ES2631

Critique and Communication of Thinking and Design
Semester I AY 2025/26

ENGINEERING REASONING FRAMEWORK (PAUL & ELDER)

INTELLECTUAL STANDARDS

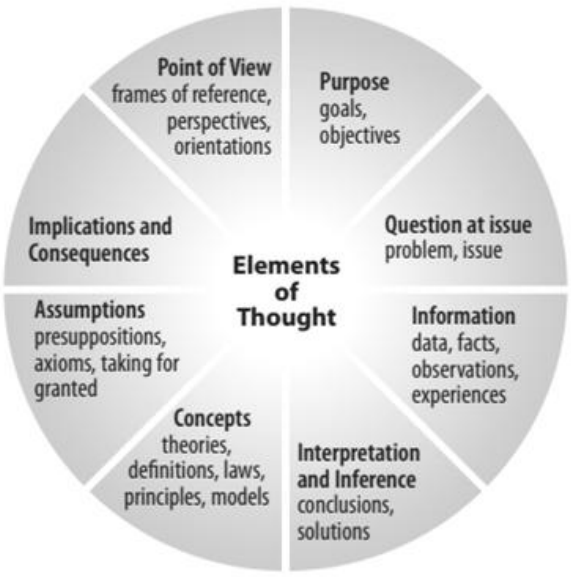
Clarity	Could you elaborate further? Could you give me an example? Could you illustrate what you mean?
Accuracy	How could we check on that? How could we find out if that is true? How could we verify or test that?
Precision	Could you be more specific? Could you give me more details? Could you be more exact?
Relevance	How does that relate to the problem? How does that bear on the question? How does that help us with the issue?
Depth	What factors make this a difficult problem? What are some of the complexities of this question? What are some of the difficulties we need to deal with?
Breadth	Do we need to look at this from another perspective? Do we need to consider another point of view? Do we need to look at this in other ways?
Logic	Does all this make sense together? Are we taking a reasonable approach to the problem? Does what you say follow from the evidence?
Significance	Is this the most important problem to consider? Is this the central idea to focus on? Which of these facts are most important?
Fairness	Am I considering the views of others in good faith? Am I accurately representing the viewpoints of others? Is there an ethical component to this issue that we are avoiding for reasons of vested interest?

Taken from p.25 of Paul & Elder's "The Thinker's Guide to Engineering Reasoning" (2013)

Must be applied to

Adapted from p.4 of Paul & Elder's "The Miniature Guide to Critical Thinking Concepts and Tools" (2008)

ELEMENTS OF THOUGHT



As we learn to develop

Taken from p.5 of Paul & Elder's "The Thinker's Guide to Engineering Reasoning" (2013)

INTELLECTUAL TRAITS

Intellectual Humility	Intellectual Perseverance
Intellectual Autonomy	Confidence in Reason
Intellectual Integrity	Intellectual Empathy
Intellectual Courage	Fairmindedness

Prepared by Wong Wei Li