

Can Critical Thinking Be Taught?

A review of Abrami et al. (2014).

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Can we teach critical thinking? Most of my teacher training was based on the idea that you can teach critical thinking. However, the notion has certainly lost popularity. I have seen many popular education bloggers claim that you can't teach critical thinking. Personally, I have always tried to teach critical thinking through history instruction. I like to teach well known events through multiple perspectives and challenge students to think about the perspective that changes the understanding of the historical event. For example, I might teach about the Red River Rebellion and ask students to write a paper on whether Louis Riel was a hero or a villain. The federalist viewed him as a traitor and a murderer. But the Metis people viewed him as a hero standing up against government oppression and colonization. This all said, I have never actually tried to research the question, can critical thinking even be taught.

I think the popular opinion today is that critical thinking is a by-product of background knowledge and therefore teaching should not try to teach students how to think critically. But is this belief true? Or a reductionist claim? I recently came across a meta-analysis by Abrami et al. (2014), which attempted to empirically answer this question. The included studies examined whether critical thinking could be taught for students age 6 or above and analyzed 867 effects. They found a significant overall effect size for teaching critical thinking of .39. However, their meta-analysis included case studies (studies without control groups), which tends to inflate results. If we look at only RCTs that estimate drops to .30. That said, many of the researchers used their own assessments, which can also inflate results. When the estimate was re-calculated for only RCTs with standardized assessments, the effect size was still equivalent, at .32 (k=95). Indeed, the effect size estimate remained significant across 38 out of 39 moderator analyses suggesting a very stable effect. In other words, across 867 effect sizes, this peer-reviewed meta-analysis found robust evidence that critical thinking could be taught.

How Should Critical Thinking Be Taught?

The authors considered 4 different instructional models:

1. Direct instruction: Critical thinking skills and dispositions are taught separately from the presentation of traditional academic subject matter, with the primary and explicit purpose of teaching critical thinking itself. While content may be used as a vehicle, it is not tied to a specific existing subject-matter curriculum.

2. Infusion: Critical thinking is taught using deep, thoughtful, and well-understood subject-matter instruction where students are encouraged to think critically within that specific domain. Crucially, in the infusion approach, general principles of critical thinking skills and dispositions are also made explicitly clear to the students alongside the subject content.

3. Immersion: Subject-matter instruction is thought-provoking and students are deeply immersed in a specific academic topic or discipline. However, unlike the infusion approach, general critical thinking principles and skills are not explicitly taught or pointed out to the students; the critical thinking aspect remains implicit.

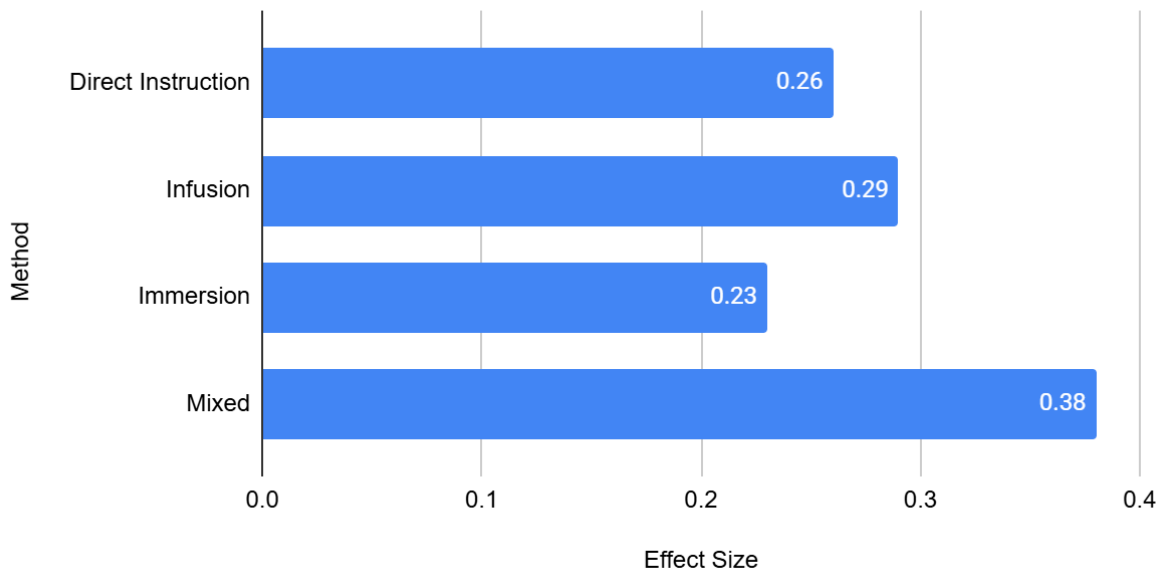
4. Mixed: This approach combines the general approach with either the infusion or immersion approach. Under a mixed framework, students are involved in subject-specific critical thinking instruction (embedded within a discipline), but there is also a separate, dedicated thread, module, or course work aimed at explicitly teaching general principles of critical thinking.

All results were statistically significant. However, mixed methods did better, as can be seen in table 1.

Table 1.

Critical Thinking Teaching Methods

Abrami et al. (2014)



The authors also compared:

Authentic Instruction: Instruction that utilizes real-world, situated, or ill-structured problems, scenarios, and tasks (such as problem-based learning, case studies, role-playing, simulations, or project-based learning) rather than abstract or purely hypothetical exercises.

Dialogue Instruction: Instruction that promotes extensive, active discussion, collaboration, and

exchange of ideas—fostering peer-to-peer or student-teacher interaction, debate, and shared inquiry rather than passive listening.

Dialogue + Authentic Instruction: A combined instructional approach where students engage in real-world, problem-centered tasks (authentic instruction) while simultaneously participating in active, collaborative discussions and exchanges of ideas (dialogue).

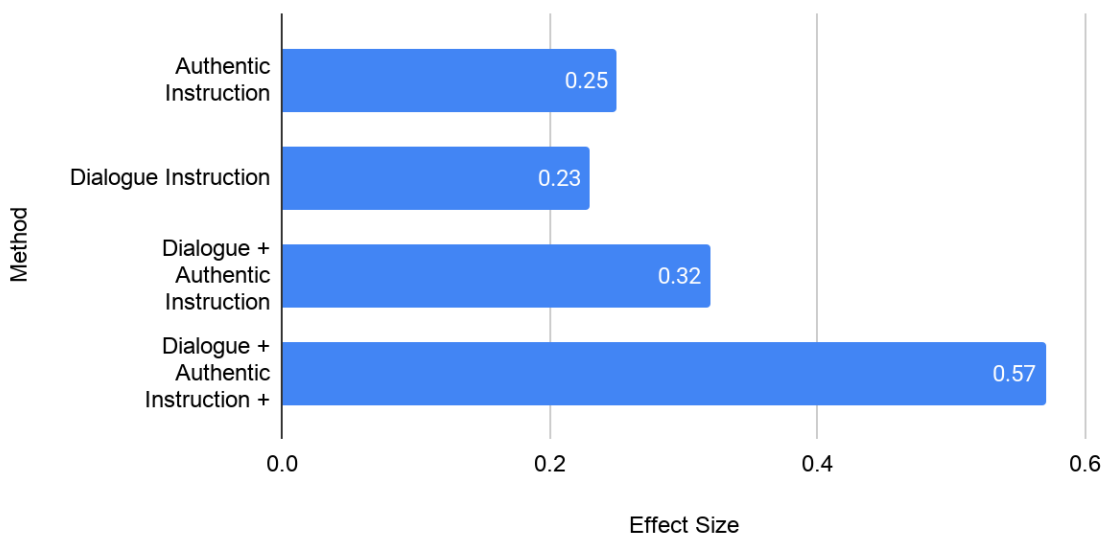
Dialogue + Authentic Instruction + Mentoring: This approach combined problem-based or real-world tasks (authentic instruction) and active discussion (dialogue) alongside individualized, one-on-one guidance, coaching, or scaffolding from an instructor or more capable other (mentoring).

All of these approaches showed statistically significant approaches, especially Dialogue + Authentic + Mentoring, as can be seen in Table 2.

Table 2.

Critical Thinking Instruction Approaches

Abrami et al. (2014)



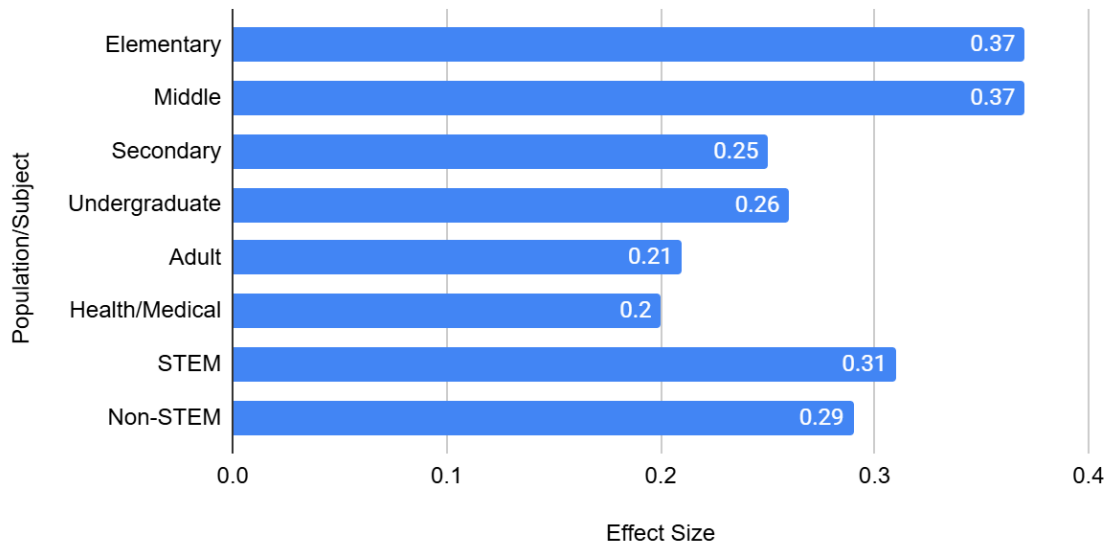
When Should Critical Thinking Be Taught?

Abrami et al. (2014) explored four demographics and three subjects. All effect sizes were statistically significant, except for adult education. Indeed, this was the only non-significant effect size found in the entire meta-analysis. This trend could suggest that it is harder to teach adults critical thinking. Effects were largest when critical thinking interventions happened in elementary school. Effects were similar for STEM and non-STEM subjects, as can be seen in Table 3.

Table 3.

Where is CS Instruction Most Effective

Abrami et al. (2014)



Final Thoughts

The Abrami et al. (2014) meta-analysis presents very strong empirical support for the idea that critical thinking skills can be improved by teacher instruction on critical thinking. Estimates were stable across 867 effects, multiple meta-analysis models, case studies, quasi-experimental studies, RCTs, researcher designed assessments, and standardized/distal assessments. The authors also ran funnel plot analyses and Orwin's adaptation analyses to check for study bias and found no significant evidence of bias. In simple terms, this meta-analysis delivers exceptionally strong and rigorous evidence that critical thinking can be taught, a finding that will no doubt upset the many theorists who claim otherwise. However, when the scientific evidence does not confirm your hypothesis or theory, the only rational decision to make is to assume that your hypothesis/theory is wrong.

That said, I think it is also important to mention that Abrami et al. shows that critical thinking is best taught, when it is both explicitly taught, but modelled and discussed within authentic circumstances. That is critical thinking should not be taught as its own subject. But rather critical thinking strategies should be explained and discussed within the context of regular instruction such as History, Science, and literacy. Teachers should both model critical thinking and provide students opportunities to practice thinking critically.

Free Resources

Free SOR Resources:

Teaching by Science has a comprehensive list of free resources for Math and Reading instruction:

[LINK](#)

Free Math and Morphology Resources:

All of the math and morphology resources discussed in this article are available through SAGE

Online Academy and can be accessed with a free/basic account: **[LINK](#)**

*Important: When creating your SAGE account, make sure you select “Free Account” as your role if you want to use the free version.

History and Science Program

Premium SAGE memberships include access to our systematic and explicit history and science programs. The science curriculum spans grades 1 through 8 and aligns with Ontario curriculum standards.

The history curriculum covers grades 7 through 12, structured across two distinct phases:

- Grades 7 through 9 follow the Ontario history curriculum.
- Grades 10 through 12 explore pivotal world history milestones, including American chattel slavery, the American Civil War, the American Civil Rights Movement, the Indian independence movement, and the fall of apartheid in South Africa.

[LINK](#)

References

Abrami, P. C., Bernard, R. M., Borokhovski, E., Waddington, D. I., Wade, C. A., & Persson, T. (2014). Strategies for Teaching Students to Think Critically: A Meta-Analysis: A Meta-Analysis. *Review of Educational Research*, 85(2), 275-314.