

# MindYoga: Scaffolding the Metacognitive Reflection Process within Learning Ecosystems

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## Motivation

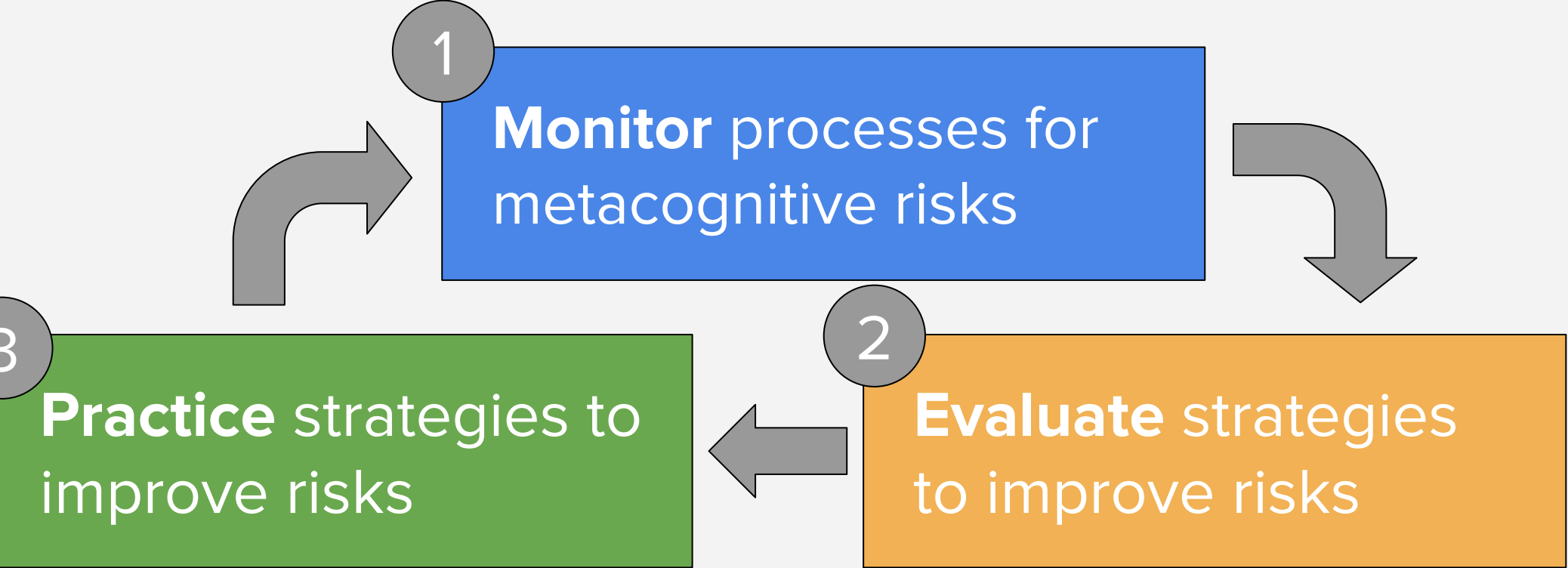
To self-direct research, students must learn to improve upon a **wide range of metacognitive skills**. Even in environments that support reflection (such as an Agile Research Studio), students still struggle as they may:

- 1 lack awareness of metacognitive risks in their processes (e.g. “[We] lack a prototype”)
- 2 struggle to capture metacognitive feedback from mentors and take action on this feedback (e.g. “Helpseek better”)
- 3 fail to identify opportunities to practice improved metacognitive strategies (e.g. “We just forgot”)

Existing systems are limited in the individualized support they can provide across a range of metacognitive skills.

## The MindYoga Framework

MindYoga introduces **3 process scaffolds** that leverage mentor feedback to integrate **individualized, contextualized support** for each student to engage in the metacognitive reflection process.



## MindYoga Process Scaffolds

- 1 **On-action dashboard (Monitor)** - Before mentor meeting, students reflect on metacognitive and project risks
- 2 **4-box model (Evaluate)** - Students and mentors discuss risks and develop an action plan at the end of the meeting
- 3 **In-action cues (Practice)** - Students receive Slack reminders with action plan during practice opportunities

1

Week 8

-We have no data on in-action cues

tweaking the prompts before the first user test

have they thought of the details of this prototype and tesing desing->timing of the cues, are prompts specific enough

Time management. We are likely going to use a lot of sprint points user testing and need to leave adequate time to iterate on the study and go through the findings efficiently.

communicating our SIG plan

are we thoughtfully thinking about our week plan are using all our supports

Sprint Focus

4-Box Model Action Item

- Study design: especially for in action cues

revise prompts and see how those would help us plan our own week, which would help us see if they work and would help us plan out our week better

...your project risks?

...your metacognitive risks?

The old in-action cues were heavy We learned that even though our more scaffolded system gave very thoughtful responses, this was not usable or necessary because users will be scaffolded by mentors later

We scoped down the study to get more precise data

2

Directions: mentor/mentee fill out designated boxes during feedback session

MENTEES

Summarize the mentor feedback you received during SIG (1-2 sentences):  
The prompts we have didn't make people come up with a specific enough risk. We should rethink the timing of in action cues in case someone is busy right before a venue.  
Maybe add scaffolding to encourage plans that are appropriate for each venue.

MENTEES

Based on your mentor feedback, what do you think your metacognitive risk is (i.e. risks relating to how you work, think, plan, helpseek, etc.)?  
communicating our SIG plan  
are we thoughtfully thinking about our week plan are using all our supports

MENTOR

Does this align with your assessment of your mentee's metacognitive risks?

MENTEES

Based on your mentor feedback, what do you think your practical risk is?  
tweaking the prompts before the first user test  
have they thought of the details of this prototype and tesing desing->timing of the cues, are prompts specific enough

MENTOR

Does this align with your assessment of your mentee's practical risks?  
yes????

STOP

Ask your mentor to validate your answers up until this point

MENTEES

What is a specific action item, that incorporates these both of strategies, that you can do this week to overcome your risks?  
revise prompts and see how those would help us plan our own week, which would help us see if they work and would help us plan out our week better  
Why does this address your metacognitive risk?  
Because it has us plan more, which was the risk  
In what venue will you do this?  
Team Work Session  
When does this venue occur (date/time):  
10-12:00 11/12

3

MENTOR: Do you still want to revise prompts and see how those would help us plan our own week, which would help us see if they work and would help us plan out our week better in Team Work Session to address communicating our SIG plan, are we thoughtfully thinking about our week plan, are using all our supports and tweaking the prompts before the first user test, have they thought of the details of this prototype and tesing desing->timing of the cues, are prompts specific enough?

## Methodology & Results

2-week pilot study (three mentors, seven students across four project teams within an ARS)

	(1) On-action dashboard		(2) 4-box model		(3) Slack in-action cues	
Project Team #	# Times Used	# Times Reflection of Metacognitive Process Changes Complete	# Times Used	# Times Metacognitive Risks and Action Plan Identified	# Times Used	# Times Reminded of Action Plan During Work Session
PT1 (S1, S2)	2	2	2	2	1	1
PT2 (S3)	1	1	1	1	1	1
PT3 (S4, S5)	0	0	2	2	0	0
PT4 (S6, S7)	0	0	1	1	1	1

When used, MindYoga is able to scaffold all three stages of metacognitive reflection, **allowing students to more actively reflect on and improve their ways of working.**

MENTEES

What is a specific action item, that incorporates these both of strategies, that you can do this week to overcome your risks?  
make a realisitic goal for what we want to accomplish next week. don't do any DTR over the weekend to reduce burnout  
Why does this address your metacognitive risk?  
It defines a space for a break from DTR  
In what venue will you do this?  
Team Work Session  
When does this venue occur (date/time):  
monday

Even with partial use, students were able to **receive benefits from using some scaffolds.**

## Future Work

Moving forward, we want to **decrease points of friction** by further integrating the scaffolds into the ecosystem. We also plan to explore **what benefits this framework has for mentors** and what **other learning environments this could be used.**