the class. Include the following kinds of information:

1. General information

   Name, home town, current residence

   Year, major

   Interests, hobbies

   Work experience

2. Anecdote

   A story about yourself that reveals an important aspect of your life or your personality.

Or

3. An Interesting Aspect of Your Life

   A description of something about you that reveals an important aspect of your life or personality.

How to Prepare Your Speech of Introduction

To prepare for this speech, complete the attached questionnaire. Freewrite about several anecdotes and aspects of your life. Talk about your experiences with a classmate, roommate, or friend. Discuss them with the instructor.

Work especially on the second part of the speech, the anecdote or interesting aspect of your life.

List your points, but do not write out the speech.

Practice your presentation once

How to Present Your Speech of Introduction

When your turn comes, walk naturally to the front of the class.

As you are walking up, take a deep breath to gain control of your breathing.

Write your name on the board.
Scan the audience.
Present your speech simply and directly, in a conversational tone.
Present your speech without notes.
When you are finished, scan the audience again.
Ask "Are there any questions?"

Appendix B

How to Prepare for a Speech of Introduction

Personal Questionnaire

In your journal, answer these questions to prepare for your first speech. This process ought to take a total of two hours or more.

Part 1. Lists

List five things you know a lot about. Select each from a different aspect of your life.

List the jobs you have had at any age.

List unusual experiences you have had: travel, work, personal, family. Think of things that are different from what others have done. Service to a community; being a stranger in a foreign land; close friendship with a person from a different country; experience with children, elderly people, animals; difficulty you have overcome.

List things you are good at. List as many as you can. Think of using your hands, using your body, using words, using your senses, using numbers, intuition, analytical thinking, originality, helpfulness, artistic ability, leadership, follow-through.

List things that are different about you: being left-handed; being a twin; being foreign-born.

List several people that were important in your life. Think of people outside your family. List turning points in your life. List things you have done this year for the first time.

List things that play an important part in your life: music, art, animals, sports, games, courses, reading interests.

List the careers you have considered.

Part 2. Brainstorm.

Go back through your notes and select one item in each category. Write out a brief statement about each one.

Select three of the topics you wrote about. Explain each one in five minutes. Do this out loud, then write it out. Think of as many details as you can that will help communicate your experience to others in the class.

Part 3. Organize

Select one topic for your speech of introduction. List the items you will mention. Create a design for your speech by putting these items in the order you will mention them. Continue your preparation by asking for peer response, practicing aloud, adding material, and revising your plan.

Richard Chisholm is a professor in the English Department. His interests range from Medieval literature to technical writing. He is an active supporter of the Writing Across the Curriculum program at Plymouth.