



# Meta-Learning

## At a Glance

### What is Meta-Learning?

**Meta-Learning** is composed of two intertwined facets: metacognition and metaemotion. Metacognition is the more familiar of the two, and is often described as “thinking about thinking,” including how we think our minds work, deciding whether we know something or not, and knowing what strategies we have available for accomplishing tasks and solving problems. Likewise, metaemotion can be described as “feeling about feeling,” including working with the mind-body connection to recognize, process, regulate, and reflect upon emotions. Because thinking and feeling are inherently linked, the two competencies of metacognition and metaemotion share a set of ten subcompetencies. Combining these, meta-learning allows people to “learn how to learn” by monitoring one’s progress and internal state throughout a task and reflecting upon what is or isn’t working.

### In the age of AI, which aspect of Meta-Learning should be emphasized?

For each competency, a modern emphasis is determined based on the relative importance of the competencies in an AI landscape, as well as the potential for the competency (and its subcompetencies) to be automated in an age of AI. Many AI meta-learning algorithms are inspired by human learning processes. Techniques like reinforcement learning, transfer learning, and few-shot learning enable AI to quickly adapt to new tasks by leveraging knowledge from previous experiences. Meta-learning, particularly metaemotion and bodily regulation abilities, nonetheless remain irreplaceable aspects of human growth and development.

In the age of AI, education must **emphasize adaptability**. Fostering adaptability is crucial due to the rapid pace of technological advancements and evolving job markets. As AI automates routine tasks, human workers must adapt by acquiring new abilities and knowledge to remain relevant. Adaptability equips individuals with the ability to learn, unlearn, and relearn throughout their lives, enabling them to navigate changing job requirements and leverage new tools.

### What other words and concepts are associated with Meta-Learning?

Reflection, Self-, Social-, and Cross-Cultural Awareness, Empathy, Balance, Mindfulness, Consciousness, Self-Management, Interconnectedness, Wisdom, Self-Actualization



## How can I best teach Meta-Learning?



Tips to follow...	Pitfalls to stay aware of...
<p>Meta-learning happens best when it is <b>repetitively and continuously baked into all learning processes</b>. Consistently prime learners to check their understanding and modulate their own unique learning journey.</p>	<p><b>Doing too much of “the work” for learners can be counterproductive.</b> Instead, create practice conditions which closely mirror that of summative or real-world performance tasks, where there might not be hints!</p>
<p><b>Repeated study and testing, along with continuous feedback</b>, increases the accuracy of learners’ judgments of their learning, which is essential for self-directed and self-regulated meta-learning.</p>	<p><b>Learners judge their progress by the ease and speed with which they learn, but neither predicts nor facilitates learning.</b> Therefore, learners often judge the best teaching and studying strategies as ineffective.</p>
<p><b>Focus on the present-moment process and intrinsic qualities of an experience</b> instead of its extrinsic, future-oriented outcomes. Doing so makes the activity more pleasurable and increases the likelihood of achieving its goal. Encourage learners to appreciate the process and experience of what they’re doing as they’re doing it.</p>	<p>“Settling down” and “paying attention” are skills that need to be developed, like basketball or math. Adults are quick to admonish learners to calm down, but <b>it seldom occurs to us that calming oneself is a skill that must be taught.</b> Like free-throws, meta-learning is a practice that cultivates the skill of self-regulating.</p>

### To foster Meta-learning, use language such as:

- **“What strategies have worked before?”** Push learners to recall similar contexts, then help them adapt and transfer the successful strategy to the new context.
- **“How did your thinking change as you learned?”** Help learners recognize that learning is dynamic and encourage them to consider new strategies for next time.
- **“Notice how you’re feeling right now.”** Intentionally create classroom moments, including moments of silence, for mindfulness and reflection.

### And when focusing on Meta-learning, avoid the following approaches:

- **“I don’t know why you’re struggling.”** Instead reframe struggles as mysteries to collaboratively be solved.
- Phrases like **“don’t worry,” “don’t be upset,” or “it’s not a big deal.”** Validate a learner’s internal state, then help uncover proportional responses together. Prime the learner to play out a scenario’s expected consequences with self-gentleness.



## Subcompetencies

To create more targeted learning experiences for meta-learning, teachers can use the following subcompetencies as specific learning objectives. Classroom exercises and activities then can infuse subcompetencies into student learning to create deliberate, explicit, systematic, and demonstrable areas for growth. All subcompetencies in the CCR Framework are identified by a brief code for shorthand (i.e., MET1).

Subcompetency	Description
MET1: Adapting flexibly to meet each situation's specific needs	Meta-learners <b>adapt their learning approaches to different subjects, tasks, or contexts</b> . They flexibly choose the most appropriate strategies for a given learning situation. As circumstances change, they change with them.
MET2: Reflecting on processes, learning, and identity	<b>Reflection is a critical part of learning how to learn.</b> This can take place at different scales, from thinking about a specific instance in the past to changes in performance over time and broader narratives about one's identity.
MET3: Understanding one's emotions and reactions	<b>Metaemotive awareness involves placing attention inwards and noticing emotional changes over time.</b> Labeling one's inner experience helps one gain a more nuanced understanding of the range of their emotions and associate those understandings to their embodied experiences.
MET4: Being mindful of one's body and its needs	Meta-learning skills require a <b>heightened awareness of one's body, sensations, and physical needs in real-time</b> . This encompasses the ability to recognize bodily signals such as hunger, fatigue, or tension and respond appropriately. Individuals with strong bodily awareness can effectively coordinate their actions and self-care based on this awareness, promoting better physical and emotional well-being.
MET5: Determining goals, plans to achieve those goals, and reviewing one's progress	<b>Goal setting empowers individuals to become more effective</b> learners, planners, and achievers by setting clear objectives, creating appropriate strategic plans to reach those objectives, and regularly evaluating and adjusting those plans.



## Subcompetencies Continued

<p>MET6: Monitoring comprehension and managing information accordingly</p>	<p>While taking in information, it is important to <b>reserve a small part of one's awareness for the meta-analysis</b>: How much am I understanding what we are doing? How much of my struggle is productive? This real-time analysis can help one be aware of their own needs and adjust as necessary.</p>
<p>MET7: Evaluating one's actions and their consequences</p>	<p>After an event, it is helpful to reflect on the consequences of one's actions, whether they were <b>expected, intended, and favorable, and what one could adjust</b> moving forward.</p>
<p>MET8: Considering other points of view</p>	<p>It takes self-awareness to <b>realize that one's perspective is just one of many possible perspectives</b> and reflection on one's contexts to imagine other possible approaches and opinions.</p>
<p>MET9: Recognizing, engaging, and empathizing with the emotions of others</p>	<p>Meta-learning involves not only identifying and understanding the emotions of those around you, but also the ability to <b>effectively tune your own socio-emotional responses in harmony with others</b>. Doing so enables individuals to navigate social situations with empathy and emotional intelligence, fostering interpersonal growth via positive and meaningful relationships.</p>
<p>MET10: Cultivating positivity, patience, and compassion</p>	<p>Meta-learning involves a disposition towards openness, positivity, and kindness, which <b>facilitate conditions that enable growth</b>. This involves handling life situations with humility, patience, and humor; interacting with empathy and compassion; and being grateful for what one has.</p>

## Growth Rubrics

The growth rubrics on the following two pages are a synthesis of the global research body on meta-learning and are designed to provide an opportunity for formative reflection on a competency based on a performance in a specific context. They are not meant to be holistic or measure the worth of a person in a high-stakes way, but rather to enable dialogues between educators and learners, creating space for feedback and opportunities for future improvement. **The rubrics are not age-specific, and progress through the levels may be slow and vary greatly depending on the context of the task.**



MET1: Adapting flexibly to meet each situation's specific needs			
Level I	Level II	Level III	Level IV
I struggle with change and try to use the same set of approaches for all situations.	I prepare for anticipated changes, applying pre-set solutions as they seem to fit best.	I react flexibly to changing circumstances, applying learnings from previous failures.	I embrace ambiguity and adjust my thinking to match the context and environment.
MET2: Reflecting on processes, learning, and identity			
Level I	Level II	Level III	Level IV
I move on from completed tasks without considering how they affect my mental and emotional processes or sense of self.	I categorize my processes as good or bad and try to avoid similar mistakes, with little attention to my identity.	I seek to improve productivity in each step of my process and consider the relationship between what I do and who I am.	I'm cognizant of my process while I'm in it and adjust in the moment, continually aligning my actions and my identity.
MET3: Understanding one's emotions and reactions			
Level I	Level II	Level III	Level IV
I classify my feelings as positive or negative but struggle to provide further detail.	I see the influence of emotions on prior actions but struggle to name those emotions in the moment.	I can accurately name my feelings, which allows me to gauge my reactions and communicate my feelings with others.	I make clear connections between my emotions, where they come from, and how they impact my feelings and behaviors.
MET4: Being mindful of one's body and its needs			
Level I	Level II	Level III	Level IV
I often overlook bodily signals such as hunger, fatigue, or tension in real-time.	I notice my general bodily needs but tend to internally compromise in addressing them.	I maintain awareness of my body and physical needs in real-time. I feel where emotions live in my body.	I'm in tune with my body and how even subtle emotional changes affect it.
MET5: Determining goals, plans to achieve those goals, and reviewing one's progress			
Level I	Level II	Level III	Level IV
I tend to not have clear goals and struggle to recognize how well I'm following directions.	I have big goals but find it hard to make them small enough and manageable to act on.	I can break my bigger goals into smaller short-term goals and evaluate my progress toward those goals.	I create specific plans to meet my goals and revise my goals regularly as my needs change.



<b>MET6: Monitoring comprehension and managing information accordingly</b>			
<b>Level I</b>	<b>Level II</b>	<b>Level III</b>	<b>Level IV</b>
I think I know how to do something but I often trip up when actually trying to do it.	I have a hard time knowing whether I understand, and sometimes get surprised by feedback.	I try to find the most important piece(s) of information and make sense of my learning in the moment so I can act on it.	I consume information and translate it through words and examples so that it is more meaningful to me.
<b>MET7: Evaluating one's actions and their consequences</b>			
<b>Level I</b>	<b>Level II</b>	<b>Level III</b>	<b>Level IV</b>
I don't consider that my actions have consequences on others.	I grasp the short-term effects of my actions but struggle to foresee their long-term impacts.	I use past experiences to inform my choices and consider both their short and long-term impacts.	I evaluate my actions in real time, adapting my decision-making process to include all stakeholders.
<b>MET8: Considering other points of view</b>			
<b>Level I</b>	<b>Level II</b>	<b>Level III</b>	<b>Level IV</b>
I assume other people see the world in similar ways to how I do.	I believe my perspectives are objective and have a hard time considering different ideas.	I relate to the ideas of people I know and decide whether or not I agree with their perspectives.	I seek perspectives from multiple diverse voices to broaden my knowledge and adapt my opinions.
<b>MET9: Recognizing, engaging, and empathizing with the emotions of others</b>			
<b>Level I</b>	<b>Level II</b>	<b>Level III</b>	<b>Level IV</b>
I struggle to recognize and understand the emotions of others in social interactions or respond appropriately.	I assume I know what others are feeling and attempt to engage and empathize with them, even if this isn't always effective.	I recognize the emotions of others and I adjust my demeanor to engage and empathize appropriately.	I have multiple ways to tell how others are feeling and am comfortable holding space for their needs while reflecting on my own.
<b>MET10: Cultivating positivity, patience, and compassion</b>			
<b>Level I</b>	<b>Level II</b>	<b>Level III</b>	<b>Level IV</b>
I tend to keep to myself and don't get involved with the needs of other people.	I help and encourage others whenever it is convenient for me.	I seek out the best in everyone and respond consistently with patience and compassion.	I create environments in which I and others can be the best versions of ourselves.