



Critical Thinking:

The objective analysis and evaluation of an issue in order to form a judgment.

In developing critical thinking skills for a scientific or mathematical closed-ended process, a structural procedure could be viewed as: Observation, Analysis, Inference, Communication and Problem Solving. In developing critical thinking skills for an open-ended challenge, which is has variable solutions with differing values and unseen obstacles - a new approach is needed.

What is Critical Thinking?

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What does the term “critical thinking” actually mean?

The definition from OED reads: “The objective analysis and evaluation of an issue in order to form a judgment.” This seems clear enough until you try to put this into practice, especially within a classroom. How do you objectively analyse and evaluate? Whose judgment are you forming, and how are you doing that? Once you start to break it down, critical thinking becomes rather complex and unclear.

The Stanford Encyclopedia of philosophy says, “Critical thinking is a widely accepted educational goal. Its definition is contested, but the competing definitions can be understood as differing conceptions of the same basic concept: careful thinking directed to a goal.” Okay, so we need a goal and some careful thinking to get us there. It’s still not crystal clear.

The Stanford site also provides information about John Dewey, the influential American philosopher of education. He called it “reflective thinking’ and defined it as “active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it, and the further conclusions to which it tends”. Maybe we are getting closer to a definition, but it still remains unclear how you put that into practice and use it in the classroom.

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Knowledge management involves cognitive tasks. Critical thinking is a different skill, it is cognition plus metacognition – thinking about thinking.

Can critical thinking be developed? And more specifically, can it be developed in a classroom environment?

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The Organisation for Economic Co-operation and Development (OECD), who issue the much sought-after international PISA ranking in schools are planning to extend the criteria of cognitive-only testing to include creativity and critical thinking and how to educate the whole child – including developing communication and connection.

Thinking critically is a necessary skill, however the opportunity to practice this through application of experience rather than abstract and theoretical study, is absent in most educational environments.

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Portal Perception

Perception is a release of purposeful and directed critical thinking, to the more subconscious and imaginative thinking. This is best expressed through learning to draw:

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As with all new things the perception skills are not easy to master, they just take practice. But before long, you are drawing very presentable pieces of work. You initially focus on one component, maybe edges, “seeing” how the edge of one thing is automatically the edge of another. Then a focus on the relationships, how one edge or line or shadow exists in relation to something else. The whole or the gestalt is not a skill, it is not something that is specifically taught, but an integration of the other perceptions, once you have the practice in place, the whole appears. Once you have mastered the initial skills, there is not another set of skills to develop, there is only more practice.

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McGilchrist points out:

Ultimately I believe that many of the disputes about the nature of the human world can be illuminated by an understanding that there are two fundamentally different ‘versions’ delivered to us by the two hemispheres, both of which are hugely valuable: but that they stand in opposition to one another, and need to be kept apart from one another – hence the bihemispheric structure of the brain.

Those differences are:

The right hemisphere:

- Is curious, looks out for what might be different from our expectations, is future oriented and welcomes change and the concept of evolving.
- Reads body language and emotional facial expressions. Is emotional, but not responsible for anger, that is in the left hemisphere’s domain.
- Is intuitive, self-aware and empathetic, is flexible, takes risks and finds solutions.
- Displays insight, imagination, visualisation and experimentation.
- Understands nuance, ‘gets’ the joke, understands metaphor, is playful.
- Is interested in individual concepts, not categories and is attuned to living things rather than mechanical objects.
- Sees the whole interconnected picture.

These attributes sound amazing, what else would a human being need?

Well, to apply these functions we need a different mental process, which is more specialised. That's where the other hemisphere comes in to play:

The left hemisphere:

- Is responsible for some aspects of language, and the voice in your head.
- Manages some aspects of logical and rational thought.
- Is analytical.
- Is narrow, sharp and pays attention to detail.
- Needs mechanical perfection.
- Wants tangible categories and coding.
- Is contained in an enclosed system, an echo chamber, a hall of mirrors.
- Is static and decontextualized.
- Demands clarity and precision.
- Does not see the whole, only fragmented parts.

The design of the brain allows the movement of communication to travel back and forth across the corpus callosum. If this system works how it was designed to work, it would provide a full power, running on all engines, access to rationality and creativity in beautiful synergistic harmony. However, this is mostly not the case.

Third Wave Thinking

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The late Dr. Richard Paul, the original founder of The Foundation For Critical Thinking, was a Professor at Sonoma State University for almost thirty years, later becoming Professor Emeritus of Philosophy. He spent his life talking about how schools do not provide an opportunity for critical thinking or intellectual development. He said:

It is now generally conceded that the art of thinking critically is a major missing link in education today, and that effective communication and problem-solving skills, as well as mastery of content, require critical thinking. It is also generally recognized that the ability to think critically becomes more and more important to success in life as the pace of change continues to accelerate and as complexity and interdependence continue to intensify. It is also generally conceded that some major changes in instruction will have to take place to shift the overarching emphasis of instruction from rote memorization to effective critical thinking (as the primary tool of learning).

Dr. Paul also wrote about three "waves" of critical thinking research, which started in the 1970's. He said the first wave was dominated by philosophers and focused on the theory of logic, argumentation and reasoning. The theorists of this wave are concerned with persuasion and argumentation. They ignore the broad meaning of logic and view it in a narrow and technical way. Human emotion, feelings and behaviour are not taken into account.

First Wave: This first wave also faced the problem of skill transference, how to take the information from critical thinking classes and apply them in other subjects. Dr. Paul tells us that the students reverted to lower-order skills like rote-memorisation to be able to pass their exams.

Second Wave: Dr. Paul tells us that the second wave looks at critical thinking from a different perspective other than logic. This wave has made strides, and views critical thinking through the lens of cognitive psychology and critical pedagogy. However, the research comes from various areas such as biology, business and nursing, so is not integrated and lacks “a shared intellectual tradition.”

Third Wave: The third wave of critical thinking, according to Dr. Paul: “Represents a commitment to transcend the predominant weaknesses of the first two waves.” He also said that third wave theorists are still relatively rare, this caused him concern as he felt there needed to be a general recognition of the importance of moving beyond the first two waves. It would need people to think outside of their own discipline, to widen the premise of logic, to be open to picking up the findings of the first and second wave, and the motivation and opportunity to push it forward.

Prism Perspectives

When I started to think about what a “third wave” of critical thinking might consist of, an image of a prism came floating into my mind.

Instead of a beam of light hitting a prism, it was replaced by a beam of thought. I didn’t know what to make of this so I looked into what happens to a beam of light when it hits a prism.

When a beam of white light hits a piece of ordinary glass, the light waves reach the surface and then travel through to the molecules inside the glass. The waves slow down and travel through the molecules at the same speed. The beam of light is fixed and together (when it exits the glass) and hits the surface beyond, showing a single white light.

Alternatively, when a beam of white light, hits the surface of a prism, the slanted angle causes the light to separate and splash out, like sprays of water from a wave, which has hit a jagged rock jutting out to sea. It then enters the glass separated into the strands of colour spectrum. The light waves then interact with the molecules and travel at different speeds due to the various wave lengths, violet is the shortest so is the slowest, red is the longest and the fastest. Orange, yellow, green, blue and indigo fall in-between. The light exits the glass separately and the colour spectrum is separated out and easy to see with the naked eye.

It seemed to me, that critical thinking was just like that. You are trying to convert a single, flat beam of thought into an interesting array of different coloured strands. But the process needs an agitator, something that acts like the molecules in the glass, which prevents the one linear thought sticking together, it needs to go through a process, which causes the thought, or line of thinking, to separate into strands, to be challenged and pulled apart. Once on the other side, these separated strands can then be examined, picked through and then reformed into a new brighter, bolder beam.

The third wave of critical thinking needs an agitator, to challenge and pull apart a single, one-track, beam of thought.

What is that agitator? It is – other people. Interaction with other people in complex situations, which requires effort, which is difficult to navigate through, trying various routes and bumping into obstructions which need to be removed or obstacles which need to be avoided or traversed. All in an attempt to get to the other side, the destination – the prize. It is agonizing, exhilarating and transformative.

(See Steve Jobs Story – P 198)

First Principle Thinking

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To open up, to ask more questions, to summon the courage to be vulnerable, to tear apart beliefs and assumptions does not come easy to young adults (or older adults). They don't want to dig deep, don't want to lay their cards on the table. They are used to burying emotions and feelings under a shallow veneer of casual interactions. In a classroom setting, feelings and behaviours are never explored, students would never experience vulnerability, or explore critical thinking - unless you are taking part in a Portal Project, which contains the agitator, it was designed into working in opposition with the other team. And applying the 'Story Stages.'

I developed The Story Stages as a structure to self-check the thinking process. They were the key to the process of critical thinking for the students:

Assumption Story Stage

What story are you telling yourself when you have a shallow grasp of the facts? This step is evaluated after skimming the surface information, and checking what premature assumptions and judgments you have made.

Deconstruction Story Stage

This step Applies "First Principle Thinking," which boils down into the foundation of the story. Asking, what is true? What is proven? It deconstructs and locates the origin of the evidence.

Reconstruction Story Stage

The final step looks at the initial assumptions and judgments from the first stage and compares them to the facts from the Origin Story. Did they align, or did you identify biases or cognitive distortions? It then reconstructs the whole story using first, second and third person perspectives.

Agitators & Disruptors

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The Disruptors within TPP's were the troublesome knowledge, the problems to solve, which the facilitators would inject into the project as a major disrupting force. This force would throw the student's plans into chaos and had an effect on the students, which was similar to the reactions that the researchers found in the behaviour of rats, the "sudden shocks to enhance the ability to emotionally cope with unexpected stressful situations." And, like Dabrowski's Theory of Positive Disintegration, the ensuing anxiety tension and loss of control, do not cause the student to retreat, but to face the challenges and burn away old ways of thinking and behaviour, culminating in emotional growth, self-awareness, empathy and compassion.

If the students had faced those challenges totally alone, there would have been a chance that they would have struggled and admitted defeat. However, they were able to turn to those around them, their teammates, for help and advice.

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Underpinning the challenge, is a culture of psychological safety. Nobody will be making fun of mistakes, or belittling efforts to get the plan back on track. Fear of failing is not an option.

Now is the time to work alone and work in a team: exploring options, selecting, rejecting, modifying, elaborating, organising, communicating, perspective taking.

Now is the time to be stubborn, critical, rebellious, and nonconforming. To be an anarchist. To be intellectually creative.

Soon, a team consciousness kicks in, the group genius - the scenius, and the students bond under the pressure, and support each other to design a new plan.

The ensuing awareness of a person's ability to face failure and emerge with renewed motivation, optimism and having created a new scenario, was really powerful for every one of them, life changing even.

Philosophical Thinking (New Addition)

Aristotle in Nichomachian Ethics claimed that the highest form of human functionality, the pinnacle of all virtues is contemplation. It is this deep reflective and philosophical thinking, which guides the conscience.

To be faced with a sea of knowledge and have to navigate towards meaning requires analysing the nature of that knowledge and how it justifies, defines beliefs and arrives at truth. This area of study is known as Epistemology, from Greek "episteme" meaning Knowledge or understanding, and "logos" meaning account or reason.

Philosophical thought, used to understand the world in a non-religious way first arose through the ancient Greeks in the 6th century BC. They explored and examined many areas of study as well as philosophy including mathematics, politics, biology and ethics.

During the Portal Projects, students find themselves thinking philosophically and referring to the great philosophers to guide them through and to help navigate and make sense of a situation, and the actions of the other characters.