Using Argument Mapping to Teach Critical Thinking Across the Curriculum

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Outline

I. Quality Initiative and Critical Thinking

II. Critical Thinking and Argument Mapping

III. Argument Mapping at UW-Stevens Point

IV. Argument Mapping at your Institution

I. Quality Initiative and Critical Thinking

- Commitment to critical thinking is an overarching objective of an undergraduate education.

- Fulfilling this objective requires an intentional focus on critical thinking across the curriculum, teaching for transfer, and meaningful assessment.

I. Quality Initiative and Critical Thinking

- Our Goal: Identify a core set of measurable critical thinking skills that instructors can infuse into a wide variety of disciplines at every level with minimal disruption to existing courses.

- The Quality Initiative is "intended to allow institutions to take risks, aim high, and if so be it, learn from only partial success or even failure."

  (https://www.hlcommission.org/Pathways/quality-initiative.html)

II. Critical Thinking and Argument Mapping

Critical Thinking is

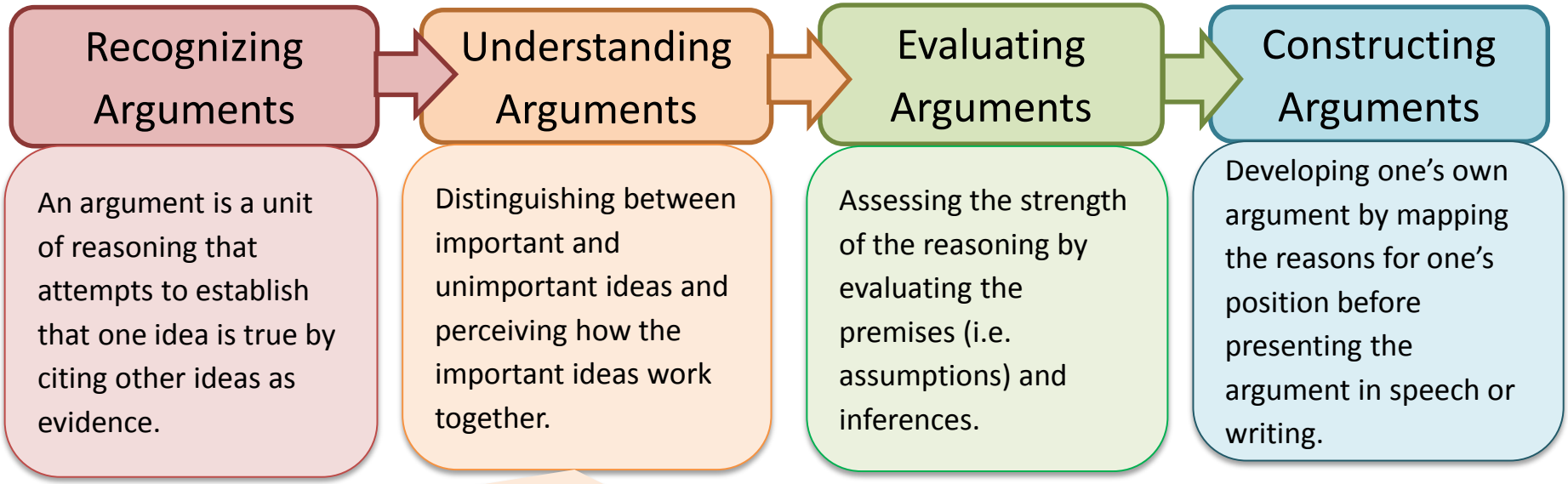
- “a habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion.” (AACU 2009, https://www.aacu.org/value/rubrics)
- "purposeful, reflective judgment which manifests itself in reasoned consideration of evidence, context, methods, standards, and conceptualizations in deciding what to believe or what to do.” (Facione 2015)
- "the disciplined mental activity of evaluating arguments or propositions that can guide the development of beliefs and taking action.” (Huitt 1998)

II. Critical Thinking and Argument Mapping

Argumentation (or case-making)

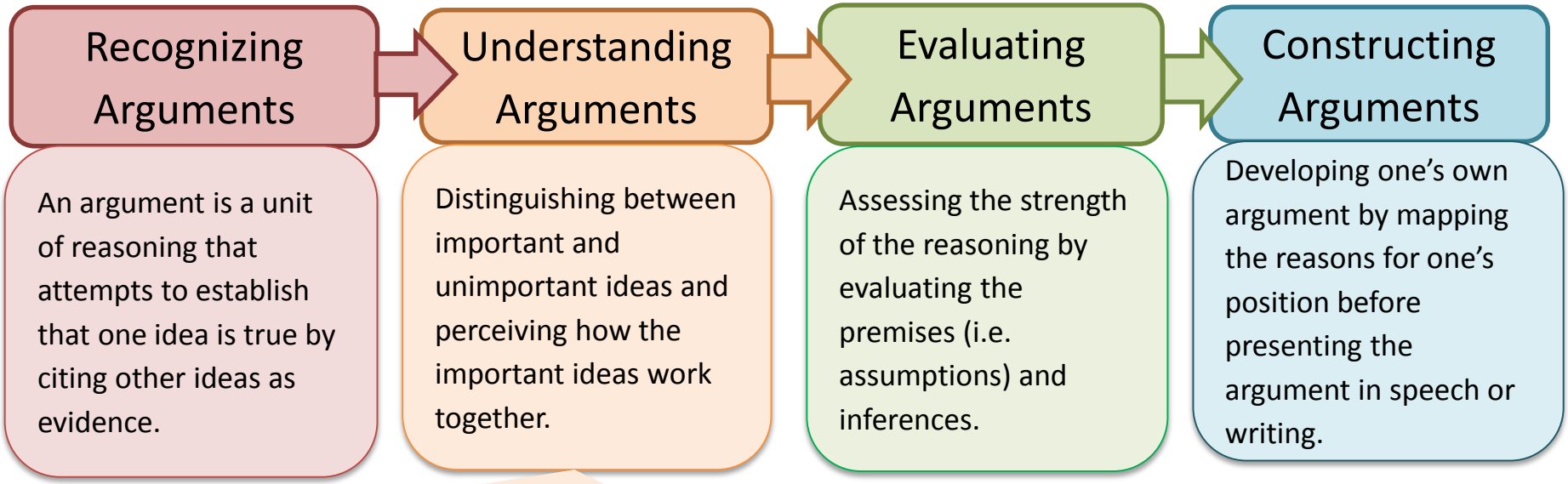
- Central to critical thinking
- Can serve as a framework for other critical thinking skills (e.g. information literacy)
- Applies to many disciplines and may be practiced at many levels

II. Critical Thinking and Argument Mapping



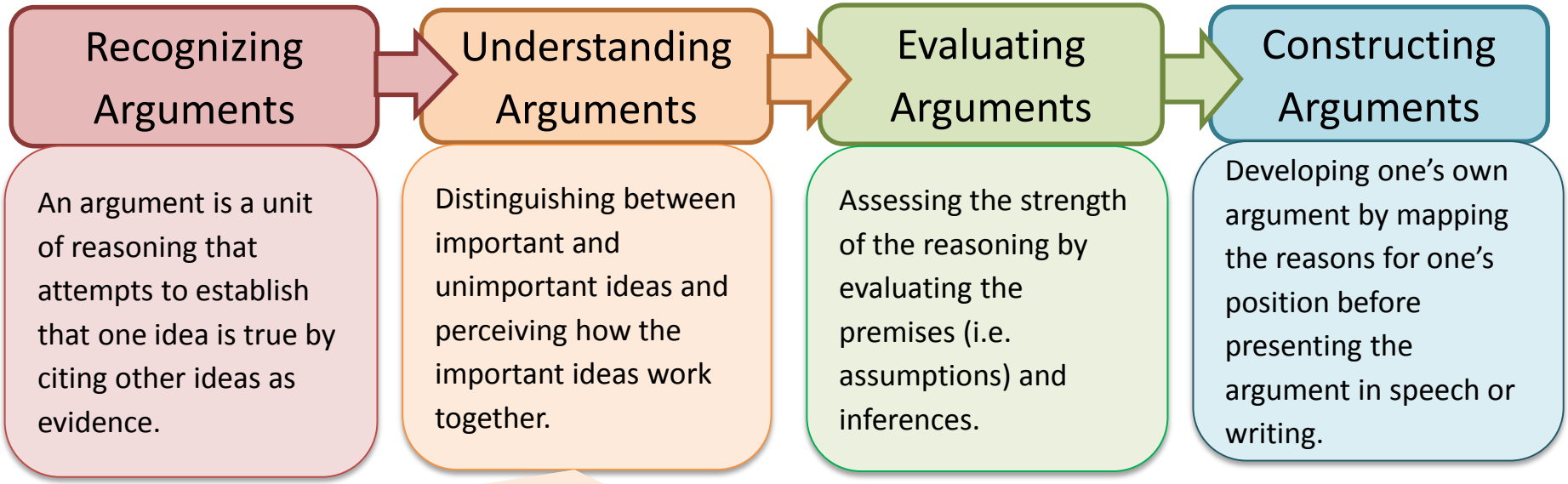
- Students have difficulty correctly identifying the main conclusion and the supporting reasons when presented with an argument. (Larson, Britt et al. 2004)

II. Critical Thinking and Argument Mapping



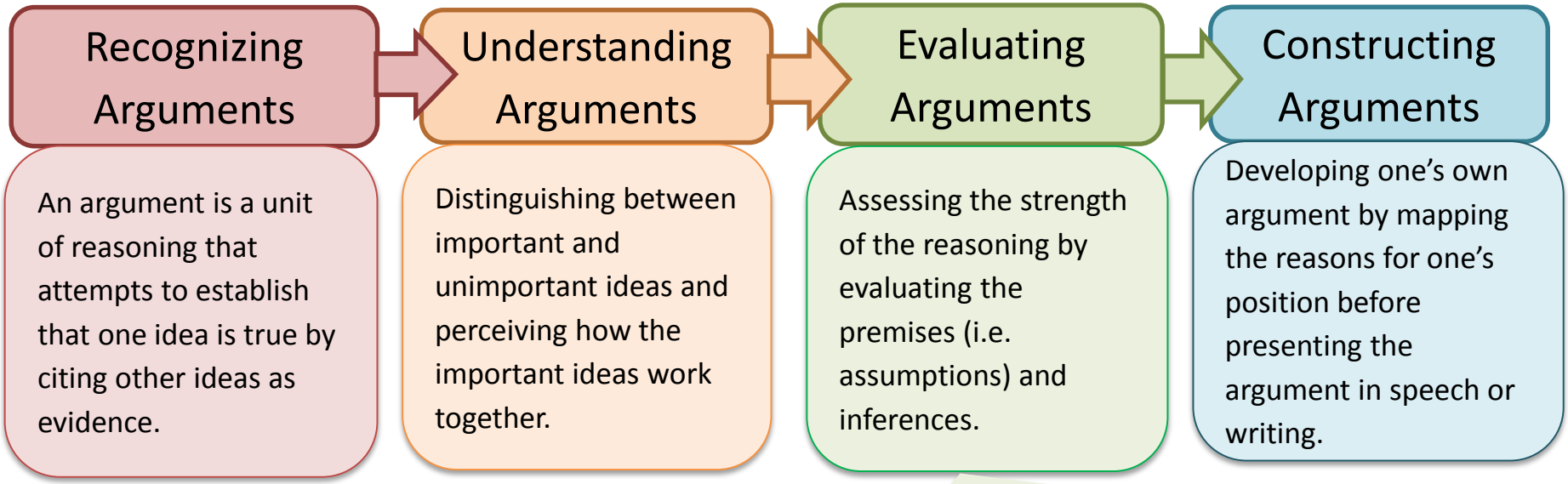
- Students tend to be "fact focused": less interested in exploring multiple views than in having the 'right answer' and reading for information rather than for the connections between ideas. (Feedback from Faculty and Staff)

II. Critical Thinking and Argument Mapping



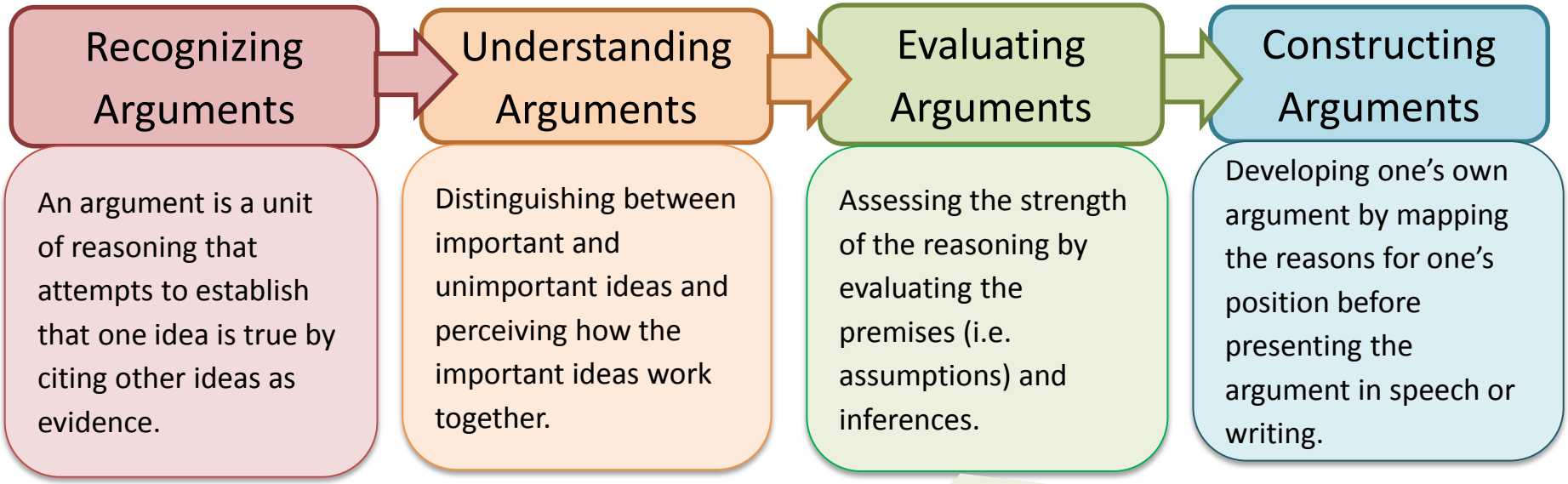
- When summarizing an argument, students tend to "narrate" the author's reasoning (e.g. "First he says …. Then he says…."). (Feedback from Faculty and Staff)

II. Critical Thinking and Argument Mapping



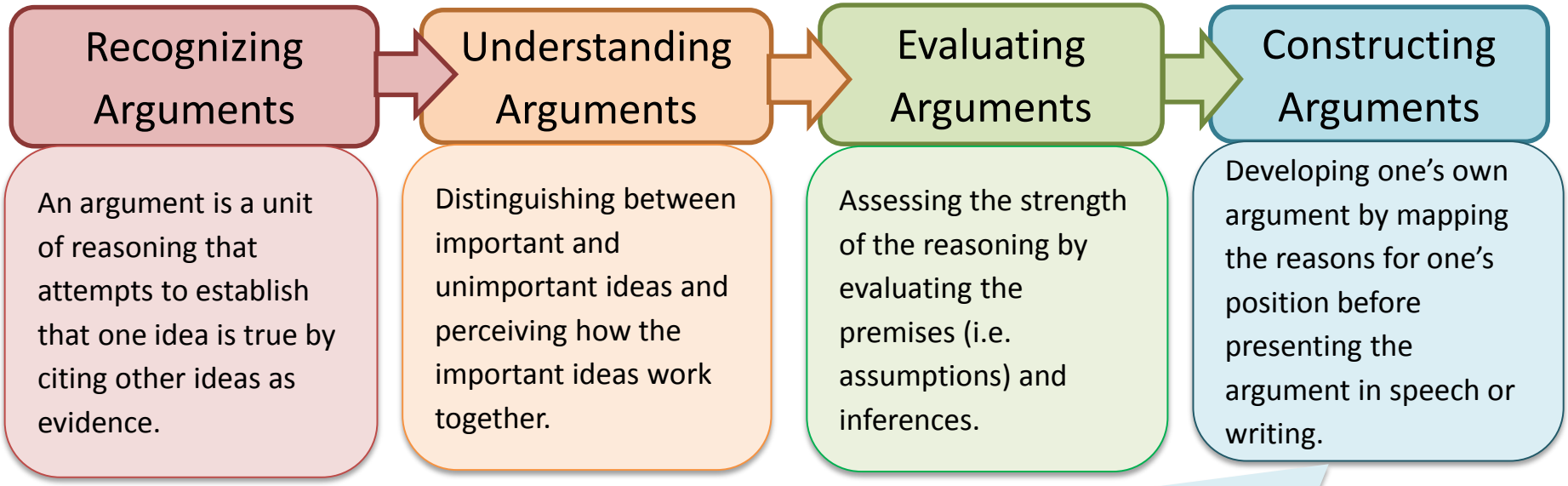
- When asked to evaluate an argument, students frequently offer vague and global assessments, such as "It doesn't makes sense" or "It sounds good." (Feedback from Faculty and Staff)

II. Critical Thinking and Argument Mapping



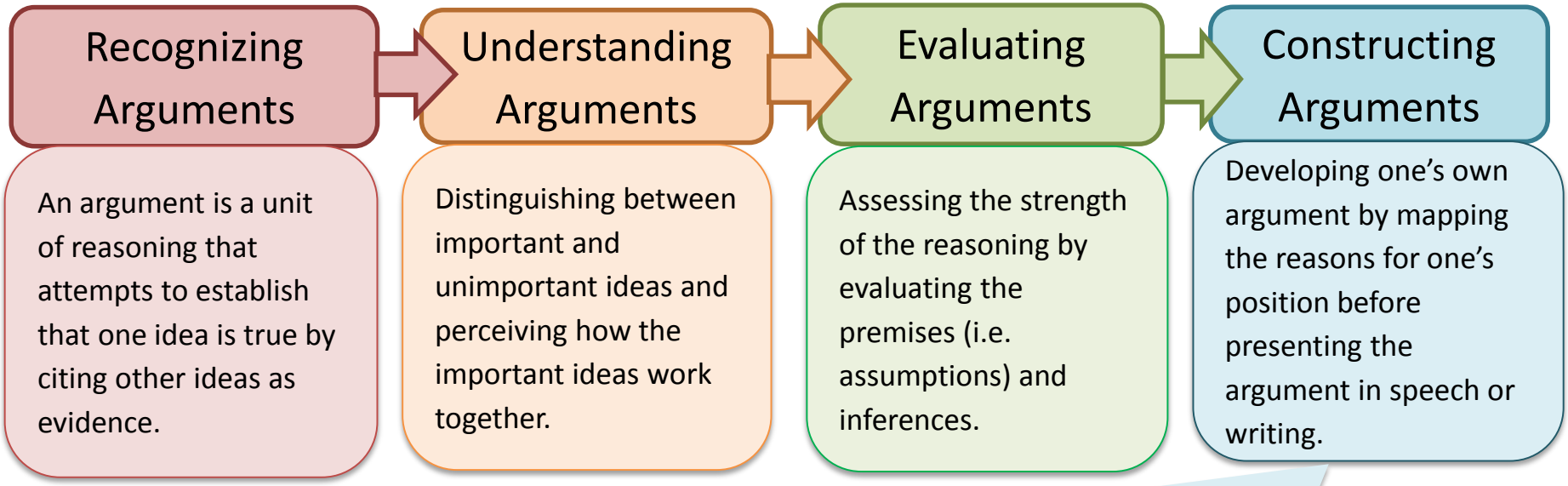
- More focused assessments tend to center upon how well an argument is expressed rather than discussing the strength of the reasoning. (Feedback from Faculty and Staff)

II. Critical Thinking and Argument Mapping



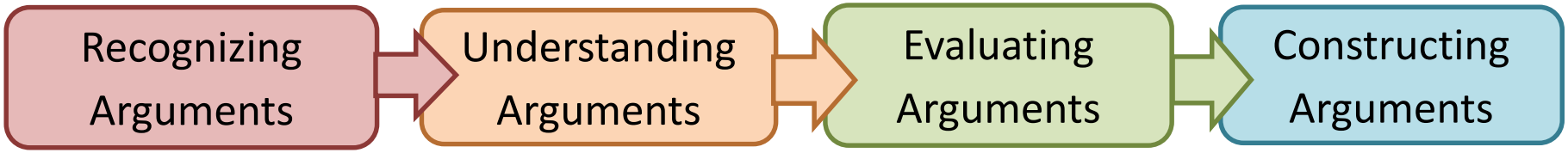
- Student papers often suffer from poor organization and weak transitions. Words like "therefore" and "because" are either lacking or else are used incorrectly. (Feedback from Faculty and Staff)

II. Critical Thinking and Argument Mapping



- Students have a weak grasp of the concept of an inference when constructing their own arguments. (Davies 2008)

II. Critical Thinking and Argument Mapping

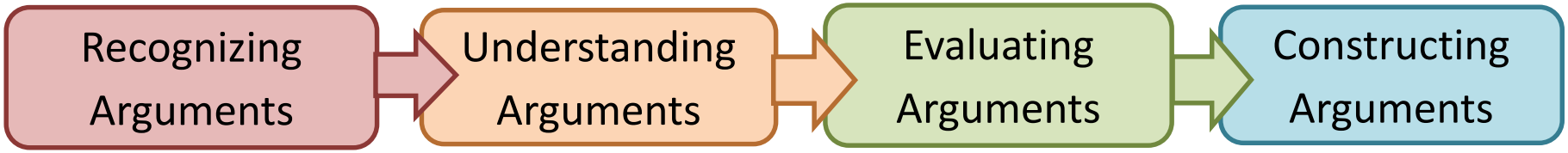


- Learning involves the acquisition of schema (i.e. cognitive models) and the automation of their use. (Sweller 1994)

- Students lack well-developed argument schema, possibly because arguments, which have an internal structure of logical support, are usually represented in prose, which has an internal structure of temporal presentation.

What to Teach

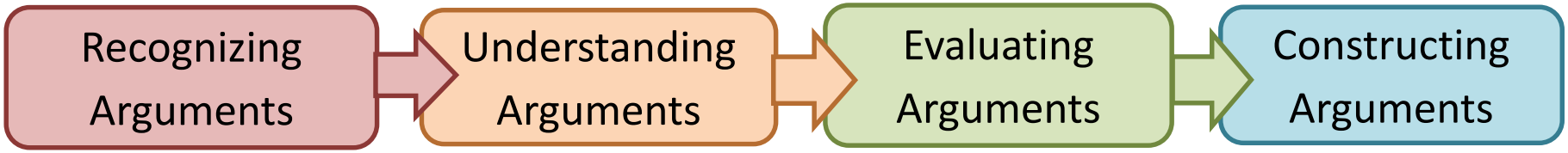
II. Critical Thinking and Argument Mapping



- Argument schema are relatively complex so acquiring them imposes a relatively high intrinsic cognitive load.
- Argument maps graphically expose the internal structure of an argument, reducing cognitive load and easing the acquisition and automation of argument schema. (Hoffmann 2011, Harrell and Wetzel 2015)

What to Teach

II. Critical Thinking and Argument Mapping



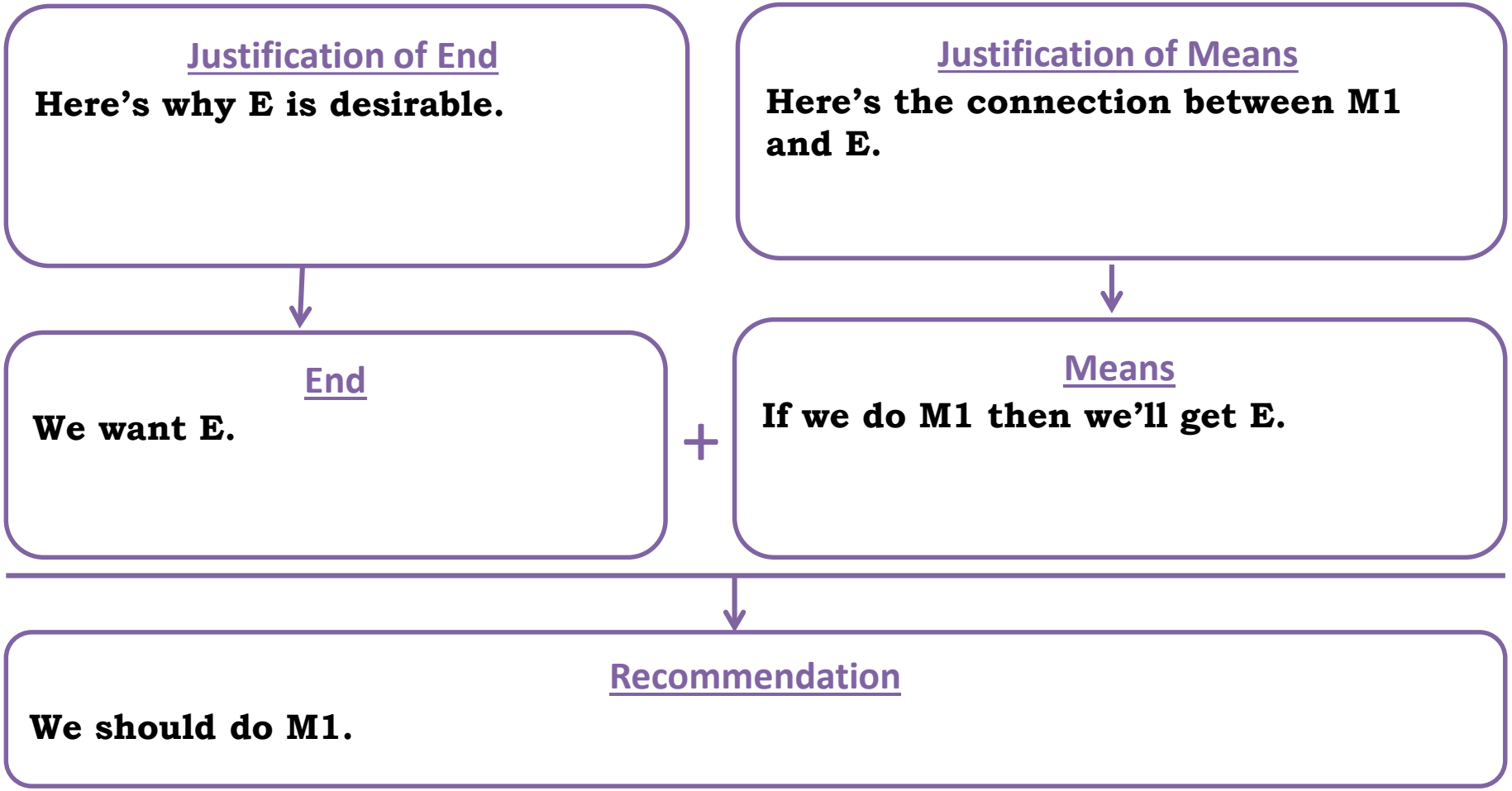
- Mastery requires deliberate practice targeted at improvement and focused on specific, scaffolded skills. (van Gelder 2005; van Gelder, Bissett et al. 2004)
- Argument maps enable the deliberate practice of argumentation skills and so improve those skills. (Cahill and Bloch-Shulman 2012; Harrell 2012)
- It's easier to develop and assess deliberative practice activities than it is to develop and assess other sorts of critical thinking assignments.

How to Teach It

Diagram	Meaning	Diagram	Meaning
2 ↓ 1	Idea 2 is a reason to believe idea 1. “2 therefore 1.” “1 because 2.”	2 + 3 ↓ a + 4 ↓ 1	‘a’ is an unstated subconclusion.
3 ↓ 2 ↓ 1	Idea 3 is a reason to believe idea 2. Idea 2 is a reason to believe idea 1. “3 so 2. Therefore 1.” “1. After all, 3 so 2.”	2 + a ↓ 1	‘a’ is an unstated premise.
2 + 3 ↓ 1	Ideas 2 and 3 jointly constitute a reason to believe idea 1. “2 and 3. Therefore 1.” “1 because 2 and because 3.”	3 ~~↓~~ 2 ↓ 1	Idea 2 is a reason to believe Idea 1. Idea 3 is a reason to reason disbelieve to idea ‘2’.
2 → 1 ← 3	Idea 2 and idea 3 independently constitute reasons to believe idea 1. “1. After all 2. Furthermore 3.” “2 therefore 1. Besides 3.”	3 ~~↓~~ 2 + a ↓ 1	Idea 2 is a reason to believe Idea 1. This assumes that ‘a’ is true. Idea 3 is a reason to disbelieve idea ‘a’.

Diagram	Meaning	Diagram	Meaning
2 ↓ 1	"2. Online classes allows students to learn at times that are convenient for them. Therefore 1. they're perfect for working adults."	2 + 3 ↓ a + 4 ↓ 1	"2. Online classes don't teach higher level thinking skills. 3. College classes should teach higher level thinking skills. And 4. only college classes should transfer in. Therefore, 1. online classes shouldn't transfer in." (a = Online classes shouldn't be college classes.)
3 ↓ 2 ↓ 1	"1. Traditional college students should be discouraged from taking online courses. After all, 2. online courses retard social integration because 3. they can be completed without meeting other students in the class."	2 + a ↓ 1	"1. Online classes are apt to engage the students because 2. they lend themselves to gamification." (a = Students are engaged by gamification.)
2 + 3 ↓ 1	"2. Online classes allow students to work at their own pace and 3. students tend to learn better when they can work at their own pace so 1. online courses can enhance student learning."	3 ↓ 2 ↓ 1	"Some people argue that "1. online classes are apt to engage the students because 2. such courses lend themselves to gamification. That's clearly mistaken, though, because 3. nothing that's graded can really be gamified."
2 3 ↘ ↙ 1	"2. Online courses are inexpensive to run so 1. they're a good choice for most colleges. 3. They tend to attract students, too."	3 2 + a ↓ 1	"The fact that 2. online classes lend themselves to gamification is taken to show that 1. online classes are apt to engage the students. But this argument fails because 3. students are insulted by the gamification of education." (a = Students are engaged by gamification.)

II. Critical Thinking and Argument Mapping



II. Critical Thinking and Argument Mapping

Justification of End

Nobody wants stress when they come home from work.

Justification of Means

We won't be fighting over whose turn is it take out the garbage or do dishes.

End

We need to live more happily together.

+

Means

Assigning specific tasks to everyone will help us live more happily together.

Recommendation

We should assign specific tasks to everyone.

II. Critical Thinking and Argument Mapping

It's often messy.

- Some sentences will need to be ignored.
- Some sentences will need to be divided into their component parts.
- Some ideas will emerge from summarizing longer passages.
- Not all inference connectors will be signaled with words like "therefore" and "because."

II. Critical Thinking and Argument Mapping

Mapping is less important than the skills developed by mapping.

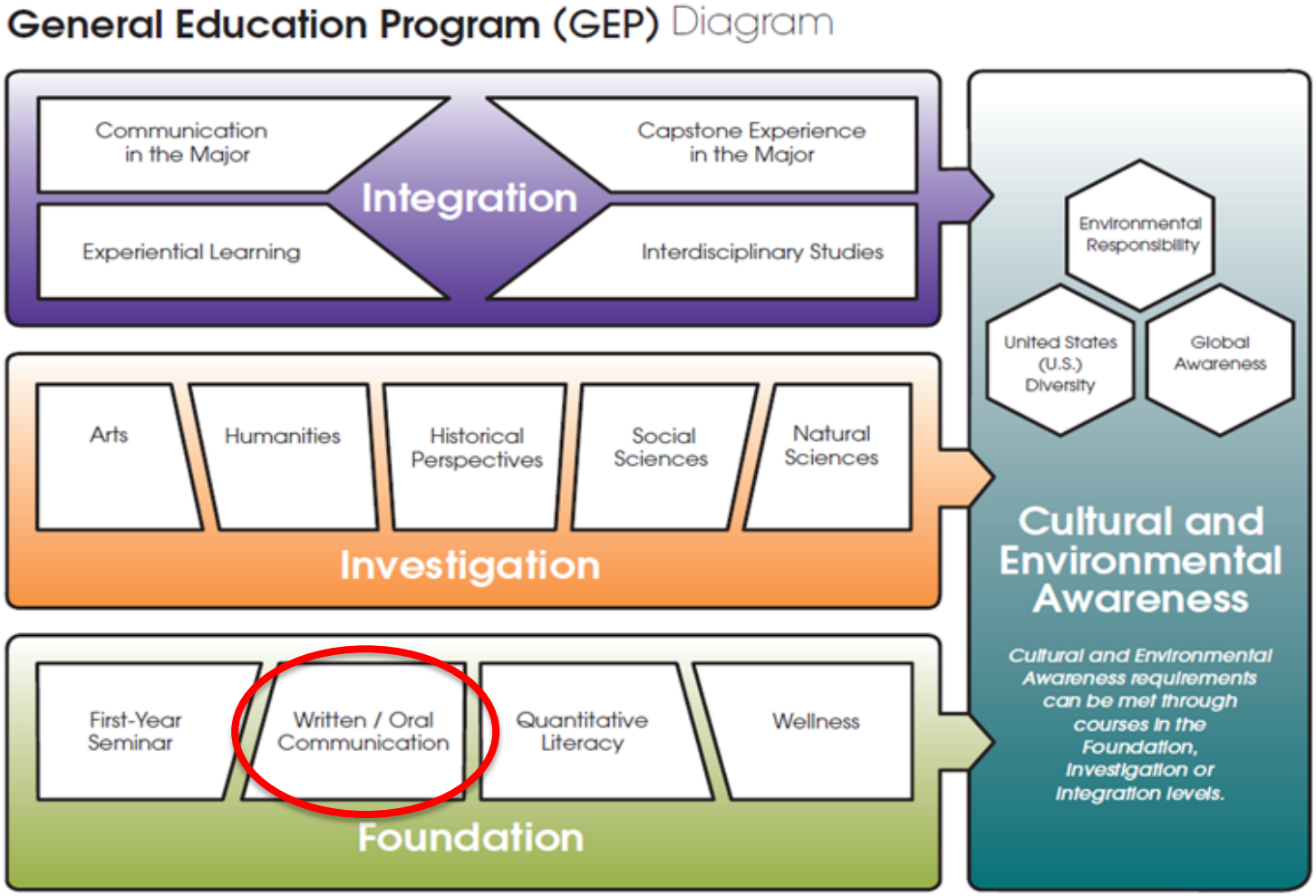
- Recognizing how the ideas that compose an argument relate to each other.
- Asking appropriate questions of each part of the argument.
- Mapping an argument before communicating it.

II. Critical Thinking and Argument Mapping

This approach lends itself to

- Application Across the Curriculum
- Focused Instruction
- Targeted Assessment

III. Argument Mapping at UW-Stevens Point



III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

What we want to know:

1. Are students proficient in identifying conclusions and reasons in arguments?

2. If not, does a relatively short lesson in which students use mapping to construct an argument improve their ability to identify reasons and conclusions?

III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

1-10 scale

1. When I talk with others, I can give good reasons for what I think, believe, or do.
   Average 8.02
2. After listening to a speech or reading an article, I feel confident in my ability to identify the main point that the speaker or author is trying to convince me of.
   Average 7.85
3. After listening to a speech or reading an article, I feel confident in my ability to identify the reasons that the speaker or author giving to convince me of his or her main point.
   Average 7.76

III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

Lewis made the following argument in his speech:

> "Women are assuming leadership roles in greater numbers. It remains true, however, that in many professions women continue to earn less than men. After all, according to the Bureau of Labor Statistics, the income of male accountants is 20 percent higher than the income of female accountants. There is a similar difference between the income of male and female lawyers. Even among doctors, there is an income gap of 20 percent or more within most medical specialties."

For the next three questions, you'll be asked to consider this argument more closely

III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

4. Lewis is trying to convince his audience of an idea (his conclusion) by using other ideas as reasons. Is the underlined idea Lewis's conclusion, a reason for Lewis's conclusion, or neither?

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a. It is the conclusion.
b. It is a reason for the conclusion.
c. It is neither the conclusion nor a reason for the conclusion.

III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

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a. It is the conclusion. 101 = 17.66%
b. It is a reason for the conclusion. 127 = 20.20%
c. It is neither the conclusion nor a reason for the conclusion. 344 = 60.14%

III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

5. Lewis is trying to convince his audience of an idea (his conclusion) by using other ideas as reasons. Is the underlined idea Lewis's conclusion, a reason for Lewis's conclusion, or neither?

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III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

5. Lewis is trying to convince his audience of an idea (his conclusion) by using other ideas as reasons. Is the underlined idea Lewis's conclusion, a reason for Lewis's conclusion, or neither?

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<u>a. It is the conclusion.</u>	286 = 50.00%
b. It is a reason for the conclusion.	195 = 34.09%
c. It is neither the conclusion nor a reason for the conclusion.	91 = 15.91%

III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

6. Lewis is trying to convince his audience of an idea (his conclusion) by using other ideas as reasons. Is the underlined idea Lewis's conclusion, a reason for Lewis's conclusion, or neither?

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a. It is the conclusion.
b. It is a reason for the conclusion.
c. It is neither the conclusion nor a reason for the conclusion.

III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

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a. It is the conclusion.	108 = 18.88%
b. It is a reason for the conclusion.	324 = 56.64%
c. It is neither the conclusion nor a reason for the conclusion.	140 = 24.48%

III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

Rayanna made the following argument in her speech:

> "A meta-analysis reviewing over 30 research studies on security cameras and crime reduction has shown that (in the U.S.) security cameras reduce automobile crime in parking lots but are ineffective in reducing crime elsewhere. This research also shows that the presence of security cameras may give people an 'illusion' of safety and cause them to take fewer precautions to avoid danger. In addition, security cameras cost millions to install throughout a city, making them impractical for municipalities already struggling to make ends meet with current state and federal funding cuts. As a result, the future of crime reduction and public safety cannot rest on the increased use of security cameras."

For the next three questions, you'll be asked to consider this argument more closely

III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

7. Rayanna is trying to convince her audience of an idea (her conclusion) by using other ideas as reasons. Is the underlined idea Rayanna's conclusion, a reason for Rayanna's conclusion, or neither?

> "A meta-analysis reviewing over 30 research studies on security cameras and crime reduction has shown that (in the U.S.) security cameras reduce automobile crime in parking lots but are ineffective in reducing crime elsewhere. This research also shows that the presence of security cameras may give people an 'illusion' of safety and cause them to take fewer precautions to avoid danger. In addition, security cameras cost millions to install throughout a city, making them impractical for municipalities already struggling to make ends meet with current state and federal funding cuts. As a result, the future of crime reduction and public safety cannot rest on the increased use of security cameras."

a. It is the conclusion.
b. It is a reason for the conclusion.
c. It is neither the conclusion nor a reason for the conclusion.

III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

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a. It is the conclusion.	91 = 15.91%
b. It is a reason for the conclusion.	356 = 62.24%
c. It is neither the conclusion nor a reason for the conclusion.	125 = 21.85%

III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

8. Rayanna is trying to convince her audience of an idea (her conclusion) by using other ideas as reasons. Is the underlined idea Rayanna's conclusion, a reason for Rayanna's conclusion, or neither?

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b. It is a reason for the conclusion.
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III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

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a. It is the conclusion.	28 = 4.90%
b. It is a reason for the conclusion.	352 = 61.54%
c. It is neither the conclusion nor a reason for the conclusion.	192 = 33.57%

III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

9. Rayanna is trying to convince her audience of an idea (her conclusion) by using other ideas as reasons. Is the underlined idea Rayanna's conclusion, a reason for Rayanna's conclusion, or neither?

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a. It is the conclusion.	471 = 82.34%
b. It is a reason for the conclusion.	59 = 10.31%
c. It is neither the conclusion nor a reason for the conclusion.	42 = 7.34%

III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

What we want to know:

1. Are students proficient in identifying conclusions and reasons in arguments?

   - The ability is highly vulnerable to ordering effects.
   - Students may be using narrative sequencing as a proxy for logical relationships or conflating narrative sequencing with logical relationships.

2. If not, does a relatively short lesson in which students use mapping to construct an argument improve their ability to identify reasons and conclusions?

III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

Justification of Goal

"Why is this an important problem or a significant need?"

Justification of Means

"How could I convince someone that this course of action will be effective in solving the problem or meeting the need?"

Goal

"What is the problem I want to solve or the need I want to meet?"

+

Means

"What can we do to solve this problem or meet this need?"

Recommendation

The explicit recommendation that people engage in the course of action recommended in the means.

III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

Goal *"What is the problem I want to solve or the need I want to meet?"*
Write your goal here: _____

Justification of Goal *"Why is this an important problem or a significant need?"*
Write the justification of the goal here: _____

Means *"What can we do to solve this problem or meet this need?"*
Write the means here: _____

Justification of Means *"How could I convince someone that this course of action will be effective in solving the problem or meeting the need?"*
Write the justification of the means here: _____

Recommendation The explicit recommendation that people engage in the course of action recommended in the means.
Write the recommendation here: _____

III. Argument Mapping at UW-Stevens Point

COMMUNICATION 101 – FUNDAMENTALS OF ORAL COMMUNICATION

What we want to know:

1. Are students proficient in identifying conclusions and reasons in arguments?

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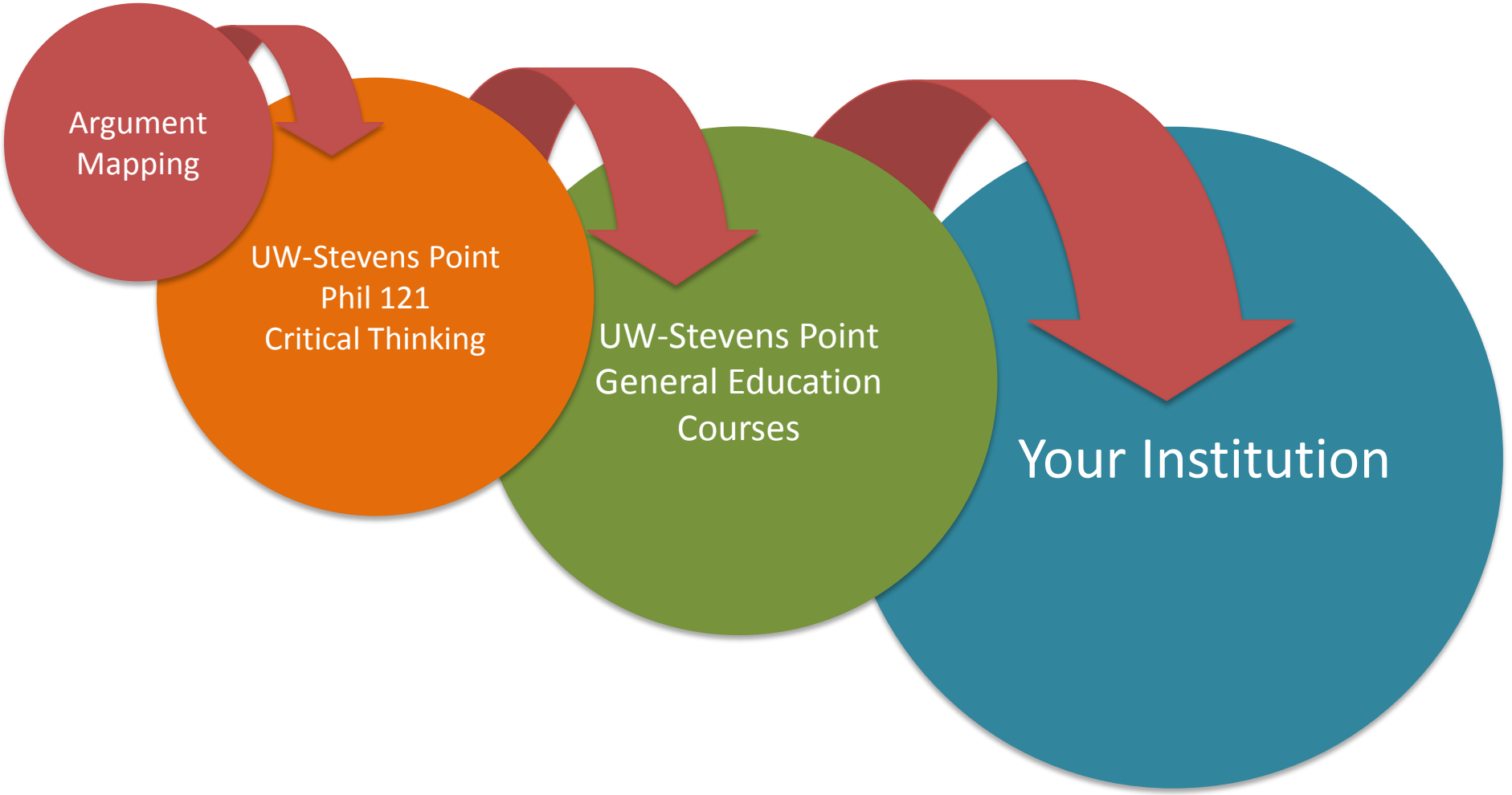
    - Students may be using narrative sequencing as a proxy for logical relationships or conflating narrative sequencing with logical relationships.

2. If not, does a relatively short lesson in which students use mapping to construct an argument improve their ability to identify reasons and conclusions?

    - Too soon to tell.

IV. Argument Mapping at Your Institution



IV. Argument Mapping at Your Institution

A. Assessment Professionals
   - Argumentation skills lend themselves to assessment *via* rubrics and exams.

B. Instructors
   - Mapping, and mapping-related skills, can be integrated into a variety of disciplines at a variety of levels.

C. Administrators
   - Faculty Exploration Groups focused on argumentation and mapping can provide a faculty-led, university-wide, approach to critical thinking.

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