

## Literature Review and Best Practices

Critical thinking is a topic that has many definitions and potential applications. While critical thinking is often presented as an abstract idea, much of the current literature on the topic strives to provide a precise definition of critical thinking. Other work expands on the way critical thinking can be used in educational settings, as well as beyond the classroom. Some studies of critical thinking and education also examine the ways critical thinking can be taught, applied, and evaluated among college students. The following summarizes some of the major works on critical thinking and the importance of teaching this skill at the college level and identifies best practices for critical thinking curriculum.

### Defining Critical Thinking

In order to understand how to circumscribe critical thinking more effectively and how its curriculum affects college students, a definition of the term must first be established. There is no consensus on any one definition of critical thinking, but some current research aims to clarify what critical thinking is in regard to college learning. In a summary of the American Philosophical Association's findings, Facione (1990) presents the findings of a panel of experts involved in compiling the Delphi Report on critical thinking and education. The report provides a definition of critical thinking, ways that critical thinking can be applied, and recommendations for teaching and assessing critical thinking in the educational milieu. In describing and defining critical thinking, this panel of experts identifies "cognitive skills in (1) interpretation, (2) analysis, (3) evaluation, (4) inference, (5) explanation and (6) self-regulation" as crucial elements of critical thinking" (p. 4). For the application of critical thinking by students, the Delphi experts emphasize that critical thinking skills can be used in a variety of ways and should be incorporated with other technical and thinking skills to experience fully the benefit of critical thinking; thus, the recommendation is that critical thinking skills be taught in conjunction with other, broader skills to enhance critical thinking (p. 5). This approach serves as a best practice for critical thinking instruction. Additionally, the report focuses on the disposition and general abilities of an effective critical thinker. Describing critical thinkers as being "able to make such judgments in a wide range of contexts and for a wide variety of purposes," the experts recommend that critical thinking education practices should include instruction regarding how to find and evaluate sources of information, how to consider various points of view, and how to interact with others

regarding opinions and ideas (pp. 12 & 14). Finally, to ensure that critical thinking skills are honed effectively among college students, the report outlines recommendations that include incorporating critical thinking skills into a variety of curricula and assessing critical thinking application often to evaluate and ensure effective use and improvement (pp. 16-17).

After explaining some ways critical thinking has been previously defined as applied and assessed, Gabennesch (2006) also offers his own definition of critical thinking: “Critical thinking is the use of national skills, worldview, and values to get as close as possible to the truth. Here, critical thinking is conceived as consisting of three essential dimensions: skills, worldview, and values” (p. 38). For the skills dimension, Gabennesch argues that information must not simply be absorbed but rather evaluated, interpreted, and applied (p. 38). The worldview aspect of critical thinking requires a better understanding of challenging and new information, and critical thinkers must “be disinclined to take things at face value” and skeptical of information and sources (p. 39). Finally, Gabennesch explains that values must be applied to the critical thinking process and that critical thinkers must be open to ideas but also willing to admit when something is not understood (p. 40). Among the benefits of possessing effective critical thinking skills, Gabennesch touts a tendency to understand and accept diversity better, as well as a necessary skepticism of “ideologies that justify illiberal practices” (p. 40). Ultimately, Gabennesch uses his understanding of critical thinking in educational settings to suggest that these skills can only be taught effectively in an educational setting when instructors first understand the process of critical thinking, incorporate it into a larger curricula, and are willing to teach critical thinking despite the challenges and occasional controversy surrounding this way of learning and understanding.

### **Teaching Critical Thinking**

Critical thinking can be applied in a variety of ways. For the purpose of this research, studies that examine critical thinking in an educational setting and how it can be taught to college students were the focus. van Gelder (2005) outlines six lessons that can be learned from teaching critical thinking. The first lesson, that “critical thinking is hard,” draws on the research of Kuhn (1991), which found that most people “cannot. . . reliably exhibit basic skills of general reasoning and argumentation” (p. 42). Overall, “humans are not naturally critical,” and the skills of skepticism and questioning sources and information do not come easily to most people (van Gelder,

2005, p. 42). Furthermore, critical thinking is considered a “higher order skill” that requires understanding of things other than just what critical thinking is and how to achieve it (van Gelder, 2005, p. 42). van Gelder also explains that critical thinking skills must be practiced, and it is not adequate simply to teach students what critical thinking is and how to do it. Students must be engaged in activities that allow them to exercise their critical thinking skills, a critical thinking best practice (p. 43). This practice, however, is not always effective when students are unable to use the skills they practice as part of a specific assignment in class. Most students have difficulties applying their critical thinking practice to activities or situations outside the classroom (p. 43). van Gelder also examines the importance of teaching critical thinking in a practical way, not just as a concept. He argues, “Knowledge of the theory allows you to better see what is going on,” and if students are familiar with the vocabulary and ideas associated with critical thinking, it will be easier for them to apply the theory (p. 44). The importance of arguments is also a key finding of van Gelder’s work, and he expresses his support for teaching critical thinking using argument maps, which facilitates students’ understanding the basis of an argument, as well as its outcomes, an additional best practice. Finally, van Gelder notes that teachers of critical thinking must be aware of students’ biases, or “blindspots,” that may affect students’ judgment and ability to think critically (p. 46).

van Gelder (2001) further examines critical thinking in his work with the Reason! Able project at the University of Melbourne. In this work, van Gelder (2001) focuses primarily on the practice of critical thinking skills and asserts that practice should be “motivated,” “guided,” “scaffolded,” “graduated,” and discussed (p. 2). Using a computer program, students participating in the Reason!Able project practiced their critical thinking skills in an interactive way and, then, were evaluated. This indirect way of teaching critical thinking was found to be significantly more effective than other approaches previously used, thus confirming van Gelder’s ideas that critical thinking skills should be taught as part of a broader learning experience, that critical thinking skills can and should be practiced, and that computer software can assist students in learning critical thinking skills by allowing them to work at their own pace, get more information when needed and receive feedback about their use of critical thinking.

van Gelder, Bissett & Cumming (2004) also studied the application of a critical thinking- specific course at the college level to determine its impact on student

outcomes. Findings showed that students who participated in the class had an overall gain in informal reasoning skills compared to their level of skill before taking the course (p. 147). The results also revealed a correlation between the practices of critical thinking skills and gained knowledge of critical thinking application and use. These correlations were positive, with students who practiced their skills more seeing a larger gain of knowledge (p. 148). These findings led to the overall recommendation that critical thinking as an educational tool should focus more on practice for students instead of relying heavily on teaching what critical thinking skills are and how they can potentially be used, an example of best practices in teaching critical thinking.

Instead, “educational programs or institutions hoping to cultivate high-level informal reasoning ability ought to include some explicit instruction in informal reasoning, based on deliberate practice” (p. 150).

Using a survey of and conducting focus groups with first-year political science students at the University of Adelaide in Australia, Beasley and Cao (2014) also focus on how students understand and apply critical thinking. The study particularly focuses on the teaching of critical thinking as an integrated part of a political science course, instead of a distinct, separate curriculum or class. Findings showed that students both understood and valued critical thinking as part of their college education, that students felt instructors were an important part of their critical thinking education, and that critical thinking was best learned when integrated in other curricula.

Cavdar and Doe (2012) specifically examine writing as a tool for improving critical thinking abilities in college students. Using the Watson-Glaser Critical Thinking Appraisal and its five levels of intellectual activity (inference, recognition of assumptions, deductions, interpretation, and evaluation of arguments), the authors assigned their participants to linked writing assignments. In the first writing assignments, students simply gave a description of the political debate surrounding healthcare. In the second assignment, using feedback they were given, the students rewrote their papers to identify better implicit assumptions made by both political parties about healthcare, compare political ideologies, and examine the strength of arguments made by both parties. Findings showed that critical thinking skills outlined by the Watson-Glaser Critical Thinking Appraisal could be applied most

effectively when specific instructions were given to students regarding the assignment and when learning outcomes were better expressed beforehand.

Fitzgerald and Baird (2011) examine the role of the instructor in developing and implementing critical thinking education strategies while also providing students with information about a specific topic. This article also focuses on the role of critical thinking education as part of a larger subject, specifically political science. With proposals regarding how to teach the difference between facts and opinions and the merit of arguments, the authors argue that vague instruction that encourages critical thinking as a self-taught skill does not help students and that specific instructions and assignments that encourage individual aspects of critical thinking are the most effective ways to build critical thinking skills.

The findings of Tsui's (2002) four case studies in four different schools showed that an emphasis on writing, editing and rewriting, and peer evaluation were linked with increased critical thinking skills among students. Schools that encouraged self-evaluation and reflection (best practices) also showed stronger critical thinking abilities overall. Two-step writing assignments with revisions and class discussions were other factors shown to increase critical thinking among students who engaged in these activities. Some teachers from the participating schools expressed concern that adding activities that enhance critical thinking, such as class discussions and writing assignments, took too much time away from their regularly planned lessons. Because of this, Tsui (2002) argues that critical thinking approaches should be added in gradually, be incorporated into regular course content, and be used through interdisciplinary approaches.

### **Assessment of Critical Thinking**

Bers (2005) draws on many previous studies of critical thinking skills and means of assessment to understand critical thinking at the community college level. Using the knowledge of these studies, Bers identifies some of the issues facing community colleges in regards to teaching critical thinking, such as the lack of motivation students feel when taking a course or participating in an assignment that they do not see as relevant to their majors or career goals, funding, and a lack of understanding of critical thinking or its necessity on the part of instructors (p. 22). Given these limitations and setbacks, Bers concludes that community colleges do see critical thinking as an important skill to teach, that assessment and evaluation are

most likely to take part at the classroom level, and that critical thinking is often taught as part of a broader curricula (p. 23). These findings led to Bers' final determination that critical thinking remains a crucial part of a community college education but that measuring the outcomes of critical thinking education still needs improvement, "despite the fact that critical thinking is a primary learning objective in many institutions" (p. 24).

In order to assess higher levels of learning integral to critical thinking, scholarship identifies the application of critical thinking skills across curricula and through reflection as essential components to developing student understanding of and ability to transfer those skills to a larger educational or professional context (Beasley & Cao, 2014). According to Eynon and Gambino (2017), ePortfolios allow students to connect their learning with broader personal and professional contexts by "advancing higher order thinking and integrative learning" (p. 17).

Eynon and Gambino (2017) highlight key principles for effective ePortfolio pedagogy: inquiry, reflection, and integration (p. 32). Eynon and Gambino (2014) cite Kolb's definition of inquiry as a practice which "involves asking questions about authentic problems, analyzing relevant evidence, creating and presenting evidenced-based solutions, reflecting on the learning process, and developing new questions and plans for further inquiry" (p. 33). These authors go further to point out that reflection through ePortfolios "can prompt, intensify, and share students' reflections on their learning"; integrative learning, however, "involves making connections and transferring knowledge across courses, disciplines, and semesters" (p. 34).