

## Critical thinking and student success - 1

A Model for Student Success: Critical Thinking and “At Risk” Students

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Abstract

There appears to be a significant gap between faculty expectations for incoming college students and these same students perceptions of their abilities. Incoming college students are not very confident of their critical thinking abilities, yet faculty expect students to enter college already being able to critically evaluate information and to reach conclusions based on a critical analysis of the data. The current study challenges the preconception that critical thinking cannot be taught and delineates a model for critical thinking that can be employed regardless of one's discipline. Outcome data strongly suggests critical thinking can lead to both proximal and distal increases in student success.

## Introduction

In a recent poll of campus faculty, Osborne (1998) noted a large discrepancy between faculty expectations for incoming students and incoming students' perceptions of their own abilities. In particular, faculty expect college students to: (1) critically think, (2) manage their time, (3) monitor their own stress levels, (4) solve problems, (5) clearly articulate what they do and do not know, and (6) prioritize tasks so more important tasks are afforded more time. In this same poll, however, first year students cited the following areas of weakness in their own preparation for college: (1) poor time management skills, (2) ineffective methods for coping with stress, (3) frustration with communication abilities, and (4) poorly developed critical thinking skills.

Many students, in fact, suggest critical thinking is not only under-appreciated in high school but also actually punished. One student said it best when he recalled a comment a high school teacher made on an essay exam of his. In response to this student's effort to speculate on the causes of the issue being

addressed, the teacher wrote in the margin, “Do not tell me what you think, tell me what I told you to know.”

Although we do want students to know what we believe it is important for them to know, should we actively discourage their efforts to place their knowledge within a context? Research suggests, in fact, that first year students are significantly less likely to be successful in making the transition to college level work when they take introductory courses that do not require written work (e.g., Boice, 1990; Rickabaugh, 1993). Additional research shows that emphasizing study skills, as many “first year experience” or “transition to college” programs do, actually does little to promote student success unless metacognitive skills are taught as well (e.g., Flavell, 1979; Gardner & Boix-Mansilla, 1994).

Yet, when discussing critical thinking as a method for assisting a first year student’s transition into college, it is not uncommon to hear faculty suggest critical thinking cannot be taught. Indeed, even students appear to enter the college

environment believing you either have what it takes or you do not (e.g., Sydow & Sandel, 1996).

In an effort to increase the retention of first year students, a pilot program was developed pairing an introductory psychology course with a course on critical thinking (Browne & Osborne, 1998). Over a five-year period, students completing this pairing of courses were tracked and both proximal and distal student success measures were gathered. The focus in this article is two-fold. First, information will be provided to challenge the prevailing attitude that students cannot be taught to critically think or the perception that, at the very best, if students can be taught to do so it cannot be accomplished within one semester. Second, longitudinal data from this pairing of courses will be provided to delineate the long-term benefits of promoting critical thinking skills in “at risk” students.

In a longitudinal study of “at risk” students, Browne and Osborne (1998) established the link between the development of critical thinking abilities and long-term measures of student success. Students enrolled in randomly selected sections

of an introductory psychology course also participated in a two credit-hour critical thinking laboratory. Activities in the lab were linked to the weekly content of the introductory psychology course. Students were placed in these special paired courses based on college entrance assessment scores, low high school ranking, and/or having already been placed on academic probation.

The challenge became one of delineating the process of critical thinking. Surprisingly, the literature is very sparse in terms of information about what critical thinking is or how it can be taught. Although there are a few well known exceptions (e.g., Chaffee, 1994, Halonen, 1995 & Smith, 1995), critical thinking is ill-defined and even more difficult to incorporate into the general education of first year students. Rather than adopt one of the discipline specific approaches to critical thinking (e.g., Halonen, 1995) Browne and Osborne (1998) chose to use applications from the the education literature. Benjamin Bloom (1956) articulated six cognitive levels for student learning. These levels, then, became the building

blocks upon which Browne and Osborne built their “critical thinking as process”

approach.

Bloom’s cognitive levels include: (1) knowledge – facts, (2) comprehension – an understanding of those facts, (3) application – an ability to utilize an understanding of that information for addressing a problem, (4) analysis – an assessment of what aspects of that knowledge are meaningful, (5) synthesis – a reintegration of those pieces into a more meaningful whole, and (6) evaluation – an assessment of the learning that has taken place and a comparison of what is now known versus what was initially known. Exams and other classroom assessment methods that require recitation of facts only require students to demonstrate the first level of understanding in Bloom’s taxonomy. Browne and Osborne, therefore, developed in-class activities, demonstrations, and assessment rubrics requiring students to demonstrate an ever-increasing ability to go beyond what is simply known.

An Example

Before proceeding with a discussion of the outcome data, it would be useful to provide an example of an activity that encourages students to move up the cognitive levels of Bloom's taxonomy. A technique employed during the first week of the course was called, The Costs and Benefits of Critical Thinking (see Osborne, Laws & Weadick, 1999 for a detailed description of this activity). This activity was designed to illustrate the relationship between the effort associated with critical thinking and the benefits gained.

Students were placed in five-person working groups. Each group was given \$240 of play money, some sketchy information about a sniper killing incident, and the opportunity to purchase additional information to assist them with the task of answering the question, "Why did Rick kill those people?" Three categories of information were available for purchase, (1) \$25.00, (2) \$40.00, and (3) \$75.00.

The more expensive information was said to be more critically important for answering the question.



Student groups then spent time deciding how to spend their money (the analogy was made to this paralleling and “investment” in their critical thinking), purchasing information and preparing an in-class presentation as to why Rick killed people. Students were given 30 minutes to purchase their information and develop their response to the question. Groups could earn points in two ways. First, they would earn points for having money left over. If there were six groups, for example, the group with the most money left over would earn six points, the next highest amount of money left over would earn five points, and so on. Additionally, groups could earn points based on the total critical thinking score assigned to their presentations by the judges.

Judges were given Bloom’s taxonomy and instructed to utilize it in assessing the critical thinking demonstrated within each presentation. The group receiving the highest critical thinking score would earn six points, the next highest group score would earn five points, and so on. Data from the groups was then plotted to show the relationship between the costs of critical thinking (the spending of the money)

and the benefits of critical thinking (the critical thinking score). Each time this

technique was employed, the data showed almost a perfect inverse relationship.

The more money the groups spent, the higher their critical thinking scores tended to

be.

It is important to note that the information students employed in reaching their conclusions about why Rick killed people, is less important than how that information is employed. As an example, one group purchased a \$25.00 piece of information revealing Rick drove a "beat up black Ford Pinto." A critical thinker would be expected to set this information aside and reach the reasonable conclusion that, at least in isolation, this information is not informative for answering the question as to why Rick did what he did. The group who purchased the information, however, proceeded to suggest that this was important because "the fact he chose to drive a black car indicates that he was depressed" (represented by the black color of the car), and "in this state of depression he decided to kill himself and take others with him."

Not surprisingly, this analysis of why Rick did what he did received a very low critical thinking score by the judges. Other groups showed a similar unwillingness to set aside information they had purchased and this became a focal point in the discussion that followed the activity. In a general sense, people may be unwilling to “give up” something they have invested a lot of time, effort and/or money on. This certainly could explain why some groups utilized apparently useless information at the expense of their own critical thinking scores.

In contrast, some groups received very high critical thinking scores despite the fact that most of their information did not “converge” on a clear answer. One group, for example, speculated that he may have had some form of brain damage (they had information stating that on the morning of the murders he suffered three blackouts). They went on to speculate that it could be a brain tumor of some kind that was affecting his perceptions of reality. Although they had very little information to build this case upon, their honesty in drawing their conclusions struck the judges as particularly indicative of critical thinkers. This group ended their

presentation by stating that their analysis was entirely speculation and could only be corroborated with an autopsy. It is worth noting that a piece of information that might have been purchased stated that an autopsy after the killing spree revealed major damage to his amygdala (a brain structure responsible for a person's levels of aggression and fear).

This activity was then followed by an in-class discussion about why students should invest in critical thinking. The costs, of course, include: (1) critical thinking is time consuming, (2) it requires a great deal of intellectual effort, (3) it requires thinkers to be open and honest about what they do or do not know, and (4) it demands that one not go "beyond the data." The benefits discussed with students include: (1) an ability to understand, apply, and analyze what is known, (2) a clearer understanding of what is not known, and, ultimately, higher grades, (3) more confidence in one's knowledge, and (4) an enhanced ability to discern what information still needs to be discovered in order to be confident in drawing conclusions.

The following class period students were required to bring in syllabi for their courses for the semester. A content analysis of these syllabi showed a very clear expectation on the part of faculty that students would be able to demonstrate critical thinking. Such statements as, “students should be able to apply course principles to real world issues,” and “students are expected to develop informed opinions and to separate opinion from fact” reinforce the point that faculty expect students to already be able to do the kind of thinking outlined by Bloom.

Other course activities included assessing news programs, persuasive speeches, and newspaper/magazine articles on Bloom’s levels. Students were required to read a magazine article, for example, and assess the degree to which the author had or had not, demonstrated critical thinking according to the six level model being used. As a final project in the course, groups were assigned chapters from the introductory psychology course textbook. It was their responsibility to learn the material, and prepare an in-class presentation of that material. These group presentations had specific criteria such as inclusion of at least three different visual

aids, and a minimum of two handouts. Students in the course, then, utilized a scoring rubric based on Bloom's taxonomy to assess the critical thinking level demonstrated by the groups in their presentations. This assessment was a major component of the students' final grades in the critical thinking laboratory.

### The Data

Proximal measures were gathered to assess the impact of this critical thinking course on students. These measures included: (1) grade point average in the paired introductory psychology course, (2) overall GPA for the semester, and (3) number of students in the paired courses receiving D, F, or withdrawal grades.

These data were compared to a matched sample of students completing the introductory psychology course during the same semesters but not completing the critical thinking lab. The samples were matched for gender, high school rank, number of credits hours completed, declared major, and admission placement scores.

Proximal data showed clear effects of the critical thinking lab. Students completing the paired courses received higher grades in the introductory psychology course (3.0 versus 2.19 on a 4-point scale), received fewer D, F, or withdrawal grades (24% versus 46%) in the introductory psychology course, and had higher overall GPA's for the semester in which the introductory course was taken (2.7 versus 2.22 on a 4-point scale).

More important than these proximal indicators of success, however, were the distal or long-term changes that were tracked. Students completing the paired courses were significantly more likely to re-enroll the next semester (80% versus 56%), were significantly more likely to have graduated within the next five years (45% versus 33%), and were significantly more likely to declare majors within the behavioral and social sciences (14% versus 8%).

### Discussion

The data from this study appear to support the contention that critical thinking is a process that can be taught. Additionally, the data strongly suggest

that the process of critical thinking can be taught and modeled well enough in one semester to initiate some long-term change. One primary challenge to employing the process of critical thinking to promote student success, however, is convincing faculty and students alike that critical thinking can be taught. Even with a model for critical thinking in hand, however, student success is not guaranteed. Students need ongoing and frequent practice with applying the critical thinking model, and they need practice with applying the model in diverse ways. Discipline-specific applications on the process of critical thinking may be less effective in the long run than requiring students to implement critical thinking in ways that are relevant to their daily lives.

One student, for example, suggested that the critical thinking course destroyed her ability to get pleasure out of watching television because she felt most programs were insulting her intelligence. This student went on to lament television commercials and asked, “just how many dentists did they survey when they decided four out of five dentists surveyed recommended a particular gum?”



Although the class found the comment to be comical, it also illustrates an ability on the part of this student to critically evaluate what others are asking her to believe.

Several faculty commented on the poll mentioned earlier that they want students to become informed consumers of information. It appears the aforementioned student, at least, has made progress on that goal. Critical thinking is a process that must be nurtured, encouraged, and rewarded. The costs are high. It is difficult for students not because they cannot do it but because they have not been encouraged to practice it. One student proclaimed after the first class period, "this kind of thinking makes my head hurt." From that day forward, a bottle of Ibuprofen sat on the front desk to remind the class that the outcome is worth the pain. In the end, this student graduated and recently sent a note to the author stating, "I just had to tell you that I got a big promotion at work. The boss said my ability to critically think was the primary reason he recommended me for the promotion. It really was worth the headaches."

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## Reviewers Questions

1. What curriculum changes could this research suggest, given that you have demonstrated that critical thinking can, indeed, be taught? I think just as much in non-education fields as in the more obvious teaching professions.
2. We could extend this discussion to high school teachers as well. Students come to the university already having been taught not to think, just to recall. This research suggests that we would serve students well to examine how high school teachers are teaching.
3. What steps could be taken to convince faculty to utilize these approaches?
4. What do you do when a group scores high in critical thinking skills but is unsuccessful in solving problems?
5. Many faculty are trouble by the number of at-risk students admitted to our universities who drop-out or flunk-out during the first or second semester. Some fail because of a lack of maturation, others because of a lack of general academic ability, and some because of difficulty with critical thinking. Is it the responsibility of university professors to address deficits in critical thinking, self-regulation of study skills, and other tasks associated with priorities and goal setting? How should university professors facilitate the development of these skills and attitudes in their classes, particularly classes intended primarily for freshman and sophomores?