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This chapter presents an overview of approaches to assessing critical thinking in community colleges, a brief description of standardized tests, and examples of several institutionally developed methodologies and good practices. Finally, it identifies challenges in assessing critical thinking in two-year colleges.

Assessing Critical Thinking in Community Colleges

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Critical thinking is generally considered to be an important outcome of postsecondary education. Indeed, as Seybert (2002) notes, community colleges typically require degree-seeking students—and sometimes those pursuing a certificate—to take general education courses that include critical thinking. Rarely, however, do individual courses focus explicitly on critical thinking or carry the term in the course title. Rather, colleges often encourage or require courses in a variety of disciplines to incorporate critical thinking into learning objectives, or they may assume that across the range of courses a student takes to complete a degree she will have encountered assignments that foster and evaluate her ability to think critically.

As described in other chapters in this volume, there is a long-standing and unresolved controversy over whether critical thinking is best taught in courses focused specifically on it or in discipline-based courses in which it is explicitly or implicitly taught within the disciplinary framework and using discipline-specific subject matter.

Exacerbating the fact that colleges treat critical thinking differently in their curricula is the problem that it has no single accepted definition. Kurfiss (1988) asserts that three types of thinking interact in the critical thinking process: knowing the facts and concepts of the discipline, which he calls *declarative knowledge*; knowing how to reason, inquire, and present knowledge in the discipline, which he calls *procedural knowledge*; and being able to set goals, determine when additional information is needed, and assess the fruitfulness of a line of inquiry, which he calls *metacognition*.

Taylor (2004) presents a simpler definition of critical thinking employed at community colleges: “Critical thinking is the kind of thinking that

professionals in the discipline use when doing the work of the discipline” (p. 2). Marzano, Pickering, and McTighe (1993) include critical thinking as a subset of abilities in the learning outcome they term “habits of mind.” They describe critical thinking as a student’s ability to be accurate and seek accuracy, be clear and seek clarity, be open-minded, restrain impulsivity, take a position when the situation warrants it, and be sensitive to the feelings and level of knowledge of others (as described in Huba and Freed, 2000).

Similarly, key elements of the definition proposed by Jones, Dougherty, Fantaske, and Hoffman (1997) are interpretation, analysis, evaluation, inference, presentation of argument, reflection, and disposition. Erwin and Sebrell (2003) assert that this definition is consensus-based, comprehensive, and useful because college and university faculty, employers, and policymakers all cited its components as among the skills college graduates should master.

Assessing Critical Thinking

The multiple definitions of critical thinking, some of which are presented here, are mirrored by multiple approaches to assessing critical thinking. Though there is no one accepted approach (let alone one accepted assessment methodology or test), critical thinking assessment ought to simulate real-world problems that are messy, poorly defined, not soluble by rote knowledge or application of a structured rule, and lacking a single correct solution. Even standardized, closed-ended tests ought to exhibit these attributes.

Characteristics of Critical Thinking Problems. Huba and Freed (2000) describe the underlying principles and offer examples of techniques to assess critical thinking and problem-solving abilities. The educational goal for these assessments is to “learn to construct and defend reasonable solutions” (p. 203) to ill-defined problems that cannot be described with a high degree of completeness or certainty, and that cannot be solved in a way on which experts would necessarily agree. Huba and Freed present assessment examples from history, biology, mathematics, chemistry, psychology, and engineering.

Wiggins (1989) is another proponent of assessment approaches that require students to address problems analogous to those they will face in the real world. He characterizes such “true tests” as requiring performance of everyday tasks, replicating challenges and standards of performance faced by typical professionals in the field, and requiring human judgment and dialogue that is responsive to individual students.

Characteristics of Measurable Behaviors. Bloom (1956) identifies six levels of learning objectives: knowledge, comprehension, application, analysis, synthesis, and evaluation. At each level it is possible to assess measurable behavior, and because critical thinking takes place when students operate in the analysis, synthesis, and evaluation phases, Bloom’s taxonomy

Table 2.1. Phases in Bloom's Taxonomy Relevant to Critical Thinking

<i>Phase</i>	<i>Behaviors</i>
Analysis	Examine, classify, categorize, research, contrast, compare, disassemble, differentiate, separate, investigate, subdivide
Synthesis	Combine, hypothesize, construct, originate, create, design, formulate, role-play, develop
Evaluation	Compare, recommend, assess, value, apprise, solve, criticize, weigh, consider, debate

can be considered an assessment of critical thinking. Behaviors for each level are shown in Table 2.1. Bloom's list of measurable behaviors can extend helpful guidance as institutions develop home-grown assessments of critical thinking.

Characteristics of Exemplary Assessment Tasks. Huba and Freed (2000) identify characteristics of exemplary assessment tasks. As an institution develops its own assessment or evaluates a standardized test, it may profit by determining to what extent each assessment or test exhibits these traits. Assessments are exemplary to the extent they are:

- Valid (they yield useful information to guide learning)
- Coherent (they lead to desired performance of product)
- Authentic (they address ill-defined problems or issues that are either emerging or enduring)
- Rigorous (they require use of declarative, procedural, and metacognitive knowledge)
- Engaging (they provoke student interest and persistence)
- Challenging (they encourage and evaluate student learning)
- Respectful (they allow students to reveal their uniqueness as learners)
- Responsive (they provide feedback to students leading to improvement) (Huba and Freed, 2000)

Exemplary assessments should also yield useful information to the institution to improve teaching and learning. They should be feasible to implement—taking into account both cost and administrative complexity—and should be intuitively understandable to faculty and other decision makers.

Standardized Instruments

A number of standardized instruments that measure critical thinking are available. Additional information about each can be found on the test publisher's Website, and critiques and examples of the tests are offered in the assessment literature. Testing companies typically have a great deal of

information about test validity and bias, as do articles focused specifically on these issues. Several publications contain a broad overview as well, notably Nichols and Nichols (2001), Borden and Owens (2001), and Erwin (1998). Here are the most well known and widely used standardized instruments for assessing critical thinking.

Academic Profile. This Educational Testing Service assessment examines college-level reading and critical thinking skills in the context of the humanities, social sciences, and natural sciences. The test is available in a standard form, which requires 120 minutes, or in an abbreviated form, requiring 40 minutes. Both criterion-referenced and norm-referenced scores are reported, which enables community colleges to determine whether students exhibit skills for each defined level of performance, and to compare their students over time or against students at other institutions.

California Critical Thinking Dispositions Inventory (CCTDI). This test, available from Insight Assessment (formerly the California Academic Press), targets students' internal motivation to use critical thinking skills to solve problems and make decisions. The seventy-five-item "agree-disagree" test measures the attributes of truth seeking, open-mindedness, analyticity, systematicity, inquisitiveness, confidence in reasoning, and cognitive maturity. The CCTDI is not a direct test of critical thinking, but its developers argue that if students do not have the inclination to use critical thinking skills they will not employ them in problem solving. Thus, they claim, the *disposition* to think critically is a key attribute to actually thinking critically.

California Critical Thinking Skills Test (CCTST). Also from Insight Assessment, the CCTST assesses an individual's or group's critical thinking and reasoning skills. It yields a total score and norm-group percentiles, as well as subscale scores by the classical categories of inductive and deductive reasoning and by the contemporary categories of analysis, inference, and evaluation.

College BASE. College BASE, developed at the University of Missouri-Columbia, is a criterion-referenced academic achievement test. Designed to be administered after students complete a college-level core curriculum, the test emphasizes concepts and principles from course materials. It tests knowledge and skills in English, mathematics, science, and social studies and gives performance rankings in higher-order thinking skills, such as interpretive, strategic, and adaptive reasoning abilities.

Collegiate Assessment of Academic Proficiency (CAAP). This ACT standardized test measures academic skills in five general education skill areas, among them critical thinking. According to CAAP literature, the test "measures the ability to clarify, analyze, evaluate, and extend arguments" (ACT, 2004, n.p.). Students read passages in a variety of formats (case study, dialogue, statistical argument, editorial) and answer multiple-choice questions for each passage. The CAAP can be used as an outcomes measure, as a measure of group change, as a cross-sectional or longitudinal study, or

as a linkage vehicle to compare students' work on different though similar ACT tests (such as the ACT Assessment, ASSET, and COMPASS).

Collegiate Learning Assessment Project (CLA). The Rand Corporation's Council for Aid to Education has developed a new instrument to measure the value added by an institution to students' critical thinking skills (http://www.cae.org/content/pro_collegiate.htm). In this assessment, the institution is the unit of analysis. Students are given open-ended tasks and asked to write essays in response, which are then assessed for the ability to identify the strengths and limitations of an argument; present a coherent argument in support of a proposition; or interpret, analyze, and synthesize information. Students take the online test in a three-hour, proctored setting.

Tasks in Critical Thinking. Developed by the Educational Testing Service and the College Board, this test is performance-based and generates group rather than individual scores. Students are asked to solve a dilemma or task in an area of humanities, social sciences, and natural sciences. Scorers use rubrics to evaluate responses, targeting the skills areas of inquiry, analysis, and communication.

Test of Everyday Reasoning. This thirty-five-item multiple-choice test is produced by Insight Assessment and is designed to assess an individual's or group's basic reasoning skills. The test takes fifty minutes and yields a total score for overall reasoning skills, as well as three subscale scores in the categories of analysis, inference, and evaluation.

Watson-Glaser Critical Thinking Appraisal. This test was developed in the 1960s, and in addition to a total score it features five subscores in inference, recognition of assumption, deduction, interpretation, and evaluation of argument. This test, as with all of the standardized tests presented thus far, is intended to test students' ability to think critically.

Other standardized instruments permit less direct measure of these abilities either because national norms or standardized scores are not produced (as in the case of the Facione's scoring rubric, to be described here) or because they rely on student self-reports of critical thinking competencies, gains, or behaviors thought to be associated with critical thinking. Although these tests are not direct measures of critical thinking, it is possible to draw inferences about critical thinking ability from these self-report assessments.

Community College Survey of Student Engagement (CCSSE). CCSSE, the community college counterpart to the National Survey of Student Engagement, contains a number of items asking students to report on the frequency with which they engage in various behaviors such as memorizing facts, ideas, or methods; analyzing the basic elements of an idea, experience, or theory; synthesizing and organizing ideas, information, or experiences; making judgments about the value or soundness of information, arguments, or methods; and applying theories or concepts to practical problems or in new situations. Available from the CCSSE office at the

University of Texas, Austin, the survey has been administered at more than two hundred community colleges. Data to construct national norms are becoming available, and studies are under way to link CCSSE results with other measures of critical thinking.

Holistic Critical Thinking Scoring Rubric. Facione and Facione (1994) developed a four-level scoring rubric to assess critical thinking and a set of instructions about how to use the rubric. It does not enable an institution to compare students' results with national norms, but it is based on extensive research on assessing critical thinking.

Institutionally Developed Assessments

Several community colleges have each created an institution-specific methodology for assessing critical thinking. For example, Peter Dlugos (2003), at Bergen Community College in New Jersey, developed three assessment exercises that combine examination of students' personal growth and development with tests of their critical thinking ability. One exercise, "Living the Examined Life," focuses on changes a student would like to make in his life. The second, "Transforming Yourself into an Enlightened Being," deals with a student's definition of what it means to be "enlightened" and how she might transform herself to become enlightened. Dlugos's final exercise focuses on students' definition and practice of compassion. Rubrics enable an instructor to evaluate students' critical thinking, organizational, and writing skills even as they evaluate student growth and development. Dlugos's work is somewhat unusual because he concentrates on students' affective development as well as critical thinking in the same assessment.

Waukesha County Technical College in Wisconsin assesses twenty-three student learning outcomes under four Critical Life Skills Areas: communication skills, analytical skills (including critical thinking), group effectiveness skills, and personal management skills. In this assessment, critical thinking is defined as the ability to apply the techniques of analytical thinking and effective decision making. Six levels of competency are identified: defining common thinking strategies, identifying common thinking strategies within a personal or occupational setting, drawing logical conclusions from adequate evidence, examining reasons and evidence from different viewpoints, constructing a case in support of a claim, and assessing the validity of decisions and cases. Students' critical thinking skills are examined through an integrated assessment plan that includes course, department, and division evaluations. Students then receive a Critical Life Skills Transcript that identifies their level of achievement within each skill area.

The Community College of Baltimore County (Maryland) states that general education courses must teach critical analysis and reasoning by offering "a variety of learning experiences that encourage students, independently and in collaboration with others, to use those fundamental principles and methods to acquire, analyze, and use information for

purposes of inquiry, critical thinking, problem-solving, and creative expression in a diverse environment” (Community College of Baltimore County, 2004, p. 2). The college uses a number of assessment approaches; the one most germane to assessing critical thinking is the GREAT project, initiated in 2001, which uses common graded assignments designed by teams of faculty from general education disciplines. Known as GREATs, the GeneRal Education Assessment Teams have developed a list of assignments and scoring rubrics for each discipline area, which are then incorporated into all sections of designated courses each semester. Trained faculty collect and score a random sample of these assignments at the end of the fall and spring semesters. On a 6-point scale, mean scores for the critical thinking rubric were 3.3 in fall 2003 and 3.8 in spring 2004. Scores indicated students were able to think critically to a moderate degree but were not outstanding. College staff assert that the GREAT project enables the institution to assess students’ critical thinking learning outcomes and also permits professional development for faculty.

The College of DuPage (Illinois) has, for several years, administered six CAAP subject area tests each fall and spring to one hundred students. Students are chosen by randomly selecting classes, and instructors have been generally willing to allocate class time for their students to take the CAAP. The results are analyzed, and differentiation is made among entering freshmen, students midway through their associate degree, and those completing their sophomore year.

One interesting finding from the first two years of the CAAP is that students’ critical thinking skills are dependent on reading ability (College of DuPage, 2000). From this finding, the college initiated a pilot project asking students to respond to a specific question according to their reading of two brief opposing essays on a topic (for example, “Does recycling make economic sense?”). The college is currently reviewing data from this pilot.

For the pilot study, a specific rubric was developed by an interdisciplinary faculty task force. The skills targeted in this design include communication of ideas, information literacy skills, synthesis and critical thinking skills, and ways of thinking and knowing. Entry-level students are compared with exit-level students in blind scoring. The rubric has been shown to be sensitive enough to demonstrate an increased skill-set across the dimensions measured (Russ Watson, personal communication, July 2004).

Perry (2004) studied critical thinking in Web-based community college courses in Maryland. He examined thirty-eight Websites for courses taught in spring 2004 and identified eight types of assignments that could be used to assess critical thinking: open-ended real-world examples, weekly assignments, discussion boards, multiple-choice tests, essay tests, journals, formal papers, and speeches. Almost all assignments (99 percent) were individual rather than group and were evenly divided between direct and indirect assessments of critical thinking. At Harold Washington College in Chicago, the faculty assessment committee undertook a multipart critical

thinking assessment project beginning in 2003. The committee first defined critical thinking, and committee members went back to colleagues in their departments several times for feedback until a consensus-based definition emerged. The committee then developed learning outcomes based on the definition, again seeking feedback from departments.

Third, the committee reviewed existing critical thinking tests to identify one that could be administered within a standard class meeting time, was consistent with learning outcomes, and had utility for faculty who took the test themselves. The college finally selected the California Critical Thinking Skills Test, and in fall 2003 roughly sixteen hundred students took the test and supplied demographic information. Results showed that students scored below the national sample of two-year college students, but not significantly so. As a result, the assessment committee is presenting a series of workshops on critical thinking strategies to train faculty to embed critical thinking activities (general and discipline-specific) into their classrooms and curricula. The college will administer the CCTST again in fall 2005 to assess progress (Cecilia Lopez, personal communication, July 2004).

Metropolitan Community College (Missouri) faculty have administered the Watson-Glaser test for five years. Recent analyses of more than two thousand test results showed that students did not score as well as desired on the subtest pertaining to inference. As a result, faculty developed course-embedded assignments focusing on inference and a scoring rubric. In 2003, the assignments were embedded in American history courses, and in fall 2004 a modified instrument was extended to psychology, sociology, political science, and criminal justice courses (Charles Van Middlesworth, personal communication, March 2005).

Challenges in Assessing Critical Thinking

Assessing community college students' critical thinking presents many challenges and issues. Some issues are similar to those inherent in constructing and implementing any assessment of student learning outcomes: test validity and reliability, students taking seriously an exercise that may not count in their course grade or graduation requirements, funding for standardized tests or institutional projects, and helping faculty understand the need to assess student learning outcomes to meet both institutional and external expectations.

These challenges are particularly germane to community colleges, but many of them are relevant to virtually any commuter, nonselective post-secondary institution that enrolls a large number of part-time adult students whose enrollment patterns are often characterized by stop-outs, swirling among multiple schools, or discontinuous enrollment over an extended period of time.

In addition, because so many community college students are older, have significant work experience, and are raising their own families, they

have probably already encountered many situations in which critical thinking was essential—which calls into question the relative impact of community college critical thinking programs. Yet the argument can be made that how and where a student acquires critical thinking skills is not important; what is important is that a student has them, especially after completing a stipulated amount of college work, or a course specifically targeted to critical thinking.

A key issue for assessment is timing, because many community college students do not persist through an official degree. In fact, students' departure is usually noted after the fact (when they do not return), and students frequently create their own curricula to meet what they perceive to be career, transfer, or personal objectives. Thus it is nearly impossible to capture students at a catalogue-defined terminal point in their program. As well, it may be difficult to assess critical thinking outside the classroom. Recently, a number of community colleges in Illinois participated in a Pew-funded initiative to assess student learning by taking sections of the ACT WorkKeys and the Community College Survey of Student Engagement. Each college, given \$1,000 to offset implementation costs, created its own incentive system for encouraging students to participate. Colleges indicated it was often difficult to obtain student cooperation to take the tests even when incentives such as cash and gift certificates were available.

Finally, although the literature is virtually unanimous in asserting that strong support from the president or academic vice president is essential for a successful assessment program, the need for a champion who actually organizes the details and does the work is rarely highlighted. Yet a survey of critical thinking programs on community college Websites demonstrated that without such a champion to lead the assessment project—not just verbally or as a figurehead, but by doing the details year after year—programs may wither or fade away.

Conclusion

Several conclusions regarding the assessment of critical thinking in community colleges have emerged from the research conducted for this chapter. One is that colleges continue to assert that critical thinking is a crucial skill they want and expect their students to possess upon completion of their college experience. A second is that assessment of critical thinking is far more likely to take place at the course level, usually with an instructor assessing his or her own students, than at the department, program, or institutional level. A third and related conclusion is that community colleges are still, for the most part, in the planning stage for conducting assessment of critical thinking at the program or institutional level. Many colleges noted they have or are creating rubrics to use in evaluating student work, but few came forward with a description of a completed project that uses rubrics for assessing critical thinking, and even fewer had results available or information

about how the results were used to revise programs and courses, improve student learning, or refine the assessment process itself. The GREAT project at the Community College of Baltimore County is one exception.

However success is defined, which itself is a topic meriting substantial discussion, the pressure for community colleges to be accountable, present evidence that students are successful, and offer students crucial learning and life skills will continue. The assessment movement is well into its second decade, yet colleges as a group have made little measurable progress in assessing students' critical thinking abilities and learning outcomes beyond the individual class level, despite the fact that critical thinking is a primary learning objective in many institutions.

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