

Critical Thinking & Intellectual Virtues

A preliminary framework for design, instruction, and assessment

Abstract: Despite being one of the explicit goals of many Western educational institutions, a lack of critical thinking ability is endemic at all levels of education as well as in the adult populace. Furthermore, many educators lack methods to teach or assess critical thinking, which has long been an ill-defined concept. In response to these challenges, an approach to fostering critical thinking based on intellectual virtues is proposed. A framework of four “cardinal” intellectual virtues (Precision, Objectivity, Openness, and Humility) provides the basis for a comprehensive framework of ninety-six distinct knowledges, values, skills, and behaviors. This framework can be adapted to suit instructional needs at the primary, secondary, and tertiary levels.

I. THE CRITICAL THINKING CRISIS

In a world marked by the proliferation of information and a plurality of charismatic voices, it is more important than ever for people to think critically about the things they read, watch, and listen to. However, despite decades of effort by the primary, secondary, and tertiary education systems, internet conspiracy theories like QAnon have captivated millions of people in North America, so-called “misinformation” and “fake news” have created a wildly polarized political landscape characterized by very different paradigms, and the COVID-19 vaccine issue has driven a wedge between two ideological groups, each with their own ideas about the creation and validity of scientific knowledge. It is arguable, in some sense, that Western society is facing a critical thinking breakdown in spite of two thousand years of momentum towards enlightenment.

Indeed, one of the core missions of the Western educational paradigm has been to inculcate critical thinking in young people (Durkin 2011), yet researchers have consistently found that such qualities are lacking in the general populace. Just over half of adults aged eighteen to thirty-one fail critical thinking tests (Ascione 2019), no measurable

gains in critical thinking ability are made during secondary school (Perkins 1985), and even undergraduate students in Western universities, supposedly the best and brightest graduates from the secondary system, are entering and leaving their degree programs without developing critical thinking skills (Caplan 2018, Strong 2021a). Furthermore, despite the stated focus on critical thinking that postsecondary institutions claim to have, many faculty members either believe that critical thinking cannot be assessed or have no method of doing so (Bissell & Lemons 2006).

This lack of understanding on the part of educators is even more pronounced at the primary and secondary levels, where historical commentary suggests that the problems of teaching critical thinking are “severe” and persistent across several decades (Schafersman 1991, Willingham 2007).

The problems inherent in teaching critical thinking are numerous: there is no agreed-upon definition for this concept (Huitt 1998), it is an internal thought process that is difficult to observe or assess (Liu et al. 2014), and existing methods of instruction tend to be overly broad and fail to develop the “cognitive building blocks” required for critical thinking (Pasquinelli et al. 2020). These problems are

especially pertinent at the primary level, where concepts must be simplified to accommodate younger students' level of development.

In response to these challenges, a framework for teaching and assessing critical thinking is proposed. Taking inspiration from a variety of sources, including philosophical and psychological perspectives, a set of four intellectual virtues form the basis for ninety-six unique knowledges, orientations, skills, and behaviors that can be cultivated, observed, and assessed by educators at all levels. This paper outlines the rationale and basis for the framework.

II. DEFINING CRITICAL THINKING

Just over one hundred years ago, the modern idea of critical thinking was developed by John Dewey, who referred to it as an "active, persistent, careful consideration of a belief or supposed form of knowledge in light of the grounds that support it and the further conclusions to which it tends" (Dewey 1910). In the decades following this original proposal, a multitude of definitions were proposed and evaluated by scholars; only recently has a convergence of opinion begun to emerge.

The general consensus at this time is that critical thinking is a set of *cognitive skills* and *intellectual dispositions* that are used to evaluate evidence, discover biases and fallacies in one's own thinking, and to decide what to believe and do (Ennis 1985, Bassham et al. 2010). Although this definition is comprehensive and seems to accurately capture the nature of critical thinking, the fact that critical thinking encompasses both "skills" and "dispositions" makes it difficult to understand or teach. For example, how exactly does one teach a disposition such as truthfulness or humility in a classroom setting when such attributes are usually cultivated through extended mentorship? How can students be reliably taught to "see through" fallacious or deceptive arguments when basic literacy and numeracy are still critically

underdeveloped (Caplan 2018)? Also, how does one objectively and fairly assess a "disposition"?

III. A VIRTUES-BASED APPROACH

Because of the complexity of the concept and a lack of educational resources at the classroom level, current approaches to teaching critical thinking are largely straightforward and skill-based by default: students are taught about different types of fallacies and biases, how to employ inductive and deductive reasoning, and what a strong argument looks like. However, as the evidence shows, such an approach is insufficient when it comes to developing the broad range of skills *and dispositions* encompassed by this concept.

It is important to note that critical thinking is never performed in a vacuum: it is a goal-oriented activity with the end objective of informing thought and guiding action. Additionally, true critical thinking often leads the thinker to inconvenient or surprising conclusions: thus, one must be willing to follow the proverbial evidence wherever it leads, and willing to accept the conclusions. Taken together, these two facts suggest that critical thinking takes a special kind of motivation: an orientation towards truth, a commitment to objectivity, and a respect for rigor are all personal qualities required of a critical thinker.

As can be seen, critical thinking is about much more than skills. At the heart of this endeavour is the cultivation of a *type of personality* rather than the acquisition of a bundle of skills. Thus, part of critical thinking education is to develop positive personality traits, or *virtues*.

To possess a virtue, according to *the Stanford Encyclopedia of Philosophy*, is to think, feel, and behave in ways characteristic of that virtue *out of a love for that virtue*. Being honest out of a fear of getting caught in a lie is not virtuous, while being honest out of a love for truth is. The element of motivation inherent in virtue seems key to critical thinking, given that it is difficult,

often inconvenient, and humbling: thus, developing *intellectual virtues* seems like a viable new path to explore (Baehr 2013).

At the primary level, the advantages of a virtues-based approach become especially prominent: young students simply need to know what is expected of them, and a set of intellectual virtues can be used to guide general classroom behavior as well as development in specific skills. Furthermore, much like an organization's internal values guide employee action, a set of virtues provides a simple "should/shouldn't" scaffold for young children when they are in unfamiliar or novel situations.

Similar benefits accrue to secondary and tertiary educators, who can use the framework in more complex ways to build skills and dispositions in their students. At this level, students will be able to think about and discuss the importance of the virtues they are expected to emulate, thus making the knowledge their own. Additionally, in the case of assessments at this level, a detailed framework based on idealized virtues provides an element of objectivity in environments that are becoming increasingly competitive and subject to student appeal.

III. PHILOSOPHICAL PERSPECTIVES

Outside of religious contexts, the concept and acquisition of virtue has been the purview of philosophy since the days of the Ancient Greeks. In *Nichomachean Ethics*, Aristotle proposed five ways by which people grasp truth, which have since become known as intellectual virtues: *episteme* (scientific knowledge), *techne* (artistic or technical know-how), *nous* (intuitive reason), *phronesis* (practical wisdom), and *sophia* (philosophical wisdom)ⁱ. Contemporary scholars have also proposed virtues such as attentiveness, humility, courage, and inquisitiveness (Watson 2018). Like almost every other topic in philosophy, there is no consensus on what

intellectual values "exist", or which ones should be pursued.

For the purposes of a framework designed for use in instruction and assessment, the works of three philosophers of education have been selected as source material. The first is a series of lectures now called *The Idea of a University*, which were delivered by the founder of University College Dublin almost two hundred years ago (Newman 1852). The second is a modern-day review of those lectures written by a scholar from Yale (Pelikan 1992). The third is an open online course about the philosophy of education (Hicks 2009).

In *The Idea of a University*, Newman draws a clear distinction between the acquisition of facts and the development of what he calls a "discipline of mind". Mental rigor, Newman claims, comes from mastering such tasks like translating languages, learning history, and understanding and developing logical proofs, and engenders within the student a number of traits or qualities such as accuracy, caution, exactness, and logical precisionⁱⁱ, as well as the ability to seek truthⁱⁱⁱ. When practiced regularly, this discipline becomes a "habit of mind" the fruits of which Newman says are "freedom, equitableness, calmness, moderation, and wisdom".

Pelikan's re-examination of Newman's ideas in the context of the modern Western university explicitly discusses a number of intellectual virtues, among them intellectual honesty, a trust in rationality and its processes, the ability to tolerate scholarly disagreement while maintaining conviction, free inquiry, and a "discipline of mind" characterized by an "ascetic" disposition.

In a lecture entitled *Education's epistemological mission*, Rockford professor Stephen C. Hicks proposes several intellectual virtues that follow naturally from the education system's goal to foster reasoning ability in its students. These virtues, which include openness to new data, a commitment to objectivity, the ability to accept

criticism, perseverance, courage, and independence all echo themes found in the works of Newman and Pelikan.

Several themes emerge from these three works. The first, and perhaps most consistently represented, is the idea of academic freedom. In the present day, such a term might evoke thoughts of university policies or tenured professorships, however the more fundamental “virtue” enshrined in and protected by such policies is curiosity. Similarly, the ability to take in new information and make sense of it, referred to as “openness” by Hicks and as “discipline of mind” by Newman and Pelikan, features prominently. Intellectual humility, characterized by Newman as calmness, moderation, and wisdom, is also covered throughout Hicks’ lectures.

Although a level of concordance does exist between these philosophical perspectives, grounding these ideas in the domain of psychology will provide additional direction.

V. PSYCHOLOGICAL PERSPECTIVES

In any modern discussion of pedagogical practice, the psychology of the learner must be considered. This is especially true where critical thinking is concerned, as the processes of evaluating information and making reasoned judgements are mental procedures and therefore subject to psychological phenomena and constraints. For this reason, it would benefit us to consider what critical thinking is from a psychological perspective. What is the function of such an activity? What is the goal?

Here, Ancient Greek thinking proves to be remarkably prescient: whereas philosophers such as Aristotle, Plato, and Socrates concerned themselves with humankind’s ability to apprehend and “grasp” truth, modern-day psychologists, neurologists, cognitive scientists, and expertise researchers have all concurred that the human mind works to model its surroundings as accurately as

possible in order to predict future events, develop short-term and long-term plans, and respond to novel stimuli (Strong 2021b). This is true in specialized situations like chess games, where skilled players utilize internal representations of game states to generate optimal moves, as well as in “everyday” situations like romantic relationships, where one develops a deep understanding of their partner’s preferences, communication style, and personality to maintain harmony.

As far as educators are concerned, the implications of this revelation are profound. Effectively, this means that the “search for truth” that has characterized Western philosophy for two millennia is not just an idle academic affair or the concern of long-dead Greeks. On the contrary, attempting to match our own perception of the world to the way the world “really is” has proven to be the fundamental way in which we relate to the world and act within it. Indeed, the human brain is wired to develop mental models of the world that correspond to reality, despite how often it gets led astray.

Several desirable mental traits follow naturally from this psychological reality. Although these traits may not necessarily be “virtues” in the purest philosophical sense, they could be considered analogous to virtues in the sense that their attainment is associated with surviving and thriving in the world.

The first of these traits is precision: having an accurate mental model of one’s surroundings requires a detailed and accurate perception of those surroundings. As many philosophers and scientists have observed, this is deceptively difficult, as our internal states can affect how we assign valence to environmental stimuli and therefore cloud our judgement. In extreme situations like war or death-defying sports, such a miscalculation could lead to catastrophic error or death. In organizational contexts, misreading a number or

misinterpreting a key market trend could prove to be costly in a monetary sense.

The second trait is openness to new data. Highlighted in Hicks' *Philosophy of Education* lectures, this character attribute governs an individual's orientation to what is novel and unexpected in their environment. Failure to acknowledge that which is "new" usually leads to a preventable catastrophe, inhibits the acquisition of valuable information, or leaves people beholden to ossified and outdated traditions.

The third trait is rationality. Although this term is defined in the dictionary as "the quality of being based on or in accordance with reason or logic", in a psychological sense this word can be taken to mean a system of rules-based thinking. Whereas the external world operates according to specific rules, the human mind can conceive of and contrive all sorts of alternate realities: therefore, environmentally-adaptive thinking endeavours to follow the same "rules" that the world does. This ensures that the mental models generated by these processes conform to the "real world" and can be reliably used to guide action.

VI. A CONVERGENCE OF OPINION

Despite the variations in their methodology and approach, many scholars in philosophy and the psychological sciences seem to be approaching something resembling a consensus on several matters regarding the matters of critical thinking. First, there is a strong emphasis on perceiving the world accurately; on seeing things "as they are". Second, both the Western paradigm and Mother Nature expect thought to be systematic, logical, and performed according to parameters that ultimately reflect real-world occurrences. Finally, there is an element of humility to consider – good scholars acknowledge the limits of their own understanding, and wise people in many walks of life have realized the importance of doing the same. From this humility springs a curiosity

for the world, and an openness to new information.

VII. DEVELOPING THE FRAMEWORK

Based on the philosophical and psychological foundations described in this paper, a framework of intellectual virtues and related attributes was developed. Design of the framework was bounded by two constraints: it had to be simple enough for primary school students to remember and work towards, yet complex enough to guide instructional design at the postsecondary level.

For this reason, it was decided to limit the number of "cardinal" virtues to four (Precision, Objectivity, Openness, Humility), so even young students could develop recall ability for them. Six subdomains of activity were classified under each virtue to give educators a more detailed scaffold when planning activities, as well as the freedom to explore concepts in-depth with their class.

To facilitate instruction and assessment activity, a demarcation of student competencies into knowledges, orientations, skills, and behaviors was employed (Seemiller 2013). When combined with the twenty-four subdomains in the framework, the framing of critical thinking in this way yields ninety-six distinct areas of potential instruction and assessment that respect both the going definition of critical thinking (skills and dispositions) as well as the suite of virtues that emerges from the convergence of thinking between philosophy and psychology.

In preliminary testing, this framework has proven to be an extremely valuable tool during the design of a university-level course by providing a checklist of learning objectives. The author is also planning to develop a suite of materials for Grades 1-5 that will support teachers in transforming their students into *bona fide* scholars. The framework itself and this explanation is presented without charge for feedback, use, and adaptation.

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HELPFUL QUOTES

ⁱ **Aristotle, "Nicomachean Ethics" (340 BC)**

"Let it be assumed that the states by virtue of which the soul possesses truth by way of affirmation or denial are five in number, i.e. art, scientific knowledge, practical wisdom, philosophic wisdom, intuitive reason; we do not include judgement and opinion because in these we may be mistaken."

ⁱⁱ **J.H. Newman, "Lecture: Discipline of Mind" (1852)**

"Consider, for instance, what a discipline in accuracy of thought it is to have to construe a foreign language into your own; what a still severer and more improving exercise it is to translate from your own into a foreign language. Consider, again, what a lesson in memory and discrimination it is to get up, as it is called, any one chapter of history. Consider what a trial of acuteness, caution, and exactness, it is to master, and still more to prove, a number of definitions. Again, what an exercise in logic is classification, what an exercise in logical precision it is to understand and enunciate the proof of any of the more difficult propositions of Euclid, or to master any one of the great arguments for Christianity so thoroughly as to bear examination upon it; or, again, to analyze sufficiently, yet in as few words as possible, a speech, or to draw up a critique upon a poem."

ⁱⁱⁱ **J.H. Newman, "Lecture: Knowledge Viewed in Relation to Professional Skill" (1852)**

"Truth of whatever kind is the proper object of the intellect; its cultivation then lies in fitting it to apprehend and contemplate truth. Now the intellect in its present state, with exceptions which need not here be specified, does not discern truth intuitively, or as a whole. We know, not by a direct and simple vision, not at a glance, but, as it were, by piecemeal and accumulation, by a mental process, by going round an object, by the comparison, the combination, the mutual correction, the continual adaptation, of many partial notions, by the employment, concentration, and joint action of many faculties and exercises of mind. Such a union and concert of the intellectual powers, such an enlargement and development, such a comprehensiveness, is necessarily a matter of training."

<i>Virtue</i>	<i>Subdomain</i>	Knowledges	Orientations / Values	Abilities / Skills	Behaviors
Precision	Truth	Understands value of truth/accuracy	Values truth and accuracy	Can identify / evaluate truth claims	Is truthful and accurate in communications
	Data	Understands types of data & validity	Values good data	Can make evaluations of data / info validity	Evaluates information carefully and accurately
	Organization	Understands the org. of knowledge	Values good information architecture	Can organize / sort knowledge & info	Habitually sorts, organizes own information
	Clarity	Understands the concept of "noise" in data	Values clarity in data, problem-solving	Can focus attention on relevant data	Sorts out noise from signal in problem-solving
	Predictions	Understands how useful/acc preds. are made	Values well-thought out predictions/hypothesis	Can develop hypotheses based on past data	Develops reasonable hypotheses
	Nomenclature	Understands the value of language use	Values accurate nomenclature	Can name issues or phenom. accurately	Habitually names & identifies phenomena
Objectivity	Facts vs. Emotion	Understands the roles of fact vs. emotion	Values fact-based reasoning over emotional	Can separate emotion/facts during an invest.	Deploys facts and emotions appropriately
	Fallacies & Biases	Understands types of common fall/bias	Values clear-headed, conscious thinking	Can identify biases/fallacies in arguments	Communications free of fallacies/biases
	Logic	Understands the basics of how logic works	Values the use of logical thought processes	Can think logically about issues	Constructs logical arguments and claims
	Pragmatism	Understands the practical value of objectiv.	Values simple, elegant explanations	Can identify specious reasoning	Seeks simplest reasonable explanation
	Process	Understands different objective processes	Values the use of methods to obtain truth	Can participate in truth-finding methods	Uses methods to understand issues
	Corruption	Understands how objectivity gets corrupted	Values credible and fair processes	Can identify obj. problems in processes	Safeguards integrity of truth-finding methods.
Openness	Cognitive Dissonance	Understand what cog.diss is & why it happens	Values being exposed to difficult inform.	Can identify cog.diss in self and others	Attempts to mitigate cog.diss in self
	Curiosity	Understands value of being open to new data	Values new, unexp., diverse information	Can seek out info to challenge own persp.	Habitually seeks out new information
	Dialectic	Understands what dialectic is, how it works	Values the use of dialectic in truth-seeking	Can engage in dialectic productively	Seeks out opps for productive dialogue
	Feedback	Understands the importance of feedback	Values feedback in their intellectual practice	Can seek out feedback from others	Seeks out meaningful feedback
	Growth	Understands the process of intellectual growth	Oriented towards intellectual growth	Can identify opportunities for learning	Seeks out opportunities for intell. growth
	Generosity	Understands value of giving benefit of doubt	Oriented towards being charitable to args.	Can differentiate bet. steelman, strawman	Can steelman an opposing argument
Humility	Limits	Understands the limits of personal knowledge	Values [intellectual humility]	Can identify limits of own knowledge	Identifies/acknowledges limits in dialogue
	Advocacy	Understands tension between humility, advoc.	Values balanced advocacy and activism	Can construct compelling & fair arguments	Advocates for ideas without overstepping
	Ego	Understands how intellectual ego manifests	Values [humility]	Can identify ego distortions & thinking patts.	Strives to quell one's own ego
	Relationships	Understands how intellectual reln's work	Values having relationships with intellectuals	Can form and maintain prod. reln's	Habitually builds relationships with others
	Context	Understands that knowledge can be contextual	Values contextual claims over absolutes	Can identify when knowledge is applicable	Applies knowledge in proper context
	Community	Understands the collective nature of knowledge	Values group participation in know. crtn	Can work with others in knowl. processes	Collaborates to achieve intellectual goals