Critical Thinking Assessment Summary

December 12, 2012

The Drake Curriculum promises to help students acquire critical thinking skills—rational analysis and argumentation that is purposeful, rigorous, self-reflective, and based on a careful consideration of evidence. Our institution maintains a commitment to inquire into the consequences of our work with students, something Lee Shulman described as a "pedagogical imperative.[1]"

This overview will look at the gathered data related to critical thinking, both direct and indirect, since 2007, as well as conclusions and suggestions for the future. A common theme throughout the data shows that Drake students have weaker skills in the areas of analyzing ideas/information and making judgments/arguments.

Direct Evidence

Over the course of several years, Drake University faculty explored first year students' ability to demonstrate critical thinking skills in their written work. In 2007, 2008, and 2011, Drake University faculty members from various disciplines collaborated in applying Drake's critical thinking rubric (adopted by the Faculty Senate in May 2006) to student papers. The purpose of the effort was to focus on Drake's overall effectiveness in supporting student learning.

Faculty members rated a total of 86 samples of first-year student work across the three years. The critical thinking rubric has five criteria:

- Question and claim: clearly define the question or problem, and clearly state a claim,
- Evidence or support: provide relevant evidence or support for claim or thesis,
- Organization: organize the project to effectively develop the claim or thesis,
- Assumptions and alternatives: identify assumptions and preconceptions; acknowledge alternative explanations or positions, and
- Communication: communicate the reasoned argument effectively.

Three faculty members rated each individual paper, providing scores for each criterion on each paper. Median score calculations gave each individual student a single median score for each of the criteria in the rubric. The information in Figure 1 below represents the percent of first year student papers with a median score that was "marginal" or "unsatisfactory" for each criterion by year.

[1] Shulman, L. S. (2003). No drive-by teachers. Carnegie Perspectives. Retrieved from http://www.carnegiefoundation.org/perspectives/no-drive-teachers

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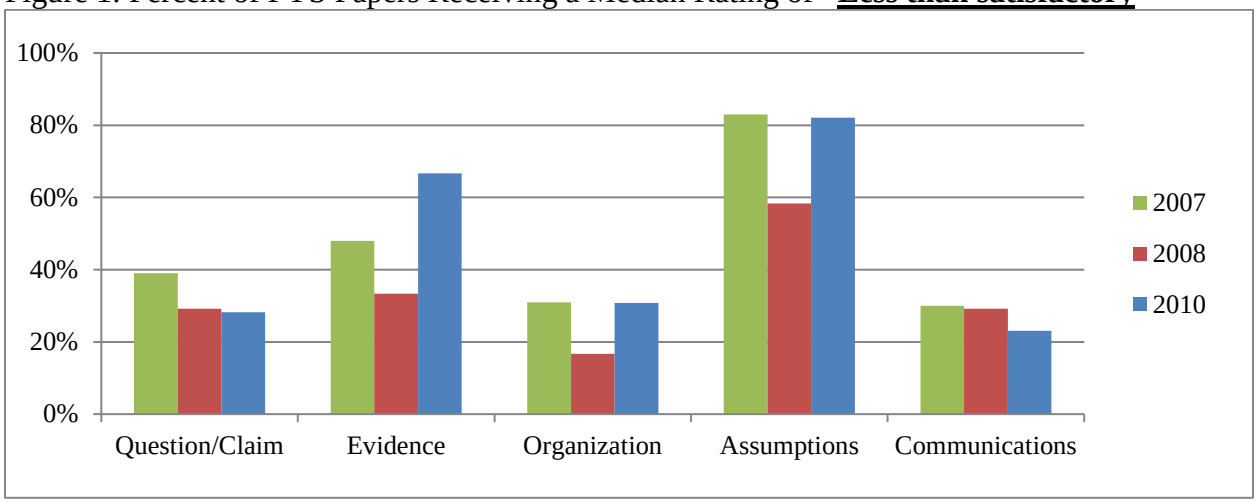
Figure 1: Percent of FYS Papers Receiving a Median Rating of **"Less than satisfactory"**



The 2011 faculty reviewers found that the overall scores were higher for the "communication" and "organization" criteria. They noticed few student errors in grammar and that in most samples they could follow the student's argument. The higher ratings for these two criteria are consistent for all three years. The faculty also noted lower scores for "evidence support" and "assumptions and alternatives." The group commented that students cited evidence, but tended to select evidence that supported their argument. Based on their review of student work, the 2011 faculty reviewers concluded:

1. Students need support to engage in higher level thinking,
2. Assignment design is important, and
3. Students struggle with assumptions/alternatives.

Another piece of direct evidence is from the 2010-2011 Collegiate Learning Assessment, which is a testing tool that uses constructed-response tasks and value-added methodology to evaluate students' performance on analytic reasoning and evaluation, writing effectiveness, writing mechanics, and problem solving. The CLA results (Table 1) showed that both our Freshmen and our Seniors ranked low on the Make-an-Argument section of the test, with Seniors' percentile rank even lower than Freshmen's. This part of the test presents an opinion on some issues and asks students to write a persuasive analytic essay to support a position on the issue. These results support the conclusions above from the review of student work.

Table 1: Select results from Drake 2010-2011 Collegiate Learning Assessment

Drake 2010-2011	Freshmen Mean Score Percentile Rank	Seniors Mean Score Percentile Rank
Total CLA Score	82	62
Performance Task	86	69
Analytic Writing Task	69	57
Make-an-Argument	52	48

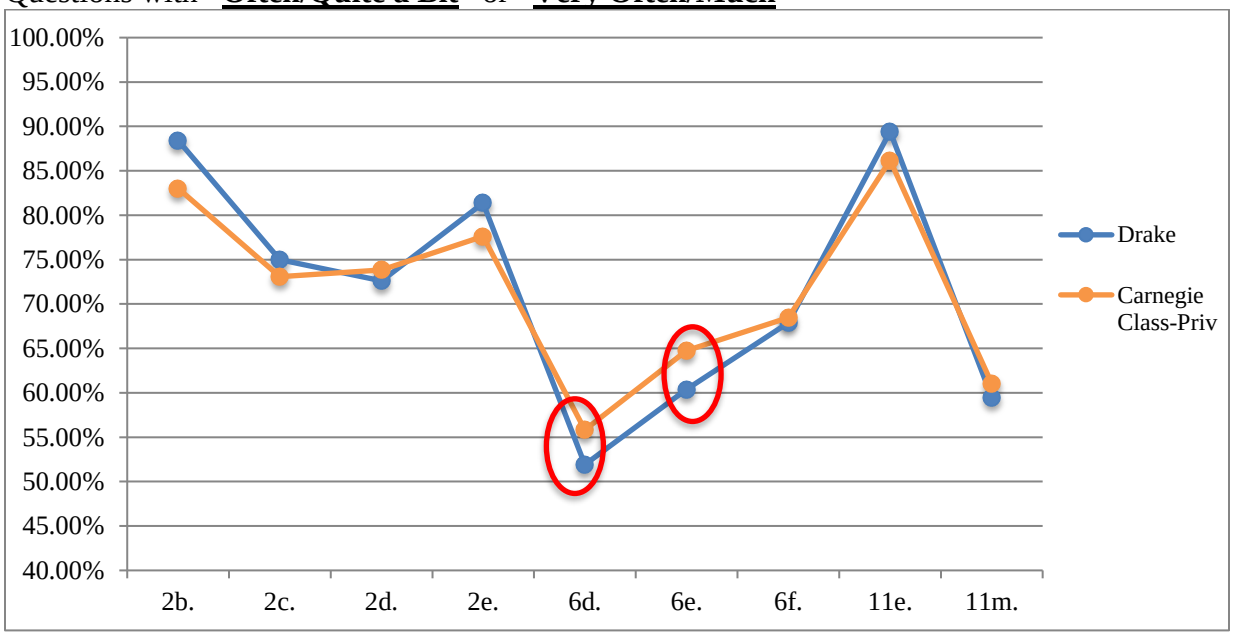
Critique-an-Argument	80	66

Indirect Evidence

The conclusions from the direct evidence appear to be supported by the results received for critical thinking related questions on the NSSE, Drake Student Survey, and Multi-Institutional Study of Leadership survey.

Several questions relevant to critical thinking from the 2010 NSSE (see question definitions in Table 2) were compared to peer data from the Carnegie Class- Private Not-for-Profit Master's Universities. Figure 2 below shows First Year Students' responses to nine questions. Comparing the percent of Drake FYS to the percent of peers who responded either "Often/Quite a Bit" or "Very Often/Much" shows that we scored lower on questions 6d and 6e, approximately a 4 percent difference.

Figure 2: Percent of Drake FYS Compared to Carnegie Class-Priv FYS Responding to NSSE Questions with **"Often/Quite a Bit"** or **"Very Often/Much"**



Interestingly, when looking at the same questions at the Seniors level, 6e is still showing up as lower than peer institutions, again approximately 4 percent lower, as well as a 4 percent negative difference for question 2c (Figure 3). It should be noted that questions 6d and 6e are relatively low for both Drake and peer institutions, so while Drake students are scoring below their peers, overall, students seem to struggle in these areas.

Figure 3: Percent of Drake Seniors Compared to Carnegie Class-Priv Seniors Responding to NSSE Questions with **"Often/Quite a Bit"** or **"Very Often/Much"**

Table 2: 2010 NSSE Questions Relevant to Critical Thinking

During the current school year, how much has your coursework emphasized the following mental activities? (Very much, Quite a bit, Some, Very little)	
2b.	Coursework emphasizes: Analyzing the basic elements of an idea, experience, or theory
2c.	Coursework emphasizes: Synthesizing and organizing ideas, information, or experiences
2d.	Coursework emphasizes: Making judgments about the value of information, arguments, or methods
2e.	Coursework emphasizes: Applying theories or concepts to practical problems or in new situations
During the current school year, about how often have you done each of the following? (Very often, Often, Sometimes, Never)	
6d.	Examined the strengths and weaknesses of your own views on a topic or issue
6e.	Tried to better understand someone else's views by imagining how an issue looks from his or her perspective
6f.	Learned something that changed the way you understand an issue or concept
To what extent has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas? (Very much, Quite a bit, Some, Very little)	
11e.	Thinking critically and analytically
11m.	Solving complex real-world problems

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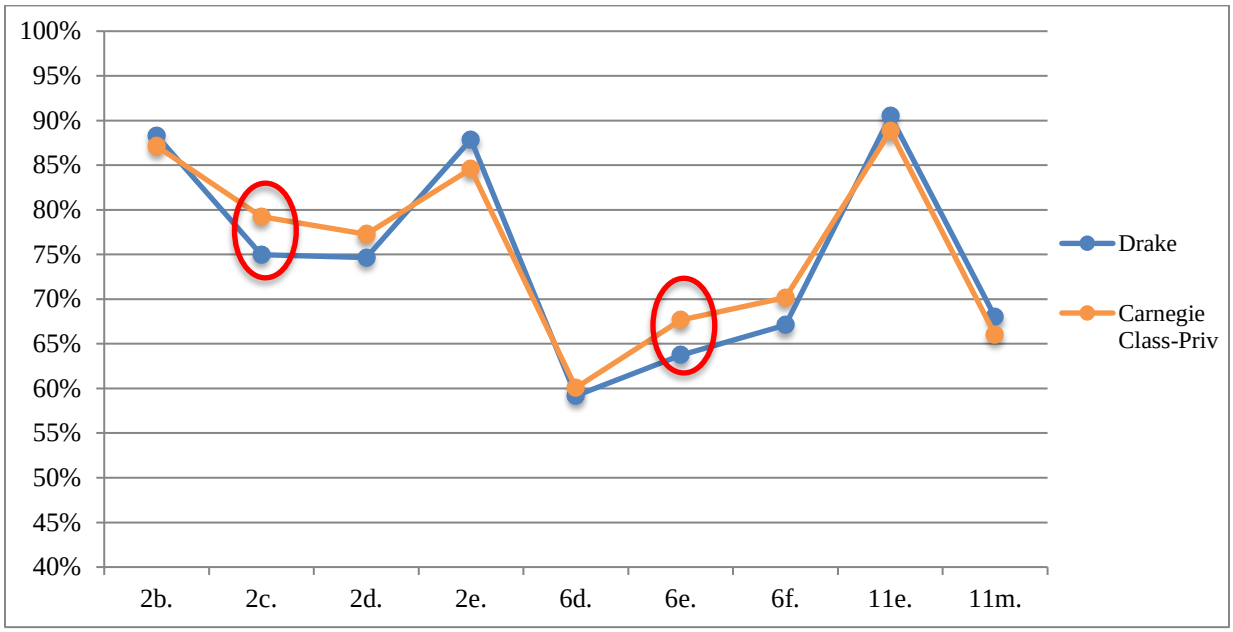

On the 2011 Drake Student Survey (DSS), scores for First Year Students and Seniors with regards to critical thinking areas show that on average, both groups indicated that their abilities are "better" since coming to Drake. Mean scores increased, as expected, from First Year to Senior year (Table 3).

Table 3: Select Mean Score results from 2011 Drake Student Survey

Each of the following reflects a goal of a Drake education. How have you or your abilities changed in each of the following areas since coming to Drake (Scale: 1 = much worse, 2 = worse, 3 = about the same, 4 = better, 5 = much better)	FR n = 285 Mean	SR n = 422 Mean
Construct reasoned arguments	3.79	4.11
Evaluate reasoned arguments	3.81	4.11
Acquire, analyze & interpret information	3.92	4.23

Similar to the DSS, the 2012 Multi-Institutional Study of Leadership survey (MSL) showed the mean scores for Drake Freshmen versus Drake Seniors in four critical thinking areas, which are grouped under Complex Cognitive Skills (Table 4). Freshmen overall scores indicate that they have "grown somewhat" in these areas during the college experience, which is not surprising since they would only have been in college for a semester at the time of the survey. Seniors scores show that they believe they have "grown" in the critical thinking areas as a result of their college experience.

Table 4: Drake University Complex Cognitive Skills Mean Score results from 2012 Multi-Institutional Study of Leadership Survey

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In thinking about how you have changed during college, to what extent do you feel you have grown in the following areas? (Scale: 1= Not grown at all; 2= Grown somewhat; 3= Grown; 4= Grown very much)	FR n = 425 Mean	SR n = 466 Mean
OUT1A: Ability to put ideas together and to see relationships between ideas	2.77	3.17
OUT1B: Ability to learn on your own, pursue ideas, and find information you need	3.01	3.35
OUT1C: Ability to critically analyze ideas and information	2.88	3.32
OUT1D: Learning more about things that are new to you	3.04	3.36

Drake students scored comparably to the National mean results in the Complex Cognitive Skills area as a whole (Table 5), indicating that Freshmen overall believe they have "grown somewhat" and Seniors overall believe they have "grown" in the critical thinking areas.
Table 5: Drake University and National Sample Complex Cognitive Skills Mean Score results from 2012 Multi-Institutional Study of Leadership Survey

Complex Cognitive Skills (summary of OUT1A, OUT1B, OUT1C, OUT1D)	FR Mean	SR Mean
Drake University	2.93	3.30
National Sample	2.90	3.32

Conclusions & Suggestions

The important question now is "What can we do with all of this information?"

A broad overview of the data shows that Drake students are struggling in the areas of understanding others' perspectives, identifying their own assumptions, and making arguments. Faculty review of student work resulted in lower scores in the areas of "evidence/support" and "assumptions/alternatives," which are two areas that are important for making an argument, the area that students scored the lowest on the CLA. The evidence from the NSSE also indicates that these are areas that students at peer institutions struggle with as well, but that in some instances Drake students are even weaker than students at peer institutions.

On the self-examination surveys (DSS and MSL), students ranked themselves as having improved their critical thinking skills as a result of their time at Drake, Seniors more so than Freshmen, as would be expected. Looking at the detailed questions on these surveys, Drake students ranked themselves lower in the areas of putting ideas together to form an argument and

analyzing ideas/information. These results mirror those from the direct evidence and NSSE, thus providing further awareness to the areas needing improvement.

With this awareness, we can now focus on ways to purposefully embed assignments that encourage students to further explore ways to analyze information and make arguments. One way to do this would be to give students the Critical Thinking rubric with appropriate writing assignments so that students are aware of the areas they are expected to address. Another way would be to include appropriate readings that exemplify what analyzing information and making arguments looks like in an academic setting. Depending on the goals of the class, these areas could also be developed in an oral context using things like prepared debates to exemplify analysis and argumentative skills.

Critical Thinking- Capstone Level Review

August 27, 2013

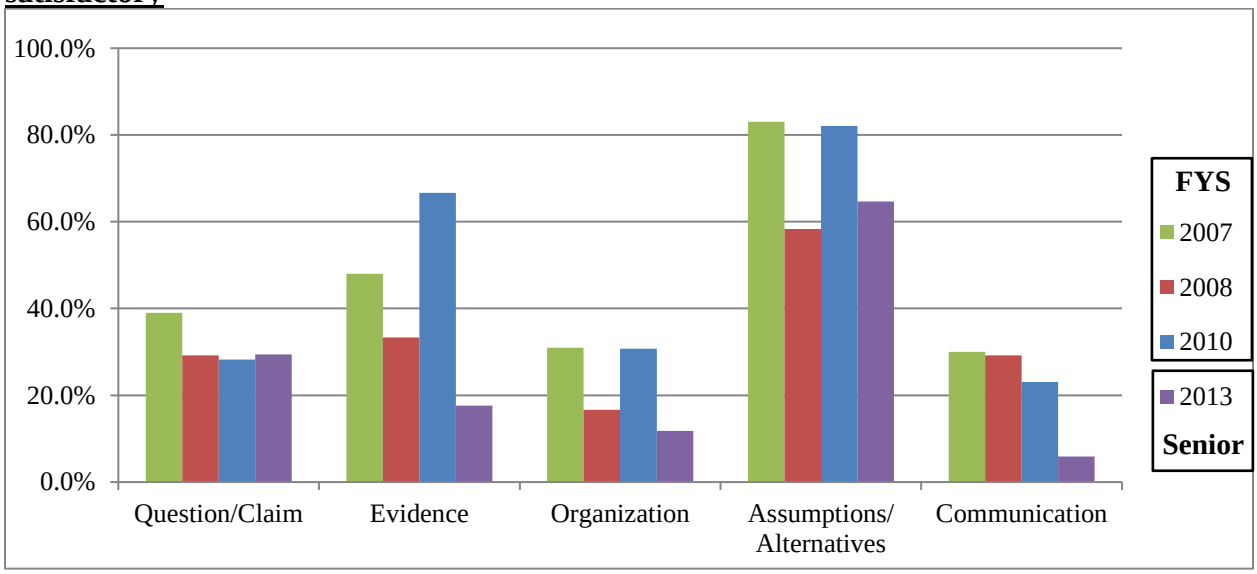
The Drake Curriculum Analysis Committee reviewed the Critical Thinking Assessment Summary that covered data gathered across 2007, 2008, and 2010 from a variety of sources. Following this review, the Committee recommended the continued use of the Critical Thinking rubric to assess student work in FYS as well as the need to use it with some samples of student work from capstone courses in order to compare skills from freshman to senior years. In Summer 2013, 17 samples of student work from five different Spring 2013 capstone courses in varying fields of study were reviewed by six faculty members.

The results of this review indicated that the area of assumptions/alternatives is still an area that students struggle with, even at the senior level. The following synopsis will cover discussions and suggestions that developed from the review.

Results & Discussions

For the review, each paper was evaluated by three faculty members using the five criteria from the rubric. The information in Figure 1 below shows results of the 2013 senior review compared to the first year student papers reviewed in 2007, 2008, and 2010. The chart shows the percent of student papers with a median score that was "marginal" or "unsatisfactory" for each criterion by year. Most notable, as hoped and expected, the senior papers had fewer scored at a less than satisfactory level in all criteria.

Figure 1: Percent of FYS and Senior Papers Receiving a Median Rating of **"Less than satisfactory"**



Discussions were centered on the criteria of question/claim and assumptions/alternatives since they had the lowest scores. Through these discussions, it was discovered that the lower scores might have been partially a result of differences across disciplines and the expectations for how these criteria would be addressed in a paper. For example, for the question/claim criterion, a scientific research paper may clearly focus more on a specific question, whereas in other

disciplines the research may be more exploratory, making it difficult to clearly state a specific question or claim. Similarly, for the assumptions/alternatives criterion, the rationale behind a scientific experiment might not be explicitly described within the paper and thus it can appear that this criterion was overlooked, when instead it was analyzed as part of the design stage of the experiment and not discussed in the paper.

Although the question/claim criterion was the second lowest scored area, the review group felt that the senior level samples were successful overall, especially considering how students were able to do the work from open-ended assignments versus the more structured assignments typical of FYS courses. The papers that were identified as weaker in this area were ones that seemed to assume the reader understood the background content or information. It was pointed out that we do not want to encourage students to repeat assignment details in the opening paragraph, but some sort of coherent claim was missing in several of the samples.

Most of the discussion was centered around the criterion of assumptions/alternatives and exploring reasons why students may not be including this in their papers. Some reasons that were suggested:

- Students may not know how to do this work, or are too accustomed to a simple five paragraph essay;
- It may not be an explicit part of the assignment;
- It may not be a clear/explicit part of the written paper if they considered assumptions/alternatives in advance of the research/project;
- Reviewers' understanding of what should be included in this criterion varied.

For the first two reasons, designing assignments that specifically invite students to address assumptions/alternatives may be the key first step, as well as including revision and peer reviews to encourage students to move beyond simply taking and defending a position. For the other two reasons, adjusting the language of the rubric to include contextualizing and framing of the topic would help to open up ways to see this criterion in a variety of assignments. This would both encourage students to include assumptions/alternatives in the assignment (assuming they received the rubric with the assignment) as well as helping reviewers to have a better understanding of what is included in this criterion.

Suggestions

The review group had several central suggestions for moving forward in the area of critical thinking:

- Recommend additional language in rubric/criteria to consider context/framing;
- Develop assignments that encourage students to move beyond taking and defending a position;
- Include revisions and peer editing as part of the assignment process;

Critical Thinking- Capstone Level Review

August 27, 2013

- Consider doing a blind review of several assignments to explore what we are inviting students to do;
- Have departments conduct a review of student work or define their criteria for critical thinking.

Additional suggestions to consider came from DCAC's review of the Critical Thinking Assessment Summary, but are still relevant to include in discussions for moving forward:

- Distribute the CT rubric and current findings across campus and raise awareness:
    - Distribution to the UCC;
    - Distribution to faculty senate via end of year update;
    - Distribution to faculty teaching CT AOI courses;
    - Distribution to the broader campus in a newsletter and/or email to faculty/departments
    - Post rubric and results to the Drake Curriculum website
- Make Goal 1 working group of the Strategic Planning Council aware of data;
- Have Deputy Provost include a synopsis in her newsletter/update;
- Recommend CT workshops geared at including assignments that could address areas of CT such as making assumptions and using evidence (areas identified as low in FYS);
- Investigate creation of a faculty toolkit for implementing CT exercises and assessment into courses;
- Continue with CT assessment through the use of the CT rubric in FYS and continue to gather examples of Drake assignments that align with the rubric;
- Further consideration should be given, and discussed with the UCC, for having the rubric required as part of the AOI course approval process.