



THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA

CREATE CHANGE

Critical Thinking

The 21st Century Skill

Dr Peter Ellerton

Curriculum Director, University of Queensland Critical Thinking Project





THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA

CREATE CHANGE

apen2019@criticalthinking.org.au

Yes! We are all rational!





Question everything. Except your impact.

Ben Ricketts once described himself as a 'greenie', and while he started his career in law with this ideal, life would ultimately get in the way. Here, he shares his journey and how the UQ MBA reignited his passion and transformed his career.

[Read and watch Ben's story](#) >



Question everything. Except your purpose.

Sophia Arkininstall is on a mission. The UQ MBA graduate is setting out to make smart cities a reality, taking the concept beyond infrastructure, to look at how our cities will enable us to live healthier, happier lives into the future.

[Read and watch Sophia's story](#) >



Question everything. Except your legacy.

For Guy Barroilhet, growing up with a close-knit family inspired him to leave a legacy. Here, he explains why his is driven to find solutions to one of the world's biggest environmental challenges and how his MBA will help him get there.

[Read and watch Guy's story](#) >



Question everything. Except your curiosity.

Samantha Rush has always been driven by curiosity; from pulling apart and rebuilding appliances in childhood, to today rebuilding systems, processes and businesses in her career. She shares how a UQ MBA has allowed her to shape her own impact.

[Read Samantha's story](#) >



Decision making



SUBSCRIPTIONS

Welcome to
The Economist Subscription Centre

Pick the type of subscription you want to buy or renew.

- Economist.com subscription** - US \$59.00
One-year subscription to Economist.com. Includes online access to all articles from *The Economist* since 1997.
- Print subscription** - US \$125.00
One-year subscription to the print edition of *The Economist*.
- Print & web subscription** - US \$125.00
One-year subscription to the print edition of *The Economist* and online access to all articles from *The Economist* since 1997.

Welcome to
The Economist Subscription Centre

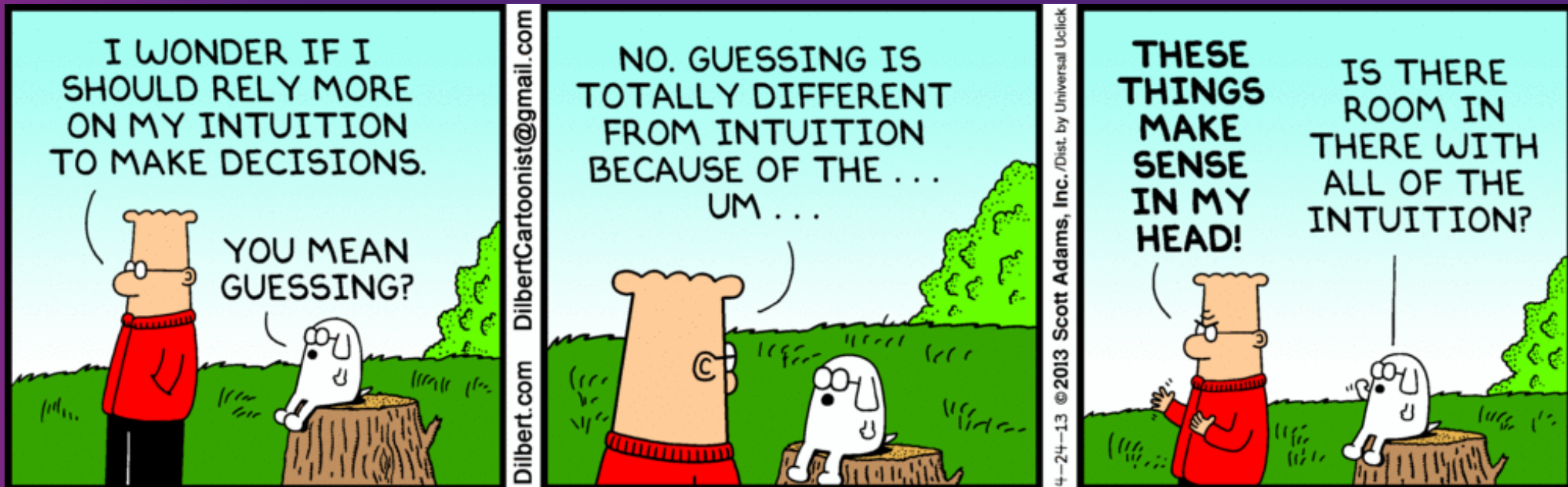
Pick the type of subscription you want to buy or renew.

<input type="checkbox"/> Economist.com subscription - US \$59.00 One-year subscription to E Includes online access to e <i>The Economist</i> since 1997.	16%
<input type="checkbox"/> Print subscription - US \$125.00 One-year subscription to t <i>of The Economist</i> .	0%
<input type="checkbox"/> Print & web subscription - US \$125.00 One-year subscription to t <i>of The Economist</i> and online articles from <i>The Economist</i>	84%





Cognitive bias



KNOW THYSELF

anchoring

The first thing you judge influences your judgment of all that follows.

When you are asked to estimate, the order in which we receive information helps determine the course of our judgments and responses.

Be especially mindful of the bias during financial negotiations such as houses, cars, and salaries. The initial price offered is proven to have a significant effect.

confirmation bias

You favor things that confirm your existing beliefs.

We are primed to see and agree with those that fit our perceptions, and to ignore and dismiss information that conflicts with them.

Think of your ideas and beliefs as software you've set up trying to solve problems with rather than things to be debated.

"The first principle is that you must not fool yourself - and you are the easiest person to fool."

- Richard Feynman

backfire effect

When your core beliefs are challenged, it can cause you to believe even more strongly.

As our experience being wrong as an anchor, our way of seeing, or our that identity. This can lead to irrational reasoning which causes us to disbelieve, despite overwhelming evidence.

"I don't want you to know how the gas you're breathing. It's what you breathe that's the gas you're in."

- Alan Watts

declinism

You remember the past as better than it was, and expect the future to be worse than it will likely be.

Despite being in the more peaceful and prosperous time in history, many people believe things are getting worse. The 20th century, with its tragedy of overly negative and violent events, may account for some of this.

Instead of relying on nostalgia to represent one of those great things used to be, unimpeachable metrics such as life expectancy, levels of crime and violence, and prosperity statistics.

just world hypothesis

Your preference for a just world makes you presume that it exists.

A world in which people don't always get what they deserve, hard work doesn't always pay off and evil happens is an uncomfortable one that threatens our preferred narrative. However, it also is the reality.

A more just world requires understanding rather than blame. Remember that everyone has their own life story, with all its trials, and bad things happen to good people.

sunk cost fallacy

You irrationally cling to things that have already cost you something.

When we invest emotional energy, attention into something it hurts us to let go. This aversion to pain can distort our better judgment and choices to make choices that are not in our best interests.

To register objectively, ask yourself: had I not already invested something, would I still do this now? What would I choose to do if they were in the same situation?

dunning-kruger effect

The more you know, the less confident you're likely to be.

Because experts know just how much they don't know, they tend to underestimate their ability, but it's easy to be over-confident when you have only a simple idea of how things are.

"The whole problem with the world is that fools and fanatics are so certain of themselves, yet never realize it's all illusion."

- Bertrand Russell

barnum effect

You see personal specifics in vague statements by filling in the gaps.

Because we are so keen to make connections, it's easy for us to take vague statements and findings to interpret them as that specific and relevant.

Rhodes, astrologers and others use this bias to make it seem like they're telling you something relevant. Consider how things might be interpreted to apply to anyone you just see.

framing effect

You allow yourself to be unduly influenced by content and delivery.

We like to think that we think independently, but the truth is that at least in part, influenced by delivery, timing, and subtle cues. This is why the advertising is so strong, despite almost everyone believing they're not affected by advertising messages.

Only when we have the intellectual humility to accept the fact that we can be manipulated, can we begin to think how much we are. Try to be mindful of how things are being put to you.

in-group bias

You unduly favor those who belong to your group.

We presume that we're all together, but the truth is that we automatically favor those who are most like us, or belong to our group.

Try to imagine yourself in the position of those in our groups, while also attempting to be impartial when judging their well-being to your group.

fundamental attribution error

You judge others on their character, but yourself on the situation.

If you haven't had a good night sleep, you know why you're being a bit slow. But if you cheer at someone else being slow, you don't have such knowledge and/or might presume them to just be a slow person.

It's not only judged in other situations, such as why it's more objectionable to see an on the side of being person's objectionable rather than justifying and blaming.

halo effect

How much you like someone, or how attractive they are, influences your other judgments of them.

Our judgments are automatic and automatic, and so if we want to be objective we need to consciously control for inherent influences. This is especially important in a professional setting.

If you notice that you're going consistently high or low marks across the board, it's worth considering that your judgment may be suffering from the halo effect.

placebo effect

If you believe you're taking medicine it can sometimes 'work' even if it's fake.

The placebo effect can work for almost all our mind influence because just about all of us have the ability to believe in something.

Hypnotic suggestions, and many other forms of mind control, have been proven to be more effective than placebo. Keep a healthy body and brain balanced by using evidence based medicine from a qualified doctor.

bystander effect

You presume someone else is going to do something in an emergency situation.

When something terrible is happening in a public setting we can experience a kind of shock and mental paralysis that prevents us from a sense of personal responsibility. The problem is that everyone can experience the same of mental paralysis in a crowd.

If there's an emergency situation, presume to be the one who will help and call for help. Be the change you want to see in the world.

availability heuristic

Your judgments are influenced by what springs most easily to mind.

The more vividly presented or available memories are can make them seem more relevant. This in turn can cause you to apply them too readily.

Try to gain different perspectives and relevant statistical information rather than relying purely on free judgments and emotion influences.

belief bias

If a conclusion supports your existing beliefs, you'll rationalize anything that supports it.

It's difficult for us to set aside our existing beliefs to consider the true merits of an argument. To practice the ideas that our ideas become impervious to criticism, and are perpetually reinforced.

A useful thing to ask is when and how did I get this belief? We tend to automatically defend our ideas without ever really questioning them.

groupthink

You let the social dynamics of a group situation override the best outcomes.

Members can be over-zealous and desperate to reach a conclusion, and so often the most confident or that voice will dominate the group decision.

Rather than openly contradicting others, seek to facilitate objective means of evaluation and critical thinking practices as a group activity.

reactance

You'd rather do the opposite of what someone is trying to make you do.

When we feel our liberty is being constrained, our inclination is to want to do something to make our own compromise.

Be careful not to lose objectivity when someone is being overbearing, or trying to force you to do something. What are your own reactions, truly from reaction.

24 cognitive biases stuffing up your thinking

Cognitive biases make our judgments irrational. We have evolved to use shortcuts in our thinking, which are often useful, but a cognitive bias means there's a kind of misfiring going on causing us to lose objectivity. This poster has been designed to help you identify some of the most common biases and how to avoid falling victim to them. Help people become aware of their biases generally by sharing the website www.yourbias.is or more specifically e.g. www.yourbias.is/confirmation-bias

Download this poster at www.yourbias.is

Intuition and the strongest bias of all



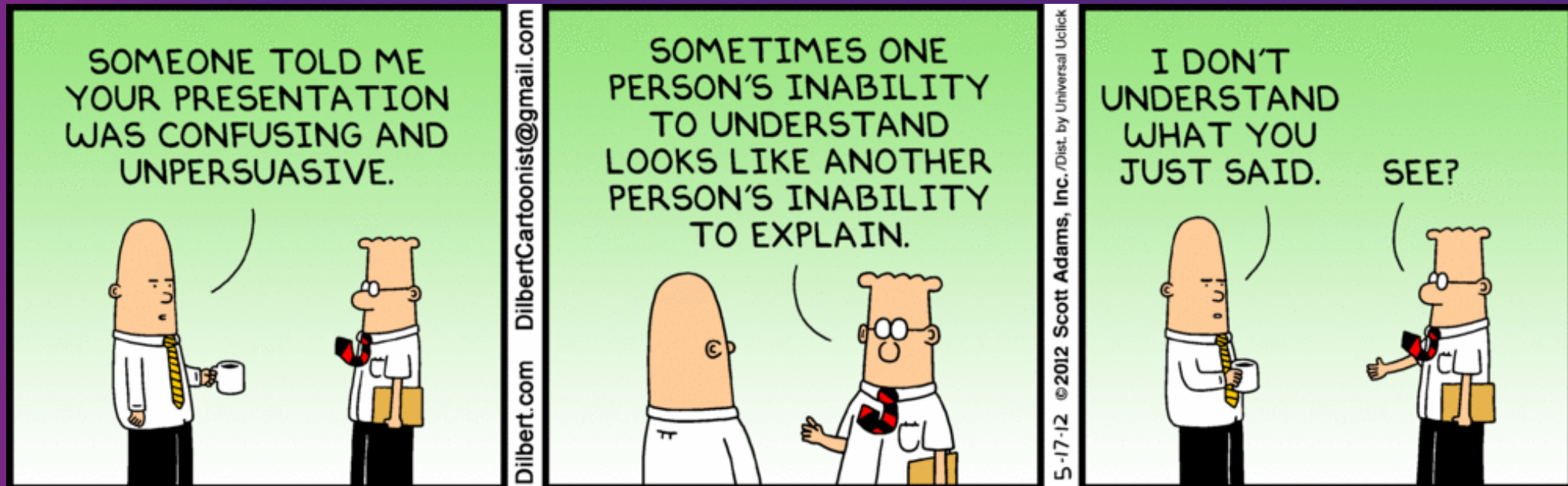
Coherence and truth



Anderson, C. A., et al. (1980).
"Perseverance of social theories: The
role of explanation in the persistence of
discredited information." *Journal of
Personality and Social Psychology*
39(6): 1037-1049.



Framing



[Prominent Climate Scientist Admits to Leaking Heartland Documents](#)

[news.yahoo.com/prominent-climate-scientist-admits-lea...](#) - United States

8 hours ago – From Yahoo! News: A water and climate scientist with decades of research in his field has admitted to deceiving the free-market conservative ...

[Global warming activist admits to stealing Heartland documents ...](#)

[news.yahoo.com/global-warming-activist-admits-stealin...](#) - United States

9 hours ago – From Yahoo! News: Peter H. Gleick, global warming activist and president of the Pacific Institute for Studies in Development, Environment, and ...

[Peter Gleick Admits to Stealing Heartland Documents - Forbes](#)

[www.forbes.com/.../peter-gleick-admits-to-stealing-heartland-docum...](#)

13 minutes ago – In a written statement, Peter Gleick of the Pacific Institute, and vocal advocate of catastrophic man-made global warming theory, has admitted to ...

[Climate scientist Peter Gleick admits he leaked Heartland Institute ...](#)

[www.guardian.co.uk/.../peter-gleick-admits-leaked-heartland-institute...](#)

5 hours ago – Peter Gleick, a water and climate analyst, says he was blinded by his frustrations with ongoing attacks on climate science.

[Denialgate - Internal Heartland Documents Expose Climate Denial ...](#)

[www.skepticalscience.com/denialgate-heartland.html](#)

6 days ago – It is clear from the **documents** that **Heartland** advocates against responsible climate mitigation and then uses that advocacy to raise money from ...

[Heartland Document Retrieval](#)

[heartlanddocuments.com/default.asp](#)

Heartland Document Retrieval. Welcome to the. **Heartland Document** Retrieval Extranet. User Name: Password: Problems Logging In? - Click here · Log In Page ...

[Whistleblower Authenticates Heartland Documents - DeSmogBlog](#)

[www.desmogblog.com/whistleblower-authenticates-heartland-docum...](#)

21 hours ago – I made no changes or alterations of any kind to any of the **Heartland** Institute **documents** or to the original anonymous communication.

[BREAKING: Warmist Peter Gleick "solicited Heartland documents ...](#)

[www.australianclimatemadness.com/.../breaking-warmist-peter-gleick...](#)

18 hours ago – Warmist Peter Gleick has admitted to soliciting **Heartland documents** under another's name and then forwarding them to journalists: In an effort ...

[Peter Gleick Admits to Stealing Heartland Documents | Climate Ske...](#)

[www.climate-skeptic.com/.../peter-gleick-admits-to-stealing-heartland...](#)

19 hours ago – I have an updated article at Forbes. A small excerpt in a written statement, Peter Gleick of the Pacific Institute, and vocal advocate of ...

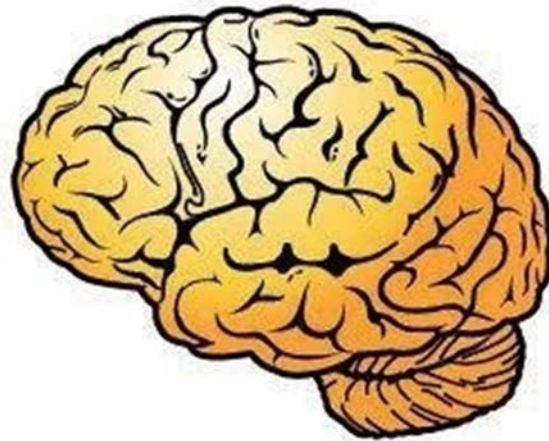
1
11
21
1211
111221
312211





Critical thinking

**THE BRAIN IS THE MOST IMPORTANT
ORGAN YOU HAVE**



ACCORDING TO THE BRAIN.

Thinking is the method of
intelligent learning.

John Dewey

What critical thinking is not

- Analytical thinking
- Difficult thinking
- Expertise
- Separate from critical thinkers

What critical thinkers do

Critical thinkers make the quality of their thinking an object of study.

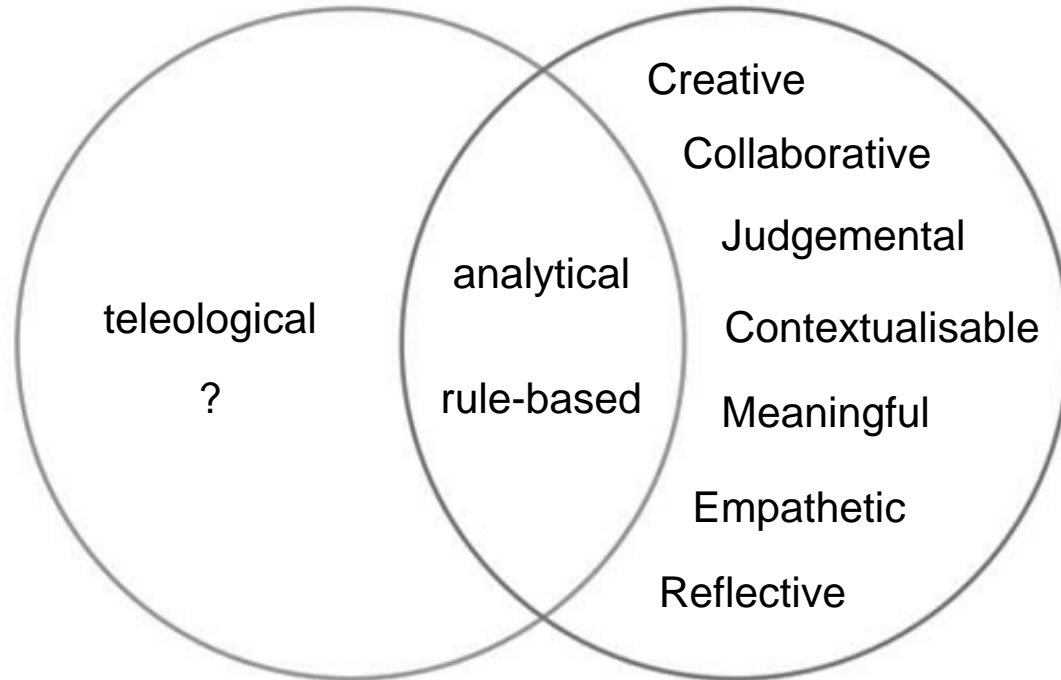
Values of Inquiry—supporting questions

Clarity	<ul style="list-style-type: none"> • Are your examples useful? • Is your argument structure clear? • Are your diagrams easy to understand? • Is your paragraph structure well-developed? • Are your words well-defined and unambiguous?
Accuracy	<ul style="list-style-type: none"> • Is your argument sound? • Are your claims justified? • Is what you are saying true? • Have you represented ideas faithfully? • How could people check on your claim?
Precision	<ul style="list-style-type: none"> • Is your attention to detail sufficient? • Have you used technical terms appropriately? • Have you quantified your information where appropriate? • Are any bullet points categorically distinct from each other? • Have you identified areas of vagueness or ambiguity in your topic?
Relevance	<ul style="list-style-type: none"> • Have you focussed on the point at issue? • Have you selected information supporting the topic? • Have you minimised distracting or unhelpful information? • Have you been able to identify why information is relevant? • Have you justified why your selection of material is relevant?

Values of Inquiry—supporting questions

Clarity	<ul style="list-style-type: none"> • Are your examples useful? • Is your argument structure clear? • Are your diagrams easy to understand? • Is your paragraph structure well-developed? • Are your words well-defined and unambiguous?
Accuracy	<ul style="list-style-type: none"> • Is your argument sound? • Are your claims justified? • Is what you are saying true? • Have you represented ideas faithfully? • How could people check on your claim?
Precision	<ul style="list-style-type: none"> • Is your attention to detail sufficient? • Have you used technical terms appropriately? • Have you quantified your information where appropriate? • Are any bullet points categorically distinct from each other? • Have you identified areas of vagueness or ambiguity in your topic?
Relevance	<ul style="list-style-type: none"> • Have you focussed on the point at issue? • Have you selected information supporting the topic? • Have you minimised distracting or unhelpful information? • Have you been able to identify why information is relevant? • Have you justified why your selection of material is relevant?

Computer “thinking”

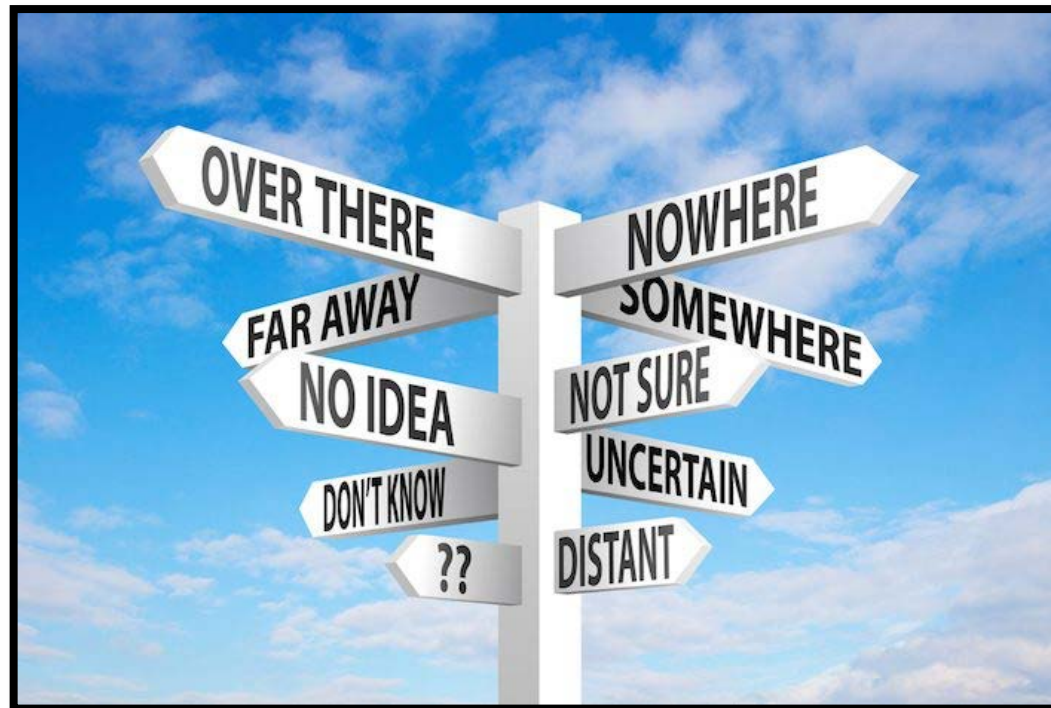


Reason is a social
competence.



There is no 'view from nowhere'

Public reasoning requires
communities of critical thinkers.



Critical thinkers seek opportunities to think collaboratively

- Socially extended cognition
- Others are sought out to test the quality of our own thinking
- Correction through collaboration is seen as progress
- The rational norms we make socially act as checks on our individual biases
- Critical thinkers give and demand reasons

The Critical Thinking Matrix

A high-resolution reference source for mapping critical thinking skills

Peter Elerton, University of Queensland, Australia

I think

© UQCTP University of Queensland Critical Thinking Project, Peter Elerton, University of Queensland		Values of Inquiry					
Cognitive Skills		Clarity (Intelligibility)	Accuracy	Precision	Depth (Complexity, relevance and significance)	Coherence	Breadth (Alternatives, perspectives, collaboration)
Interpretation	Category	The criteria for categorising are unambiguous and the common characteristics of elements within the category are explicitly stated.	Categorical distinctions are drawn from accurate representations or generalisations of characteristics. Hasty generalisations are avoided.	Categorical distinctions are based on quantifiable data, specific characteristics or clear logical definitions.	Categorisations are made using relevant and significant characteristics rather than superficial resemblances. Logical and causal relationships between categories are identified. Specific information is identified and foregrounded.	Logical distinctions between categories are appropriate and coherent. The logical relationships within and between categories is evident.	Alternative perspectives and criteria for categorising are explored. Preferring one framework over another is justified. Potential taxonomies are considered.
	Decoding	Terms are disambiguated and literal and intended meanings are distinguished when necessary. Implied meaning and social contexts are identified. Symbolic representations are identified and explained.	Intended or implied meaning is preserved in decoding. Literal and intended meanings are distinguished. Accurate use of symbols is evident.	Key terms are appropriately used to describe the information content. Correct procedures for working with quantitative or symbolic data are followed effectively. Symbolic representations are used effectively.	Meaning is preserved by maintaining logical or causal relationships. Mastery of symbolic representation includes understanding the meaning of complex operations. Nature and complexity of the problem understood and represented. Analogies or relevant similarities and illustrations used to elucidate and explain. Language examined for 'spin'.	The logical content of propositions, phrases or terms is made clear and placed in context. The relationships between elements are understood.	Alternative meanings resulting from other cultural or cognitive perspectives are explored. Different interpretations of the situation are considered.
	Clarifying meaning	Key terms and technical terms are identified and explained. Literal and intended meanings are distinguished as necessary. Clarity is preserved as information moves between formats.	Statements are appropriately qualified. Limitations of understanding and representation are acknowledged. Intended or implied meaning is preserved. Paraphrasing and elucidation retain meaning.	Vagueness and ambiguity of terms and meaning identified. Key and technical terms identified and examined for appropriate use.		Logical structures identified and logical coherence determined.	Language and visualisations reflect the need to cater for a diverse audience holding alternative views, approaches or perspectives.
Analysis	Examining ideas	Procedures of investigation are made explicit. Key concepts and structures are identified and named. Technical terms are used.	Faithful reproduction of information. Inaccuracies or contradictory information identified. Inferential relationships identified.	Detail preserved and reported. Vagueness and ambiguity eliminated or addressed. Technical terms are used appropriately and effectively.	Relevant and significant information is identified and foregrounded. Areas of focus are established. Problematic aspects are identified. Information necessary to frame and address the problem is identified. Ideas are compared and contrasted.	Causal and logical relationships are identified. Evidence is presented and evidential and inferential relationships are tested. General logical structure is identified and examined. Ideas are tested against existing knowledge.	Ideas are analysed within a transdisciplinary or collaborative approach, and through a variety of perspectives, including social, political, cultural and disciplinary.
	Identifying arguments	Premises and conclusions are made explicit. Argument structure is identified and discussed. Inferential pathways are articulated.	Argument types and structures are identified and named. Ambiguity is identified and addressed.	Nature of evidential material made clear. Procedures and algorithmic processes articulated in detail. Propositional content of premises and conclusions is identified and articulated.	The point at issue is identified. Relevant and significant information pertinent to the formation of premises is identified. Hidden premises are identified and discussed.	Logical relationships examined to determine the nature and form of argument. Claims are extracted from text and evidential relationships identified. Argument is tested for validity.	Arguments framed in various ways are recognised as potentially representing different perspectives. Recognition that the acceptance of evidence may depend on personal context, experience and perspective.
	Argument deconstruction	Correct use of terms. Identification of key components of arguments. Supporting evidence made clear. Diagrams or mapping used to make argumentation clear.	Premises, conclusions and inferential relationships are accurately presented.	Correct use of terms, including 'valid' and 'sound'. Representations are explicit and accurate.	Problematic aspects of argument structure/complexity are explored. Relevant and significant information affecting the reasoning process is identified and its role explained. Direct links between evidence and claims are made explicit. Claims and conclusions are connected to the nature of the problem and of the evidence. Cognitive and social biases are explored. Assess the contextual relevance of questions, information, principles, rules or procedural directions.	Cogency of argument is noted. Evidential and inferential links are examined for logical consistency. Hidden premises and unstated assumptions identified. Cognitive biases identified or postulated. Logical fallacies identified.	Relationships between unstated assumptions or elements, such as beliefs, are identified, and the effect this may have on the reasoning process is explored. Recognising limitations of a single discipline approach or of a single methodology.
Evaluation	Assessing claims	Evidence is presented in context. Direct links between evidence and claims are made explicit.	Claims are faithfully reproduced. Supporting evidence is accurately represented.	Detail of claims is preserved, including quantifiable aspects.		Claims examined/assessed for logical coherence with each other and with evidence and methodology.	Recognising various levels of credibility that might be associated with varying perspectives about the claim. Understanding the nature of claims as a function of discipline or methodological approaches.
	Assessing arguments	Premises, conclusions and evidential relationships are articulated.	Strengths and weakness inherent in argument types, including inductive and deductive arguments, are identified in context.	Key terms are used correctly and amounts quantified where appropriate or necessary. The tools and processes of evaluation of inferences are explicitly stated.	Suitability of evidential relationships examined with regard to the nature of the problem. Proposed causal and logical relationships identified and examined for weaknesses and strengths.	Causal and logical connections tested. Inductive arguments are analysed for strength and weakness, including the use of analogies and generalisations. Deductive arguments are examined for validity and soundness. Logical fallacies identified and their effect on the argument assessed.	Additional information that may be necessary to strengthen the argument identified. Argument tested using alternative standards of various disciplines or methodological approaches.
	Synthesising claims	The synthesis is clearly derived from the constituent claims, with links made explicit.	Intended and implied meaning is preserved and generalisations and categorisations accurately represent the constituent claims.	Similarities and differences of positions are made clear, and quantified where appropriate or necessary, including how these affect the synthesis.	Relevant and significant information retained and highlighted in the synthesis. Inclusion and exclusion of material in synthesis explained. Common features identified from specific cases both explicit and implicit.	Effective inductive generalisations made. Synthesis is coherent with the logical content of the constituent claims. Purpose and meaning are developed.	Awareness of the variety of beliefs and perspectives that may be compatible with a particular claim. Synthesis considered from various framings and axioms.
Inference	Querying evidence	Nature of evidence is clear and evidential relationships are articulated.	Evidence is faithfully reproduced and represented with honesty and clarity.	Detail is sought and presented. Information is quantified where appropriate or necessary. Exact nature and role of evidence made clear.	Premises requiring evidential support are identified and strategies for seeking significant and relevant information that might inform or test hypotheses are determined. Alternative hypotheses maintain the emphasis on significant and relevant information, as well as a focus on solving the problem. Complexity is managed and problematic causal and evidential relationships are addressed across possible outcomes.	Logical connections between matters of fact and the point at issue or problem to be solved are made clear. Implications of evidential material made clear.	Inquiry encompasses or takes into account various methodologies (e.g. transdisciplinary approach).
	Conjecturing alternatives	Possible inferential pathways (paths of reasoning) articulated based upon varying use of evidence and argumentation. Alternative hypothesis and potential conclusions are clearly expressed.	Inquiry and the exploration of alternative reasoning are sensitive to maintaining the integrity of evidence and information.	Alternatives supported by calculation or other algorithmic process.		Alternatives are logically coherent with the given information and their logical implications explored.	Alternative framing of problem explored. Collaborative or multidisciplinary reasoning employed.
	Concluding	Clear articulation of pathways from premises to conclusions, including use of evidence and argumentation.	Proper and correct use of algorithms or procedures to arrive at conclusions. Correctly identify evidential and inferential relationships and show how these lead to conclusions.	Conclusions contain specific and detailed information, quantified where appropriate or necessary.	Modes of reasoning used and conclusion reached appropriate to the nature of the problem.	Logical connections between premises and conclusions evident and explained. Inferences well-supported. Cogent approach taken (i.e. appeal to reason).	Conclusions reached using a variety of reasoning modes, such as mathematical, dialectic, scientific, inductive and deductive.
Explanation	Stating results	Correct use of terminology, unambiguous use of language and effective and clear categorical distinctions made. Explicit representation and explanation.	Statements, descriptions, diagrams and other representations maintain the integrity of information.	Detail preserved and presented. Information quantified. Correct use of terms. Vagueness and ambiguity eliminated or addressed.	Information that is significant and relevant is highlighted. Problematic aspects are outlined.	Logical connections made explicit, showing links to evidence and conclusions. Implications made clear.	Presentation of statements, descriptions, diagrams and other representations are sensitive to interpretations other than those of the author.
	Justifying procedures	Effective use of examples and illustrations. Inferential pathways made explicit. Standards of evaluation explained and presented.	Inquiry and investigations are presented faithfully and not modified to suit the nature of the conclusions.	Process and conceptual development recorded. Calculations used to provide quantified data.	Strategies explored and evaluated. Nature of inquiry appropriate to the problem.	Methodologies, algorithms and other procedures supported by logical analysis. Reasons given for choosing areas of focus and minimising other information. Standards of evaluation explained and presented.	Evidential, conceptual, methodological, ontological and contextual considerations are made with reference to the nature of justification as a function of alternative perspectives, beliefs and suppositions.
	Presenting arguments	Argumentative prose, diagrams, charts, graphs and graphics convey a clear meaning, adhering to convention. Points at issue clearly defined and stated.	Evidence faithfully reproduced and counter-arguments and criticisms engaged with honesty and clarity.	Quantitative data included. Unnecessary information is minimised.	Identify and address counter-arguments. Causal and logical relationships that relate to the situation or problem are identified and their role made explicit. Problematic aspects identified and solutions explained. Reflections show personal engagement with significant and relevant issues. Threshold (key) ideas and concepts are identified. Deficiencies in personal knowledge that may impact rational or objective analysis acknowledged and managed. Revisions geared to improve outcomes and examined for consequences to original position, findings, or opinions.	Logical structure and coherence evident. Well-supported inferences with implications explicitly represented.	Cogent presentation but with due consideration of various reasoning modes and how alternative perspectives may influence the acceptance or definition of evidence.
Self regulation	Metacognition	Reflective practice is evident and cognitive development across issues is clearly reported.	Authentic representation of student's own mental processes and cognitive development.	Reflection targeted to specific processes and outcomes.		Logical analysis of own thoughts comparable in scope and rigour to analysis of others.	Recognition of bias, erroneous thinking or fallacious reasoning. Collaboration sought for the purpose of testing own thoughts.
	Self-correction	Recognition of bias, erroneous thinking or fallacious reasoning is recognised and reported.	Self-criticism and redirection is authentic and resembles the criticism that would be made of third persons.	Reflection leads to specific and detailed changed or specific courses of action are articulated.		Recognition and acceptance of logical errors in preliminary thinking. Rational conclusions contrasted with personal preferences or bias.	Willingness to modify thinking through collaborative inquiry. Self-correction seen as progress.

Cognitive skills modified from Fairclough, P. A. (1990) *Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction*. Values of inquiry concept from Kahn, T. S. (1970) *The Structure of Scientific Revolutions*. *International Encyclopedia of Unified Science*. Chicago, University of Chicago Press. 2. Values of inquiry modified from Elder, L. and Paul, R. Paul (2001) *Critical Thinking: Thinking with Concepts*. *Journal of Developmental Education* 24(6).

Solid Pathways



<http://indigenous.education.qld.gov.au/school/Pages/solid-pathways.aspx>

Aspiring Thinkers Network



<https://impact.edu.au/professional-networks/aspiring-thinkers>

Peter Ellerton



University of Queensland Critical Thinking Project

peter.ellerton@uq.edu.au

<https://critical-thinking-project.uq.edu.au/>

CRICOS PROVIDER NO. 00025B



THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA

Create change