Outcomes

This interactive workshop will introduce you to argument-mapping, an evidence-based way to clarify and improve reasoning across a variety of contexts, from the meeting room to the classroom. You will leave the workshop with a specific action-plan to sharpen reasoning, decision making, and problem solving in your organization, and you’ll be connected to a network of other professionals interested in doing the same.

By attending this workshop, attendees will
- Learn how to graphically represent reasoning.
- Learn how graphically representing reasoning can sharpen argumentation, decision making, and problem solving.
- Learn how graphically representing reasoning can be used in meetings to facilitate discussion and group deliberation.
- Network and build relationships.

9:30 a.m.  Opening Discussion
- What are your experiences with critical thinking in your classroom, workplace, or organization?
- What would you like to get out of this workshop?
- Identify a specific problem or issue that you’re facing right now for which critical thinking is needed

10:30 a.m.  Critical Thinking
- What Critical Thinking is
- Why Critical Thinking can be Hard
- What makes Critical Thinking Easier

Noon  Lunch

1:00 p.m.  Visual Thinking
- Concept Maps
- Reasoning Maps
- Logical Structure of Reasoning
- Evaluation of Reasoning
- Uncovering Hidden Assumptions
- Dialogue Maps

2:30 p.m.  Application
- Work on the specific problem or issue that you identified
MAPPING THE REASONING
ARGUMENTATION, DECISION MAKING, AND PROBLEM SOLVING

July 21, 2017
OPENING DISCUSSION
What are your experiences with critical thinking in your classroom, workplace, or organization?

What would you like to get out of this workshop?

Identify a specific problem or issue that you’re facing right now for which critical thinking is needed.
You will

- Learn how to graphically represent reasoning.
- Learn how graphically representing reasoning can sharpen argumentation, decision making, and problem solving.
- Learn how graphically representing reasoning can be used in meetings to facilitate discussion and group deliberation.
- Develop an action-plan to sharpen argumentation, decision making, and problem solving in your organization.
- Network and build relationships.
CRITICAL THINKING
Critical Thinking: "Purposeful, reflective judgment which manifests itself in reasoned consideration... in deciding what to believe or what to do." (Facione 2015)

Facione, Peter, 2015, "Title: Critical Thinking What It Is and Why It Counts,”
Critical Thinking: "Purposeful, reflective judgment which manifests itself in reasoned consideration... in deciding what to believe or what to do." (Facione 2015)

Cognitive Processes

- Applying knowledge
  - Analyzing existing pieces of reasoning
  - Evaluating existing pieces of reasoning
  - Constructing our own pieces of reasoning

Reasoning "Down"
- Formulating a Conclusion
- Hypothesis Formation
- Decision Making
- Problem Solving

Reasoning "Up"
- Defending a Conclusion
- Testing an Hypothesis
WHY IT CAN BE HARD
Grasping the elements involved and the relationships between the elements.
Grasping the elements involved and the relationships between the elements.

Cognitive Processes

- Critical Thinking: "Purposeful, reflective judgment which manifests itself in reasoned consideration... in deciding what to believe or what to do." (Facione 2018)

- Communicating our own pieces of reasoning

- Reasoning "Up"
  - Defending a Conclusion
  - Testing an Hypothesis

- Reasoning "Down"
  - Formulating a Conclusion
  - Problem Solving
  - Hypothesis Formation
  - Decision Making
Maps make the elements and the relationships between the elements easier to see.
We can understand critical thinking as the “purposeful, reflective judgment which manifests itself in reasoned consideration… in deciding what to believe or do. (Facione 2015). This purposeful reflective judgment can take the form of a variety of psychological actions, including applying knowledge, analyzing existing pieces of reasoning, evaluating existing pieces of reasoning, constructing our own pieces of reasoning, and communicating our own pieces of reasoning. Constructing our own reasoning can, in turn, be conceptualized as either reasoning “down” – which includes formulating a conclusion, formulating an hypothesis, making a decision, and solving a problem – or reasoning “up” – which includes defending a conclusion and testing an hypothesis.

Faulty heuristics and general unwillingness can both hinder the psychological actions that constitute critical thinking, actions that require grasping the elements involved and the relationship between the elements. The elements include concepts, questions, and assertions. Inclusion and causality are relationships between concepts. Relationships between question and assertion include “raises the question” and “possible answer. Relationships between assertions are support, objection, standing as dependent reasons, and standing as independent reasons.

The lack of schema and high cognitive load both hinder the ability to grasp the elements and relationships involved in critical thinking. The ability to grasp the elements and relationships involved in critical thinking can be assisted by the internalization of schema, and this internalization can be facilitated by graphical representations and deliberate practice.
Maps make the elements and the relationships between the elements easier to see. Maps make reasoning easier to track and evaluate.
“I think my house will sell within six months. After all, it’s on a river. Of course, lots of people are worried about flooding. My nasty neighbor thinks that my house is priced twice as high as comparable houses, but I think it’s priced reasonably, and reasonably priced houses always sell quickly. My husband claims that our house needs a new roof, and of course houses that need new roofs stay on the market longer, but as far as I can see, our roof is structurally sound.”

• What are the main elements (assertions) in this piece of reasoning, and how are they related to each other?
• Try to represent this argument visually.
LOGICAL STRUCTURE OF REASONING
Conclusion: This house will sell within six months.

Connection (Inference):

Reason: (+) This house is priced reasonably.
Objection

Conclusion

This house will sell within six months.

Connection (Inference)

(+): This house is priced reasonably.

Connection ("Outference")

(-): This house needs a new roof.

Reason

Objection
Dependent Reasons

This house will sell within six months.

(+) This house is priced reasonably.
(+ ) Reasonably priced houses sell within six months.
(-) This house needs a new roof.
Dependent Reasons

This house will sell within six months.

(+) This house is priced reasonably.
(+) Reasonably priced houses sell within six months.
(-) This house needs a new roof.
(-) Houses that need new roofs don't sell within six months.
Independent Reasons

This house will sell within six months.

(+) This house is on a river.
(+) This house is priced reasonably.
(+) Reasonably priced houses sell within six months.
(-) This house needs a new roof.
(-) Houses that need new roofs don't sell within six months.
• The structure of the reasoning can be more complex.
• The content of the reasoning can be more difficult to comprehend.
• It can be difficult to track other people’s reasoning.
• It can be difficult to track our own reasoning.

It’s hard to find a black chicken in the dark. But it’s even harder if you don’t know what a chicken looks like.
EVALUATION OF REASONING
Assessing Reasons

Are the reasons true?

This house will sell within six months.

(+) This house is on a river.
(+) This house is priced reasonably.
(+) Reasonably priced houses sell within six months.
(-) This house needs a new roof.
(-) Houses that need new roofs don't sell within six months.

False! The house costs twice as much as comparable houses.
False! The roof is structurally sound.
Lots of people are worried about flooding.

If the reasons were true, would they show that the conclusion is probably true (or false)?

- (+) This house is on a river.
- (+) This house is priced reasonably.
- (+) Reasonably priced houses sell within six months.
- (-) This house needs a new roof.
- (-) Houses that need new roofs don't sell within six months.

Assessing Connections

False! The house costs twice as much as comparable houses.

False! The roof is structurally sound.
Lots of people are worried about flooding.

(+) This house is on a river.

(+) This house is priced reasonably.

(+) Reasonably priced houses sell within six months.

(-) This house needs a new roof.

(-) Houses that need new roofs don't sell within six months.

(-) The roof is structurally sound.

(-) This house costs twice as much as comparable houses.
Mapping Objections to Connections

This house will sell within six months.

(+) This house is on a river.
(+) Houses on rivers sell within six months.
(+) This house is priced reasonably.
(+) Reasonably priced houses sell within six months.

(-) This house needs a new roof.
(-) Houses that need new roofs don't sell within six months.

(-) The roof is structurally sound.

(-) This house costs twice as much as comparable houses.
(-) Lots of people are worried about flooding.
What all this means for the conclusion

This house will sell within six months.

(+): This house is on a river.

(+): Houses on rivers sell within six months.

(+): This house is priced reasonably.

(+): Reasonably priced houses sell within six months.

(-): This house needs a new roof.

(-): Houses that need new roofs don't sell within six months.

(-): The roof is structurally sound.

(-): Lots of people are worried about flooding.

(-): This house costs twice as much as comparable houses.
UNCOVERING HIDDEN ASSUMPTIONS
Uncovering Hidden Assumptions

This house will sell within six months.

(+): This house is on a river.
(+): Houses on rivers sell within six months.
(+): This house is priced reasonably.
(+): Reasonably priced houses sell within six months.
(-): This house needs a new roof.
(-): Houses that need new roofs don't sell within six months.

(-): Lots of people are worried about flooding.
(-): This house costs twice as much as comparable houses.
(-): The roof is structurally sound.
Uncovering Hidden Assumptions

If B then C

... A ... C ...

... A ... B ...

If B then C
This house will sell within six months.

This house is on a river.

If is on a river then will sell within six months.
This house will sell within six months.

This house is on a river.

If a house is on a river then it will sell within six months.
This house **will sell within six months.**

This house **is on a river.**

Houses on rivers **sell within six months.**
We ought to use environmentally safe insulation.

Using environmentally safe insulation is good for the environment.

We ought to do things that are good for the environment.
We shouldn’t use lead paint.

Lead paint is poses health risks.

We shouldn’t do things that pose health risks.
Is / Ought Reasoning

I think my aunt’s new house is ugly.

I ought to tell my aunt that I think her new house is ugly.

We ought to tell the truth.

Watch out! “Ought” statements can have exceptions.
Means / Ends Reasoning

I’ll do M.

I’ll fix the front door.

I want E.

I want to sell my house.

Fixing the front door will help me to sell my house.

M will increase my chances of E.
I want to sell my house.

I’ll bribe the inspector.

Bribing the inspector will help me to sell my house.

Watch out! There is more than one means to an end.
Means / Ends Reasoning

I’ll burn down my house.

I want to eliminate my clutter.

Burning down my house will eliminate my clutter.

Watch out! Sometimes the cure is worse than the disease.
Means / Ends Reasoning

I’ll do M.

I want E.

M will get me E.

M is no worse than other ways of getting E or of living without E.
Maps make the elements and the relationships between the elements easier to see. Maps make reasoning easier to track and evaluate. Maps make conversations easier to follow.
Mapping a Conversation

(?) How can we achieve X?

Connection (Response)

(+) We want X.  (+) A will give us X.

Connection (Inference)

(+) A is no worse than other ways of getting X or of living without X.

(+) Let’s A.
Mapping a Conversation

(?) How can we achieve X?

(!) Let's A.
(+A) We want X.
(+A) A will give us X.
(+A) A is no worse than other ways of getting X or of living without X.

(!) Let's B.
(+B) We want X.
(xB) B will give us X.
(+B) B is no worse than other ways of getting X or of living without X.

(-B) B is better than A.
Mapping a Conversation

(?) How can we achieve X?

(?) Let’s A.

(+) We want X.
(+B) A will give us X.
(+B) A is no worse than other ways of getting X or of living without X.

(!) Let’s B.
(+B) We want X.
(x) B will give us X.
(+B) B is no worse than other ways of getting X or of living without X.

(?) Let’s C.
(+B) We want X.
(+B) B will give us X.
(+B) B is no worse than other ways of getting X or of living without X.

(+) B is better than A.
(-) B won’t give us X.
APPLICATION
What are your experiences with critical thinking in your classroom, workplace, or organization?

What would you like to get out of this workshop?

Think of a specific problem or issue that you’re facing right now for which critical thinking is needed.
- Bubbl.us  https://bubbl.us/
- MindMup  https://www.mindmup.com/
- bCisive  https://www.bcisiveonline.com/
- Rationale  https://www.rationaleonline.com/
- TruthMapping  https://www.truthmapping.com/#cat=3
WEIGHING OPTIONS
I) What our Options Are

- Buy a house
- Rent an apartment
2) The Possible Consequences of Each Option

- Buy a house
  - Investment
  - Dog
  - Responsibility
  - Bankruptcy
  - Meet Soulmate

- Rent an apartment
  - Less Responsibility
  - No Dog
  - Noisy Neighbors
3) How Good or Bad Each Consequence Would Be

- **Buy a house**
  - Investment
  - Dog
  - Responsibility
  - Bankruptcy
  - Meet Soulmate
    - Less Responsibility
    - No Dog
    - Noisy Neighbors

- **Rent an apartment**
4) How Likely Each Consequence is

- **Certain**
  - **Investment**
  - **Bankruptcy**

- **Impossible**
  - **Meet Soulmate**
  - **Noisy Neighbors**
  - **No Dog**
  - **Less Responsibility**
  - **Responsibility**
  - **Dog**

- **Buy a house**
  - **Responsibility**
  - **Dog**

- **Rent an apartment**
  - **No Dog**
  - **Less Responsibility**
  - **Responsibility**
Q3 - Please indicate how you feel the workshop met the indicated outcomes.

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
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<td>I learned how to graphically represent reasoning.</td>
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<td>I learned how graphically representing reasoning can be used in meetings to...</td>
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<td>I networked and built relationships.</td>
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<td>I networked and built relationships.</td>
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</table>
Q4 - What was the most useful aspect of this workshop for you?

<table>
<thead>
<tr>
<th>What was the most useful aspect of this workshop for you?</th>
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</thead>
<tbody>
<tr>
<td>Being introduced to the different online platforms for argument mapping and learning how to map a discussion.</td>
</tr>
<tr>
<td>I enjoyed the use of visuals, and walking through each of the mapping websites, and exploring how they actually worked.</td>
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</tbody>
</table>
Q5 - What was the most difficult or unclear aspect of this workshop for you?

Uncovering hidden assumptions was the most difficult aspect to understand, but it was well presented and I think it would just take practice to gain better understanding.

It would have helped to have more discussion on the meaning of critical thinking at the very beginning of the workshop, and to have more examples to refer back to throughout the day (in addition to the elevator example).
<table>
<thead>
<tr>
<th>Q6 - Do you have any suggestions for future subjects, topics, or approaches?</th>
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</thead>
<tbody>
<tr>
<td>Do you have any suggestions for future subjects, topics, or approaches?</td>
</tr>
<tr>
<td>I would enjoy learning more about how to use software to create argument maps, with the chance to practice.</td>
</tr>
<tr>
<td>Not at this time.</td>
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</tbody>
</table>
Q7 - Do you have any other thoughts or comments that you would like to share?

<table>
<thead>
<tr>
<th>Do you have any other thoughts or comments that you would like to share?</th>
</tr>
</thead>
<tbody>
<tr>
<td>This was an extremely informative conference and I am so glad that I was able to attend! Thank you!</td>
</tr>
<tr>
<td>Overall, the workshop was excellent!</td>
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</tbody>
</table>