Combining Critical Thinking and Written Composition: The Sum of the Whole Is Greater Than the Parts

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Introduction

In 1991, I attended a three-day workshop at Phillips University in Enid, Oklahoma. The focus of the workshop was using primary texts in writing courses and exploring the various methods of teaching written composition. A good deal of the workshop was run by Dr. Barbara Walvoord, a leading advocate of teaching writing as a process. With the process approach, students work on writing and rewriting one or two papers for an entire semester, where in more traditional composition courses students produce six to ten discrete papers modelled on different rhetorical patterns. The process approach emphasized such pre- writing exercises as free writing, brain-storming, outlining, first drafts, peer reviews, and student-teacher conferences, with numerous draft revisions until an acceptable final copy is produced. One major difference is that all instruction in grammar is in the context of students revising their papers, as opposed to discrete grammar exercises. Compared to the more traditional approachs of teaching writing--approaches that focused on formal instruction in grammar, and numerous stand-alone attempts to produce an acceptable paper--the process approach seemed to make intuitive sense. For one thing, its approach mirrored the manner I used in writing papers, books, and texts: outline, draft, revision, revision, and more revision, usually in response to a peer's or editor's critique.

However, the fact that one approach has an intuitive appeal based on our own limited experience is never sufficient to warrant recommending it to wider circles of academe. So, at the end of the workshop, I ask Dr. Walvoord if there had been studies to show that the process approach to writing was indeed superior to the alternatives. Is there evidence that the process approach produces better writers? To my genuine surprise, she responded that as far as she knew no such studies had been done. I was perplexed and disappointed.

My problem was that, by virtue of a FIPSE Grant, I was charged, with the help of colleagues from other departments in the humanities, to design a course that integrated instruction in critical thinking and written composition with the study of primary texts. From the beginning, I understood two things. First, such a course could **not** be "business as usual" with respect to writing instruction, going over numerous rhetorical modes. There simply would not be enough time. If a course were to combine critical thinking

and written composition, then all writing assignments should must be geared to ask students to give arguments and evidence for their positions, that is, papers must be what most rhetorics call "argumentative papers." Third, I knew from talking with my colleagues that the faculty outside of the English Department would not be willing to teach a traditional composition course with formal instruction in grammar and six to ten papers each semester. That was not what they envisioned when they signed on to participate in the FIPSE grant. On the other side, many faculty in the English department tended to support (at least by their own practice) the more traditional approaches to teaching composition and so would be reluctant to endorse writing instruction that varied too widely from the traditional approach. Finally, if we were going to combine instruction in critical thinking and written composition, approaching writing as a long self-correcting process seemed to me to be analogous to the critical thinking process which involves, whenever possible, self-correcting thinking. But if we adopted the process approach, there would not be time to cover the standard variety of paper formats: narrative, description, comparison and contrast, cause and effect, definition, etc. Now, I was being told by a well-known expert in writing instruction that there was no evidence I could show to the skeptics that the process approach was superior, even though she and I both believed that it was.

In the end, in spite of a paucity of empirical evidence, my colleagues and I managed to forge ahead and design a course that treated writing as a critical process. To some extent, this was possible because we continued to remind ourselves that FIPSE awards program development grants for ideas that are novel and show promise of being useful in wider educational circles. If the idea of integrating instruction in critical thinking and written composition was indeed novel, then of course there would not be any research to support our conjectures about teaching writing in the context of critical thinking. We would have to do the research ourselves, vowing to respond appropriately to the data, i.e., if our approach did not produce adequate results, we would make changes. A description of our approach and the present results of our research are the subject of this paper. In brief, after four years, our research data indicates that teaching critical thinking and written composition together enhances both critical thinking and writing abilities more than teaching both by themselves in stand-alone courses. The whole is greater than the some of its parts.

Program Summary

The following is a description of the formulation, instantiation, and on-going assessment of Baker University's two-semester sequence integrating instruction in critical thinking and written composition. The narrative begins in 1979 with the problems found with student writing and critical thinking in a seminar, "Science, Technology, and Human Values," required of all Baker University seniors. In response to these problems (and with the help of two FIPSE Grants) we designed a two- semester freshmen sequence that integrates critical thinking and written composition. After two-years of planning involving six to ten faculty, this sequence began in the fall of 1990. After four years of research, we are in a position to draw some tentative conclusions about instruction in writing and critical thinking. Our assessment data indicates a number of things that should be of interest to many teachers of both critical thinking and written composition, not the least of which is that integrating critical thinking and written composition works far better than teaching either alone. In addition, if Baker University is a typical school, our study provides evidence that traditional undergraduate education does little to enhance

students' writing skills beyond the level attained during the freshmen year, although critical thinking skills are enhanced significantly. That is to say, while our data indicates it is possible to teach freshmen to be better writers in the context of critical thinking, the typical courses students take to fulfill distribution and major requirements do little to enhance further students' ability to communicate in writing.

History

Some of the long-held "articles of faith" in liberal education are that liberally-educated people should be able to understand and integrate ideas from a wide range of disciplines--disciplines grounded in the varieties of human experience. The minds of liberally-educated persons should resemble spacious pantries, able to handle (and keep straight) large quantities of valuable goods gathered from the spacious landscapes of higher learning. In addition, liberally-educated persons should have heightened social consciousness, being aware of the interdependence of the global human community and our duties to others. They should also be sensitive to the scope and complexity of the ethical issues facing citizens living in a technological society and know how to approach such problems with defensible ethical principles applicable to specific issues. Liberally-educated persons should also understand and appreciate the tremendous power and limitations of the methods of modern sciences.

With an eye to these ends, in 1979, Baker University faculty began requiring all seniors to complete a capstone seminar entitled "Science, Technology, and Human Values." Each student chooses a public policy issue that is the result of scientific or technological developments. Typical topics include renewable agriculture, AIDS testing, funding organ transplants, keeping very pre-mature babies alive, or nuclear waste storage, to name but a few of a long list. After researching the issue, each student in the section writes, presents, and defends a position paper. Students are asked to present both practical and ethical arguments for their position and to evaluate honestly alternative positions and possible objections.

While the seminar appeared to be a natural culmination of our undergraduates' liberal education, by the early 1980s, faculty teaching the seminar began to complain that, while most Baker seniors were adequate writers with respect to style and mechanics, there were major problems with the quality of argumentation found in their papers. Students were not adequately equipped to evaluate critically positions counter to their own, nor were they very good at constructing convincing arguments for their own positions. It seemed obvious that the "Fourth R," **Reasoning**, had been missing from their undergraduate education. Something needed to be done.

In an attempt to address weaknesses in students' reasoning and critical thinking abilities, in 1988 we applied for and received a FIPSE grant to design a required course that integrated instruction in critical thinking and written composition. Wherever possible we planned to use primary texts as the readings for discussion. After two-years of planning and an additional FIPSE Grant, in the fall of 1990, Baker University began a new interdisciplinary critical thinking and written composition sequence required of all freshmen.

The two-course sequence differs from either traditional, stand-alone critical thinking or composition courses by carefully integrating instruction in critical thinking and written composition, and, whenever possible, using primary texts for readings. The fundamental assumption behind the new approach is that students can become better writers if they are first taught to think critically about what they hear, read, and write. Hence, we spend the first half of the first semester teaching students the fundamentals of critical thinking, i.e., how to identify and evaluate positions with respect to the evidence and argumentation. Students are then taught strategies for applying their critical abilities to writing expository papers. A second assumption is that all freshmen will benefit from a careful study of important **primary** texts from a variety of disciplines. Such texts raise fundamental issues that the entire freshmen class can discuss. Learning to read such texts provides skills useful in a variety of other classes. A third assumption is that instruction in both critical thinking and writing will provide a solid foundation for the remainder of students' education by empowering students with skills and dispositions useful in most academic, as well as professional, settings. Wherever careful analysis, reasoned evaluation, and persuasive writing are needed, the skills taught in the freshmen sequence will be gainfully employed.

The first semester of the sequence is called "Critical Reading and Writing." The course structure is simple. It instructs students to read critically, to evaluate the reasonableness of ideas and arguments, and to employ these critical thinking skills in writing expository prose. The text, *Reasoning and Writing: An Introduction to Critical Thinking*, was developed over a three-year period by Baker faculty teaching the courses and with the help of consultants well-known in the field of critical thinking, e.g., Ed Damer, Ralph Johnson, Connie Missimer, Steve Norris, Jerry Nosich, and Harvey Siegel, not to mention substantial funding from both the U.S. Department of Education and the Hall Family Foundation.

We take the following definition of critical thinking as our point of departure: "Critical thinking is thinking that attempts to arrive at a conclusion through honestly evaluating a position and, whenever possible, its alternatives with respect to available evidence and arguments." While this is pretty straight-forward, the emphasis is on the "honest evaluation of a position" and that requires taking a serious look at the alternatives to one's favored position, examining the evidence and arguments for the positions. It also involves evaluating the arguments against one's favored positions. Asking students to look at the alternatives with respect to any position is not anything new; it is the essence of John Stuart Mill's arguments in *On Liberty* for the value of open and free discussion in a democratic society. Only after honestly evaluating those ideas opposed to our own can we have any assurance of the reasonableness of the one's we hold.

Beginning instruction focuses on three skills essential to critical thinking: clarification and understanding, rational evaluation, and articulation. It seems obvious that if students are being asked to evaluate a position, they must first be able to clarify and understand what they are to think critically about. We cannot criticize what we do not understand. Once students understand a position, they must be equipped with the critical tools necessary for a reasoned evaluation. Finally, students must be able to articulate and defend their positions in clear, rhetorically effective expository prose. Being useful in all disciplines, these critical thinking skills transcend any specific discipline.

The formal study of critical thinking skills and dispositions is completed in the first six to seven weeks of the first semester. Our approach is to first explain, i.e., to justify rationally, to students the importance of acquiring these skills and dispositions. We then introduce the skills in the context of what we call "Principles for Critical Discussion." The idea is to imbed the more technical notions of critical thinking within a pragmatic framework that will guide any sort of critical discussion of any issue. That is, we asked ourselves what behavior-guiding rules would discussants need to follow in order to carry on a fruitful critical inquiry. For example, to maximize success inquirers should adopt what we call "The Fallibility Principle" where all members must assume they could be wrong with respect to any belief about an issue. We also believed that members of a discussion should have the right to ask others for further clarify a position (The Clarification Principle) and to state the reasons they have for holding the belief (The Reasons Principle). Other principles deal with rules for determining when a position is deemed acceptable and when a position can rightfully be rejected. Without such principles, discussions tend to go nowhere. With such principles, class discussions take on a new vibrancy.

Because clarity is so important, and yet so difficult for most freshmen, we spend a good deal of time showing students how to paraphrase and summarize difficult material. Next, the need to evaluating the reasonableness of a position naturally leads to instruction in deductive and inductive arguments, as well as instruction in informal fallacies. Finally, the need for discussants to clarify and defend their positions leads naturally to instruction on formulating arguments that form the skeleton for their papers. In general, the idea is that critical thinking skills and dispositions can be grounded in informal rules that rational inquirers would adopt in order to further their odds for successful dialectical inquiry.

The rest of the sequence focuses on the application of those skills both to reading primary texts and to writing critical papers. The course format is student-centered, designed to engage each freshman in the learning process through daily exercises in critical thinking and writing, as well as responses to discussion questions over the readings. Instructors are seen as discussion leaders and persons to facilitate student progress in critical thinking and writing, as opposed to experts in the works being studied. Lectures are absolutely discouraged.

Throughout both semesters, we emphasize the notion that writing is a self-correcting process much like critical thinking. Understood as a process, students are encouraged continually to refine what they write in response to criticisms from others or ideally from themselves. The ability fruitfully to criticize our own ideas or forms of expression is an essential part of the study of critical thinking. That is to say, critical thinking teaches students that there are standard questions one can (and should) ask with respect to the acceptability of a position or an argument. In addition, because a primary rule of critical thinking is one cannot criticize what one does not understand, the standard of clarity guides the students' prose. The standard questions of critical thinkers, i.e., questions with respect to the acceptability of evidence and arguments, can easily be applied to positions taken in student writing.

Currently, six papers are required during the two-semester sequence. In most cases, prior to writing the paper, students outline their position and arguments, and meet individually with teachers to discuss their plan. Explicit strategies for developing arguments to support a thesis are taught in the latter chapters of

the critical thinking text. For example, if a student decided to argue against requiring employers to provide health care for all employees, the student might use what we call "a *modus tollens* strategy" pointing out that the acceptance of the position entails a number of unacceptable consequences. Hence, requiring employers to insure their employees is not a reasonable position. The student-faculty conferences are valuable because it is at this stage that faculty can identify ill-formed theses and arguments, hence saving students from writing a weak paper.

Once the papers have been written and evaluated, upon returning the papers, teachers spend considerable time in class going over some of the more common mechanical errors found in the papers. Grammar is always taught in the context of student writing--the quality of which determines students' grades. In order to receive a grade, students must correct all mechanical errors. This often requires consulting a required grammar handbook.

After a quick review of critical thinking skills and strategies, the second semester of the sequence asks students to continue applying their critical thinking and composition skills to the study of a variety of texts from different cultures, time periods, and disciplines. It is important for students to see that the same strategies for both evaluating and generating arguments can be used regardless of the subject or discipline. If a position is stated, reasons are needed for support. Good reasons are those that, if accepted, would entail the acceptance of the position in question. The readings for the second half of the sequence have included selections from the Bible, Buddhist and Confucian literature, as well as works by Plato, Sophocles, Epictetus, Descartes, Pascal, Goethe, Condorcet, Adam Smith, Voltaire, Wollstonecraft, Hume, Darwin, Dostoevski, Nietzsche, Marx, Virginia Woolf, Einstein, Shaw, Yeats, Freud, Faulkner,and Sartre--to name a few. Each reading is rich with ideas and is chosen to provide an alternative perspective on important issues. The readings are paired so that opposing positions are taken by at least two authors, e.g., Marx and Adam Smith on the value of a market economy. It is the students' job to choose and defend the most reasonable position. To avoid the possibility of using previously written papers, the readings are changed each semester. This makes finding good fecund readings an on-going challenge.

Transfer students who have had traditional curriculum elsewhere are provided a one-semester junior level course building the unique qualities of the freshman sequence, e.g., instruction in critical thinking and argument analysis, onto skills already acquired by older students.

A number of pedagogical approaches are unique to our program. First, we require students who score below the 50th percentile on the English part of the ACT exam to enroll in a Fundamentals of English course that focuses on grammar and writing at the sentence and paragraph level. These students are over half-way through this course before they are asked to begin the process of writing a critical paper in the first semester of the freshmen sequence. This is because the first six or seven weeks of the critical thinking/composition course are spent studying the principles of critical thinking and their application to reading and writing.

Second, we try to avoid the criticism that hybrid critical thinking courses tend to be light on logic. We

emphasize instruction in formal deductive logic, inductive logic, and the traditional informal fallacies. Our emphasis on formal logic seems justifiable for a number of reasons. First, sound deductive arguments serve as a model for good reasoning that we should all try to achieve, even though arguments in real life seldom do. Second, with deduction as the paradigm, informal fallacies are easier to teach. Students who understand validity see more easily why some of the informal fallacies are fallacies, i.e., why the premises do not entail or support the conclusions. Third, we use the argument forms of **modus ponens**, **modus tollens**, and **disjunctive syllogism** to develop general strategies for writing argumentative papers. For example, if a student wanted to argue for a position, we show them how one can support a position (C) by showing that the alternatives (A and B) are flawed. In essence, such an approach is nothing more than a disjunctive syllogism. As we have already seen, if students want to critique a position, one strategy is to employ their knowledge of **modus tollens** and show that the position entails consequences that are false or unacceptable, hence the position must be rejected. Showing the application of formal logic to constructing arguments is one of the unique aspects of our approach and may account in part for its success relative to other approaches.

Another unique practice is our use of people from a variety of disciplines, e.g., English, foreign language, religion, philosophy, business, chemistry, theater, and speech communications. While some teachers are better at teaching critical thinking and writing than others, with only a couple of exceptions, post-test scores of our assessment tests do not vary significantly relative to the instructor or the instructor's discipline. This may be because the staff meets weekly to go over the material to be covered the following week. We also have workshops prior to the fall semester to work on teaching and grading techniques and to revise the course materials.

In general, the ideas behind the structure of the courses are very simple: teach students the skills and dispositions of critical thinking, show them how these can be used to critique positions and write papers, and require them to use the skills over and over as they read and write. Logic and critical thinking are so foreign to many students that keeping the approach as simple (and repetitive) as possible may also account for some of the program's success relative to more traditional approaches to teaching both composition and critical thinking.

Program Assessment

Assessing our new approach to teaching critical thinking and written composition is difficult. As anyone involved in educational research understands, it is hard to isolate all possible variables. Hence, the data presented here should be considered as one sample of many in an ongoing project. In other words, as the years go by and the body of data increases, we will be more certain of our conclusions.

To assess the effectiveness of our new approach to teaching critical thinking and writing, we give pre-tests of both the Test of Standard Written English (TSWE) and the Ennis-Weir Critical Thinking Essay Test (E-W) to all Baker freshmen at the beginning of the year and post-tests at the end of the year after they have completed the sequence. Assuming the validity of both of these tests, this tells us what gains freshmen make in the areas of critical thinking and written composition over the course of the year-long

sequence. To assess our entire general education program with respect to these skills, we give the tests again when the freshmen are seniors. We can then see what gains they make over the four-years of their education. For comparison groups, we used students at liberal arts schools resembling Baker, large state institutions, and large community colleges. In all the comparison groups, students were enrolled in one-semester courses in written composition, traditional logic, or critical thinking. Responding to skeptical concerns by those favoring more traditional approaches to teaching both critical thinking and writing, our initial concern was to find out whether our new two-semester sequence instructed students in written composition as well as a traditional one-semester composition course, and in critical thinking as well as a traditional course in either logic or critical thinking. The skepticism about teaching critical thinking skills seemed especially well-founded, because formal instruction in critical thinking ends after the first six or seven weeks of the first semester. The rest of the course involves the application of those skills to writing argumentative papers. After four years, the data indicates that our integrated approach produces significantly better outcomes than stand-alone traditional courses in critical thinking or composition. In the area of critical thinking, the degree of difference is quite astounding.

The following chart gives average pre and post test scores on the TSWE and the E-W for Baker freshmen from the fall of 1990 to fall semester of 1994. Those scores are compared to scores of sixty-six Baker seniors who went through the new critical thinking\composition sequence. The scores of the freshmen are also compared to those of students in comparison groups at a major state university, a liberal arts college much like Baker, and a large metropolitan community college. These students were taking either more traditional written composition, logic, or critical thinking courses. Again, the reasons for the comparison are to evaluate how well our new freshmen sequence, LA 101-102, teaches critical thinking and written composition compared to more traditional alternatives, and to see how well Baker's entire educational program functions in enhancing student abilities in these two fundamental areas of competency. In order to enhance students taking seriously the post-tests, in all cases the post-tests were given as part of a final or midterm exam.

The TSWE is the English Composition component of the Scholastic Aptitude Test (SAT). The exam measures both knowledge of mechanics and the writing ability of students. According to the test booklet, TSWE scores correlate highly with scores on written expository essays, thus making it appropriate for evaluating students' writing abilities. The range of possible scores is 20 to 60, with 44 being the national mean.

The E-W critical thinking essay exam consists of an eight paragraph letter to the editor arguing for a ban on overnight parking on city streets. Students are to read the letter and respond with a nine-paragraph letter evaluating the reasoning in each paragraph of the original letter and the overall quality of the letter's arguments. The E-W evaluates students' ability to read carefully, evaluate arguments found in what they read, and express their reasoned judgment in writing. Given these are the primary goals in our freshmen critical thinking and composition sequence, the test seems appropriate. It was recommended by one of our consultants, Steve Norris, co-author with Bob Ennis of *Evaluating Critical Thinking*. As far as we know, it is the only critical thinking test currently in print that asks students for a written response upon judging the quality of reasoning in a piece of writing. The range of possible scores for the E-W is -9 to +29. Using double-blind grading techniques, grader reliability on the exam has always been

over .89. Norris emphasized that graders should not know if they were grading pre or post tests, as that might influence their judgments. While the test would seem tedious to score, we have had great success in training student workers to do the grading. As Norris and Ennis indicate in their book, after some practice, experienced graders can score an exam in under 10 minutes.

We give the E-W at the beginning of the fall semester and then again as part of students' final exam at the end of the spring semester. The results are not made public, nor are the exams discussed. Given the relative equality of scores among sections of the course, I doubt that any teacher consciously teaches to the test, although in some ways, because the test so mirrors our concept of critical thinking, the courses cannot but help students do better on this test. The increases in scores, relative to our comparison groups, show this.

COMPARISON of TSWE AND ENNIS-WEIR SCORES from FALL 1990 to SPRING 1995

BAKER FRESHMEN	Pre TSWE	Post TSWE	Diff.	Pre E-W	Post E-W	Diff.
90/91	45.3	49	3.7	5.8	11.8	6.0
91/92*	46.0	51.1	5.1	9.4	12.2	2.8
92/93	44.8	48.8	4.0	6.8	12.6	5.8
93/94	47.1	48.7	1.6	8.1	14.1	6.0
BAKER SENIORS:	Fr. Av.	Sr. Av.		Fr. Av.	Sr. Av.	
94/95 (n=66**)	45	49.2	4.2	9.6	15.7	6.1

COMPARISON GROUPS:

	pre	post		pre	post	

	TSWE	TSWE	Diff.	E-W	E-W Diff.
BU 1988-1992 (n=53) (Srs.in random classes)				unknown	11.3 -4.5***
State University Written Comp. 101 Fall 92	44.9	46.2	+1.3		
Liberal Arts College: Written Comp. 101 Fall 91	42.2	45.6	+3.4		
State University: Introduction to Logic (an elective course) Spring 92				13.9	13.5 -.4
Fall 94				11.2	9.5 -1.7
Community College (an elective course): Critical Thinking Course Spring 92				12.1	13.7 +1.6

* Current senior class
** These are the graduating seniors for whom we have complete scores for both the E-W and TSWE pre-tests. We have partial scores on 77 seniors.
*** The -4.5 is compared to the average score of 15.7 for current seniors who have gone through the critical thinking/composition sequence.

OBSERVATIONS

During the 1991/92 academic year, when most current seniors were freshmen, freshmen improved significantly more than the comparison groups on the TSWE (+5.1 compared to +2.35), with lesser improvement on the Ennis-Weir Critical Thinking Essay Test (+2.8). (This seemed to be a bad year for the program.) Yet even that small gain was better than our comparison groups' average decrease of -.17. The comparison group at the large state school was a standard elective logic course using a popular texts. While the students scored well on the pre-test, scores declined on the post-test which was given as part of their final exam. The comparison group at the community college took a standard critical thinking course. Their gain of 1.6 points was modest.

The most encouraging data of this study is the E-W post-test scores for current seniors (15.7) compared to the scores of seniors prior to implementing the new critical thinking/composition sequence (11.3). The 4.5 point difference is significant. To assure inter-grader reliability, we had the graders grading the current senior class essays go back and grade the E-W exams for the 53 seniors between 1988 and 1992 who took the exam but did not have the new critical thinking\composition sequence.

Conclusion

What accounts for the success of our students in increasing the on the E-W? Absolutely compelling answers to that question would take more controlled experiments where we carefully isolate as many variables as possible, e.g., teaching methods, textbooks, and teacher preparation. Nonetheless, there are some obvious differences which appear to be causally related to the difference in performance between our students and the comparison groups. First, by decree of the non-philosophers who worked to design the course, the critical thinking instruction had to be relatively simple--nothing fancy or too complex. A little learning may be a dangerous thing if someone wants a Ph.D in philosophy, but it may be just what the doctor ordered when it comes to critical thinking instruction at the undergraduate level. In the finished text, we focused on a few fundamental concepts and strategies of critical thinking and showed how they applied to everything students were asked to read and write. Second, two- semesters are better than one. Applying the same concepts and strategies for two-semesters surely must result in better educational outcomes than one-semester courses. Third, critical thinking may be taken more seriously when we show students how it applies (or can apply) to everything they read and write. Most logic courses do not do this. Logic is one course among many.

For the 66 seniors for whom we have complete data (pre and post E-W and TSWE scores), the average TSWE score increased from 45.0 in 1991 to 49.2 in 1994. Unfortunately, the 49.2 is lower than the average freshmen score at the end of the critical thinking\composition sequence. At the same time, the post-test average for all freshmen in 1992 was 12.2. This rose to 15.7 by the time they were seniors in 1994.

What are we to make of the slight decline in TSWE scores between the end of the freshmen year and the beginning of their senior year? This data suggests that Baker's general education requirements in place between 1991 and 1994 (a typical distribution requirement) may not have sufficiently emphasized college level expository writing. Faculty have attempted to remedy this with a new general education

program which requires students to complete four writing courses, as well as the freshmen sequence (LA 101-102) and the senior capstone "Science, Technology, and Human Values" (LA 401). Writing courses require students to write papers during the semester equal to eight typed pages. This writing is to be graded with a careful eye to grammar, mechanics, clarity, and style. The nice thing about our on-going research program is that we will be able to see if there are any differences.

There is yet one final perplexity. What are we to make of the relatively small increase in TSWE scores (+1.6 compared to +4.0) by freshmen during this past 93-94 academic year? It is ironic that during this past year, we included special periods for instruction in English grammar into the syllabus. We took time to go over various grammatical points throughout the semester. Our experience of declining test scores may add validity to already existing research which concludes that instruction in formal grammar has no positive effect on student writing. Teaching grammar may be a practice so deeply ingrained in the psyche of the typical composition teacher that if the results do not match expectations, the response is not to give up teaching grammar but rather, much like the practice of blood letting, "We must not be letting enough blood, let's take some more." Breaking with the traditional paradigm, our original plan was to provide any needed instruction in mechanics and grammar in the context of evaluating and returning drafts of student papers. Given the test scores for last year, we shall return to our original methods this year and look carefully at the resulting scores.

ENDNOTES

1. While we would like for our seniors to all be adept at the ethical evaluation of proposed policies relating to technology, many are not. As a consequence, the classes spend the first few weeks of the course studying my text *Science, Ethics, and Technological Assessment*, 2nd ed. (Boston: American Press, 1995).
2. The term "the Fourth R" is from George Hanford and the College Board's influential *Academic Preparation for College: What Students Need to Know and Be Able to Do* (New York: The College Board, 1981).
3. Some may be interested to know that before writing the FIPSE grant to design a critical thinking course required of all students, we tried to get faculty across the curriculum to include critical thinking instruction in their courses. In 1984, we brought Jerry Nosich in to do a four-day workshop for all faculty on how to infuse critical thinking into their courses. Nosich did a great job, but over a year later, when I looked at the instructors' course syllabi, it was all too obvious that nothing had changed. Perhaps Aristotle was correct when he said in his Politics, when something is the responsibility of everyone, it is the responsibility of no one. If critical thinking is going to be taught, someone or some group has to take responsibility for doing it.
4. Outside funding has been essential to the success of this program. In 1988, the first FIPSE grant was for $68,500 and gave considerable released time for six Baker Faculty; the second grant, in 1989, was for $106,110 and gave released time to ten faculty to work on the integrated sequence. After one-year of operation, the Hall Family Foundation supported the program with a three year $175,000 grant, and in 1994 awarded us another $175,000 matching grant to continue the research. Obviously, from the projects inception, people beyond Baker University have thought the idea of integrating critical thinking and written composition was a worthy project.

Some will no doubt ask "Why the appeal? Why should granting agencies and private foundations be interested in supporting a program that is trying to integrate critical thinking and written composition?" The appeal may be that if teaching critical thinking is an important educational ideal, one being mandated by many states, who will teach it? Philosophers are the best equipped to teach logic and reasoning skills, but there are never enough philosophers on a college faculty to teach a required critical thinking course and also teach the philosophy courses needed for a philosophy major. As a result, the ideal would be a course teachable by faculty from a variety of departments, especially English, that provides superior instruction in both reasoning and writing. This is what we have attempted to create. Our goal is to change the way both critical thinking and composition are taught on many college campuses.

5. By "expository papers" we mean any paper which takes a position and then provides evidence and arguments for the reasonableness of the position. Reports, descriptions, journals, and meditations do not count as "expository prose."
6. Donald L. Hatcher and L. Anne Spencer. *Reasoning and Writing: An Introduction to Critical Thinking* (Lanham, Md.: Rowman and Littlefield, 1993).
7. See not #4 for a breakdown of the funding.
8. *Reasoning and Writing: An Introduction to Critical Thinking*, p.18.
9. See John Stuart Mill's *On Liberty* (Indianapolis: Hackett Publishing, 1978), p.19.
10. Our position disagrees with John McPeck's in his influential *Critical Thinking and Education* (New York: St. Martin's Press, 1981). "In isolation from a particular subject, the phrase "critical thinking" neither refers to nor denotes any particular skill. It follows from this that it makes no sense to talk about critical thinking as a distinct subject..." p.5. Harvey Siegel points out in his Educating Reason: Rationality, Critical Thinking and Education (New York: Routledge, 1988) that critical thinking does always require a subject to think about, but the skill taught in a critical thinking text are not domain specific. Faulty inferences are faulty inferences regardless of the subject. p.19.
11. This method of setting up rules to govern discussion was first suggested to us by Frans H. Van Eemeren and Rob Grootendorf *Argumentation* 2 (4), November, 1988, 499-510.
12. An exception to this approach was tried last year. Throughout both semesters, we devoted portions of class periods to instruction in formal English grammar. Unfortunately, the gains on the Test of Standard Written English were the lowest of any year. This year, we are going back to the practice of only going over grammar in the context of a graded piece of student writing. We hope the test scores will improve.
13. Looked at in this fashion, it is difficult to understand the criticism of teaching the classics as "indoctrination into a specific point of view." Most of the classic writers disagree on most things.
14. See Michael Scriven's "Prostitution of the Critical Thinking Requirement," *CT News* (1991), Vol 10, Number 2, pp 1-5, and my "A Critique of Critical Thinking," *Thinking*, Fall, 1986.
15. For an excellent discussion of the various approaches to defining and assessing critical thinking, see Diane F. Halpern's article "Assessing the Effectiveness of Critical Thinking Instruction," *The Journal of General Education* 42, #4 (1993): 238-258.
16. I credit Steve Norris for this fine suggestion. Student attitude towards such tests seems to be a problem in other studies on teaching critical thinking. See for example, Peter A. Facione's "The

California Critical Thinking Skills Test--College Level: Technical Report #1--Experimental Validation and Content Validity" (Millbrae, CA.: California Academic Press, 1990). "They (students) were told vaguely that there cooperation was appreciated as a part of a much larger university research effort regarding CT. They were told specifically that their individual test results would not affect their final grades." Facione goes on to say that the attitude of students taking the test at the beginning of the semester was much better than that of those taking the test at the end of the semester. "The November post-test students, pressed at the end of the semester with a variety of deadlines and knowing that the CCTST would not influence their final course grade, although willing to participate, seemed to do hastier work and put forth less effort on the CCTST." p.12. Perhaps this accounts for some of the marginal gains students taking the test. The mean pre-test scores for the classes purporting to teach critical thinking were 16.0938 out of 34; the mean post- test scores were 16.831, a gain of .74.

I have heard of the same sort of gains from John Hoaglund at Christopher Newport College. They turn out to be statistically significant, but hardly the sort of gains that would convince a skeptic that courses providing formal instruction in critical thinking were teaching very much.

17. Stephen P. Norris and Robert H. Ennis, *Evaluating Critical Thinking* (Pacific Grove, CA.: Midwest Publications, 1989).
18. This was a bad year for the program because we were still in the process of refining our test, *Reasoning and Writing*, and some of the staff were still having problems with the logic involved in teaching critical thinking. Fortunately, the longer people teach in the program, the better we all get at explaining, exemplifying, and applying the critical thinking procedures.
19. We are continuing to do research with the logic courses at the large state university and will soon have additional data. Having used Copi's 4th edition as an undergraduate (it's now in its 8th), I can see why studying it would not help students do much better on the E-W exam. If the teacher focused almost entirely on informal fallacies (without the Latin names) and the chapters on induction, perhaps some gains could be made. My teacher never got to induction. Doing proofs was far more important!
20. The initial graders arrived at an average of 11.4 for the 53 exams. This indicated that even different grading teams can attain similar scores for the Ennis-Weir exam.
21. For the 77 seniors, we looked only at their pre and post test scores as freshmen, not the averages of the entire freshmen class.
22. See, for example, William H. Evans and Jerry L. Walker's *New Trends in the Teaching of English in Secondary Schools* (Chicago: Rand McNally & Co., 1966) and Frank O'Hare's *Sentence Combining* (Urbana, Illinois: National Council of Teachers of English, 1973).