Insights From Research on How Best to Teach Critical Thinking Skills

Teaching in a Digital Age

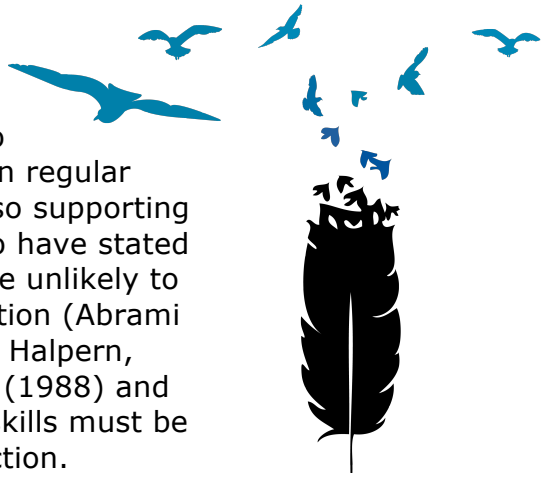
In today's world, students need to learn critical thinking skills in the classroom so that they can use critical thinking skills outside of the classroom. Though many definitions of "critical thinking skills" exist, most have in common the active, intellectual processes of conceptualizing, evaluating, reasoning and problem solving (c.f., Angelo, 1995; Scriven, 1996, Wade, 1995; Bailin et al., 1999b; Ennis, 1985; Facione, 1990; Kennedy et al., 1991; Sternberg, 1986; Willingham, 2007). There is widespread agreement that critical thinking skills are becoming essential for all people to master. For example, the US Department of Labor lists critical thinking as a foundational set of skills crucial to success in the workforce. The Common Core State Standards, which were created to ensure that all students graduate from high school prepared for their next challenge, whether that is work-force training, college or entry-level career placement, pick up on this theme by emphasizing the need to teach critical thinking skills at all grade levels. One major goal of the Common Core State Standards is to promote the teaching of critical thinking skills from a young age and to continue that training throughout students' school careers. As of June 2014, more than 2/3 of US states have chosen to adopt the Common Core Standards (CCSSO, 2014). As such, we can surmise that the need to teach and improve critical thinking skills as a tool for future success is top of mind for many education stakeholders.

Empirical research has shown that learners begin developing critical thinking competencies at a young age. Theory suggests that people can be taught to think critically (Kennedy et al., 1991; Lewis and Smith, 1993) and teachers have been increasingly urged to provide instruction in critical thinking skills. At this time, there is large-scale agreement that students' critical thinking skills are important and should be improved, and important work has been to toward defining what those skills are with respect to state standards. However, the question about how best to teach these skills remains. There are arguments about whether critical thinking skills should be taught explicitly, in a hybrid model or implicitly, for example.

The debate revolves around the domain specificity and transferability of critical thinking skills. One way to view this is to ask whether critical thinking skills should be taught implicitly or explicitly and whether those skills should be directly tied to discipline-specific content. Specifically, the question can be exemplified with the question, "if critical thinking skills are taught explicitly in one domain, such as science, will those skills transfer to other domains, such as social studies?" This debate has implications for the instruction of critical thinking skills at all levels.

On one end of the spectrum is the approach of providing direct and explicit instruction in critical thinking skills that are separate from, and outside of, the context of specific subject matter. This approach provides students with deliberate practice in applying critical thinking skills (Lai, 2013; Halpern, 2001; Van Gelder, 2005). For this, **the general approach**, to work, students must also be taught how to transfer these critical thinking skills across distinct contexts. There is disagreement about the extent to which such skills are reliably transferable. For example, some researchers, such as Pithers and Sodman (2000), do not believe that critical thinking skills can be taught explicitly as a separate subject matter. Another approach, **the mixed approach**, is to explicitly teach critical thinking skills but that teaching is not separate from explicit instruction in the content of a specific discipline. Rather, that explicit instruction in critical thinking skills is directly linked with instruction in content. Using this approach, teachers pair stand-alone instruction in general critical thinking principles with application of critical thinking skills in the context of specific subject matter (c.f., Lai, 2013). A third approach, **the immersion approach**, is one that focuses on the instruction of discipline-specific content. Critical thinking skills are taught, but not explicitly so. Instead, students are said to "naturally" acquire these skills as they engage with the subject matter (Lai, 2013; Ennis, 1989).

Abrami et al. (2008) examined 177 studies on the effects of instructional interventions on students' critical thinking skills. They found the best results were achieved with the mixed approach, where explicit critical thinking instruction was integrated with explicit content instruction. This finding strongly suggests that teachers should use some time to explicitly teach critical thinking skills, but that they should do so within the context of explicit instruction in regular academic, discipline-specific, content. Also supporting this approach, are many researchers who have stated that critical thinking skills and abilities are unlikely to develop in the absence of explicit instruction (Abrami et al., 2008; Case, 2005; Facione, 1990; Halpern, 1998; Paul, 1992). For example, Lipman (1988) and Silva (2008) argue that critical thinking skills must be taught hand-in-hand with content instruction.



Educational technology offers teachers more and more opportunities to engage, improve and assess students' critical thinking skills within a discipline-specific course. Increasing students' opportunities to participate in cooperative learning, group dialog, ambiguous dialog and reciprocal peer questioning experiences while in a science, social science or ELA class (for example) are among the many recommended instructional strategies for improving students' critical thinking skills. Wikis are a great example of an educational technology tool that teachers can use to foster these skills in a way that is not possible without technology. Wikis are websites teachers

create that provide a space for students to work collaboratively on projects, fostering cooperative learning and in many cases, group dialog. Other forms of technology provide teachers and students with extended ways to communicate about topics synchronously (chat, web conferencing) and asynchronously (email, listservs, bulletin boards). By using synchronous and asynchronous communication tools teachers can: pose questions that students must grapple with; create situations whereby students can engage in reciprocal peer questioning; have students lay out their logic and reasoning for others to read and evaluate; and, create spaces where students can teach each other what they know. Learning management systems (or course management systems) often have chat, video and bulletin board features already built into them allowing teachers and students to have a secure space to engage in the critical thinking activities just described. Importantly, teachers can engage students in critical thinking exercises related to the content area that they are teaching. Google also provides many free online resources that help students work collaboratively on shared documents and projects. Research shows that computer-based constructivist learning environments can more effectively promote higher-order thinking skills, learning motivation, and teamwork, than can traditional settings (Rosen & Salomon, 2007).

Also, interactive course software, such as interactive thinking tools, are valuable for teaching critical thinking skills. Thinking tools are applications that facilitate students' representations of what they have learned, and what they know, using different representational formalisms. There are several classes of thinking tools, including semantic organizers, dynamic modeling tools, information interpretation tools, knowledge construction tools and microworlds (Rosen & Tager, 2013; Jonassen, 2006; Jonassen, & Reeves, 1996). Another type of interactive thinking tool is a concept map. Concept mapping is cognitively challenging and requires skills such as assessing, clarifying, prioritizing, summarizing, and organizing ideas and information (Jonassen, 1996; Kinchin et al., 2000), processes highly related to critical thinking competencies (Binkley et al., 2012; OECD, 2013; Partnership for 21st Century Skills, 2009). Popplet, iMindMap and Coggle provide free computer applications for organizing information and mind mapping. As well, Mindmeister and Lucid Chart both provide collaborative workspaces that are designed for multiple people to work together to graphically organize and present information.

The world is placing an ever-increasing demand on critical thinking skills. This demand translates into the need to teach these skills well in classrooms. Thankfully there are many types of educational technology applications that are available to assist teachers in this task. The power of technology to move students away from passively listening to lectures to actively engaging with, and grappling with, material is tremendous. The sky is the limit.

Research & Innovation NETWORK

About the Teaching in a Digital Age Research

States and districts are investing heavily in educational technology, aiming for a transformational change in student learning. The crucial next step is to effectively integrate technology with instruction to improve learning outcomes. Pearson, Digital Promise, National Network of State Teachers of the Year (NNSTOY), and the University of San Diego have come together to research digital learning strategies and how they positively affect student learning. Separating tools from toys, this research strives to provide evidence-based recommendations for educators to implement in their classrooms.

Learn more at ResearchNetwork.Pearson.com

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