

## A Reason!Able Approach to Critical Thinking

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A couple of years ago I set a mundane homework assignment for my class of about 50 mid-level Arts students. They were to take one of the course readings - a chapter from *How the Mind Works* by Steven Pinker - and return in a week with a one page essay, in which they had identified and evaluated the author's main argument.

Students in the Faculty of Arts at the University of Melbourne are among the most talented and privileged in Australia. They ought to have found this basic exercise in critical reading to be quite straightforward. Yet, when I graded their essays, I found that almost none had even done the task, let alone done it well.

Most had just produced a kind of haphazard summary, little more than a random selection of interesting ideas from the text. There were very few attempts to engage critically with the author's argument. Indeed, most students were not even aware that they were not doing the assignment as specified. This was a multi-level failure of critical thinking!

Unfortunately, it just illustrates a very widespread problem. Although higher-order thinking skills are increasingly required for success in a knowledge-based society, average levels of critical thinking are disturbingly low. In an intensive study, U.S. psychologist Deanna Kuhn found that a majority of the population could not reliably exhibit even the most basic skills - the kind of skills which would, for example, allow you to make a reasoned choice among candidates in an election.

Meanwhile, employers are claiming that "independent and critical thinking" is the single most important factor in determining who they will hire and who they will reject. A recent DETYA-sponsored survey found that employers "*value* this skill, and *can* find it, but it is *rare*."

Students with weak critical thinking skills will have a harder time finding satisfying employment, let alone enjoying all the benefits of better thinking for their intellectual life, academic success, and personal affairs.

One task for schools, then, is to markedly enhance critical thinking skills. This is a tough problem. Most obviously, schools usually have little in the way of time and resources to devote to yet another educational desideratum. But there is a deeper difficulty. How, exactly, do you improve critical thinking? If the current approach doesn't work, what should be done?

Over the years, many different programs, methods or techniques have been proposed, all with the goal of accelerating critical thinking skill acquisition; and there have been almost as many studies of whether these approaches actually work. However the news from this line of research is rather discouraging. Although many studies have found what appear to be positive effects, the gains are modest at best. All too often, there is no statistically significant benefit; and in some cases, there is no difference at all!

My teaching experience reinforced this gloomy picture. Every year I would teach a one-semester undergraduate subject in critical thinking. Informal observation suggested that subject was next to useless. Students performed so badly in the final test it was hard to believe they were any worse when they started. We later did systematic pre- and post-testing, which supported that dismal assessment; and we found that a number of other similar studies had drawn much the same conclusion.

This was obviously an intolerable situation. Critical thinking is very important; students are not very good at it; and yet our most intensive efforts to improve it were failing! There *had* to be a better way. The challenge was to find one that was demonstrably effective, but also practical and affordable.

This challenge was the genesis of the Reason! project at the University of Melbourne. Over the past four years we have been developing new methods and tools for

enhancing critical thinking. The hard work is now starting to pay off. Students are showing really substantial gains in critical thinking skills, and the Reason! approach is being picked up by other universities and schools in Australia and around the world.

The Reason! approach is based on an obvious and old-fashioned idea: *practice makes perfect*. This is true for just about every other skill; why shouldn't it be true for critical thinking as well? If students aren't improving fast enough, they're probably not getting enough practice; or, just as likely, the practice they are doing isn't the right sort.

The central problem to be solved, then, is how to get students doing large amounts of what we call "quality practice;" and to have this happen without placing excessive demands on teachers.

To overcome this obstacle, the Reason! project has developed a software package called Reason!Able. The software is designed to guide and scaffold students through the complex processes involved in reasoning about any topic at all. By using the software on a wide variety of problems, students develop an implicit grasp of the general concepts, procedures and skills involved in thinking critically, at least at a basic level. After a while they perform better even when not working in the Reason!Able practice environment.

The software uses simple, colourful graphics to present arguments, which otherwise tend to be overwhelming in their complexity. These "argument maps" are constructed and modified by the users themselves, and can accommodate any argument whatsoever. Abstract logical complexity is made concrete in visual, manipulable diagrams. Students find this a much more attractive medium than dry, linear prose.

Does the approach work? Every semester, we do intensive pre- and post-testing to assess the extent to which students are actually improving their skills. The results are dramatic. Over a twelve week period, students improve by almost a whole standard deviation. (To see how large this is, consider that gains of this magnitude in IQ would be equivalent to a 10-12 point improvement across the whole group.) Our approach appears to be about 3-4 times as effective as traditional attempts to teach critical

thinking. Students improve their skills more, over one semester, than is normally found in an entire undergraduate education.

Not surprisingly, instructors from other faculties and institutions and have been looking to apply the Reason! approach in their own teaching. Although the approach was originally intended for a whole one-semester critical thinking subject, the Reason!Able software stands alone and can be deployed in just about any discipline or context in which students are supposed to be doing some kind of reasoning in natural language – i.e., in most situations. For example, at the University of Melbourne, the software is now used teaching in subjects ranging from Law to Agriculture.

Of course, students really should be developing their critical thinking skills at a much earlier age; at university level we ought to be able to presuppose a strong grasp of the fundamentals. The current version of the software was actually designed in part with secondary school students in mind, and has been available to schools for around a year now.

To date more than thirty Australian schools have incorporated Reason!Able into teaching to a greater or lesser extent. Some schools, such as Melbourne Grammar, have undertaken ambitious initiatives to incorporate Reason!Able across many subjects and year levels. They recognize that the skills in question are generic and fundamental, and that the best way to build the skills is for students to use appropriate techniques repeatedly over a long period and in many different contexts.

This is worth emphasizing. Reason!Able is not like a multimedia package, to be used separately from or in addition to everything else. Rather, it is a generic tool, similar to a word processor. You might think of it as a *thought* processor, helping students structure their thinking in more systematic and logical ways. Many teachers are already familiar with generic concept mapping tools such as Inspiration, or mind mapping tools such as MindManager. Reason!Able is in the same broad space, but focuses exclusively on reasoning and argument.

Teachers have been creative in applying Reason!Able in learning. One common use is in essay planning. Before writing a “defend your opinion”-type essay, students use the software to map out their reasons and to deal with objections. The resulting argument map forms the *logical* backbone for their essay. The converse of this is what we call “critical reading.” Here students are given a text, and the software helps them identify and evaluate the author’s reasoning. This helps them articulate a genuinely critical response.

Other uses include structuring class discussions; debate preparation; research planning; and even dispute resolution!

In all these activities, Reason!Able functions much like training wheels on a bicycle. The world of reason, evidence, debate, judgement and truth is exceedingly challenging. Negotiating this terrain actually requires very sophisticated skills. In my opinion, mastering critical thinking skills is approximately as difficult as learning a second language. As everyone knows, second languages take years of coaching and hard work. (I studied German for 5 years in high school, and still couldn’t hold a decent conversation.) Acquiring critical thinking skills is easier when there is scaffolding to help learners do roughly the right kind of thing. Eventually, like training wheels, the scaffolding can be thrown away. By that time, the appropriate dispositions should be second nature.

We don’t yet know just how effective Reason!Able is in a schools context. It is still early days; we haven’t yet undertaken any serious studies, and educational research is a notoriously tricky business. Our optimism is based on the results found at Melbourne University, plus anecdotal evidence from teachers who are observing the impact on students’ thinking. We are planning to try to quantify the benefits of the Reason! approach, and a few schools have already offered to work with us in conducting the research.

At the Reason! project, we are interested to hear from, assist, or work with any school interested in using this kind of approach to substantially enhance critical thinking.

The Reason!Able software can be downloaded from

<http://www.goreason.com>

The Reason! project research website is

<http://www.philosophy.unimelb.edu.au/reason/>

and we have created an email discussion group for leaders in the use of the Reason!  
approach in teaching:

<http://groups.yahoo.com/group/reasonleaders>