Introducing Standardized Critical Thinking Skills to Ontario High School Students

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For about five years, now, I have been lobbying various politicians, the Ministry of Education, teachers, principals, and superintendents, in the hopes of introducing Critical Thinking skills to the Ontario high school curriculum. This past summer, I was successful in convincing the Ministry of Education and the trustees of the Upper Grand District School Board to allow me to develop and implement a pilot project which will introduce Standardized Critical Thinking skills into three high schools in southern Ontario. I must thank the Ontario Minister of Education, Liz Sandals, as well as the Chair of Trustees, Mark Bailey, and the Vice Chair, Marty Fairbairn, for their assistance, guidance, and advice on this project. Without them, I would still be lobbying.

The following is a proposal outlining the importance of having Universally Standardized Critical Thinking skills taught in Ontario high schools. Please keep in mind that the information contained here is what I believe a high school graduate should know. The information would need to be modified to accommodate all grade levels.

For historical significance, the Upper Grand District School Board will be the first Board of Education in Canada to be involved in a pilot project for the primary purpose of teaching standardized critical thinking skills. What follows are the main reasons for wanting to implement such a pilot project.

1. Intrinsic Benefits: Fairness.

The fairest way to educate students in the use of human reasoning skills is to provide them with universally standardized tools for critical thinking. In this way, everyone is equally empowered to effectively communicate their views, listen to others, and grow.

Once students are aware of the rules of reasoning and then use them in accordance with universally established standards, it generates a level playing field in which everyone's views can be expressed and understood with greater clarity. There is often a disconnect between the expression or intention of a viewpoint and the interpretation of it. Learning universally standardized rules for critical thinking minimizes that gap.

In exercising Critical Thinking skills, one can easily see why it is so difficult to argue against the idea of fairness. To do so, one would have to state why treating people unfairly and giving one group a greater advantage in having access to such critical thinking skills over another is somehow justifiable. To do so, we would agree, is unfair and civically unacceptable.

Hence, by implementing a program to establish and teach such Standardized Critical Thinking skills would be to act fairly and in the best interest of everyone's high school-aged children. This is the most intrinsically worthwhile aspect of this proposal – that is, a system within the High School education system that will treat every student as fairly as possible.

2. Extrinsic/Practical Benefits: From the Schools to Society, Cost/Benefit Analysis, Saving Time, Money, and Energy

A. Empowerment:

Standardized Critical Thinking Skills will provide students with empowerment through effective cognitive understanding and communication. By providing students with the tools to better understand information and express themselves in more confident and cogent ways, we can give their voices greater power and efficacy. In satisfying universalized standards, their Critical Thinking skills will increase their abilities to understand and interpret information more effectively.

i. *Application***:** Assistance in organizing thoughts, developing ideas, expressing opinions, building confidence, self-esteem, leadership, etc.

B. Media Literacy:

Students will become more critically reflective of how information is viewed, interpreted, and acted upon. Students will develop more responsibly attained screens and filters through which information will be considered based on universally standardized criteria.

i. *Application:* Capacity for understanding complexities of information in various forms of media. Comprehension of reliably attained information from specific sources, understanding meaning embedded within content e.g. advertising, editorial biases, etc.

C. Scientific Literacy:

Students will better understand how and why science works, how it touches and affects our lives, and what we can do to empower our students with critically reflective capacities that allow them to ask the right questions of the scientific community.

i. *Application:* Abilities to recognize the foundational structure on which scientific information is gathered and disseminated throughout society.

ii. *Application:* Capacities to know what counts as statistically significant or relevant in studies.

iii. *Application:* Abilities to spot pseudoscientific claims, conspiracy theories, quackery, etc.

D. Application to other courses:

Regardless of what courses students take, Critical Thinking skills apply to all areas of study including mathematics, the sciences, civics, history, geography, English reading and composition, technical classes, etc.

i. *Application:* Irrespective of any and all other courses students may take, Standardized Critical Thinking skills will allow them to better understand process, content, goals, and evaluations of their courses.

E. Civic Responsibility and the Settling of Disputes:

Teaching Standardized Critical Thinking skills is civically responsible. It will lead to quicker resolutions at the lowest level of occurrence. It will lead to efficacy of communication within families, schools, the workplace, within law, and even within politics itself. The clearer we can be when discussing ideas, the better someone can interpret what our intentions are. They may not agree with them, but if we attain greater clarity through a more standardized or universalized structure of critical thinking tools, then we facilitate quicker resolutions to grievances and problems throughout society.

i. *Application:* There are robust statistical correlations between literacy rates and increases in GDPs[1] as well as correlations associated with low literacy and incarceration rates[2].

F. Preparation for the Future:

Having learned and practiced good critical thinking skills better prepares students for post-secondary education and the workforce.

i. *Application:* Irrespective of the career path of a student, Standardized Critical Thinking skills will assist in the planning and implementation of career goals through clearer reasoning, more efficient organizational abilities, and better decision-making skills.

DEVELOPMENT

Purpose: Introduction and implementation of Universally Standardized Critical Thinking tools into the curricula of Ontario high schools in an effort to develop more effective cognitive, communication, social, and resolution skills.

Motivation: Insufficient and inadequate training of these skills is evidenced in performances of first- and second-year College and University students. The current à la carte approach to teaching Critical Thinking in Ontario high schools allows too much latitude with selection and little cohesive or standardized universality across the province.

Solution: Teach high school students how to think by teaching the teachers Standardized Critical Thinking skills.

Proposal: A structured program outlining universally established aspects of Critical Thinking, i.e., teaching the Teachers the ABCs of Critical Thinking.

THE ABCs OF CRITICAL THINKING

1 **A is for Argument:** The structure of our thoughts, opinions, ideas, etc. How to formulate ideas in order to be more clearly understood.

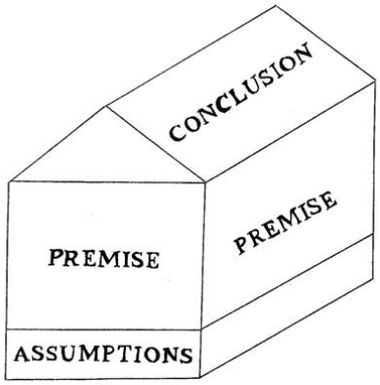
What comes to mind when you think of the word 'argument'? Do you think about images or sounds of people arguing or angrily yelling at one another? Does the term conjure up images of individuals embroiled in heated screaming matches? Or do you think of Monty Python sketches?

When it comes to critical thinking, an argument is actually a good thing. An argument is the way you put together or structure your ideas, opinions or beliefs so that people will better understand what it is you're trying to say.

So what is an argument? An argument is made up of two things: the point you believe and the reasons why you believe it. Therefore, any and all arguments must have a main point and reasons that support it. In informal logic, critical thinking, and reasoning and argumentation, these two parts of an argument are called: the conclusion and the premises. To have an argument, you need at least one premise and one conclusion:

Premise(s) + Conclusion = Argument

When it comes to arguments, you need to think of a house. A house is generally made up of three basic parts: the roof, the walls, and the foundation. This is similar to the structure of all arguments. For all arguments have a roof (the conclusion), walls (your premises), and a foundation (your assumptions).



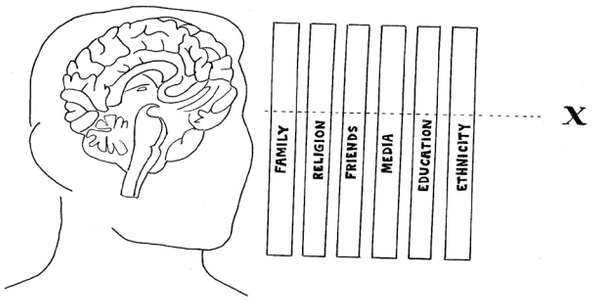
Modes of Reasoning: There are several forms or modes of reasoning that students will learn in developing arguments. These include but may not be limited to deduction (moving from premises to infer conclusions), induction (developing and understanding based on statistical frequencies), and abduction (inference to the best explanation).

2 **B is for Bias:** Recognizing the natural and cultural factors that influence the way we see and think about the world. A bias is a way in which a person is influenced in order to understand and act on particular types of information. Consider many of the relevant factors that influence the ways in which we and others see and understand the world.

Biological Biases: Genetics, neuropsychology, emotions, gender, age, health, etc.

Cultural Biases: Ethnicity, family, religion, friends, media, education, etc.

Biases act like filters through which we attempt to make sense of the world:



The most difficult part of becoming a good critical thinker is to acknowledge any biases in yourself that may distort your reasoning. The better we understand our biases, the more reflective and fairer we will be when discussing important issues.

3 **C is for Context:** Understanding necessary background information in which information is presented, interpreted, and acted upon.

Context, Time, Place, and Circumstance

It is important to identify context related to arguments or information. Otherwise, we may judge and react unfairly and too quickly. And this can lead to a Strawman Argument whereby we misinterpret a person's argument and then attack that misinterpretation. This is neither fair nor relevant.

All of language is embroiled within a context in which we try to convey not only what it is we're thinking but also how we're feeling and what the setting is in which these interactions are taking place. Context allows us to better understand the reasons why someone might think and act in a particular way.

How then, do we try to understand the actions of others elsewhere, e.g., the Middle East, the Congo, the school halls, the shopping malls, etc? We need to be careful when interpreting information to make sure we have established enough background information to be able to acknowledge the context in which the information is being presented.

In this way, when context is sufficient, we can more fairly interpret what is being presented and why the information is being presented in the way it is. How many times have you said or heard the phrase "That was taken out of context"?

This refers to an unfair interpretation of an issue due either to a lack of factual information or a misunderstanding of the surroundings or circumstances in which the information was situated.

The Rules of Fair Play for Critical Thinking

1. Acknowledge your existing biases and determine how they filter the way in which you see and act in the world.
2. Make every effort to attain enough facts before formulating a position on a particular issue.
3. Make every effort to acknowledge the context in which the facts occur before formulating a position on a particular issue. Use a conditional: "All things considered, this is what I now believe."
4. Acknowledge that, due to the way in which so many people are biased differently, there are going to be disagreements on many issues.
5. Be open to the possibility of revising your position.

4 **D is for Diagramming:** Learning the mechanics of our ideas and literally seeing what they look like on paper.

Diagramming =
Drawing the Structure of Arguments

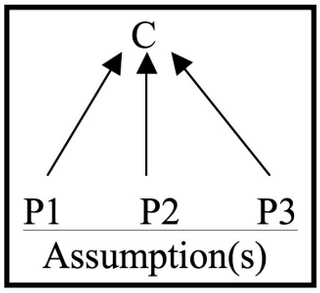
Diagramming allows us to represent and visually identify the structure of an argument from the overall conclusion (roof) to the supporting premises (walls) to the underlying assumptions (foundation).

Diagramming allows us to literally see your or another's argument. Diagramming allows us to identify a number of key components of an argument:

1. The conclusion: The overall main point
2. The premises: The reasons that support the main point
3. The assumptions: The underlying criteria that anchor the premises
4. Noise: Factors that may or may not provide context

Diagramming Abbreviations:
All premises are abbreviated as **P**. All main premises are abbreviated as **MP**. The conclusion is abbreviated as **C**.

- It is a beautiful day today. The birds are chirping, the sun is shining, and there isn't a cloud in the sky.



Premise Indicators: Words such as: since, the reason is, the reasons are, as indicated by, for, if, as, because, given that, etc., indicate where premises are in a person's argument.
Conclusion Indicators: Words such as: therefore, we may infer that, hence, I conclude that, thus, which shows/reveals that, so, which means that, ergo, establishes, then, implies, consequently, proves, as a result, justifies, follows, supports, etc., indicate where the conclusion is in a person's argument.

The Diagramming Checklist

1. Determine the conclusion or overall point that the person is trying to make. If it is a written argument, underline the conclusion. If the overall point is not clearly stated, it is probably hidden (like in most advertisements, i.e., "Buy this product").
2. Consider whether or not the person is using indicator words. If any are present, circle them.
3. Put brackets around and number the various basic or main premises.
4. Create a legend, and adjust the wording of the premises, if necessary.
5. Build a house with the conclusion on top, premises beneath, and assumptions on the bottom.
6. Consider the underlying assumption(s).

5 E is for Evidence: Determining what type and how much evidence is required to support a position.

There are many different types of claims that we and others make every day. Some of these claims require very little evidence to convince someone of our views. Other claims, however, require considerably more evidence. Remember Carl Sagan's statement: "Extraordinary claims require extraordinary evidence." And David Hume's claim: "Wise [people] proportion themselves to the evidence."

Anecdotal Evidence: Personal Experience:

Anecdotal evidence occurs when one individual provides information about a singular experience. We must be careful about relying on individual experiences because they might not indicate a fair representation. In other words, individual experiences can lead to improper and sometimes unfair generalizations, e.g., if someone has a bad experience at a restaurant, they might assume that many patrons will have bad experiences. This type of generalization is unfair because it came about after only one experience.

And that's not enough to provide statistical significance to support their conclusion. One of the most famous cases of bad anecdotal evidence came from a celebrity named Jenny McCarthy. Ms. McCarthy wrongly concluded that because her child developed autistic symptoms after he had received a vaccination, therefore, the vaccine caused his autism.

As it turns out, Ms. McCarthy was completely wrong in her generalization, but unfortunately, she directly or indirectly brought about illness, sickness, and in some cases, death to many children because their parents refused to have them vaccinated because of Ms. McCarthy's anecdotal evidence and her unjustified belief.

Legal Evidence:

Legal evidence comes in many forms but generally, in legal testimonials, witnesses in a court of law swear under oath that the information they are providing is true.

Intuition:

This capacity provides a peculiar form of evidence but is highly subjective. For example, you sometimes hear people say things like:

- "I didn't walk down that dark alley because I felt as though it might be dangerous."
- "I didn't purchase the car from that salesman even though it seemed like a great buy because there was something suspicious about him."

But we might say that these intuitive approaches to evidence come from personal feelings about specific situations that are triggered by cues or behavioral patterns that elicit emotional responses in us. They are sometimes referred to as hunches. And they are not always dependable because your intuition about something or someone might be completely different from mine. So who's right? And how would we determine this?

Scientific Evidence:

This type of evidence includes claims involving our understanding of the natural world that require that we present physical, empirical evidence to show we are on the right track in terms of understanding natural properties and mechanisms. In order to better understand how scientific evidence is gathered, here is a brief description:

The Scientific Method in Six Easy Steps

1. We often first make an observation of something that has happened.
2. We then consider what caused this thing to happen by posing educated guesses (or hypotheses).
3. We can then make predictions about what we should expect to see if our hypotheses are correct.
4. If necessary, experimentation and data collection may be conducted.
5. Further observation is necessary, which will lead to three possible outcomes:
   a. If we observe that our data positively support our prediction, then we have hypothesis confirmation (at least for now, or tentatively).
   b. If we observe that our data do not support our prediction, then we have hypothesis falsification, and we may be forced to either give up or modify our hypothesis.
   c. If there are simply not enough data to decide either way, then we suspend judgment.
6. Finally, we need to consider whether there are any other competing hypotheses that provide equally plausible or likely explanations of our observation. If there are, then we need to ask ourselves which seems more reasonable. If there are no others, then we may decide to tentatively accept the hypothesis based on the currently available information.

Consider an example involving bread in a toaster. A person is making breakfast and puts two slices of bread into a toaster. Upon returning to the toaster minutes later, the bread has not become toast.

This is Step 1: Observing some phenomenon, i.e., bread is not toast. Now, Step 2: the educated guesses or hypotheses begin. Why is the bread not toasted? The toaster might be unplugged. The power could be out in the house, or the neighbourhood, or the entire city. There could be something wrong with the toaster. These are all good hypotheses. But when we start making predictions (Step 3) and collecting data (Step 4), we can start to falsify some (Step 5). So if the toaster's plugged in, then we can falsify and eliminate that hypothesis. Now we move on. To test to see if we have power, we plug something else into the outlet. If there's power, we falsify that hypothesis and move on to the toaster. Within the toaster there are specific parts. Maybe the switch is broken. Maybe the cord is damaged. Maybe there is an internal fuse.

Whatever the case, we now know the problem lies within the toaster itself. And we know this by using the scientific method and various modes of reasoning.

Scientific reasoning has become our most powerful tool in understanding cause-and-effect relationships in the natural world, and the evidence it provides gives the greatest strength to our premises in support of our explanations.

Scientific Studies: Asking the Right Questions

> *"There are three types of lies: lies, damn lies, and statistics."*
>
> – Mark Twain

67.52% of all statistics are made up on the spot ;-)

Whenever anyone uses statistics and/or studies to support their argument, you need to know how to check their facts. And to do so, you simply need to ask these questions:

Important Questions for Studies:

1. Who conducted the study?
2. What was the motivation for the study – in other words, why was it conducted in the first place?
3. Who funded the study?
4. What was the methodology of the study, or how was the study carried out? (Remember to consider sample size and representation.)
5. Is the study repeatable? That is, would any other scientists, under similar conditions, arrive at the same findings?

Once we find answers to these questions, we are in a better position to determine how reliable the information will be in the study.

6 F is for Fallacies: Knowing the most pertinent errors in reasoning and being able to spot them in others and within our own belief systems.

A fallacy is an error in reasoning. Fallacies usually occur because of inconsistencies, irrelevancies, and contradictions in our statements. For example, a Star Wars video game of my son's has a character mentoring a young Jedi Knight by saying the following: "Listen to and trust your feelings." As it stands, this does not present much of a problem. That is, until you hear what he says next: "Don't let your feelings cloud your judgement." Well…which is it? If I were the Jedi Knight, should I listen to and trust my feelings or not let them cloud my judgement? The two commands are inconsistent when taken together.

To date, there are over 150 informal fallacies. I cover 24 fallacies in my book *How to Become a Really Good Pain in the Ass: A Critical Thinker's Guide to Asking the Right Questions*.

Among the most important fallacies I will introduce to high school students are: **Ad Hominem:** attacking the person rather than the argument. **Confirmation Bias**: being unable to see outside of information which only confirms what we already believe. **False Dichotomy:** the proposal that there are two and only two possible options or outcomes. **Language Problems:** Identifying euphemisms, vague, and ambiguous terms. **Post Hoc:** simply because an event happens after another event does not necessarily mean there is causality between the first and the second. **Red Herring:** intentionally diverting a person's attention away from the topic at hand. **Slippery Slope:** a fallacy committed when one wrongly believes that by starting at one point, they will inevitably end up in an unfavourable final point. **Strawman argument:** deliberately misrepresenting another's argument and then attacking the misrepresentation.

Conclusion: By teaching students universalized critical thinking skills, we empower them with the capacity to reason and think independently and responsibly. This, in turn, will lead to more efficient communication skills which will lead to more responsible actions. The purpose is not to teach students what to think, but how to think. And this will ultimately lead to a more cohesive, literate, and hopefully, cooperative society.

It is my hope that Standardized Critical Thinking skills will one day be taught in all high schools throughout Canada and, with enough support, the world. •

References

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2. Vacca, James S. Educated Prisoners Are Less Likely to Return to Prison. *Journal of Correctional Education*. 55(4): 297-305.

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