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Is critical thinking across the curriculum a plausible goal?

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ABSTRACT: Critical thinking (CT) is considered an essential educational goal. As a result, many philosophers dreamed their departments would offer multiple sections of CT, hence justifying hiring additional staff. Unfortunately, this dream did not materialize. So, similar to a current theory about teaching writing, "critical thinking across the curriculum" has become a popular idea. While the idea has appeal and unquestionable merit, I will argue that the likelihood the skills necessary for effective CT will actually be taught is minimal.

KEYWORDS: critical thinking, critical thinking across the curriculum, critical thinking skills, deductive reconstruction, informal logic

1. INTRODUCTION

Hardly anyone in academe denies the importance of students learning to think critically. Scholar after scholar has proclaimed its importance. For example, well-known textbook author Diane Halpern (1993, p. 238) claimed that "The ability to think critically is almost always listed as one of the desirable outcomes of higher education." Williams, Oliver, and Stockdale (2004, p. 34) have claimed that "few concepts have attracted more attention than critical thinking." According to one survey, 90% of professors claimed critical thinking (CT) was "the most important purpose of undergraduate education" (Bok, 2006, pp. 67-68). Arum and Roksa (2011, p. 35) report that "99% of college faculty say that developing students' ability to think critically is 'very important' or essential.'" R. J. Aldisert (1997, p. xxii), a practicing U.S. Circuit Court judge and textbook author, claimed that skills normally associated with CT should be a part of the education of all law students.[1] Finally, a recent survey in *Forbes* claimed that CT was the number one skill desired by would-be employers in 2013 (Casserly, 2012).

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[1] In his book *Logic for Lawyers*, Judge Ruggero J. Aldisert writes "One has only to read a sampling of appellate briefs directed to the United States Court of Appeals …to perceive the necessity of improving logical presentations….All lawyers must understand basic concepts of deductive reasoning….(and) inductive reasoning, with its twin facets of induced generalization and analogy. And they should have a mental blueprint of how to recognize formal and material fallacies. This is what members of the legal profession need (xxii). This could be a description of what is covered in many critical thinking texts.

With such interest across the disciplines and among the professions, it was natural for some of us in philosophy to dream that our departments would be asked to develop and teach numerous sections of CT courses, and that would, much like written composition requirements did for English Departments, justify hiring significant numbers of new professors to teach the sections of the required CT courses. For many reasons, not the least of which was the added expense of hiring a cadre of philosophically trained CT teachers, this dream did not materialize. So, much like those in charge of teaching written composition who also found themselves lacking faculty resources have endorsed the idea of "writing across the curriculum," the idea of "critical thinking across the curriculum" (CTAC) was introduced. This has been deemed a positive move by such CT reformers as Richard Paul (2011) and Gerald Nosich (2009; 2012). Rather than CT skills being taught primarily in courses offered by philosophy departments, instruction would be integrated into courses in almost every discipline. Indeed, sounding almost as convincing as the phrase "No Child Left Behind," who could claim the "Critical Thinking Across the Curriculum" was not a worthy educational goal?

Part of the appeal of CTAC is that a college curriculum that had a successful CTAC program would avoid the all-too-common situation Sharon Bailin described in one of her papers, "The Problem with Percy: Epistemology, Understanding, and Critical Thinking" (1999). There she describes a student who has done poorly on a paper because the very idea of providing good arguments and evidence (let alone evaluating the alternative positions) was something that he believed only happened in CT or philosophy courses, not across the curriculum. If CTAC were ever to become a reality, students would expect those sorts of assignments in almost every class and be prepared to handle them well. In theory anyway, it would seem that one course taught by a philosopher trained in CT could not be nearly as effective as students getting the central CT concepts and skills in many of their classes across the disciplines and throughout their college careers.

In spite of the appeal and nearly universal commitment to the value of enhancing students' CT skills, numerous studies reporting students' gains in CT skills indicate that a college education has been only marginally successful, to put it generously, in teaching the needed skills (Arum & Roksa, 2011; Bok, 2006; Hatcher, 2011; Pascarella & Terenzini, 2005). Arum and Roksa (2011, p. 35) report, using the College Learning Assessment (CLA) test, that students gained only 0.18 of a standard deviation in their first two years of college.[2] In their influential *How College Affects Students, Vol.2,* Pascarella and Terenzini surveyed a wide variety of assessment reports, using a variety of standardized assessment instruments, with most of their data coming from the California Critical Thinking Skills Test (CCTST). The gains in a percentage of a standard deviation or what is now called "effect size"

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[2] It should be noted that the CLA test is not without its critics. Kevin Possin's paper "A Serious Flaw in the Collegiate Learning Assessment (CLA) Test," argues that the standards for grading the students' essays are not the standards that most who understand logic would apply. "I was struck by how any answer was accepted so long as the writer offered reasons for it, no matter its justificatory power or lack thereof..." (p. 8).

from freshman to senior year were estimated at 0.55 to 0.65, with freshman to sophomore gains of only 0.34 (2005, p. 157). My own assessment data from eighteen years of using either the Ennis–Weir Critical Thinking Essay Test (E-W), The California Critical Thinking Skills Test (CCTST), and the Cornel Level Z Critical Thinking Test (CLZ) showed a variety of effect size gains ranging from 0.97 to 0.57, depending on the test used (Hatcher, 2011; 2009; 2006). While these gains are better than some of the reported data, one can hardly say they indicate a highly successful approach to teaching CT. For example, for the students at Baker University, a 0.57 effect size gain on the CLZ means that after a year-long course integrating CT and written composition, the average student gained only 2.7 points on a 52-question test.

So, given the evidence, I think it is fair to conclude that current approaches to teaching CT are not working very well, and, while in theory CTAC sounds like a terrific idea, I believe the likelihood that professors from across the disciplines will actually teach the knowledge and skills necessary for effective CT is small. Such a conclusion is not an easy one for me, and I actually hope people who read this will show where I am wrong. There is nothing I would like more than for CTAC to work. However, based on the reports of CT assessment, my own research, and many years working with Baker University's program, I am afraid the conclusion is warranted. One problem, I believe, is the logical skills necessary for effective CT, however we define it, are not part of the education of professors in many disciplines, nor are all professors equally enamored with the high value critical thinking places on rationality (Hatcher, 1991). It should be no surprise then that many are not particularly effective at teaching the needed skills. This should be no more surprising than someone pointing out that not everyone with a PhD can teach mathematics, piano, or basketball. Secondly, from a practical standpoint there is considerable evidence, mostly taken from the data from the Critical Thinking and Composition Program at Baker University (1990 -2008), that even well-intending professors who sincerely desire to teach CT skills and who are given extensive training cannot effectively teach them.

Notice that there is nothing logically contradictory or incoherent about the concept of CTAC or having it as an educational ideal. The problems that prevent this worthy goal from being realized to any significant extent, I shall argue, all have to do with teachers, their academic values, their own educations, and the realities of higher education.

2. WHAT EXACTLY IS THE GOAL?

If CTAC were to materialize, what would it look like? While this may seem like an obvious place to start, some might claim that to answer the question of what CTAC would look like first requires we agree on some conception of CT, and, more importantly, the skills needed to engage in this special sort of cognitive activity (Hatcher, 2011). It seems obvious that not all thinking is "critical" thinking. Recounting an important historical event is thinking, but not critical thinking. Summarizing a plot structure for a piece of fiction is thinking, but not "critical" thinking. Reporting on the current state of research on Alzheimer's is thinking, but

not critical thinking. So, what makes some thinking, "critical thinking"?

It would be convenient if we could just go to some dictionary or encyclopedia and find a standard definition of CT and a list of its corresponding skills. However, as is obvious to anyone who has followed the literature on CT, that will not happen. As Matt Lipman's (2006, pp. 56 -58) research has shown, there are at least thirty-one definitions of CT in the literature. How do we decide which is the correct one?

Unlike the concerns of Sanders and Moulenbeit (2011, p. 39), who claim that "The need for consensus is evident if collaboration across the disciplines is to involve the development of critical thinking skills," I believe that agreeing on what counts as the best definition is not necessary. Look, for example, at how California handled their CT requirement. In 1981, California Law (EO 338) required all California graduates of state institutions (over 1/3 million students) to have nine hours in oral and written communication and critical thinking. Currently, Executive Order (EO1065) maintains the same requirement and, without defining CT, while stating clearly what sorts of knowledge and skills are required to satisfy the requirement:

> In critical thinking courses, students will understand logic and its relation to language; elementary inductive and deductive processes, including an understanding of the formal and informal fallacies of language and thought; and the ability to distinguish matters of fact from issues of judgment or opinion....students will develop the abilities to analyze, criticize, and advocate ideas; to reason inductively and deductively; and to reach well-supported factual or judgmental conclusions (p. 7).

If one looks at the most common definitions in the literature, each implies a specific set of fundamental skills and the exercise of these skills in appropriate situations, e.g., Bob Ennis's (1987, pp. 1-5) critical thinking is "reasonable reflective thinking that is focused on deciding what to believe and do" or Pete Facione's (1986, p. 222) "Critical thinking is the ability of a person to present well-reasoned arguments and to evaluate correctly the arguments others present." The primacy of skills over any definition is also evident if one looks at some of the more common standardized critical thinking tests, e.g. the Ennis-Weir Critical Thinking Essay Test (Ennis, R. & Weir, E., 1985), the California Critical Thinking Skills Test (Facione, P & Facione, N. C, 1994), or the Cornell Critical Thinking Test, Level Z (Ennis, R, Millman, J., & Tomko, T, 2004). These tests are not testing whether students or teachers are using or understand some specific definition of CT. They are testing whether students understand and can apply a specific set of logical skills, e.g. identify and evaluate deductive and inductive reasoning, being sensitive to informal fallacies, being sensitive to definitions. Pascarella and Terenzini (2005, p. 156) make the same point, that is, while definitions vary, most attempts focus on the individual's ability perform certain intellectual skills successfully. Fisher and Scriven (1997, p.87) make a similar point: "...anyone who wishes to develop as a critical thinker will have to polish various constituent skills..."

So what are these? If one looks at the test booklets or the literature by some of the better-known writers on CT, the list could be quite long (Ennis, 2011, 1987; Facione, P & Facione, N., 1994). However, at a minimum, I believe that any

conception of CT must include at least three basic skills. At a most basic level, they are 1) students must be able to analyze, clarify, and understand what is being claimed and the support that is provided, 2) after skill #1, students must then be able to evaluate the reasonableness of the position; in other words they must be able to evaluate an argument, and 3) students must have the ability to articulate their reasoned judgments in writing (Hatcher and Spencer, 2006, pp. 32-39); that is, once they have evaluated an argument, they must be able to articulate their judgment and defend it with evidence and arguments. I believe this defense should include stating clearly and honestly evaluating any objections to their chosen positions. This later skill is especially important. As J.S. Mill (1978, p. 35) said in *On Liberty*, "He who knows only his own side of the case knows little of that. His reasons may be good, and no one may have been able to refute him. But if he is equally unable to refute the reasons on the opposite side, if he does not so much know what they are, he has no grounds for preferring either opinion." It is what Ralph Johnson (2000, pp. 164-175) has called the *dialectical tier* of argumentation. The importance of this dialectical skill is not reserved only for philosophers. It also emphasized in *The Bedford Handbook* (Hacker & Sommers, pp. 111-114), a book on style and mechanics widely required by writing instructors. So, the dialectical nature of CT is not something that only philosophers (and lawyers) emphasize. [3]

So, rather than arguing about what counts as the best definition of CT, if one wants to see whether CT is being taught in a course or across a curriculum, I believe the best strategy is to see that specific academic skills are implied in *any* definition, as well as the focus in most of the widely-used standard CT tests, and then look for them in a school's curriculum. [4] If CT is being at least minimally taught in a course, then all three skills are either being taught or applied. If they are absent, then CT is not being taught.

One need not expect that these three basic CT skills will be taught in every course. That would result in redundancy (R. H. Ennis, personal communication, July 2, 2012). However, these skills do need to be taught somewhere, and because they are so essential for student success at CT, preferably early in the students' academic experience. In my opinion, the best option would be to focus on them in some designated entry–level course or courses, hopefully taught persons with adequate training in and passion for CT. After that, at least ideally, students would be required

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[3] In his book, *Clueless in Academe,* Gerald Graff argues that these skills should be the focus of all college education. This is what academic writing is all about. Of course, as the title of his book indicates, not many professors teach these three fundamental skills. See also Chapter Two, of Hatcher and Spencer's, *Reasoning and Writing: From Critical Thinking to Composition* (2006).

[4] Some may note that I have changed my position, given that I once argued (2000) for a new definition of CT, i.e., "the honest evaluation of alternatives with respect to available evidence and arguments." In fact, until recently, with much discussion among members of the Association for Informal Logic and Critical Thinking (AILACT), I thought that agreeing on a definition was very important when trying to integrate CT into a curriculum. I now believe that there will always be disagreement over what constitutes the "correct definition," but that any adequate conception of CT must at a minimum include three skills: understanding arguments, evaluating arguments (especially those that are critical of one's position), and articulating one's judgment with the supporting reasons.

to take a number of courses in a variety of disciplines designated "CT" courses because they included specific assignments that required students to exercise these three skills. Given the redundancy problem, this approach seems to make the most sense. However, I shall argue that this ideal is unlikely to ever be realized. It is a noble but implausible goal.

Let's take a closer look at these skills.

3. ARGUMENT #1: WHERE IN A CURRICULM DO WE FIND CT SKILLS?

3.1. Skill #1: Understanding arguments

For any issue or question, when trying to decide what to accept or reject, one must be able to understand the various positions or alternatives and the support given for each alternative. For example, imagine that someone wanted to decide whether it was reasonable to believe in a theistic God, as commonly conceived. The person would first need to find and understand the various arguments given in support of the rationality of such religious belief. Next, the person would need to find and understand the arguments given in opposition to the rationality of such a belief. Unless one has access to a number of anthologies that contain many of these arguments, this will also require having some research skills or what is now called "information literacy." To state the obvious: One must be able to find the alternative positions prior to analyzing and evaluating them.

An exercise to demonstrate whether a student has understood an argument in a piece of writing is if he or she can summarize it by stating the position and the reasons given in its support. Suppose someone was assigned a basic summary of Bertrand Russell's "Why I Am Not a Christian." At a basic level, the summary would look something like this: "According to Bertrand Russell, it is irrational to believe in the theistic god (position) because the standard arguments for its existence are all flawed and the character of Jesus is questionable (reasons). For the beginning student, this can be a challenging task. For complex pieces of argumentation, paraphrasing prior to summarizing is a good idea.

In general then, whatever specific knowledge and skills are needed to understand the various positions and their support are necessary conditions for rationally deciding whether to accept or reject the position. As a necessary condition, it follows that courses that do not teach or ask students how to get clear on the arguments, stating the conclusion and its putative support, that are in their readings are not courses that include critical thinking. For example, if a course in history simply asks students to research a particular event and write a research paper, such a course does not include CT. If a science course simply asks students to explain what Kuhn meant by "normal science" rather than introducing them to the various debates in the discipline, it does not include CT. If a literature course merely asks students to trace the plot structure of or follow the use of some symbol in some piece of fiction, that is not critical thinking.

For our purposes, the main question is how many courses across the curriculum ask students to summarize the arguments in a piece they are studying? I am skeptical. In fact, there may be disciplines where the materials students study do

not contain any arguments. For example, I can imagine an American History textbook that tells a narrative without any argument.

3.2 Skill #2: Evaluating Arguments

The next skill is argument evaluation. One must ask how widely argument evaluation skills are taught in a college curriculum. Because all positions and their support cannot be equally strong, students who would be effective critical thinkers must also learn to evaluate fairly the arguments for alternative positions. To evaluate an argument fairly means to apply consistently a specific set of epistemic or logical standards to each position and its support. Because there is no one standard way to evaluate arguments, I will not attempt to defend any one approach over alternatives. The main point is the ability to evaluate the reasonableness of a position is necessary for effective CT. Such evaluation, however conceived, requires a good deal of expertise and practice.

One approach to argument evaluation is "the fallacy approach" (Damer, 2001; Johnson & Blair, 1994). This approach tends to teach the standard informal fallacies and use that knowledge to evaluate arguments. Arguments are unacceptable if some informal fallacy is committed. However, this alone is not enough to determine if an argument is a good one or not. In addition to not committing a fallacy, the premises in support of any conclusion must be relevant, acceptable and sufficient (Johnson & Blair, 1994, pp. 54-55). Finally, any acceptable piece of argumentation must provide an effective rebuttal to all serious counter-arguments (Damer, 2001, pp. 23-41). Again, this is what Ralph Johnson (2000, pp. 164-175) has called the *dialectical tier* of argumentation. Given these conditions, students must spend a good deal of time learning exactly what makes for premises that are relevant, acceptable, and sufficient, as well as studying the common informal fallacies—a list that can be quite long. Often, this alone can take an entire semester.

Another possible approach to argument evaluation is "Deductive Reconstruction" (Cederblom & Paulsen, 2006; Hatcher, 1999a, 1999b; Hatcher & Spencer, 2006). Deductive Reconstruction is an approach to evaluating arguments that asks students first to summarize the arguments found in readings, stating the arguments' conclusions and any putative support. The ideal summary would look something like, "According to Smith, marijuana should be legalized because of reasons a, b, and c. Once the argument is summarized, an additional If/then premise is added to make the argument a valid deductive argument. The pattern is often *Modus Ponens or Modus Tollens* or some combination of valid argument patterns. For example, the summary of the argument for the legalization of marijuana would be transformed into a valid deductive argument by adding the major premise, "If some drug has properties a, b, and c, then it should be legal." The minor premise is "Marijuana has properties a, b, and c." Hence, the conclusion is "So, Marijuana should be legalized." A summary of Bertrand Russell's position in "Why I am not a Christian," might be "It is irrational to be a Christian (position) because the arguments for the existence of god are weak and the portrayal of Jesus in scripture shows that he was neither wise nor good (reasons)." In order to make the argument

valid, a second premise is added in the form of a conditional, "If all of the arguments for the existence of god are weak and the portrayal of Jesus in scripture shows that he was neither wise nor good, then it is irrational to be a Christian." The form of the argument is now *Modus Ponens.*

In the Deductive Reconstruction model, evaluating the support for a premise requires adequate knowledge of inductive reasoning. Determining the reasonableness of an "If/then" premise often requires extensive research into the background and history of the debate. So, in this model, there is no way to evaluate the claims without becoming familiar with the context that frames the issue, as well as the nature of inductive inferences and their limitations. Finally, if critical inquiry is construed as "honest inquiry," inquirers must construct and evaluate the arguments on all sides of an issue before making a judgment as to which position is most reasonable. In this way, one fulfills one's dialectical obligations.

It should be noted that in some cases of practical reasoning, the reconstructed arguments have premises with such qualifiers as *usually*, *likely, probably, or all things being equal* (Cederblom, 2012; Ennis, 2004)*.* If the concept of validity is applied strictly, these arguments are problematic because it is possible for the premises to be true but the conclusion false. For example, consider the argument: If a student has a long history of academic success in high school, it is likely that the student will do well in college. Smith has a long history of academic success in high school. Hence, it is likely that Smith will do well in college." While this appears to be *Modus Ponens* and so a deductively valid. argument, we all know that there are many instances where the Smiths of the academic world do not do well in college. This particular Smith may not know how to behave or manage his or her time once he or she leaves home and flunk out. However, even if such arguments do not meet all of the requirements of valid deductive arguments, i.e., that it is impossible for the premises to be true and the conclusion false, I have argued (2003) that, because of its simplicity, Deductive Reconstruction is a useful tool for helping students get clear on just what the reasons are intended to support a position and focus on their adequacy.

While there are other methodologies for evaluating arguments, e.g., the Toulmin Method (1958), or Hitchcock's (2003) or van Gelder's (2004) computer-assisted argument mapping, the point should be adequately clear that these evaluation techniques are not the sort of things that one learns or exercises in classes across the curriculum. For example, in my own education as an undergraduate English major, I had nineteen courses in literature, and there was never a word about recognizing or evaluating arguments. Given what Kuhn said about the teaching of "normal science" (Kuhn, 1962, pp. 35-42), one can imagine science majors having much the same experience as I did in English.

3.3 Skill #3: Articulating one's judgment

The third skill that is necessary for successful CT is the ability to articulate one's judgment, stating one's position and its support, in clear convincing prose. Properly done, this demonstrates that one has gone through steps one and two in a proper fashion. That is, one has clearly understood some position and its support and was

able to evaluate it by the common logical standards of either Deductive Reconstruction or a more informal approach. A proper articulation would also show that one has given serious attention to alternative positions or critiques of one's own position. So, the form of the articulation will be a paper that explains the position to be critiqued, then critiques the position, honestly entertains objections and gives adequate responses, and then draws a conclusion.

This sort of paper is not uncommon, and could in theory be part of almost all college courses. However, in my experience, it is not the norm.

4. ARGUMENT #2: UNDER IDEAL CONDITIONS CAN TEACHERS ACROSS THE DISCIPLINES EFFECTIVELY TEACH THE ESSENTIAL CT SKILLS?

A second reason that CTAC is an implausible goal is there is evidence that, even under more or less ideal conditions, faculty from across the disciplines cannot effectively teach the basic skills necessary for CT. The support for this claim is from eighteen years of assessment data from Baker University's General Education Program. The core components of the program consisted of three specially-designed courses required of all students: a two-semester freshman sequence and a senior capstone seminar. The freshman sequence, "Critical Thinking and Effective Writing" and "Ideas and Exposition," provided instruction for freshmen in the fundamental skills needed for critical thinking and then showed how these skills can be successfully applied in writing position papers. The senior capstone seminar, "Science, Technology, and Human Values," asked seniors to choose a public policy issue brought about by current scientific or technological developments and then research, prepare, present, and defend a fifteen to twenty page position paper arguing for a specific public policy. Topics included cloning research, water use policy, energy policy, reproductive technologies, numerous medical issues, and defense policy, to name a few of approximately 150 on a list. In the spirit of Mill's *On Liberty*, a significant part of the paper required a clear presentation of and response to possible objections to the proposed policy.

The capstone began in1979, and it was not long before those teaching in the program realized that many seniors were seriously challenged (to put it mildly) when asked to write such a paper. The primary difficulty was that students did not understand how to construct or evaluate arguments. In 1984, with the help of a grant from the Council of Independent Colleges, we invited Gerald Nosich to do a week-long workshop on CTAC. While Nosich did a very good job,[5] upon examining the syllabi of courses taught by those who attended, it was clear that nothing had really changed. In 1987, with the help of a grant from the Council of Philosophical Studies we brought Richard Paul to campus for a presentation on the nature and

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[5] Nosich was at that time still in his Deductive Reconstruction phase present in his text *Reasons and Arguments (*1982) He has since changed in an attempt to avoid the formal logic that deductive reconstruction requires. For an explanation of the shift see his article "From Argument and Philosophy to Critical Thinking Across the Curriculum." *INQUIRY: Critical Thinking Across the Disciplines,* 25(3), 4-13.

value of CT. While Paul did a splendid job and his presentation was well attended, again nothing changed in terms of instruction. Finally, in 1988, funded by two FIPSE grants from the U.S. Department of Education ($68,500, $106,110), a group of humanities faculty began planning the freshman critical thinking and written composition sequence. From 1991 to 2005, various parts of the program were sustained and enhanced by four generous grants from the Hall Family Foundation ($175,000, $175,000, $396,000, and $120,000).

I think it is fair to say that the Baker program was developed and sustained under ideal conditions. Financial support from various grants, totaling over one million dollars allowed those working on the project the luxury to do what few groups charged with designing such programs have been able to do. First the faculty members were given 25% (one course each semester) released time for two years. Second, the grants allowed many of us to attend numerous International Critical Thinking Conferences organized yearly by Richard Paul and his colleagues at Sonoma State University. In making presentations describing our project, we gained valuable feedback from the scores of people who attended the sessions. Third, as we were working on the courses, we had funds to bring in some of the better known and respected scholars in the area of CT. They came to campus and gave presentations on their conceptions of CT and how to teach it. They also evaluated our plans and materials for the freshman sequence, including drafts of the text we were writing for the course. These scholars included Harvey Siegel (1988), Stephen Norris (1989), Ralph Johnson (2000), Ed Damer (2001), Connie Missimer (1986), and Jerry Cederblom (2006). Prior to Harvey Siegel's visit, as a point of departure for the project, the professors working on the courses read and discussed his fine book, *Educating Reason*. I thought that we could make better progress on designing the courses if we all could understand and endorse Harvey's conception and defense of CT as an educational ideal. Fourth, and perhaps most importantly for the goal of CTAC, from 1992 to 2003, the grant money from the Hall Family Foundation allowed my colleague Anne Spencer and I to put on summer workshops for any Baker faculty who were going to teach a section of the required course for the first time, as well as anyone who was interested in integrating the CT skills that were covered by all freshmen into their courses in their disciplines. Again, given the redundancy problem of teaching the same basic skills in every course, this seemed to be the best approach to CTAC. The format of the workshops was to have the participants work through our text, *Reasoning and Writing: From Critical Thinking to Composition* (Hatcher and Spencer, 2006), and on the last day of the workshop do presentations on how they would use the CT material in their classes. Finally, the grants funded one-course released time each semester for its director. As a result, I ran weekly staff meetings where the teachers would go over the material in the text that would be taught that week. An instructors' manual was also developed and distributed to the teachers.

It is hard to imagine a healthier environment for producing a quality CT program and for achieving the goal of CTAC. With the institutional support, plenty of financial resources available, and the genuine desire by faculty to teach our students to write solid, well-argued critical papers, if we could not be successful, how could anyone expect to be?

Given that some might think any failure was a function of our approach to CT, a brief description of the freshman sequence might be helpful. The courses began, not unlike other critical thinking courses, by defining[6] and explaining the nature and importance of critical thinking. For example, we show how many social problems, such as those resulting from prejudice against women and minorities, result from people basing beliefs on insufficient evidence. Most importantly, we argue that college educations, at least those not focused on job training, typically ask students to read material that express competing points of view. So, if one is not to become cynical about discovering which position is more rational, one needs the tools necessary for evaluating the arguments for the alternative positions.

After showing the importance of critical thinking, instruction in basic critical thinking skills followed. The skills were the same ones emphasized at the beginning of this paper: summarizing readings and arguments, evaluating arguments, and using the knowledge of valid argument patterns to develop strong arguments for papers. Again, our approach to argument evaluation was a combination of Deductive Reconstruction, a approach employed by other textbook authors (Nosich, 1982; Cederblom & Paulsen, 2006), and teaching informal fallacies. The appeal of Deductive Reconstruction was largely a function of its simplicity (Hatcher, 2009); i.e., if arguments are in a valid deductive form, then, for purposes of evaluation, the main question is whether the premises are relevant and reasonable or do they need further support. Evaluating the level of support for the premises usually involves understanding the nature of evidence based on good inductive inferences.

We spent only three to four weeks studying deduction, induction, and a few of the more common informal fallacies. The final weeks of the semester showed students how to apply the logical tools of Deductive Reconstruction to writing solid position papers on issues of their choice. Hence, we believed that the logical skills that our students learned should easily transfer to any course where papers with a thesis were required.

The second semester of the course asked students to apply these same critical thinking skills and strategies to five sets of readings and write five additional critical papers, all including the same basic parts (albeit not necessarily in the same order): thesis, support, counter-arguments or objections, replies, and conclusion. Students were required to follow the same process. Where in the first semester, all sections used the same text, teachers were free to choose any set of readings, as long as the papers followed the same process and were graded by the program's agreed upon grading rubric.

With a program with plenty of financial support, sound advice from a stellar group of experts, and a willing cadre of teachers, how could the program not succeed? If this "Gold Medal" program had unsatisfactory results, then it would seem that a successful CTAC program would also be implausible. In fact, the pre to

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[6] Our definition of CT is "Thinking the attempts to arrive at a judgment only after honestly evaluating alternatives with respect to available evidence and arguments" (Hatcher and Spencer, p.1.) This definition was influenced by Connie Missimer's work and our conviction that the process of CT should end in an argumentative paper, where serious research precedes deciding on a position.

post-test gains using the California Critical Thinking Skills Test and the Cornell Level Z Critical Thinking Test (CLZ) were satisfactory, always above 0.50 of a standard deviation. However, and here is the rub, when I looked at the range of student scores on the CLZ relative to their first-semester CT instructor, the semester when the logical skills covered by that test were supposed to be taught, the range turned out to be great. While the mean gain for 369 students over the three years was +3.0 points with an effect size of +0.60, the mean gains relative to individual instructors ranged from +6.0 to -1.0. Some instructors did a superb job; others seemed to make students worse.

What this shows is something many already know, but has not been demonstrated: Even with the best of intentions by the teachers and a program with plenty of faculty development funds, some people are much better than others at teaching the logical skills needed to do well on CT tests like the CLZ. Even with significant outside funding for serious faculty development, the data indicate that some teachers were unable to teach their students the CT skills needed to do well on the CLZ.[7]

Most institutions that emphasize CT as a desirable educational outcome do not have this sort of resources. If many of the faculty members in the Baker Program could not teach CT, why assume that faulty without such training, support, and enthusiasm can teach it?

5. OBJECTIONS AND REPLIES

5.1 Objection #1:

If one wants to see how to teach critical thinking across the curriculum, just look at the scores of articles in *INQUIRY: Critical Thinking Across the Disciplines.* There are obviously lots of classes in many disciplines that are successful. Tom Solon (2003) has shown how integrating CT skills into a course in general psychology can achieve great pre to post-test gains.

First, as noted earlier, Solon's study may only show that Tom Solon is a good teacher and can effectively teach CT in a General Psychology class. The study, as far as I know, has never been replicated. This interpretation is consistent with the checkered pre and post test scores in the BU Program where students in some sections had good effect size gains, while those with some teachers actually got worse.

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[7] As an aside, the checkered results also mean that one should not quickly endorse a specific approach to teaching CT based on published assessment data from one teacher teaching one section of any CT course for only one semester. For example, prior to calculating the effect size gains relative to Baker's instructors, when Tom Solon (2003) reported effect size gains of 0.87 on the CLZ for an experimental group of 25 students taking his Introduction to Psychology class that included instruction in logic and CT skills, it appeared that his integrative approach was far superior to all others (Hatcher, 2006). Now, given the wide range of Baker's scores, such a conclusion may be unwarranted. It may just be that Solon was an excellent teacher, while others may never be able to replicate those splendid gains, even if they followed his approach and used the same materials.

Second, Solon's course integrating CT and psychology had students spending significant time studying chapters four through seven of Diane Halpern's text, *Thought and Knowledge*. These are the chapters that cover deductive and inductive logic, as well as probable reasoning. These are the sorts of things that are on most standardized CT tests, especially the Cornell Level Z. This sort of commitment to the study of logic is not typically found in courses across the disciplines.

Third, the courses described in the articles in INQUIRY tend, like Solon's, to be unique courses in a discipline rather than CTAC programs with multiple sections. It is hard to know if any positive results can be replicated. My intuition is that much has to do with the commitment, knowledge, and passion of the instructors.

5.2 Objection #2:

Nothing in this paper precludes having a philosophy department, rather than faculty from a variety of humanities disciplines, teach a standard critical thinking course that covers the three basic CT skills to all students and then have a few courses from a variety of disciplines throughout the next three years specifically create assignments that require students to apply the skills. This seems like a workable approach.

Actually, this would be ideal. However, a required CT course taught by a philosophy department is unlikely for many reasons. First, the resources that would be required are not there unless the school hired numerous new philosophy teachers. If only the existing staff is used, then every section of CT that is offered means one fewer section of "real philosophy." It is a "zero-sum game." That may not be what the department wants, especially in smaller departments with limited courses offerings . Second, many professors of philosophy are simply not interested in teaching a basic CT course. They are experts who want to teach courses in their chosen field of study. If the uninterested are forced to teach a section of CT, nothing good will come of that sort of situation. Finally, as Scriven has pointed out (1991, pp. 1-2), there will not be agreement on what is meant by CT and some departments will simply want to call their traditional formal logic course "critical thinking."

5.3 Objection #3:

Some, like Jerry Nosich (2010), might claim that my conclusion only follows because I have given a narrow "philosophers'" conception of CT, which assumes that CT skills must include knowledge of logic, either formal or informal.

In response, I agree that I am using a conception of CT that assumes some knowledge of logic. But, how else can one decide among competing ideas except by examining the level of support for each? That means looking at the relationship between the premises and the conclusion of each alternative, and deciding whether the premises themselves are relevant to the conclusion and reasonable. In other words, one needs to determine the level of inductive support for the premises.

6. CONCLUSION

So, what can we reasonably conclude? The reports of effect size gains on standardized CT tests have been minimal. The skills that are essential for effective CT (understanding arguments, evaluating arguments, and articulating one's judgment) are not skills that are emphasized across the disciplines. In fact, in my own experience, they were never emphasized. And finally, there is at least some evidence that faculty from across the disciplines are not very good at teaching these CT skills, even when they are provided with plenty of support, instruction, and encouragement. So, I conclude that CTAC is an implausible goal in higher education.

Having said that, given the importance of CT in higher education, what in an ideal world might we do? Ideally, what is the most reasonable strategy? Here, I will refer to the words of Kevin Possin (2013, p. 12) in his recent paper "A Fatal Flaw in the Collegiate Learning Assessment Test" (the CLA) :

> Critical-thinking skills are *not* statistically significantly enhanced by content-*specific* courses like introduction to philosophy or chemistry, or by content-*independent* courses such as symbolic logic. So much, then, for leaving the task of magically enhancing critical-thinking skills to "immersion" and "critical thinking across the curriculum."
> To enhance critical-thinking skills, students should be deliberately and explicitly studying critical thinking with the assistance of those with real expertise in those skills. Simply having a graduate degree is poor evidence of having acquired that expertise.

While Possin's position is consistent with my own arguments with respect to CT skills not being present across the curriculum and is supported by much of the empirical research one finds in the literature (Ortiz, 2007; van Gelder, 2004), if we follow Possin's recommendation, it remains to be seen where the resources are to hire only those "with real expertise in those skills" to teach all students. However, it is not impossible. After all, schools find resources for all sorts of things they deem important: sports programs, math requirements, foreign language requirements, etc. Perhaps that 99% of faculty who claim that "developing students' ability to think critically is very important or essential (Arum & Roksa, 2011, p. 35.) should put pressure on administrators to come up with the funds. Doesn't willing an end entail willing the means?

However, one CT course does not CTAC make. As I mentioned earlier, one possible solution would be for colleges to designate a list of special courses as "CT Courses." In addition to the required course taught by "real experts," colleges should require students to take three or four additional courses that require the application of the skills learned from the "real experts." Some have already done this with their "Writing Across the Curriculum Programs." If students are given quality instruction in those skills early in their college educations and are required to apply them in at least a few courses through the rest of their educations, they should become better critical thinkers. Lest one think this is too much to ask, we should remember that,

according to *Forbes*, CT skills were ranked #1 by would-be employers for 2013 (Casserly, 2012).

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