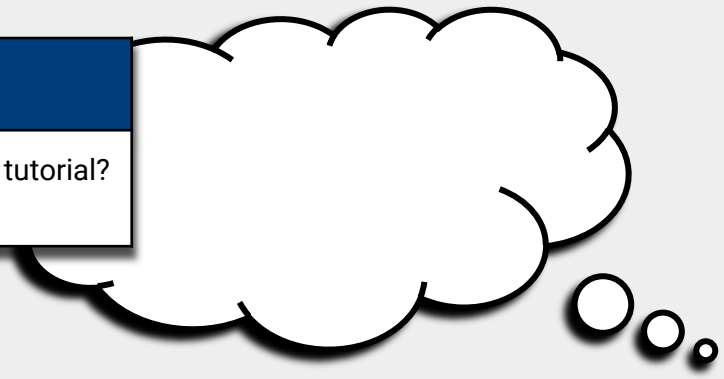
ES2631

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

WEEK 3 TUTORIAL WORKSHEET

1 WEEK 2 RECAP (10)

1) What did we do and learn in week 2's tutorial?
2) Any questions about A1?



2 REMINDERS (5)

1) Write an 80-100-word reflection on intellectual trait in respective group's Google Slides.
2) Upload photo of week 2's mind-map to respective Google Drive group folder.
3) Update A1 tentative topic Google Sheets on your group's A1 ideas.

3 HOUSEKEEPING (5)

1) As a **group**, book a **20-min Zoom consult** on this Google Sheets in one of the following **Week 5** slots. Please book under the correct tab:
   - **G01 & G06**: **9 Sep (Tues)**
   - **G22 & G25**: **11 Sep (Wed)** & **12 Sep (Thurs)**

Week	Tutorial activities	Deadline (Friday, 2359)
2	EoT and Int. traits | **A1 brainstorm**	**Quiz 1**: 22 Aug **Online activity 1 (int. traits reflection)**: **22 Aug**
3	Int. standards | **A1 problem**	**Quiz 2**: 29 Aug
4	Sources, plagiarism, AI use | **A1 overall**	**Quiz 3**: 5 Sep
5a	OP | **A1 peer sharing & feedback**	**Quiz 4**: 12 Sep **Online activity 2 (source justification)**: 12 Sep
5b	**A1 Zoom consult**	
6	**A1 OP**	**Ppt deck and video**: by end of tutorial

Prepared by Wong Wei Li

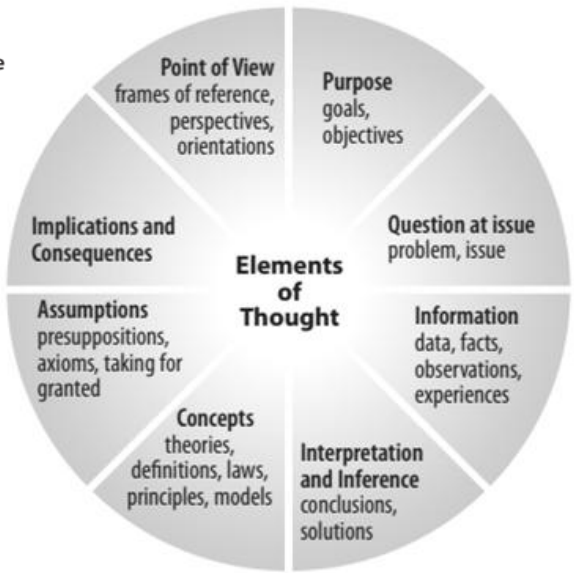
WEEK 3 TUTORIAL WORKSHEET

4 INTELLECTUAL STANDARDS (30)

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)

For definition of these intellectual standards, see pp. 21-25 of Paul & Elder's "The Thinker's Guide to Engineering Reasoning"



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

WEEK 3 TUTORIAL WORKSHEET

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ACTIVITY 1: APPLYING IS TO EOT (30)

In week 2, we put ourselves in the shoes of the Singapore government and broke down the thinking and reasoning behind the design and implementation of the ERP system into various elements of thought.

To ensure rigorous criticality, the Singapore government would have also needed to apply intellectual standards to those elements.

Using appropriate **intellectual standard(s)**, what **question(s)** would they (or you) have needed to ask about each element to ensure quality decision-making?

Elements of thought	Intellectual Standards
Purpose: To reduce traffic congestion on major roads and the CBD in Singapore, especially during peak hours, by influencing motorist's driving habits.	**Clarity**: Is the purpose of ERP **understandable** to all stakeholders so that there is buy-in? **Significance**: Is this purpose **important** enough to focus resources and effort on? **Relevance**: How is this purposed **related to** solving actual issues on the roads?
Question at Issue: What can effectively change motorist' driving habits in order to reduce congestion in Singapore's CBD?	**Clarity**: Is the key question **easy to understand**? **Precision**: Is the question **specific** and/or **detailed enough**?
Information: Traffic flow data (to determine the number, location and operating hours of the gantries), research on what fee levels would actually influence motorist behaviour, case studies/pilot studies, technical specifications, public feedback	
Inference: Evidence suggests that introducing variable road pricing at key congestion points will encourage many motorist to either avoid peak times, take alternative routes, switch to public transport or carpool, reducing congestion	

Adapted from p 2 of "AY25-26_S1_ES2631_Week 3 Tutorial Handout (Student)"

WEEK 3 TUTORIAL WORKSHEET

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ACTIVITY 1: APPLYING IS TO EOT (30)

Elements of thought	Intellectual Standards
Concept: Dynamic pricing, traffic flow theory, system optimisation, behavioural economics, and smart city infrastructure	
Assumption: Cost deterrence changes driver behaviour, and that people have viable public transport alternatives, congestion reduction is a shared societal goal, the public will accept the implementation and pricing as fair and necessary	
Implication: • Intended: Less congestion and smoother traffic on roads where ERP is implemented, supports Singapore's goal towards a more sustainable, car-lite society • Unintended: Potential congestion on alternative, non-ERP routes, possible perception of unfairness, changes in travel patterns or time	
Point of View: • Government planners: Need for efficient and sustainable urban transport • Motorists/car owners: Concerns about extra cost, convenience and alternative options • Public transport users: May benefit from less congested roads or face more crowding in buses/trains • Environmentalists: In favour due to lower emissions • Businesses in CBD: May suffer from less customers	

Adapted from p 2 of "AY25-26_S1_ES2631_Week 3 Tutorial Handout (Student)"

WEEK 3 TUTORIAL WORKSHEET

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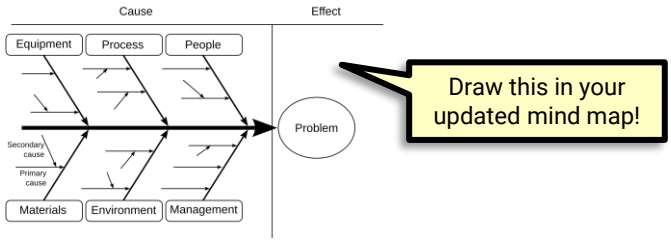
ACTIVITY 2: WHITEBOARD MIND-MAPPING (30)

1) Draw an **updated mind-map** on the whiteboard, where you respond to the following questions.
   - What is the **problem**? Articulate this in one statement.
   - Who is the **target user** (specific demographic or community)?
   - How do you prove that this problem **exists** and is **worth solving**?
   - What are the **causes** and/or **constraints** of this problem?



The *Ishikawa* diagram, or fishbone diagram, is a useful tool for brainstorming *thoroughly* the different causes to a problem.

   - What are the **current measures** (e.g, engineering solutions, policies, campaigns, etc.) **already implemented in Singapore** to try and address this problem?
   - What are the **gaps** of these current measures?

ACTIVITY 3: EOT & IS (30)

2) Label your group's mind-map with the appropriate:
   - **Elements of thought**: What **elements** are at play in the various parts of the problem section? For example, ***information*** is needed to support the existence of the problem. What about the gaps of the current measures—what element can I use to frame these "gaps?"
   - **Intellectual standards**: What **standards** can the group use mindfully to ensure quality elements? For example, is the information supporting the existence of the problem ***accurate***? How am I assessing the ***accuracy*** of this information?

3) Take photo of the updated mind-map at the end of tutorial and upload to your respective group's Google Drive folder, following this path: Google Drive > respective X) GXX > 0) Tutorial activities > GXX_X (X, X, X) > **GXX_X week 3 mind-map**