QAGTC 2024

Dr Peter Ellerton

University of Queensland

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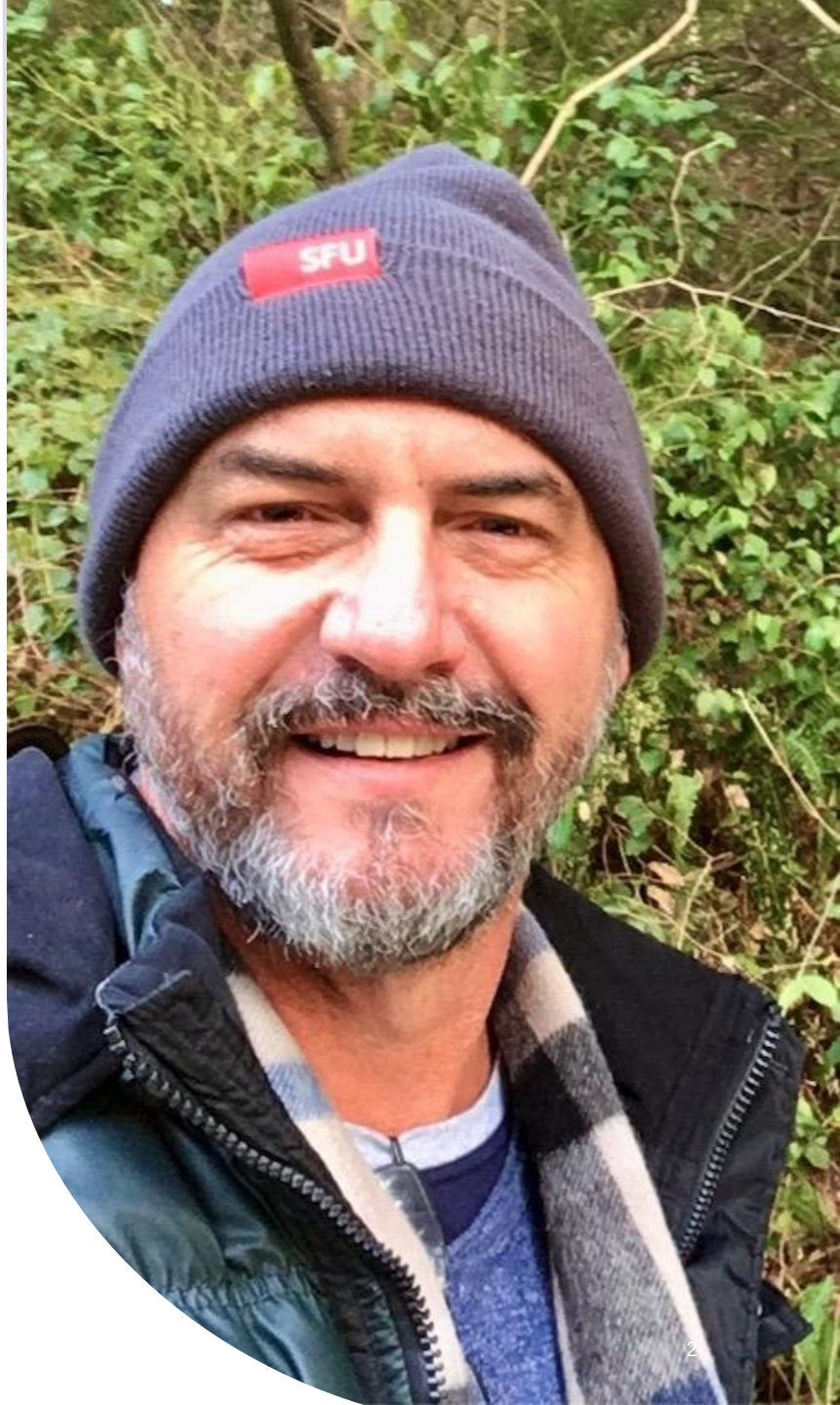
- ACARA critical and creative thinking rewrite
- NSW DoE: On critical thinking and collaborative inquiry
- National Assessment Program Scientific Literacy working committee
- QCAA critical thinking framing paper
- European Commission Joint research Centre “Enlightenment 2.0” – Placing reason at the centre of political decision-making; meaningful and ethical communication
- Australian Research Council Grant: Problem-based Learning in STEM Education



Goals

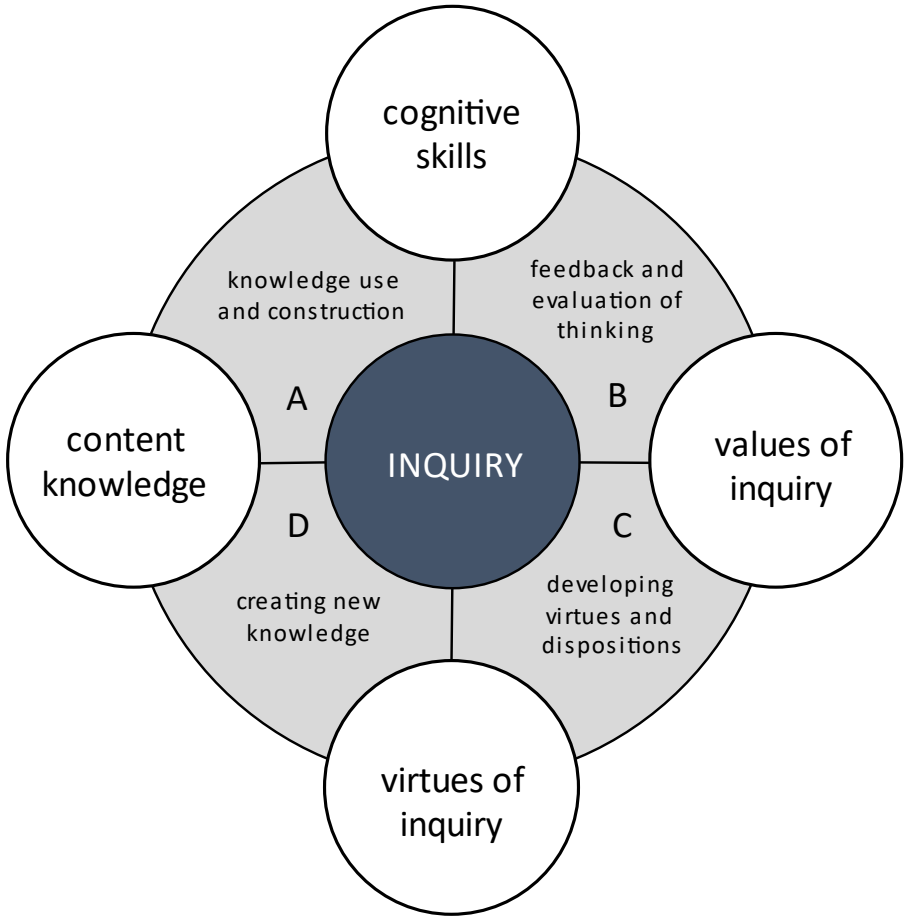
1. Identify key cognitive targets for developing student thinking

2. Provide feedback on the quality of student thinking

3. To understand the mechanisms of collaboration and how to optimise it in the classroom

Connecting thinking and learning

A pedagogical schema for expertise in Teaching for Thinking



Session One

Cognitive skills and how to use them

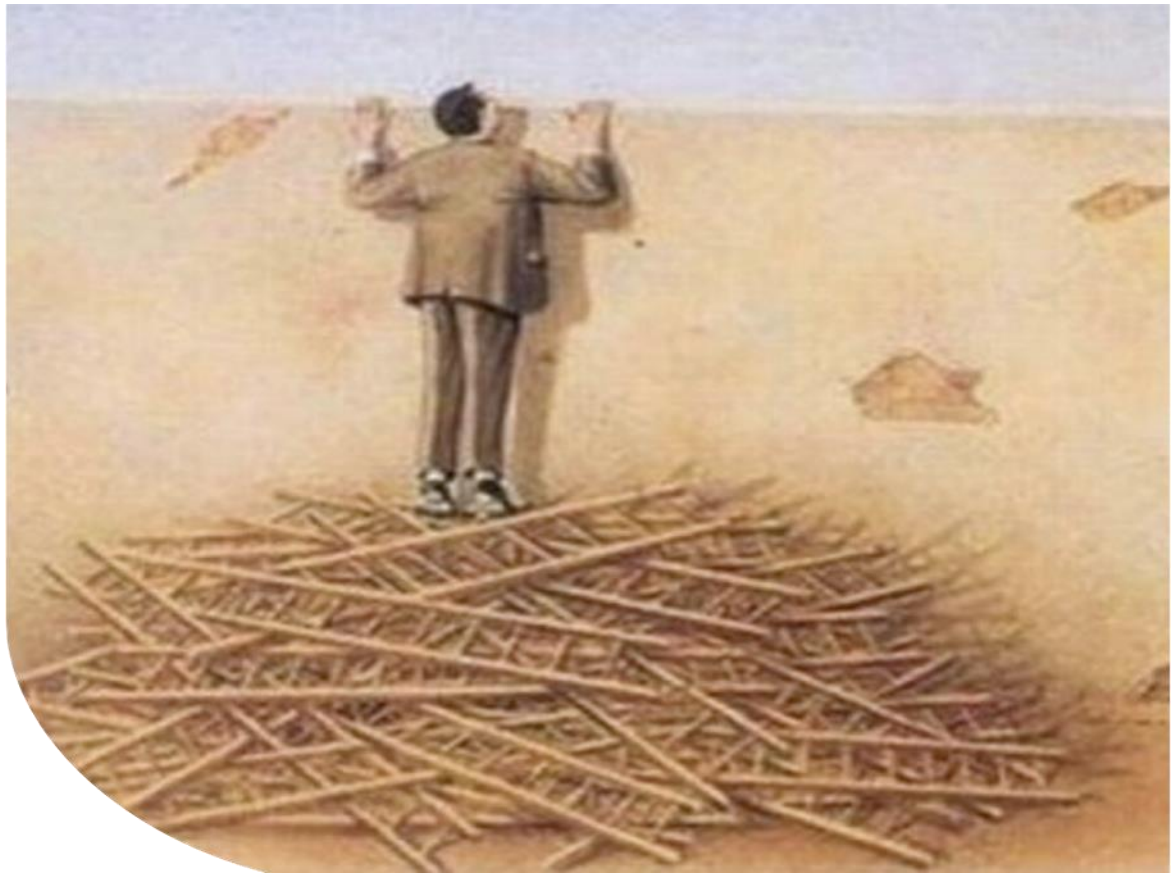
What are cognitive skills?

Cognitive skills are used to develop, manipulate and create knowledge

What are cognitive skills?

The power of developing cognitions is in understanding their interplay with content knowledge

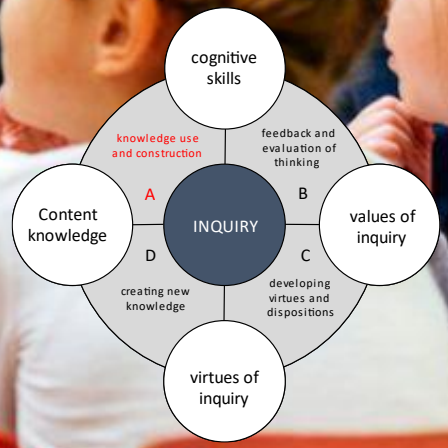
What are cognitive skills?



What can students do with their knowledge?

ZONE A: KNOWLEDGE USE AND CONSTRUCTION

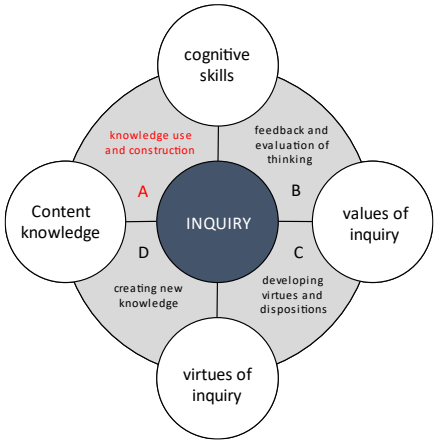
ANALYSE
JUSTIFY
EVALUATE
EXPLAIN



ZONE A: KNOWLEDGE USE AND CONSTRUCTION

What do you expect students to *do* when they analyse?

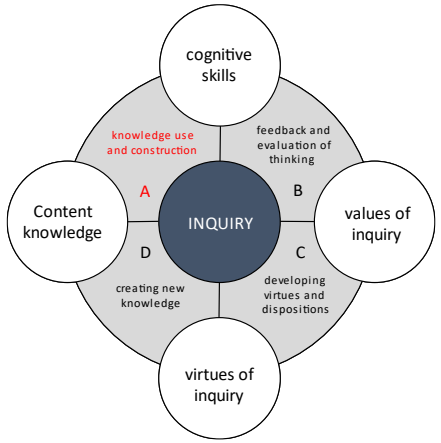
ANALYSE
JUSTIFY
EVALUATE
EXPLAIN



ZONE A: KNOWLEDGE USE AND CONSTRUCTION

What do you expect students to *do* when they justify?

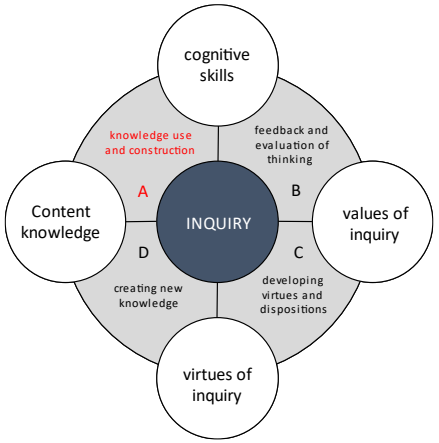
ANALYSE
JUSTIFY
EVALUATE
EXPLAIN



ZONE A: KNOWLEDGE USE AND CONSTRUCTION

What do you expect students to *do* when they evaluate?

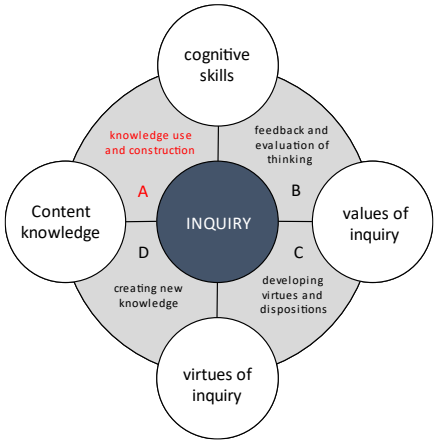
ANALYSE
JUSTIFY
EVALUATE
EXPLAIN



ZONE A: KNOWLEDGE USE AND CONSTRUCTION

What do you expect students to *do* when they explain?

ANALYSE
JUSTIFY
EVALUATE
EXPLAIN

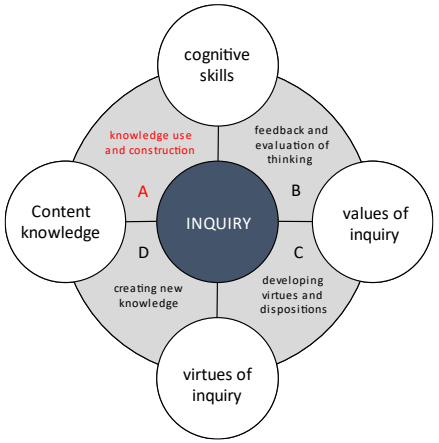


ZONE A: KNOWLEDGE USE AND CONSTRUCTION

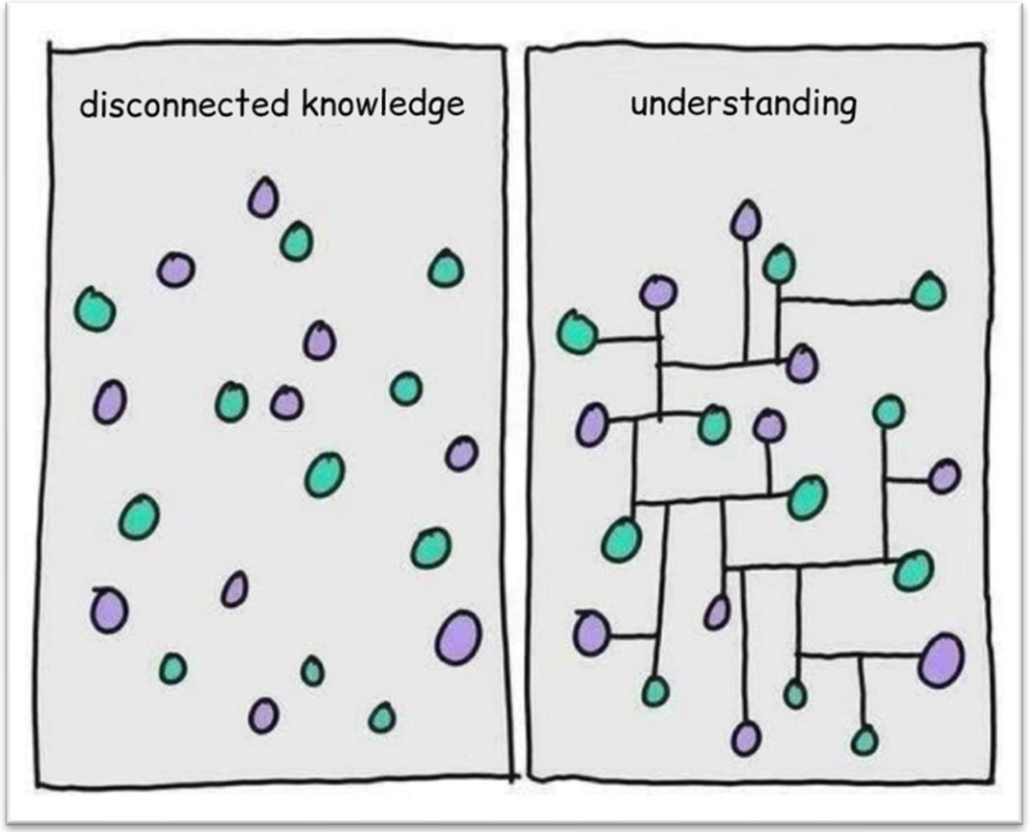
~~What do you expect students to *do* when they explain?~~

What is the difference between ‘explain’ and ‘describe’?

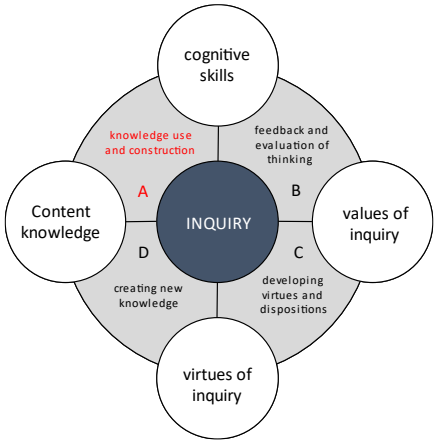
ANALYSE
JUSTIFY
EVALUATE
EXPLAIN



ZONE A: KNOWLEDGE USE AND CONSTRUCTION



ANALYSE
JUSTIFY
EVALUATE
EXPLAIN



ZONE A: KNOWLEDGE USE AND CONSTRUCTION

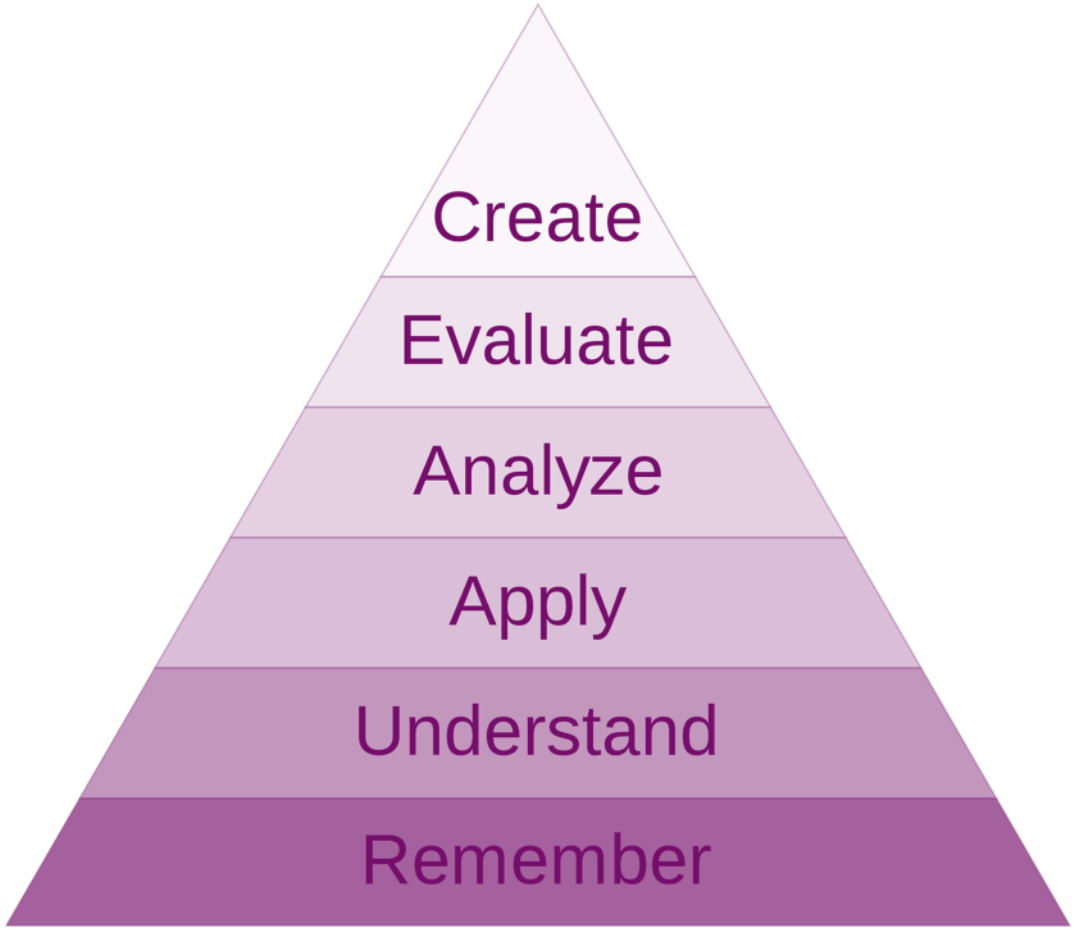
Things that are cognitive skills

ANALYSE
JUSTIFY
EVALUATE
EXPLAIN

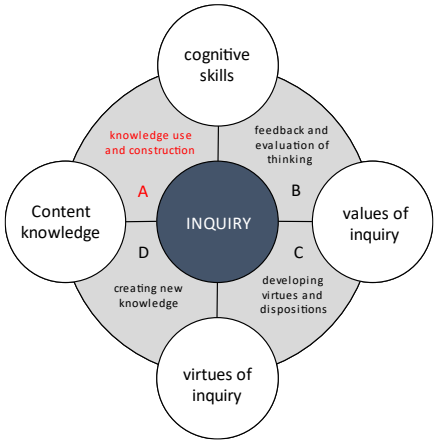
Things that are not cognitive skills

SNORING
UNDERSTANDING
BANANAS

ZONE A: KNOWLEDGE USE AND CONSTRUCTION



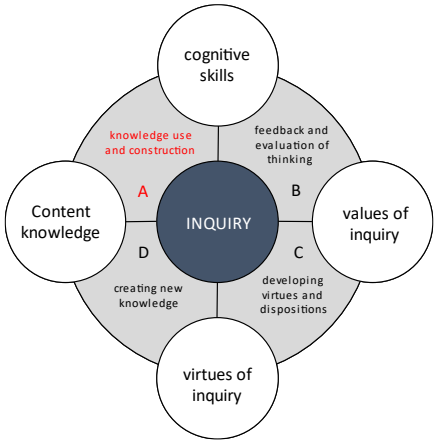
cognitive relationships



ZONE A: KNOWLEDGE USE AND CONSTRUCTION

The problems with Bloom's Taxonomy were indirectly acknowledged by its authors. This is evidenced in their discussion of analysis: "It is probably more defensible educationally to consider analysis as an aid to fuller comprehension (a lower-class level) or as a prelude to an evaluation of the material" (p.144). The authors also acknowledged problems with the taxonomy's structure in their discussion of evaluation: "Although evaluation is placed last in the cognitive domain because it is regarded as requiring to some extent all the other categories of behavior, it is not necessarily the last step in thinking or problem solving. It is quite possible that the evaluation process will in some cases be the prelude to the acquisition of new knowledge, a new attempt at comprehension or application, or a new analysis and synthesis" (p.185). In summary, the hierarchical structure of Bloom's Taxonomy simply did not hold together well from logical or empirical perspectives. (Marzano, 2006, pp.8–9)

cognitive relationships



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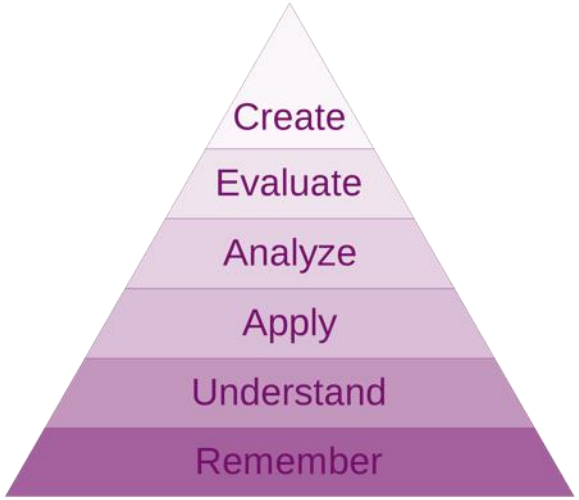
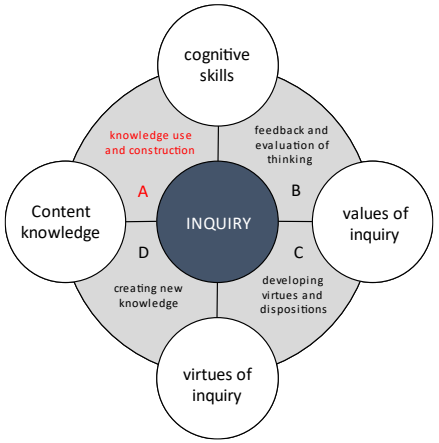


Two significant problems:

1. ‘Higher-order’ skills are constituted by ‘lower-order’ skills
2. Using ‘higher-order’ skills as discriminators between grade levels

cognitive relationships



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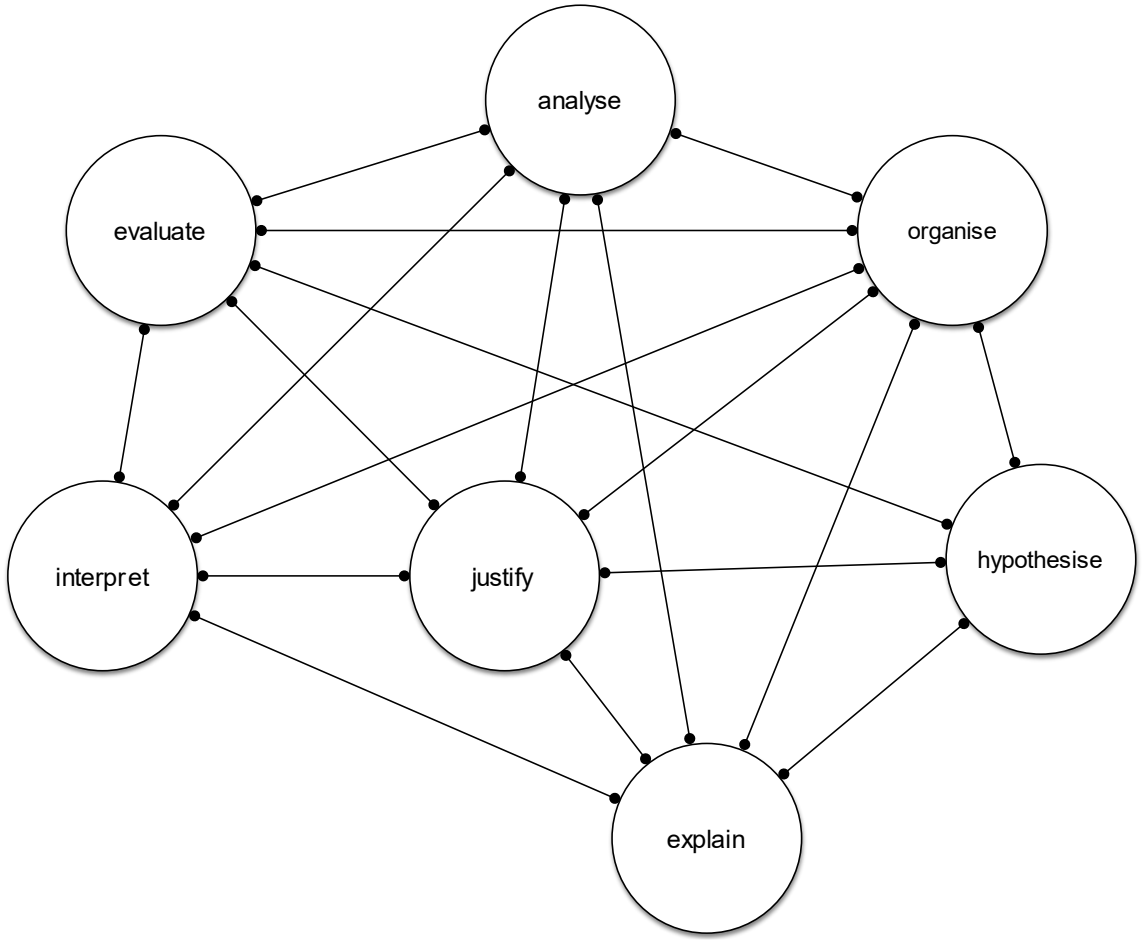
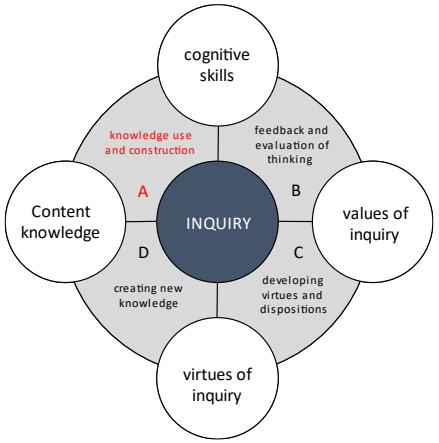
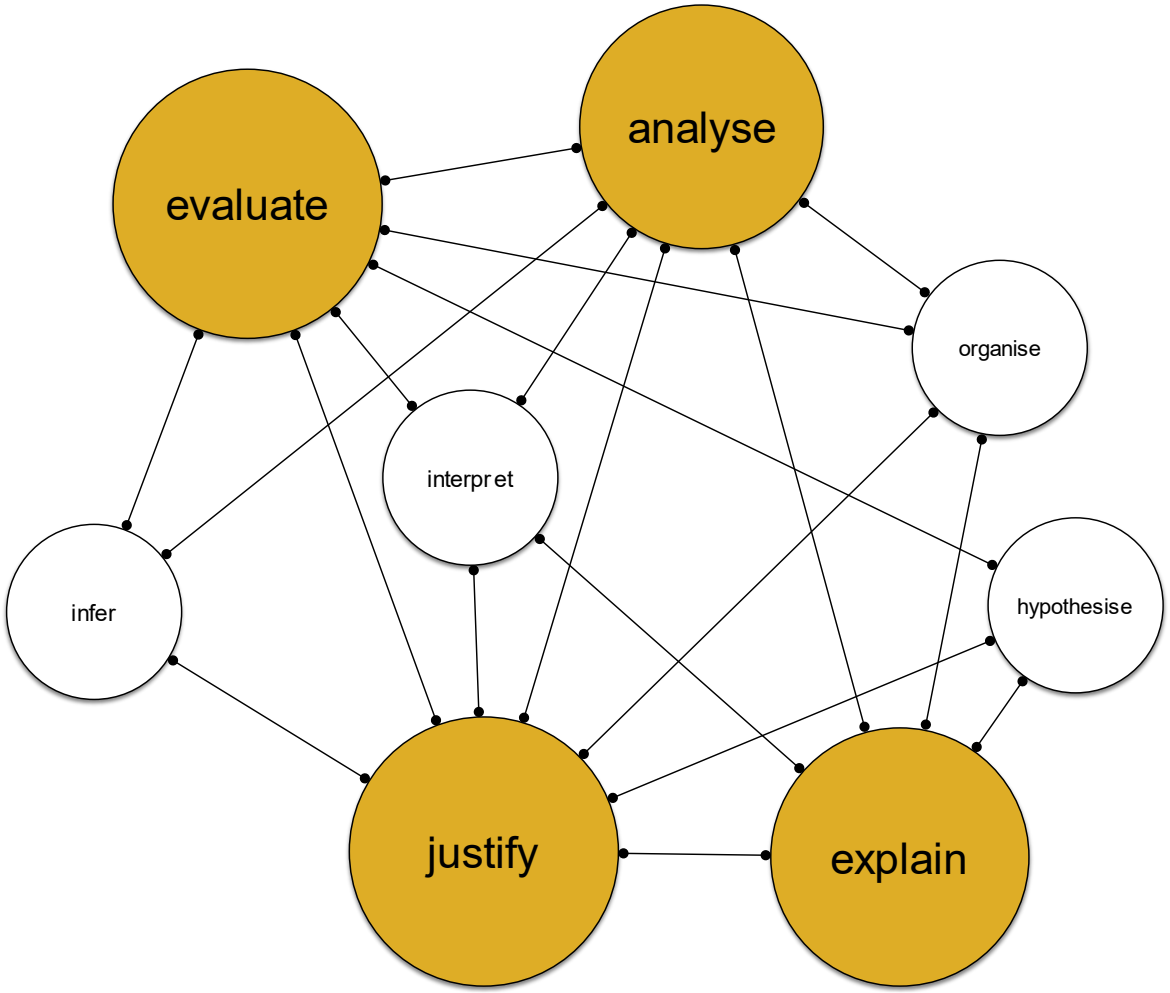


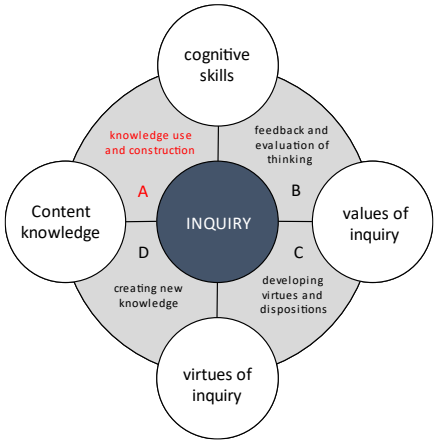
the Cognitive Web model



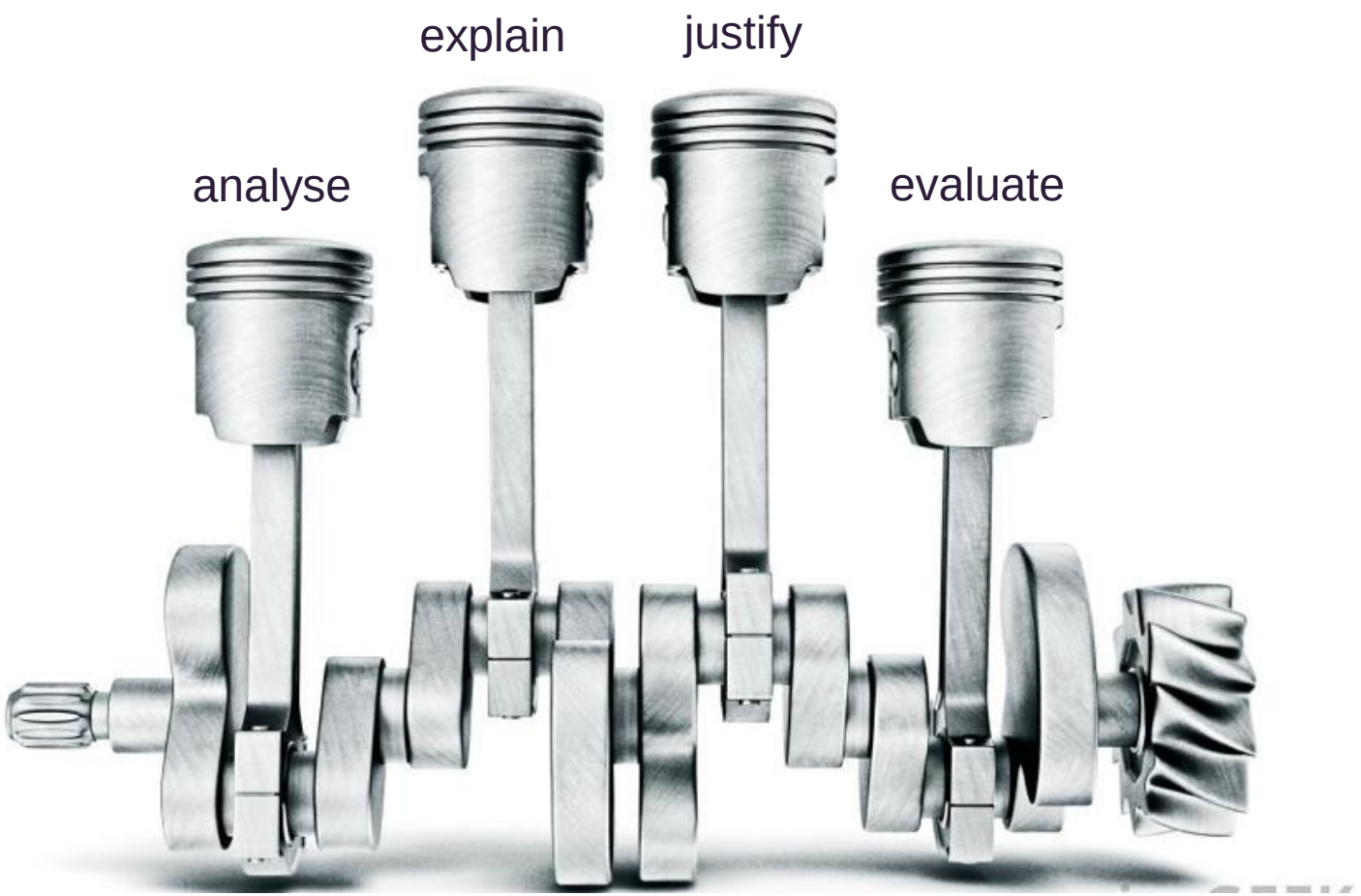
ZONE A: KNOWLEDGE USE AND CONSTRUCTION



the Golden Tetrad



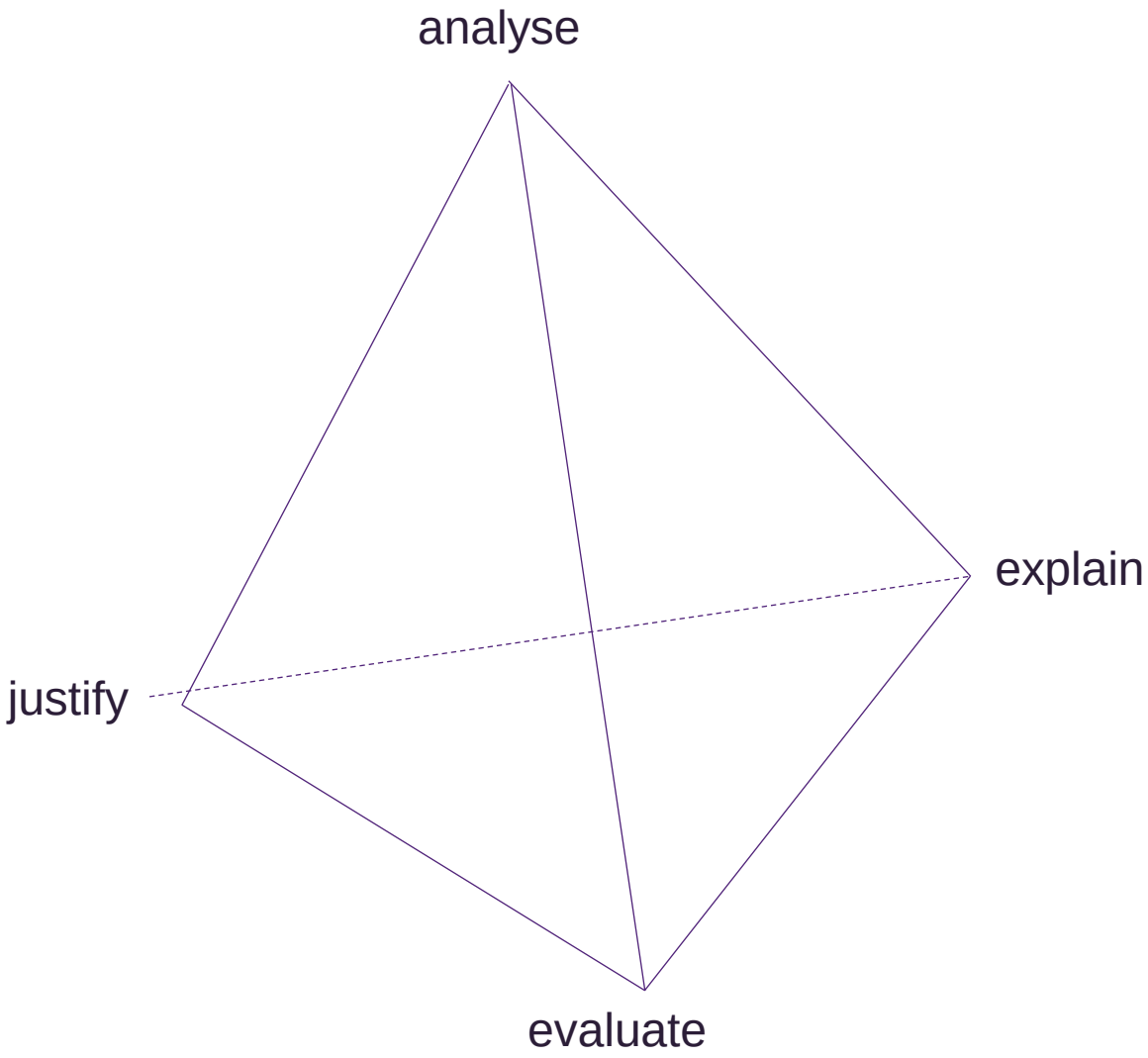
The GOLDEN TETRAD



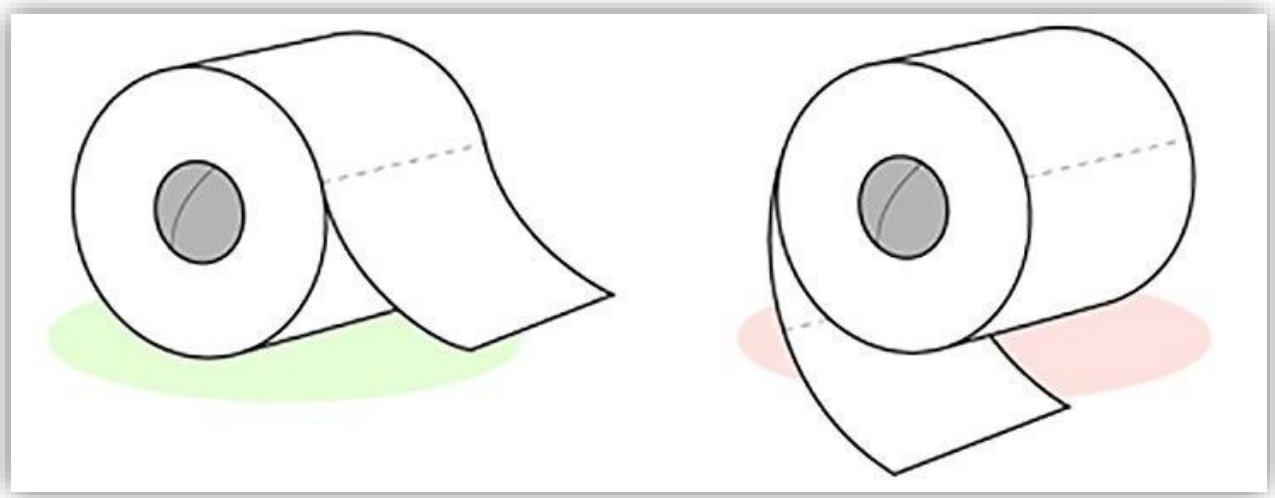
The engine of cognition in the classroom

Some relationships between the cognitions:

- The extent of understanding and quality of explanation is a function of the depth and breadth of analysis.
- The strength of a justification is often a function of the quality of analysis.
- The persuasiveness of a justification is often a function of the quality of explanation
- The criteria of evaluation are used to justify and explain decisions (and themselves require justification).

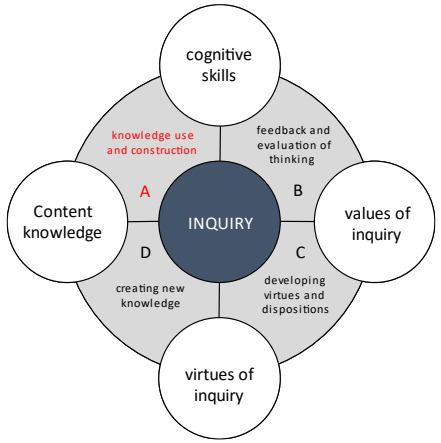


ZONE A: KNOWLEDGE USE AND CONSTRUCTION



the Golden Tetrad

discuss…



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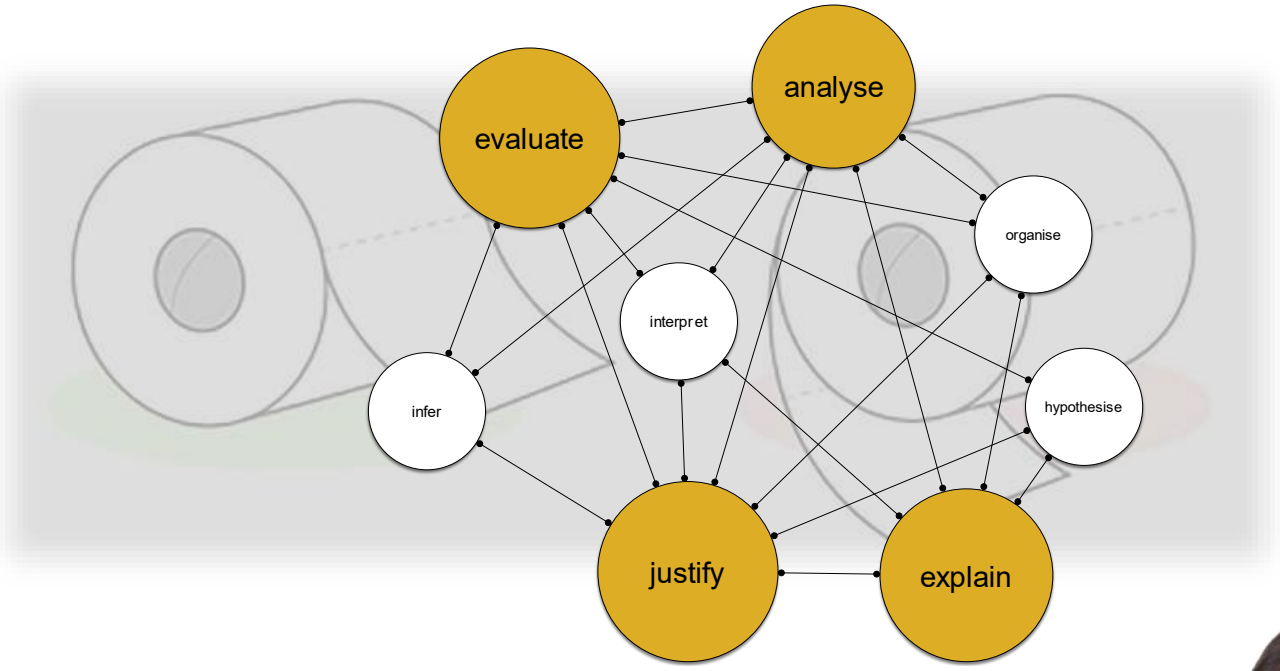
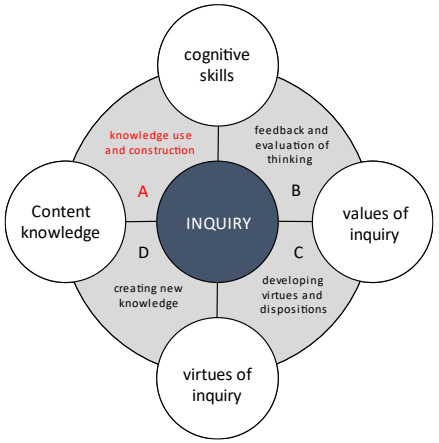
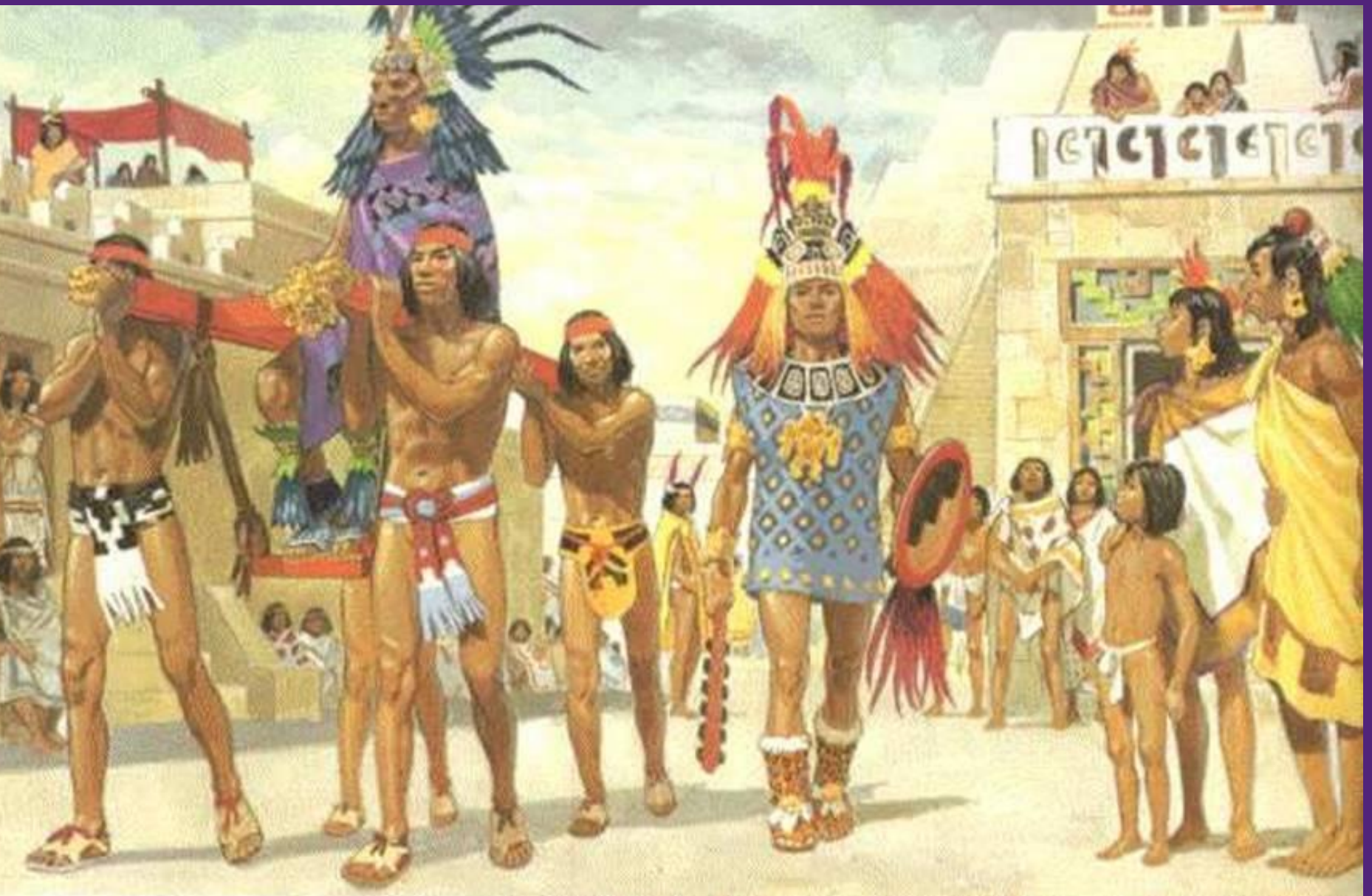


the Golden Tetrad

discuss…

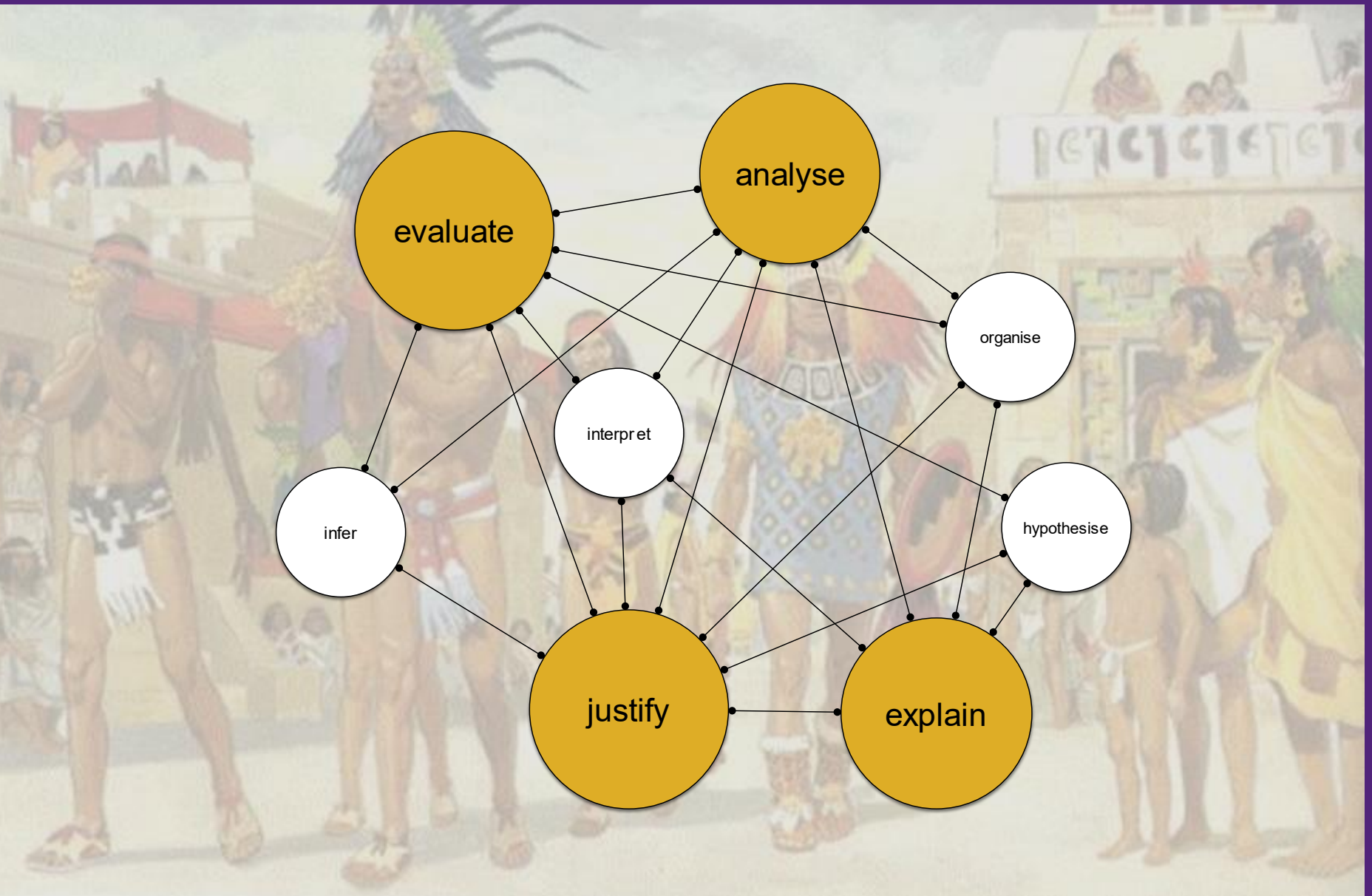


What can you infer about this civilization?



Analyse
Construct
Evaluate
Explain
Generate
Hypothesise
Identify
Infer
Interpret
Justify
Organise
Speculate
State
Synthesise

What can you infer about this civilization?



Analyse
Construct
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Which one doesn’t belong?

A. He dashed quickly through the forest.

B. He eavesdropped while they spoke.

C. She glared menacingly at her opponent.

D. They were seriously overwhelmed by the other side.

Analyse
Construct
Evaluate
Explain
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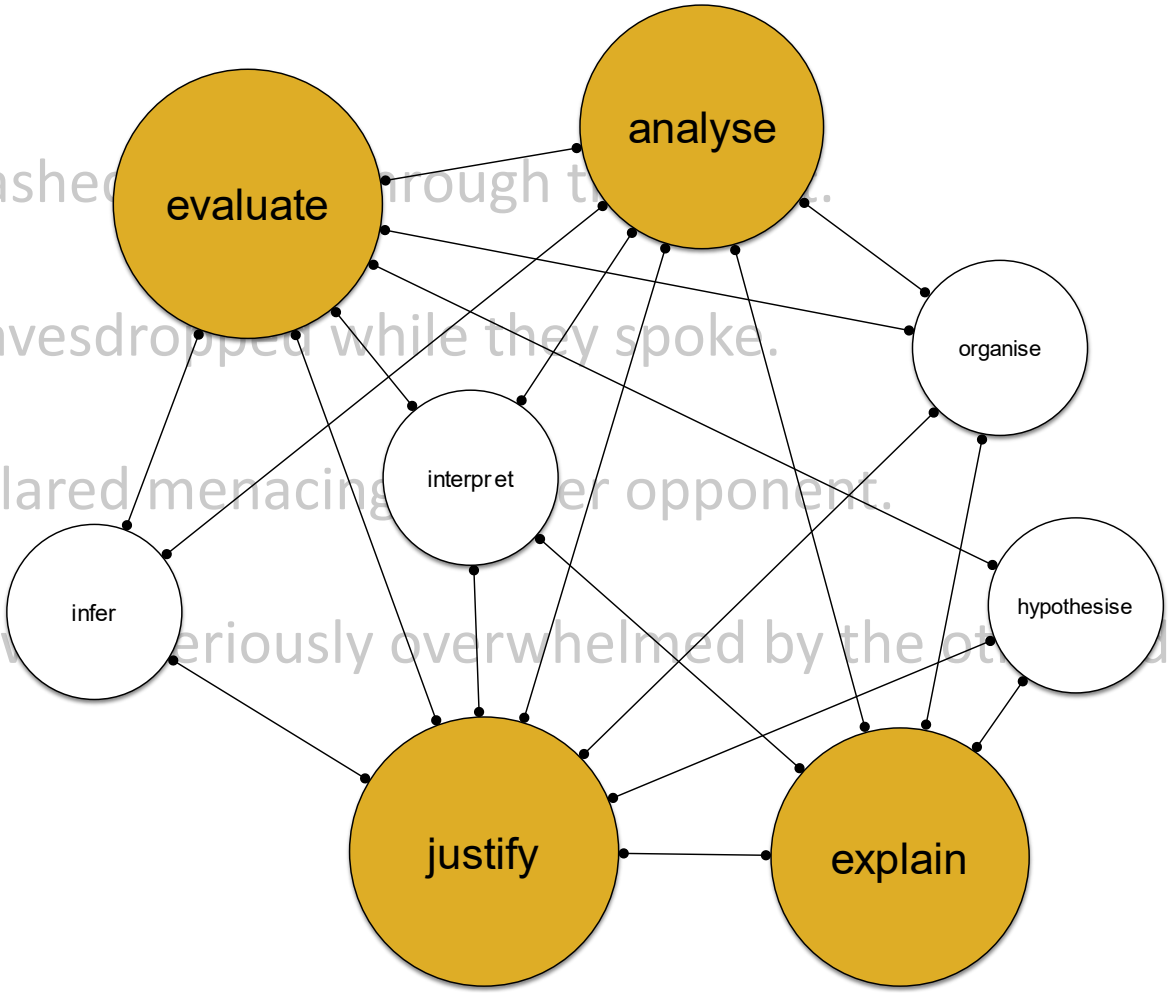
Which one doesn't belong?

A. He dashed through the door.

B. He eavesdropped while they spoke.

C. She glared menacingly at her opponent.

D. They were seriously overwhelmed by the outcome.



Analyse
Construct
Evaluate
Explain
Generate
Hypothesise
Identify
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Speculate
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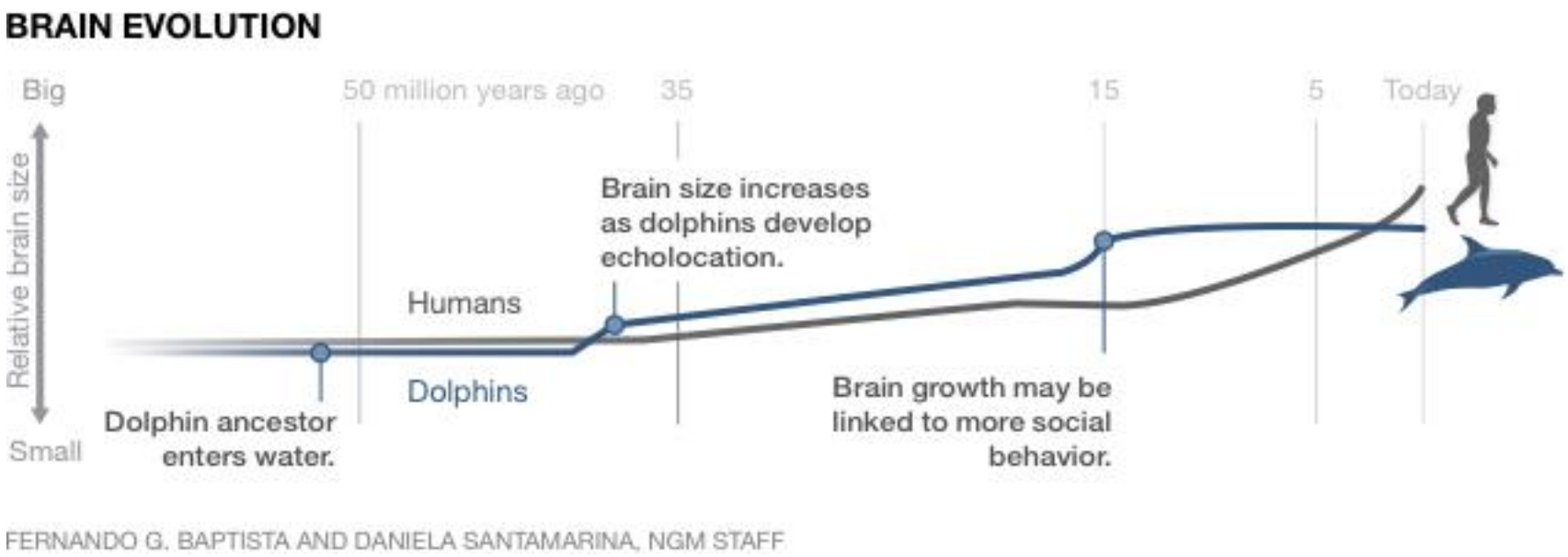
Synthesise

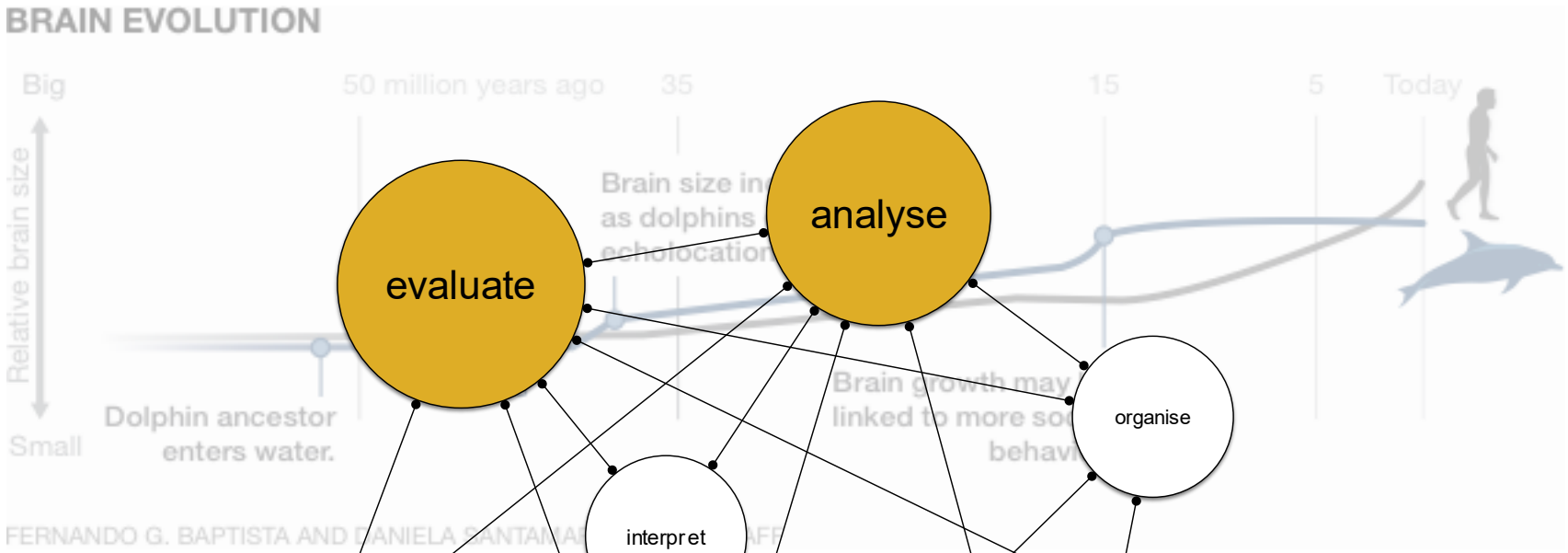
Analyse the graph below



What might explain the closing of the gap between dolphin and human brain size from 15 M years ago?

Analyse
Construct
Evaluate
Explain
Generate
Hypothesise
Identify
Infer
Interpret
Justify
Organise
Speculate
State
Synthesise

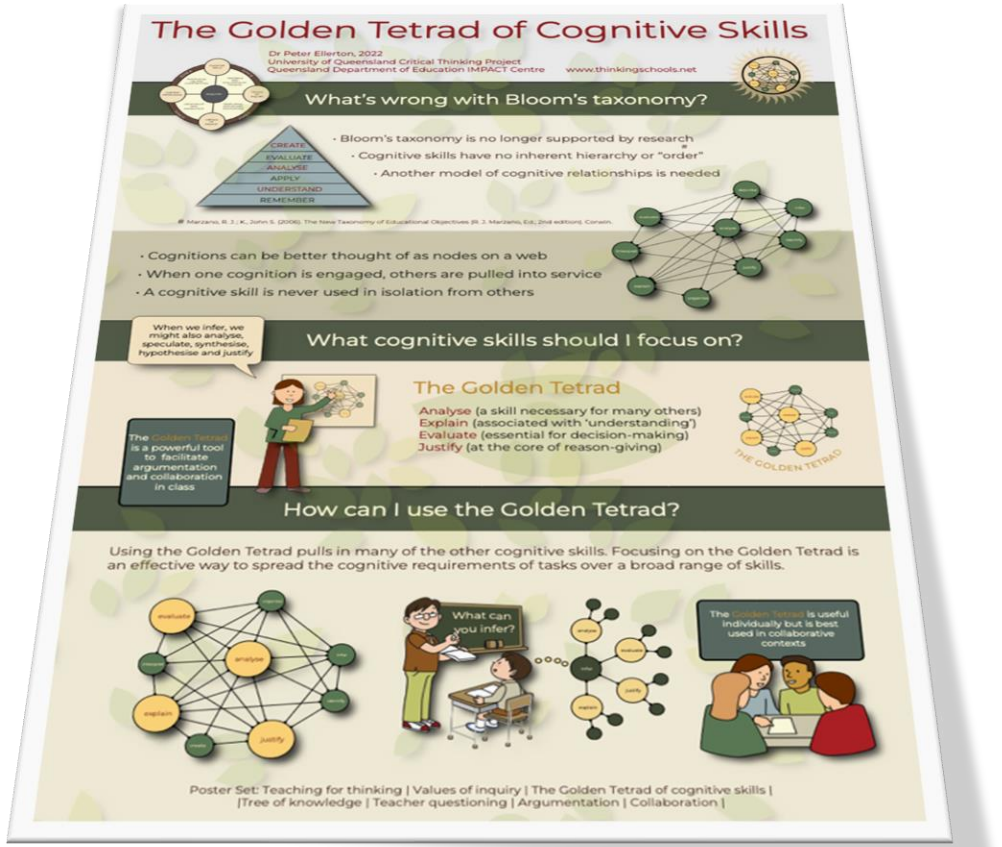
Analyse the graph below



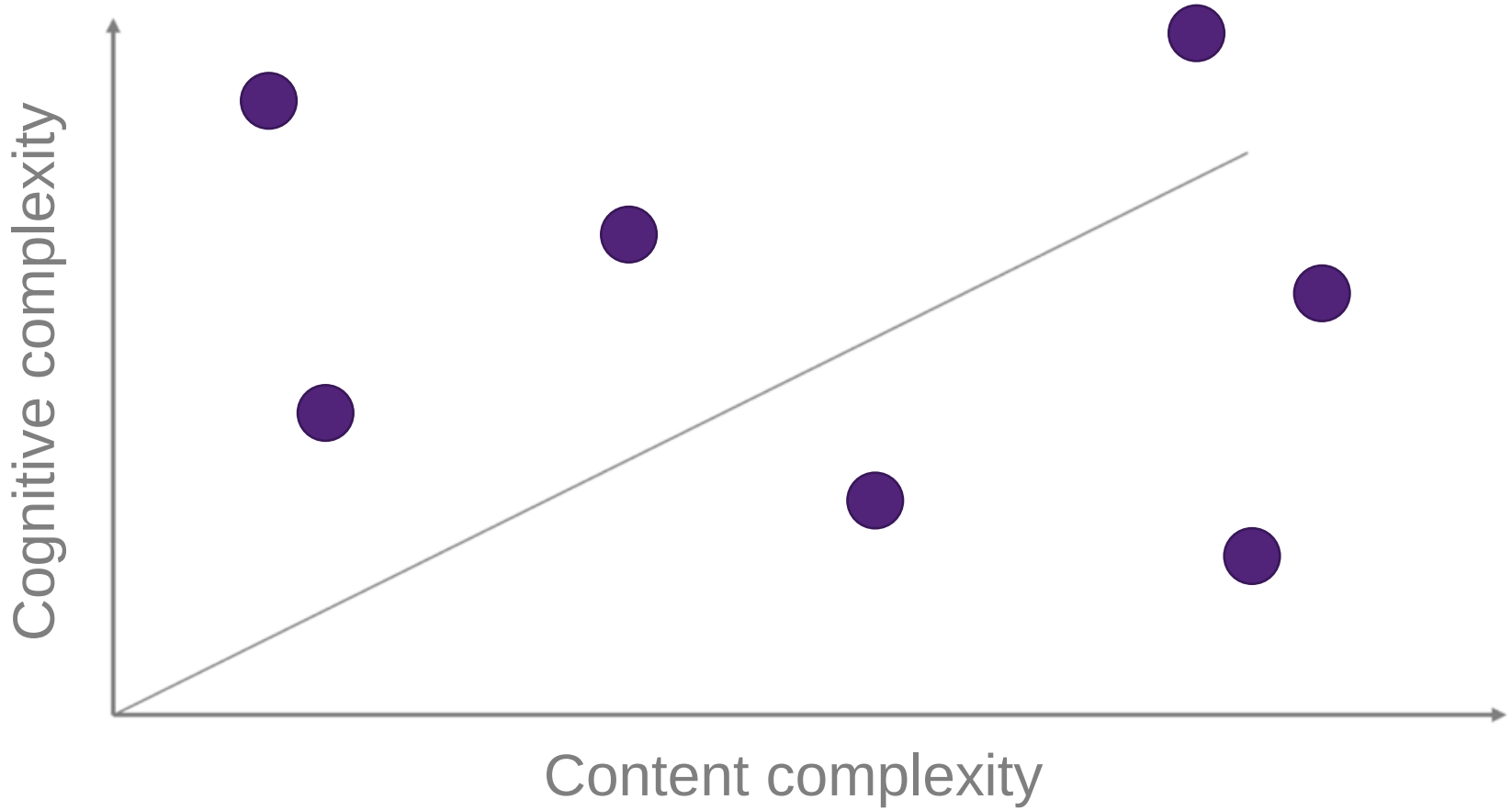
What might explain the closing of the gap between dolphin and hu size from 15 ago?

Analyse
Construct
Evaluate
Explain
Generate
Hypothesise
Identify
Infer
Interpret
Justify
Organise
Speculate
State
Synthesise

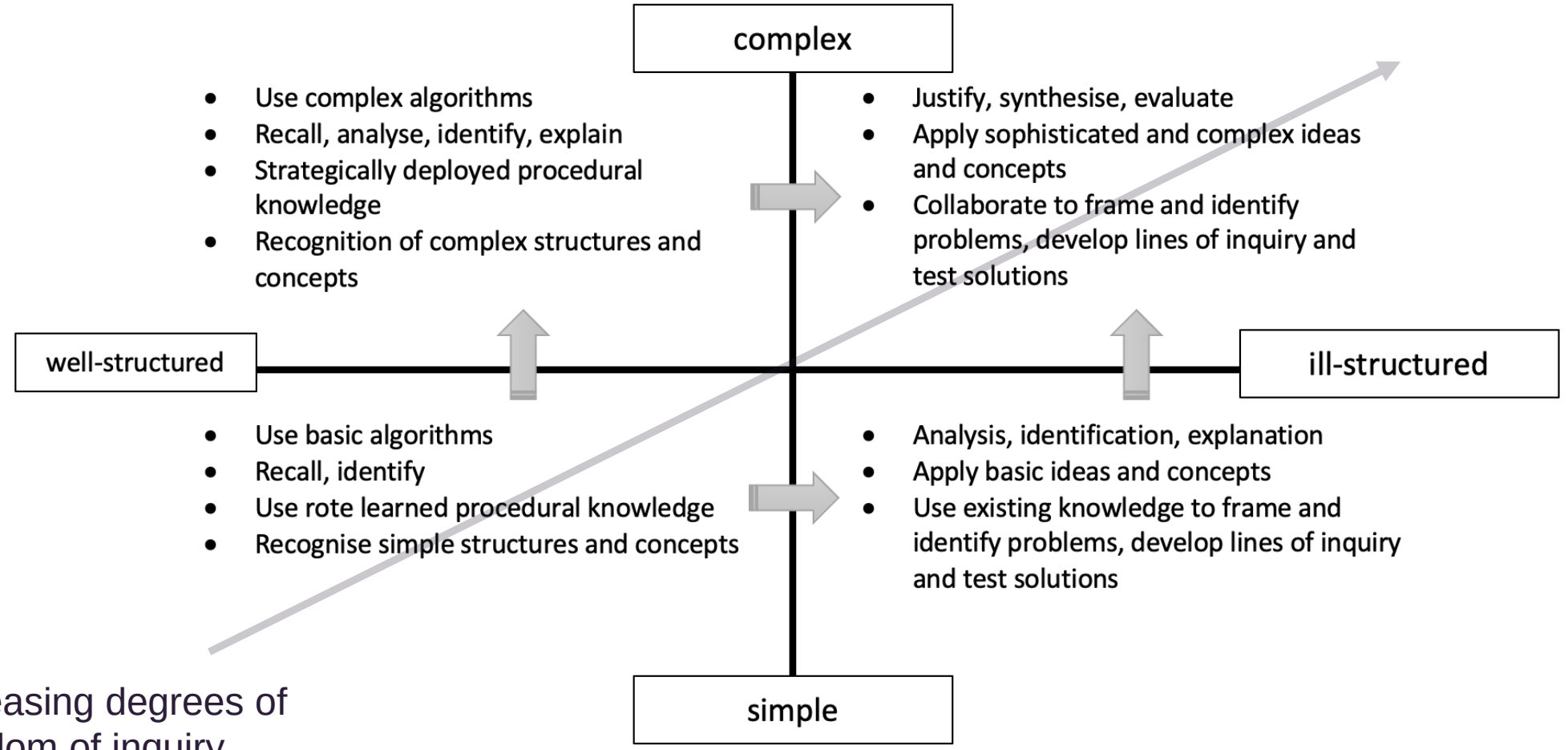
Golden Tetrad poster



Something you might find useful


Cognitive complexity
Content complexity

Problem types and cognitive requirements



Increasing degrees of freedom of inquiry


CLARITY
OF
PURPOSE
(what you will be doing and why you will be doing it)
PRECISION
OF
LANGUAGE

Session Two

What do we value in good thinking?

(the Values of Inquiry)

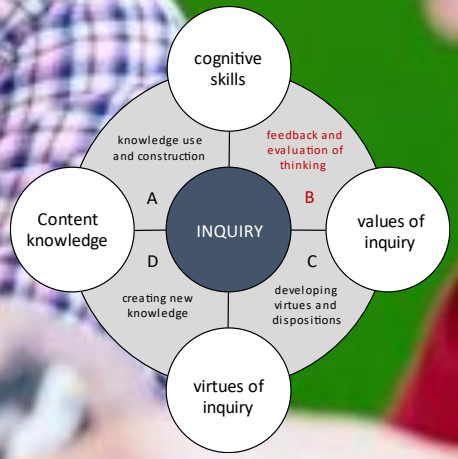
ZONE B: FEEDBACK AND EVAULATION OF THINKING

Improvement demands feedback

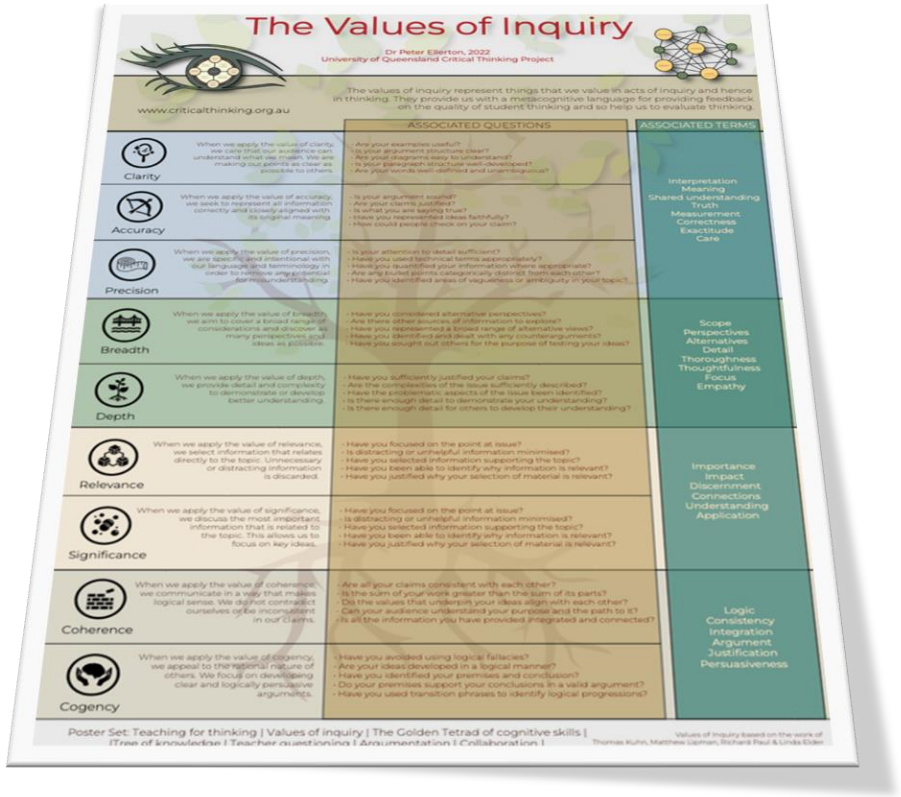
How can we evaluate thinking?

ZONE B: FEEDBACK AND EVAULATION OF THINKING

Thinking is inseparable from inquiry



Values of Inquiry poster



ZONE B: FEEDBACK AND EVAULATION OF THINKING

 Clarity	When we apply the value of clarity, we care that our audience can understand what we mean. We are making our points as clear as possible to others.	· 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	When we apply the value of accuracy, we seek to represent all information correctly and closely aligned with its original meaning.	· 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	When we apply the value of precision, we are specific and intentional with our language and terminology in order to remove any potential for misunderstanding.	· 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?

Interpretation
Meaning
Shared understanding
Truth
Measurement
Correctness
Exactitude
Care

ZONE B: FEEDBACK AND EVAULATION OF THINKING

 Breadth	When we apply the value of breadth, we aim to cover a broad range of considerations and discover as many perspectives and ideas as possible.	· Have you considered alternative perspectives? · Are there other sources of information to explore? · Have you represented a broad range of alternative views? · Have you identified and dealt with any counterarguments? · Have you sought out others for the purpose of testing your ideas?	Scope Perspectives Alternatives Detail Thoroughness Thoughtfulness Focus Empathy
 Depth	When we apply the value of depth, we provide detail and complexity to demonstrate or develop better understanding.	· Have you sufficiently justified your claims? · Are the complexities of the issue sufficiently described? · Have the problematic aspects of the issue been identified? · Is there enough detail to demonstrate your understanding? · Is there enough detail for others to develop their understanding?	

ZONE B: FEEDBACK AND EVAULATION OF THINKING

 Relevance	When we apply the value of relevance, we select information that relates directly to the topic. Unnecessary or distracting information is discarded.	· Have you focused on the point at issue? · Is distracting or unhelpful information minimised? · Have you selected information supporting the topic? · Have you been able to identify why information is relevant? · Have you justified why your selection of material is relevant?
 Significance	When we apply the value of significance, we discuss the most important information that is related to the topic. This allows us to focus on key ideas.	· Have you focused on the point at issue? · Is distracting or unhelpful information minimised? · Have you selected information supporting the topic? · Have you been able to identify why information is relevant? · Have you justified why your selection of material is relevant?

Importance
Impact
Discernment
Connections
Understanding
Application

ZONE B: FEEDBACK AND EVAULATION OF THINKING

 Coherence	When we apply the value of coherence, we communicate in a way that makes logical sense. We do not contradict ourselves or be inconsistent in our claims.	· Are all your claims consistent with each other? · Is the sum of your work greater than the sum of its parts? · Do the values that underpin your ideas align with each other? · Can your audience understand your purpose and the path to it? · Is all the information you have provided integrated and connected?
 Cogency	When we apply the value of cogency, we appeal to the rational nature of others. We focus on developing clear and logically persuasive arguments.	· Have you avoided using logical fallacies? · Are your ideas developed in a logical manner? · Have you identified your premises and conclusion? · Do your premises support your conclusions in a valid argument? · Have you used transition phrases to identify logical progressions?

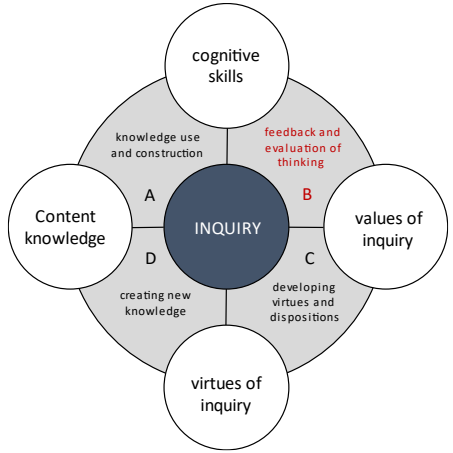
Logic
Consistency
Integration
Argument
Justification
Persuasiveness

ZONE B: FEEDBACK AND EVAULATION OF THINKING

Specific feedback
("do this")

General feedback
("apply this value")

values
of
inquiry



ZONE B: FEEDBACK AND EVAULATION OF THINKING

- Can you give me some examples of what you mean? (clarity)
- Could you provide a diagram to make that clearer? (clarity)
- Check your use of technical language. (clarity, precision)
- Can you strengthen your justification? (coherence, depth)
- Check you have accurately represented that idea. (accuracy)
- Giving more detail would provide a better understanding of your point. (accuracy, precision, depth)
- Can you quantify this statement? (precision)
- Your central point is not clear. (clarity, coherence)
- Is all the information you have included necessary to make your point? (relevance, significant, coherence)
- Consider if all your points are necessary to justify your conclusion. (simplicity, clarity)
- Can you justify why you have focused on this? (relevance, significance)
- Are there any counterarguments you should consider? (breadth)
- What implications would this have if it were true? (coherence, depth, breadth)
- Make sure you give your reader the information they need when they need it. (coherence)

Consider the Golden Tetrad of cognitive skills

What values of inquiry do you most associate with “analyse”?

Consider the Golden Tetrad of cognitive skills

What values of inquiry do you most associate with “justify”?

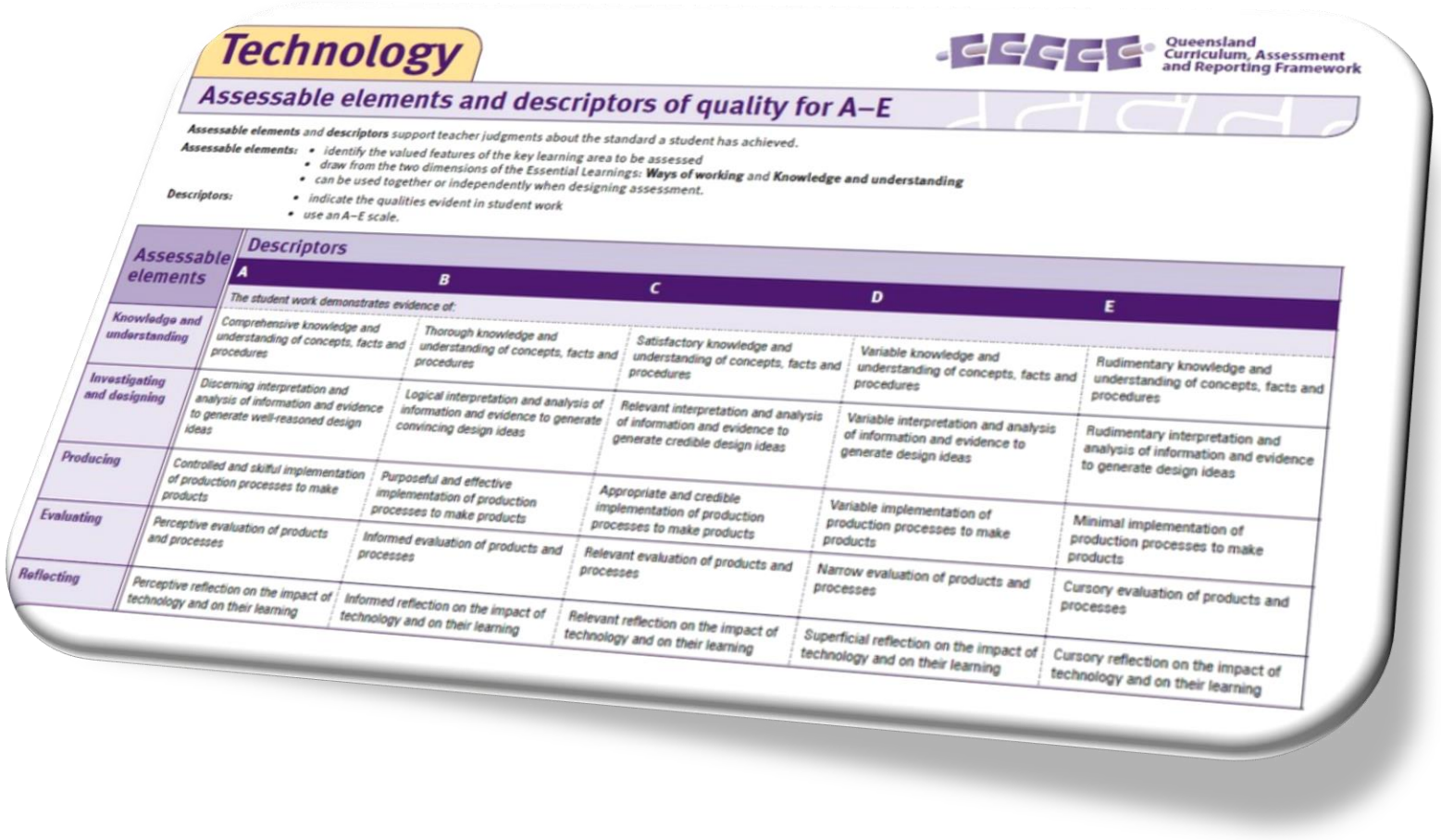
Consider the Golden Tetrad of cognitive skills

What values of inquiry do you most associate with “evaluate”?

Consider the Golden Tetrad of cognitive skills

What values of inquiry do you most associate with “explain”?

How can cognitions and the VOI inform criteria sheets?



Technology

Queensland Curriculum, Assessment and Reporting Framework

Assessable elements and descriptors of quality for A–E

Assessable elements *and* ***descriptors*** *support teacher judgments about the standard a student has achieved.*

Assessable elements:
- *identify the valued features of the key learning area to be assessed*
- *draw from the two dimensions of the Essential Learnings:* ***Ways of working*** *and* ***Knowledge and understanding***
- *can be used together or independently when designing assessment.*

Descriptors:
- *indicate the qualities evident in student work*
- *use an A–E scale.*

Assessable elements	Descriptors				
	A	B	C	D	E
	The student work demonstrates evidence of:				
Knowledge and understanding	Comprehensive knowledge and understanding of concepts, facts and procedures	Thorough knowledge and understanding of concepts, facts and procedures	Satisfactory knowledge and understanding of concepts, facts and procedures	Variable knowledge and understanding of concepts, facts and procedures	Rudimentary knowledge and understanding of concepts, facts and procedures
Investigating and designing	Discerning interpretation and analysis of information and evidence to generate well-reasoned design ideas	Logical interpretation and analysis of information and evidence to generate convincing design ideas	Relevant interpretation and analysis of information and evidence to generate credible design ideas	Variable interpretation and analysis of information and evidence to generate design ideas	Rudimentary interpretation and analysis of information and evidence to generate design ideas
Producing	Controlled and skilful implementation of production processes to make products	Purposeful and effective implementation of production processes to make products	Appropriate and credible implementation of production processes to make products	Variable implementation of production processes to make products	Minimal implementation of production processes to make products
Evaluating	Perceptive evaluation of products and processes	Informed evaluation of products and processes	Relevant evaluation of products and processes	Narrow evaluation of products and processes	Cursory evaluation of products and processes
Reflecting	Perceptive reflection on the impact of technology and on their learning	Informed reflection on the impact of technology and on their learning	Relevant reflection on the impact of technology and on their learning	Superficial reflection on the impact of technology and on their learning	Cursory reflection on the impact of technology and on their learning

Geography IA1 – ISMG Criterion: Analysing and Applying (8 marks / 25)	English IA1 – ISMG Criterion: Knowledge application (9 marks / 25)	Design IA2 – ISMG Criterion: Exploring (10 marks / 35)
• discerning selection of data and information • astute interpretations and inferences that identify how patterns, trends and relationships represent a geographical challenge • sophisticated extrapolation from the analysis to make generalisations about the impacts of climate change on biophysical and anthropogenic environments.	• discerning analysis of perspectives and representations of concepts, identities, times and places in the texts • discerning analysis of the ways cultural assumptions, attitudes, values and beliefs underpin the texts and invite audiences to take up positions • discerning analysis of the effects of aesthetic features and stylistic devices in the texts.	• discerning description of the features that define a HCD problem and essential design criteria based on stakeholders' requirements and principles of good design • insightful analysis of needs and wants using relevant primary data about stakeholders and secondary data about existing designs and HCD information to identify the significant features, constraints and the relationships between them.
• considered selection of data and information • coherent interpretations and inferences that identify how patterns, trends and relationships represent a geographical challenge • effective extrapolation from the analysis to make generalisations about the impacts of climate change on biophysical and anthropogenic environments.	• effective analysis of perspectives and representations of concepts, identities, times and places in the texts • effective analysis of the ways cultural assumptions, attitudes, values and beliefs underpin the texts and invite audiences to take up positions • effective analysis of the effects of aesthetic features and stylistic devices in the texts.	• effective description of the features that define a HCD problem and design criteria based on stakeholders' requirements and principles of good design • considered analysis of needs and wants using relevant primary data about stakeholders and secondary data about existing designs and HCD information to identify valid features, constraints and the relationships between them.
• appropriate selection of data and information • basic interpretations and inferences that identify how patterns, trends and relationships represent a geographical challenge • sufficient extrapolation from the analysis to make generalisations about the impacts of climate change on biophysical and anthropogenic environments.	• adequate analysis of perspectives and representations of concepts, identities, times and places in the texts • adequate analysis of the ways cultural assumptions, attitudes, values and beliefs underpin the texts and invite audiences to take up positions • adequate analysis of the effects of aesthetic features and stylistic devices in the texts.	• adequate description of the features that define a HCD problem and some design criteria based on stakeholders' requirements and principles of good design • appropriate analysis of needs and wants using primary data about stakeholders and secondary data about existing designs and HCD information to identify some features, constraints and the relationships between them.

How can students demonstrate discerning, astute or insightful analysis?

Discerning – discriminating; showing intellectual perception; showing good judgement; making thoughtful and astute choices; selected for value or relevance

Astute – showing an ability to accurately assess situations or people; of keen discernment

Insightful – showing understanding of a situation or process; understanding relationships in complex situations; informed by observation and deduction

Sophisticated – of intellectual complexity; reflecting a high degree of skill, intelligence, etc.; employing advanced or refined methods or concepts; highly developed or complicated

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Considered – formed after careful and deliberate thought

Effective – successful in producing the intended, desired or expected result; meeting the assigned purpose

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Adequate – satisfactory or acceptable in quality or quantity equal to the requirement or occasion

Appropriate – acceptable; suitable or fitting for a particular purpose, circumstance, context etc.

How can students demonstrate discerning, astute or insightful analysis?

Discerning – discriminating; showing intellectual perception; showing good judgement; making thoughtful and astute choices; selected for value or relevance

Significance

Relevance

Astute – showing a
accurately assess situations or people; of keen discernment

Accuracy

Insightful – showing understand
of a situation or process; understanding relationships in complex situations; informed by observation and deduction

Depth

Coherence (Logic)

Sophisticated
intellectual co
reflecting a hi
of skill, intelligence, etc.; ploying advanced or fined methods or oncepts; highly developed or complicated

Precision

Considered – formed after careful and deliberate thought

Coherence (Logic)

Breadth

Depth

Effective – successful in producing the ntended, desired or expected result; meeting the assigned purpose

Adequate – satisfactory or acceptable in quality or quantity equal to the requirement or occasion

Appropriate – acceptable; suitable or fitting for a particular purpose, circumstance, context etc.

Consider the QLD Ancient History syllabus

Sample ISMG

Analysing	Marks
The student response has the following characteristics:	
• discerning selection and detailed examination of features of evidence from historical sources	5

Consider the QLD Ancient History syllabus

Sample ISMG

Devising and Conducting	Marks
The student response has the following characteristics:	
• development and application of a nuanced key inquiry question and relevant sub-questions • discerning selection of relevant evidence from ancient and modern historical sources • acknowledgment of different perspectives in the evidence from historical sources	4–5

Consider the QLD Ancient History syllabus

Sample ISMG

Evaluating	Marks
The student response has the following characteristics:	
• discerning and well-reasoned judgments about the usefulness and reliability of evidence from historical sources	5

Consider the QLD Ancient History syllabus

Sample ISMG

Synthesising	Marks
The student response has the following characteristics:	
• sophisticated historical argument that skilfully combines evidence from historical sources	5

Consider the QLD Ancient History syllabus

Sample ISMG

Communicating	Marks
The student response has the following characteristics:	
• conveys ideas related to the key inquiry question and sub-questions clearly and purposefully • all features of an independent source investigation are consistently applied • minimal errors in spelling, grammar and punctuation	4–5

Session Three

Mechanisms of Collaboration

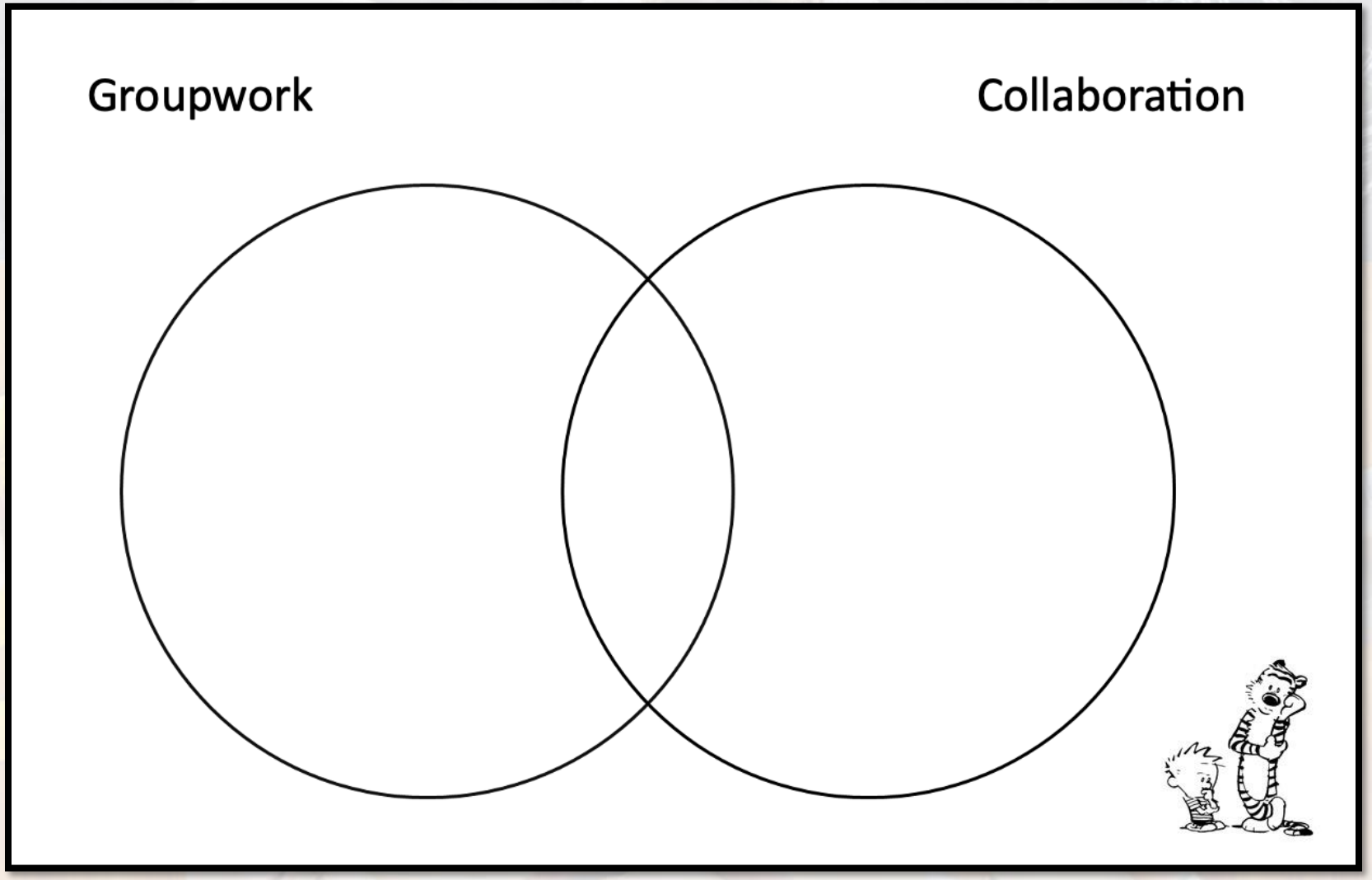
COLLABORATION

COLLABORATION

Letter from a principal

"I love the chatter, shouts and laughter that echoes through our corridors, the charged silence of classrooms filled with concentrated learning and the smiles of students and staff as they go about the business of education. "

COLLABORATION



Reasons to collaborate

- Why is collaboration important?
- What are the inhibitors of good collaboration?
- What are the enablers of good collaboration?
- How can students be metacognitive about their collaboration?

The assembly bonus

In a seminal paper, Michaelson, Watson and Black (1989)[1] identified what they called an *assembly bonus* in teams working collectively (p.843). They found that the performance of the group (3-8 members) eclipsed that of the most able member 97% of the time. Just as striking, in 40% of the cases the group performance could not be explained by recourse to average or highest individual scores (*ibid*). Woolley et al. (2010)[2] suggest that a general collective intelligence factor, c, analogous to individual general intelligence, exists for groups as measured across a wide variety of tasks.

Their findings indicate that this so-called c-factor does not correlate well with individual or average general intelligence and is most strongly aligned with “average social sensitivity of group members, [and] the equality in distribution of conversational turn-taking” (p. 686).

[1] Michaelsen, L. K., Watson, W. E., & Black, R. H. (1989). A realistic test of individual versus group consensus decision making. *Journal of Applied Psychology, 74*(5), 834–839. https://doi.org/10.1037/0021-9010.74.5.834

[2] Woolley, A. W., Chabris, C. F., Pentland, A., Hashmi, N., & Malone, T. W. (2010). Evidence for a Collective Intelligence Factor in the Performance of Human Groups. *Science*, *330*(6004), 686–688.

Reasons to collaborate

1. **Develop rigour in reasoning through accountability**

   Working with others provides opportunities and contexts for explanation, analysis, justification and evaluation

2. **Grow virtues that enable and enhance collaboration**

   Character traits that are indicative of good critical thinkers include humility, curiosity, honesty and open-mindedness

3. **Apply and refine the Values of Inquiry**

   Critical thinkers make their own thinking an object of study, understanding what we collectively value in good thinking

4. **Learn the norms and standards of good reasoning**

   Like a language, thinking together is about creating shared meaning using socially derived norms of reasoning

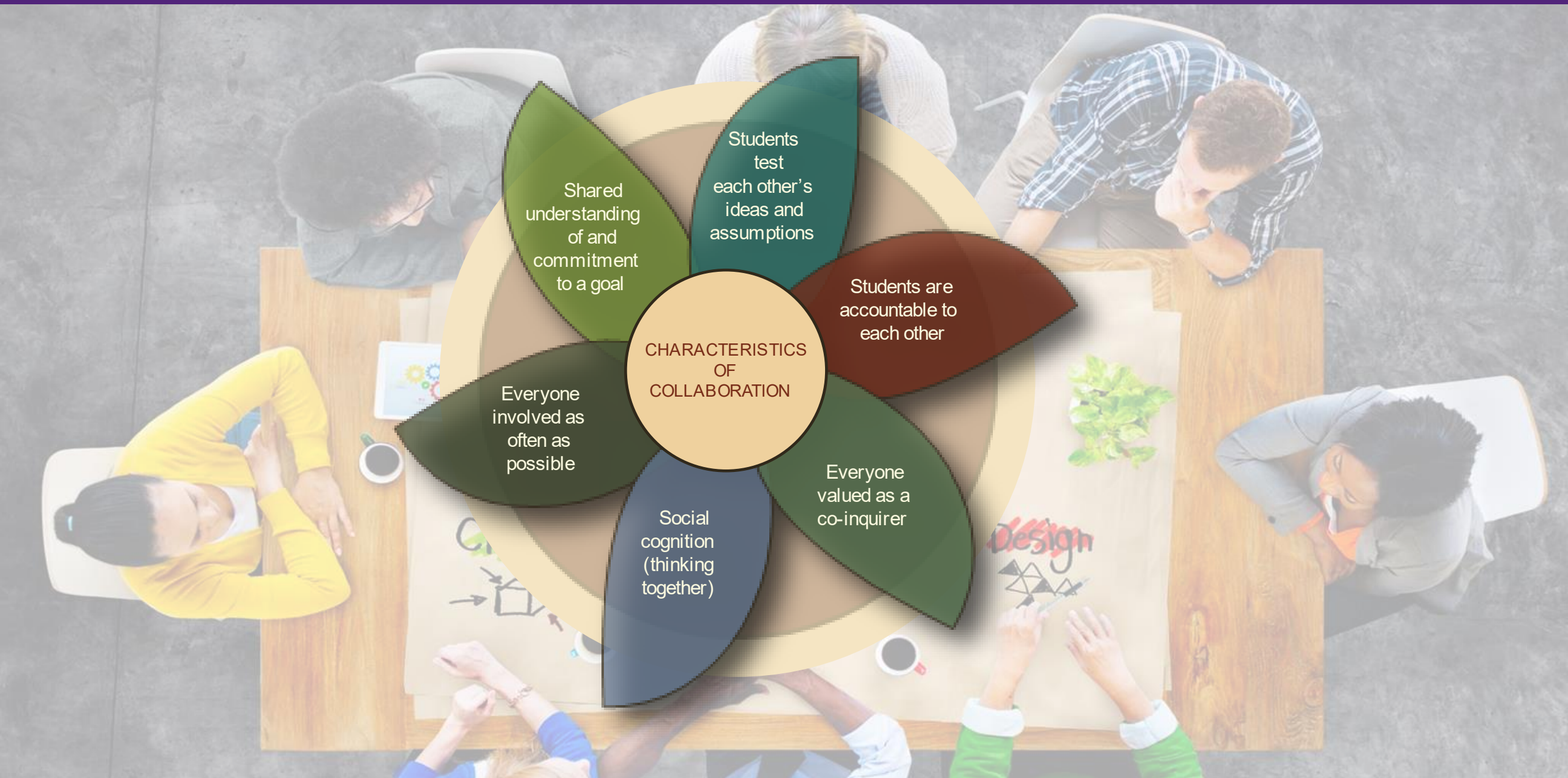
5. **Engage in social cognition (thinking together)**

   Thinking together means we are making the group, not the individual, the unit of cognition

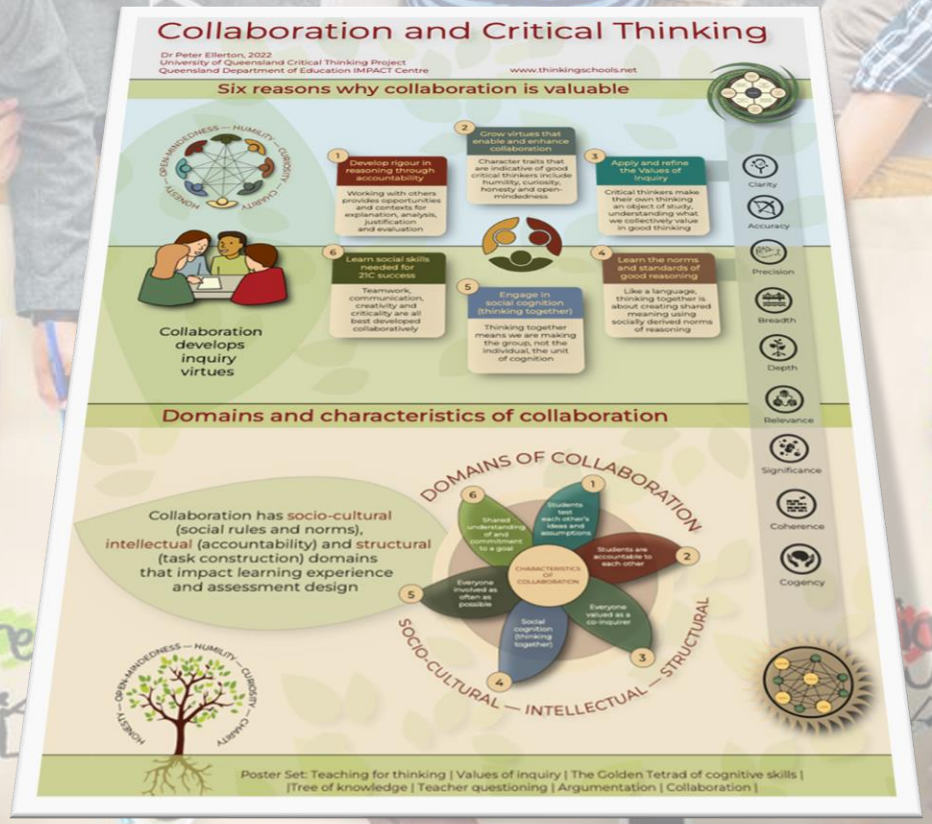
6. **Learn social skills needed for 21C success**

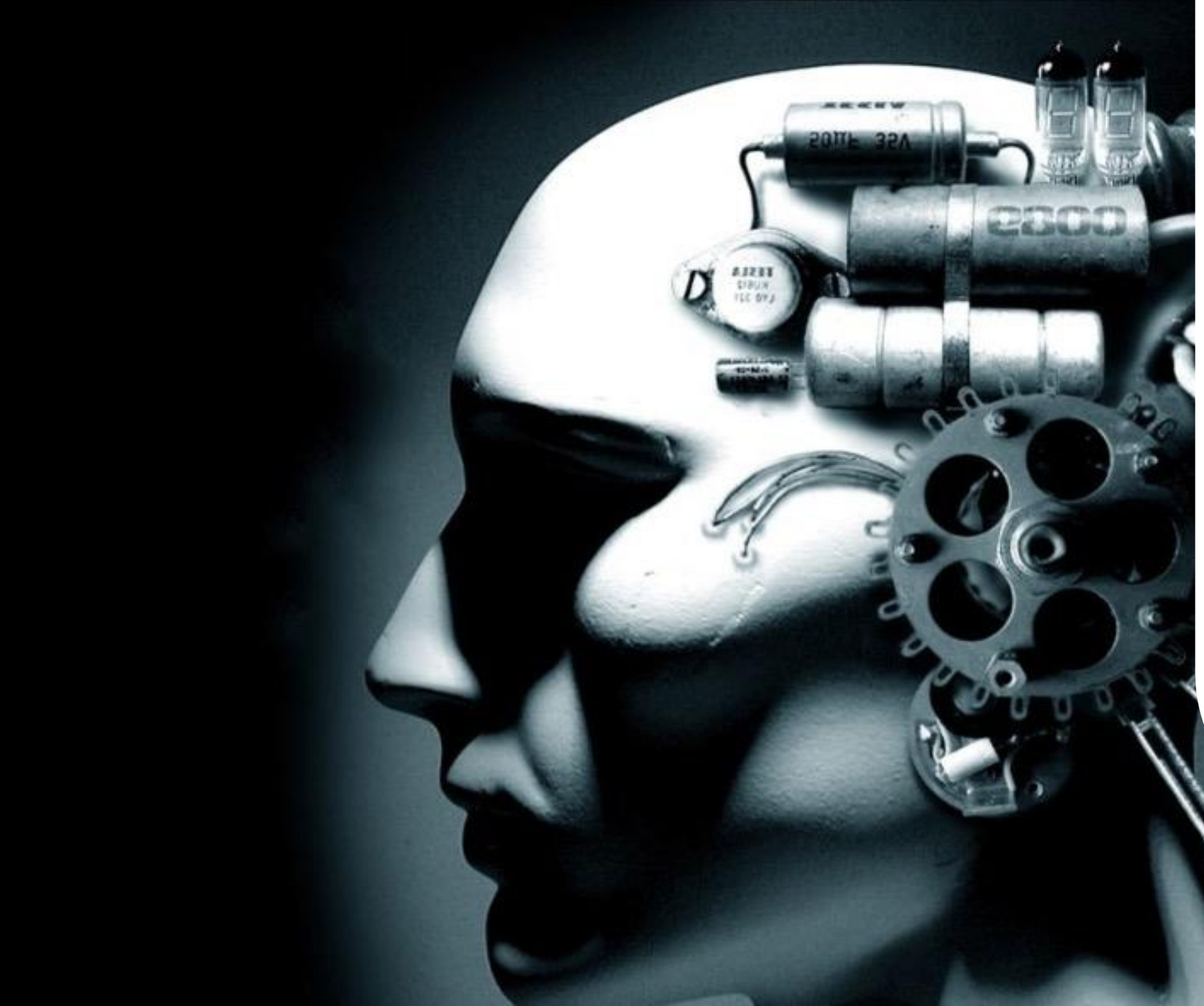
   Teamwork, communication, creativity and criticality are all best developed collaboratively

Characteristics of collaboration



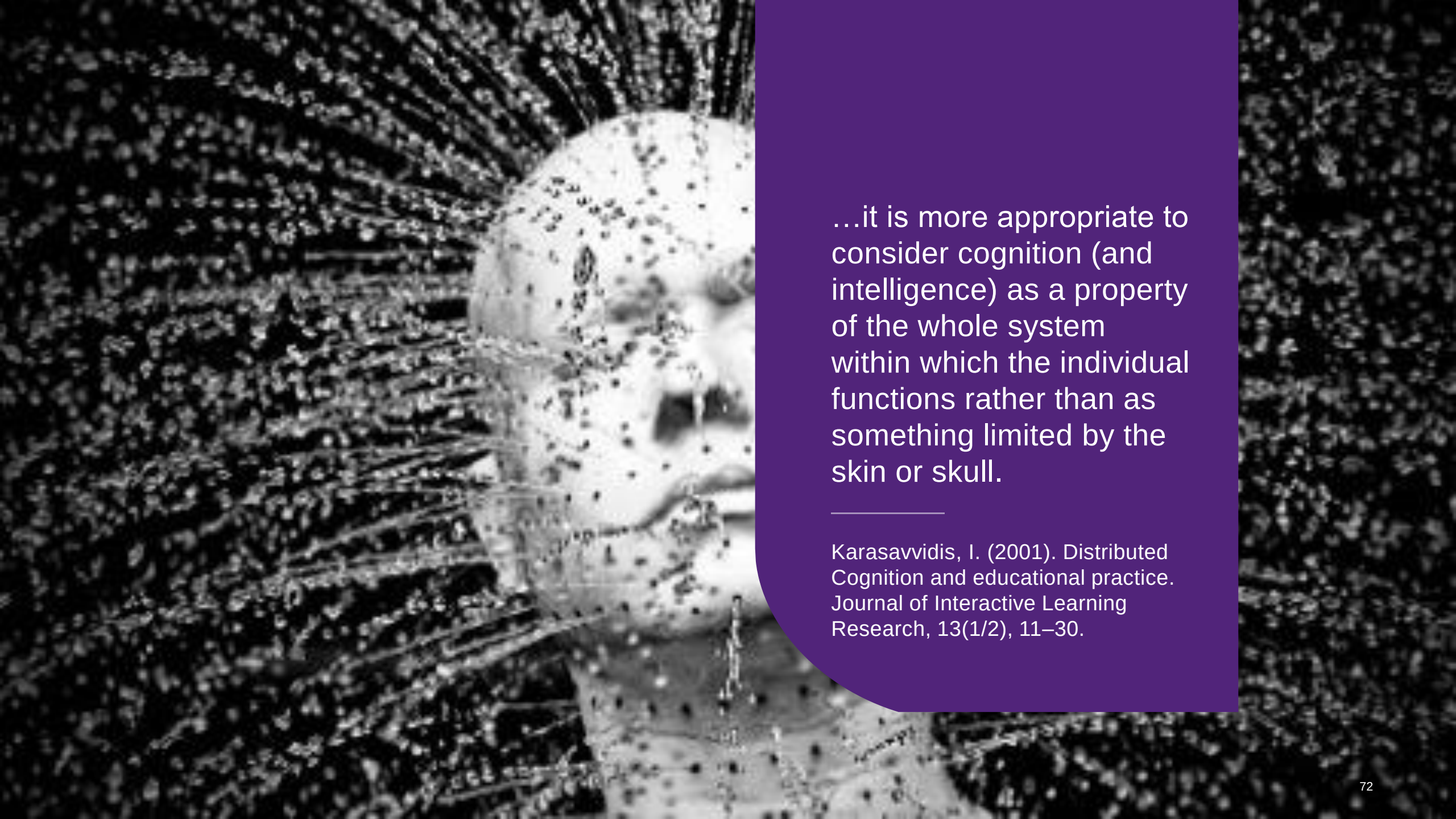
Collaboration poster





Materially extended cognition

Challenging the classical idea of the individual as the unit of cognition



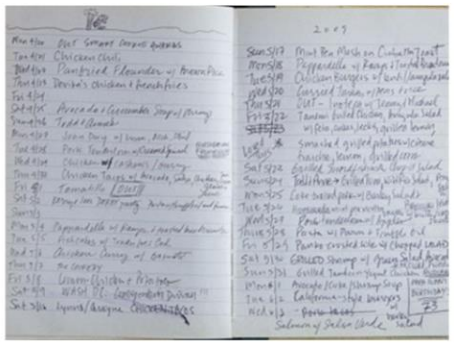
…it is more appropriate to consider cognition (and intelligence) as a property of the whole system within which the individual functions rather than as something limited by the skin or skull.

Karasavvidis, I. (2001). Distributed Cognition and educational practice. Journal of Interactive Learning Research, 13(1/2), 11–30.

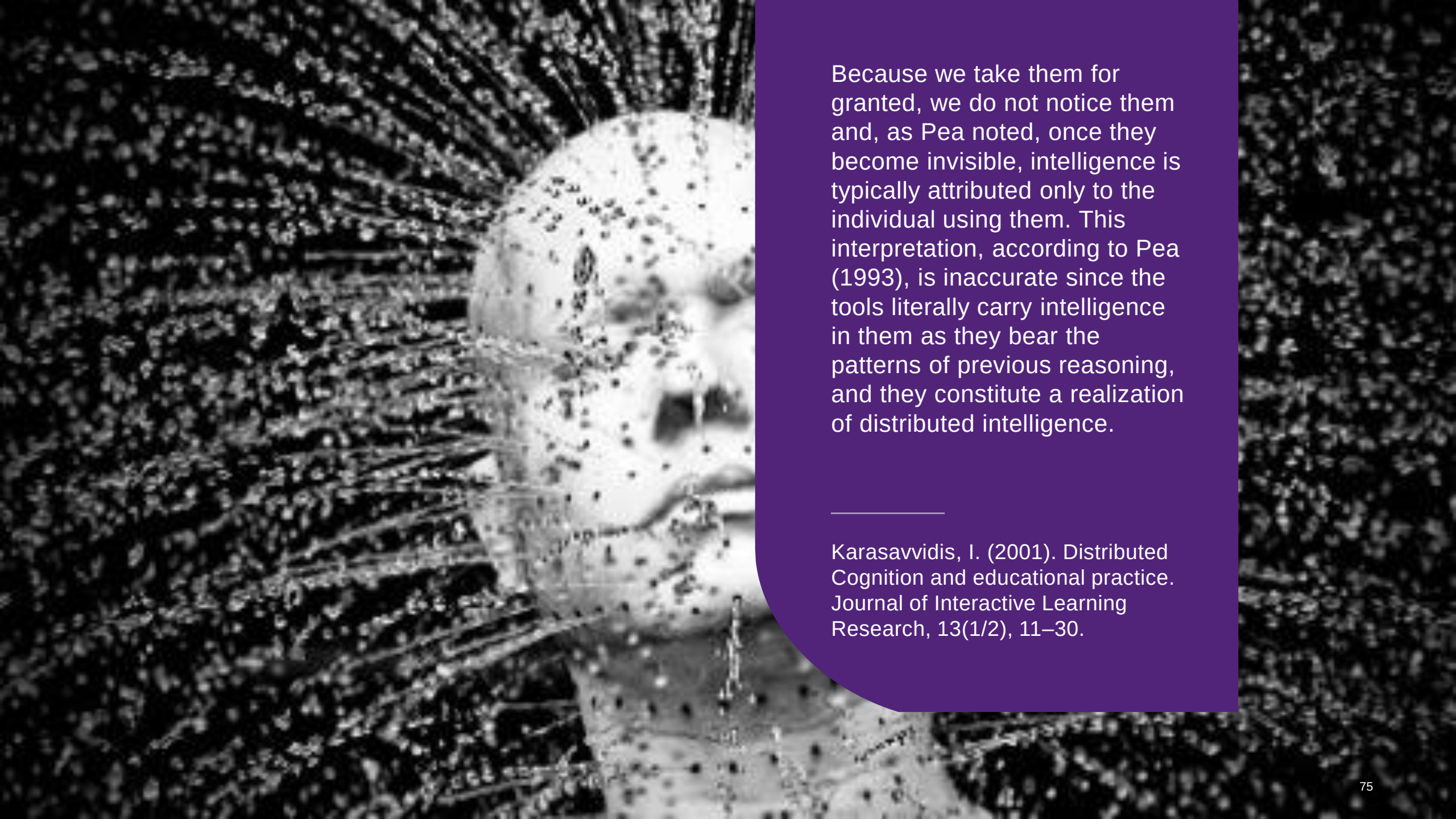
The image of mind that emerges is that of the leaky mind “escaping its natural confines and mingling shamelessly with body and with the world”

Clark A. Being there: Putting brain, body and world together again. Cambridge, MA: MIT Press; 1997.

Materially extended cognition



Each of these can act as an integrated part of our cognition.



Because we take them for granted, we do not notice them and, as Pea noted, once they become invisible, intelligence is typically attributed only to the individual using them. This interpretation, according to Pea (1993), is inaccurate since the tools literally carry intelligence in them as they bear the patterns of previous reasoning, and they constitute a realization of distributed intelligence.

Karasavvidis, I. (2001). Distributed Cognition and educational practice. Journal of Interactive Learning Research, 13(1/2), 11–30.

Lave, Murtaugh, and de la Rocha (1984) reported the case of a shopper who “found an unusually high priced package of cheese in a bin. He suspected an error. To solve the problem, he searched through the bin for a package weighing the same amount and inferred from the discrepancy between the prices that one was in error”. This type of problem-solving behavior shows that, instead of engaging in mental arithmetic—which would make the solution more effortful and error-prone—the shopper resorted to the environment in an attempt to avoid mental effort and make the problem solution much easier, essentially offloading the computation onto the environment itself and using it as a tool.

Songlines

https://www.deadlystory.com/page/culture/Life_Lore/Songlines

The term ‘Songline’ describes the features and directions of travel that were included in a song that had to be sung and memorised for the traveller to know the route to their destination. Certain Songlines were referred to as ‘Dreaming Pathways’ because of the tracks forged by Creator Spirits during the Dreaming. These special Songlines have specific ancestral stories attached to them.

Socially extended cognition

Extending the unit of cognition from the individual to the group

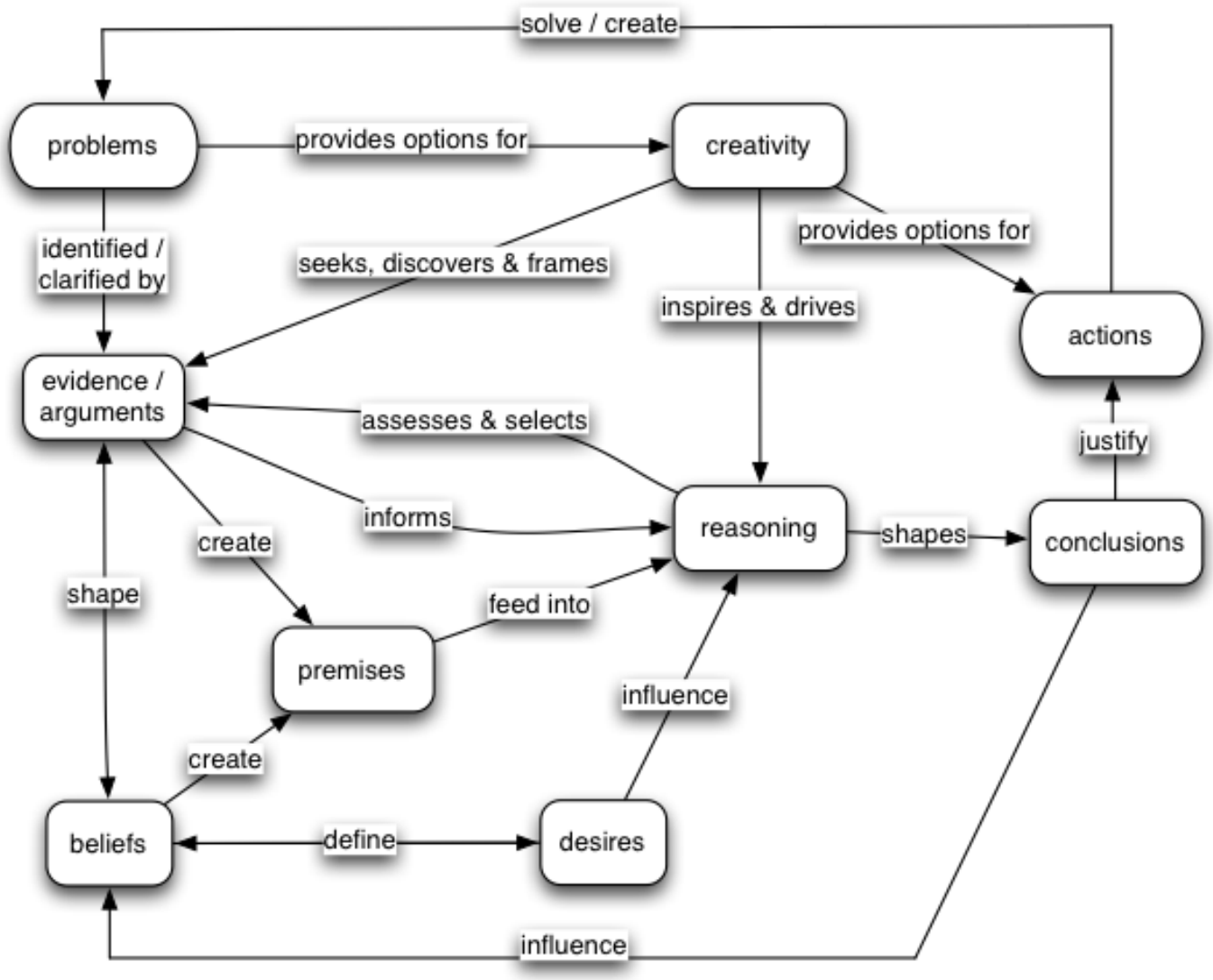
…in Vygotsky's general genetic law of cultural development: "every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first *between* people (inter psychological), and then *inside* the child (intra psychological)" (Vygotsky, 1978; p. 57, emphasis in the original).

Wertsch (1991) provided an illustration of this law by considering the case of a young child who was assisted by his mother to remember where his toy was. He points out that it is impossible to say that either participant did the remembering, as neither the child could have effectively managed his memory resources nor the mother could have known the position of the toy. The cognitive act of remembering was carried out on the intermental plane.

As individuals reason together, their inputs and outputs can form a system that encompasses and extends what is possible as separate agents. Many people have experienced collaborative sessions in which someone's question or idea has sparked a thought in another, assumptions that were unconsciously held have been made public and actionable, one person's proposal has been built upon by another who would not have been able to do so otherwise, and so on.

In these cases, other minds act as cognitive resources that are not available to us acting in isolation. We are not always just communicating the results of our completed cognition but are engaged in a flow of ideas and exchange of partially formed thoughts to see where they may lead. The exchange is a part of the cognitive process, and the result is more than the sum of the parts.

Ellerton et al., 2024, *forthcoming*



Ellerton, P. (2015). Metacognition in critical thinking: Some pedagogical imperatives. In M. Davis (Ed.), *Palgrave Handbook of Critical Thinking in Higher Education*. Palgrave Macmillan.

University of Queensland Critical Thinking Project: Draft Collaboration Matrix

Criteria	1 - Poor	2 - Fair	3 - Good	4 - Very Good	5 - Excellent
Shared Goals and Vision	No clarity or alignment of objectives	Some alignment but objectives are not clear to all	Clear objectives but not all are aligned	Mostly aligned with clear objectives	Fully aligned with a clear and shared vision
Open Communication	Rarely communicates; many misunderstandings	Limited communication; some misunderstandings	Regular communication; occasional misunderstandings	Frequent and clear communication; few misunderstandings	Constant open and effective communication
Mutual Trust and Respect	Mistrust evident; no respect for contributions	Occasional trust issues; minimal respect	Generally trusting and respectful	High trust and respect with occasional lapses	Absolute trust; deep respect for all contributions
Active Participation	Rarely contributes; minimal involvement	Occasional contributions; limited involvement	Regular contributions but not fully engaged	Actively contributes most of the time	Fully engaged; consistently proactive
Flexibility	Resistant to change or feedback	Struggles with change; occasionally considers feedback	Adaptable but with some resistance	Often flexible and open to feedback	Always adaptable; embraces change and feedback
Diversity of Skills and Knowledge	Homogeneous skills; no diversity	Limited diversity; some overlapping skills	Balanced skill set but lacks diversity	Diverse skills with some unique expertise	Highly diverse and complementary skill sets
Joint Decision-making	Decisions made unilaterally	Some joint decisions but occasional exclusion	Joint decisions made regularly	Mostly inclusive decision-making	Always inclusive and collective decision-making
Shared Accountability	Blames others; avoids responsibility	Sometimes accepts responsibility; occasional blame	Generally shares responsibility but with lapses	Often accountable with minimal blame	Fully accountable; no blame culture
Conflict Resolution	Avoids conflicts; unresolved issues	Some conflicts addressed but not effectively	Regularly addresses conflicts; some unresolved	Effectively resolves most conflicts	Always addresses and resolves conflicts constructively
Feedback Loops	Rarely seeks or gives feedback	Occasionally seeks or gives feedback	Regular feedback but not always acted upon	Frequent feedback with most being actionable	Continuous feedback and always acts upon it
Shared Leadership	One dominant leader; no role changes	Occasional shared roles; limited leadership diversity	Shared leadership but with clear dominant figures	Often shared leadership with rotating roles	Fully shared leadership; roles adapt as needed
Synergy	Individual efforts; no combined value	Some joint efforts but limited synergy	Clear synergy but with some isolated efforts	High synergy with occasional individual efforts	Full synergy; combined effort exceeds individual contributions
Transparent Processes	Processes unclear and confusing	Some processes in place but lack clarity	Clear processes but not always followed	Mostly clear and often followed processes	Fully transparent and always followed processes

Dr Peter Ellerton, UQ Critical Thinking Project

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Dr Peter Ellerton, UQ Critical Thinking Project

Where to from here?

- What have you heard today that resonated with your practice?
- What are the implications of these ideas for your practice?
- What further questions or challenges do you have?