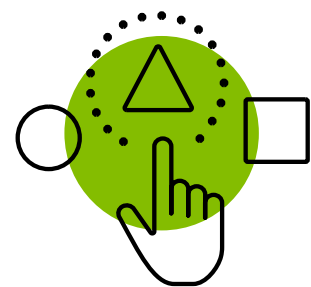




Learning Design Principles
Learning Behavior

Self-Regulated Learning and Metacognition



Summary

What are Pearson's Learning Design Principles?



Our Learning Foundations describe the optimal conditions for learning and reflect the learner experience we hope our products will create. We do this by incorporating our Learning Design Principles.

Each of our Learning Design Principles goes into detail about a key principle, supporting product design and marketing by describing:

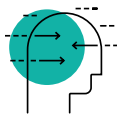
- the research that informs the principle
- why it matters in learning
- how we can apply it in practice

Our portfolio of Learning Design Principles will continue to grow over time.



Welcoming Experience

- Motivation & Mindset
- Social & Collaborative Learning



Minds in Mind

- Developing Understanding
- Attention & Cognitive Load
- Active Learning, Memory & Practice
- Desirable Difficulty & Scaffolding
- Feedback for Learning



Learning Behavior

- Self-Regulated Learning & Metacognition



Purposeful Design

- Objective Design
- Assessment & Evidence-Centered Design
- Personalized Learning & Adaptive Systems
- Authentic Learning



Learn Anywhere

- English Performance Standards
- Digital & Virtual Learning

Self-Regulated Learning and Metacognition

The majority of learning is self-driven and self-managed — but learners are often poor judges of what they do and don't know, and how to close the gap with effective study strategies. How can we equip learners to more accurately evaluate their own knowledge and manage their learning?

Self-regulated learning (SRL) is when learners take charge of their own learning outside the influence of an instructor, and can do so effectively.

Metacognition means thinking about thinking. Thinking about what's going on inside your own mind, becoming aware of your knowledge, your thought processes, and monitoring and controlling those processes are all part of metacognition. To practice SRL effectively, you need good metacognitive skills.

SRL can be thought of as a series of phases:

- **Forethought phase:** learners monitor what they already know and plan accordingly
- **Performance phase:** learners monitor their actions and execute learning strategies
- **Self-reflection phase:** learners reflect on their performance and calibrate or change their learning strategies accordingly

During each phase, learners **monitor** what they know and how they're performing, and make adjustments to **control** and execute their learning strategies.

Why it matters

- Learners with good SRL skills are also effective learners and have better outcomes
- Independent learning is a necessary step on the journey to lifelong learning, which is an important part of Pearson's mission
- Most learners do not have effective SRL skills — but SRL can be taught

Impact

When we successfully incorporate this principle into learning experiences, we can have an impact on these learner outcomes:

- learners are self-directed because they are supported to create SMART goals and study plans for their learning
- learners are *accurately* confident in their knowledge and skills because they check what they know and what they don't with good reflective habits
- learners persist because they are confident in their ability to learn the material and know when to ask for help
- learners are effective and efficient students because the learning experience combines direct instruction in study strategies with scaffolded practice
- learners master key objectives because they use effective study strategies



The big ideas

1

Self-regulated learning involves maintaining a cycle of **monitoring and control**.

I monitor how I'm learning and adjust as needed.

I know what I need to do to reach my goals.

2

Before studying, learners should identify the gaps in their knowledge; decide the right learning level; analyze tasks; set appropriate goals; create effective plans; and prepare resources.

3

While studying, learners should continually **monitor** their progress and **control or adjust** their learning strategies as needed.

I can tell I'm making progress.

I know what study strategies to use to reach my goals.

I know when to ask for help.

4

After studying, learners should **reflect** on the content they covered, the study strategies they used, and the feedback and outcomes they achieved to decide whether to stop studying, keep studying, or change study strategies.

I know what to keep the same and what to do differently next time.

The self-regulated learning cycle

Self-regulated learning (SRL) involves maintaining a cycle of monitoring and control.

What it feels like for learners

I monitor how I'm learning and adjust as needed.

Monitoring is the metacognitive process of observing your own mind and thinking in real time, in order to assess your own learning and knowledge. (How difficult will it be to learn this? How easily could I solve a similar problem? Did I do well on the test?)

Control is the metacognitive process of making decisions about how to affect your own learning and knowledge. (When and where do I learn? What material do I focus on? What learning strategies will I use?)

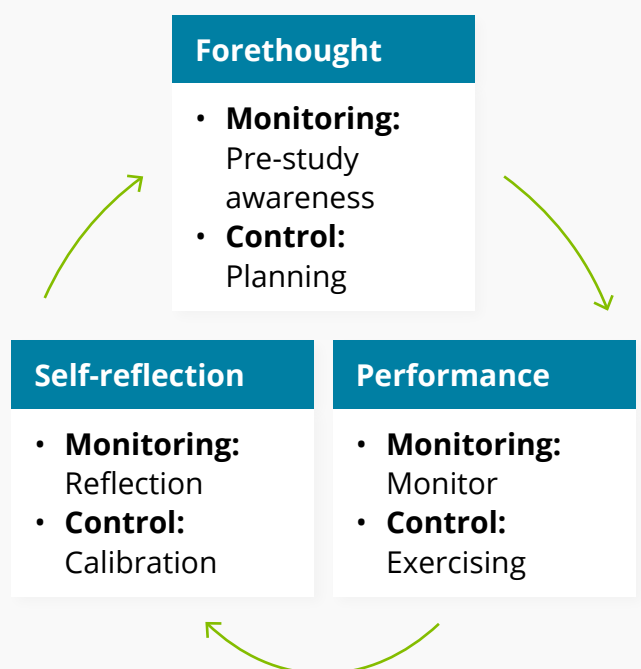
SRL is a continuous cycle of monitoring and control throughout the forethought, performance, and self-reflection stages. It's a habitual practice, not a state (which is why we don't say someone is or isn't a self-regulated learner, only that they are or aren't practicing self-regulated learning).

SRL can be taught. Teaching learners more effective learning strategies, and encouraging them to engage in reflective evidence-based practice, helps them become more effective learners who:

- are aware of what they do and don't know
- are aware of which study strategies are and aren't effective
- are strategic about studying and manage their time well
- are accountable for their own learning
- believe they can improve their knowledge and performance by studying
- set and achieve higher learning goals

What it means for designing learning experiences

- Explicitly teach the SRL learning cycle
- Scaffold in places for learners to monitor and control their understanding as they learn



The forethought phase

Before studying, learners should identify the gaps in their knowledge; decide the right learning level; analyze tasks; set appropriate goals; create effective plans; and prepare resources.

What it feels like for learners

I know what I need to do to reach my goals.

Knowing what to study

- Before studying, learners need to correctly identify what they know and what level of knowledge they need to reach. This helps them choose the right study strategies and allocate the right amount of study time
- Learners often don't know what they don't know. When they think they know more than they do, they may choose study strategies that are too difficult, or allocate too little study time
- Ask: What do I know now? Where do I want to get to? How easy or hard will it be for me to learn this?

Planning studying

- Learners need to set goals and determine which study strategies will accomplish those goals
- Effective learners set high and attainable goals and make realistic and effective plans that help them reach those goals
- In general, learners whose goals involve improving their knowledge and understanding of the topic are more motivated to learn and use better study strategies
- Poor planners may choose less effective goals and study strategies, or not plan at all. This can lead learners to start studying too late or choose ineffective strategies
- Ask: Where is the right place to start? What do I need to study? How should I study it? How long should I study for?

What it means for designing learning experiences

- Provide information about prerequisites and learning goals/objectives, to support awareness of current knowledge levels, knowledge gaps, and study planning
- When introducing a new topic, include experience(s) that:
 - activate prior knowledge and surface potential gaps (e.g., diagnostic assessments or pre-tests)
 - encourage self-reflection and monitoring of current level(s) of understanding
- Assign learners a study plan that incorporates SMART goal setting as an expectation at the beginning of the learning experience with routine reflections on goal achievement
- Train learners in effective time management techniques (set specific goals, prioritize, manage time, and structure their work day)

The performance phase

While studying, learners should continually monitor their progress and control or adjust their learning strategies as needed.

What it feels like for learners

I can tell I'm making progress.

I know what study strategies to use to reach my goals.

I know when to ask for help.

Learners should continually monitor their accuracy and understanding, and adjust their learning strategies as needed, asking reflection questions like: Have I understood this? Do I need to study it more?

- **Learners who struggle with monitoring often overestimate what they have learned**

They may rely on faulty cues, such as how easy it is to recall information in the moment, or have mistaken beliefs about how memory works. This can lead to overconfidence, which can make learners stop studying too early or not study at all. Learners' monitoring can be improved by teaching them which cues are and are not reliable predictors of future performance.

- **Not all study strategies are created equal**

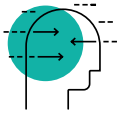
Study strategies based on accurate metacognitive judgments lead to more efficient learning and better learning outcomes. More effective study strategies are associated with a higher grade point average. Learners often select less effective strategies because they feel easier. More effective strategies may feel more challenging, but are actually more efficient.

| More effective | Less effective |
|--|--|
| <ul style="list-style-type: none"> • Self-testing • Spaced practice • Self-explanation • Highlighting less | <ul style="list-style-type: none"> • Rereading • Restudying • Cramming • Highlighting more |

To support effective metacognitive monitoring:

- **Wait:** at least a few minutes, or even a few days
- **Generate:** try to remember what you learned
- **Validate:** check your work

This helps learners by giving them an accurate sense of what they can actually remember, as opposed to what is fresh in their mind, and whether the information they can recall is correct and complete. This improves content learning and self-regulated learning skills.



**See this Learning
Design Principle:**

Feedback for Learning
Active Learning, Memory
& Practice
Desirable Difficulty
& Scaffolding

What it means for designing learning experiences

- Prompt learners to reflect on their learning and adjust their study planning as needed
- Provide learners with a view of their performance to help improve their monitoring accuracy
- Teach effortful, effective study strategies
- Teach how memory works, including how it fades over time
- Help learners check the accuracy of their responses when they self-test
- Use the wait-generate-validate method
- Use recall items (e.g., short answer, fill-in-the-blank) instead of recognition items (e.g., multiple-choice, true/false)
- Provide immediate feedback on the correct answer for practice problems
- Provide opportunities to repeatedly test the same concepts under different conditions (e.g., different wordings)
- Vary the difficulty of material to be learned. Learners are more accurate judges of their learning when the material varies widely
- Provide specific, actionable, and timely feedback on practice and assessments, surfacing current knowledge and potential gaps to support reflection and goal setting
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The self-reflection phase

After studying, learners should reflect on the content they covered, the study strategies they used, and the feedback and outcomes they achieved to decide whether to stop studying, keep studying, or change study strategies.

What it feels like for learners

I know what to keep the same and what to do differently next time.

After completing a learning activity:

- **Learners should reflect on both what they have learned and how they have learned it**

This helps learners decide whether they should continue studying. Effective learners can do this on their own without external support. Learners who struggle with reflection may not do it at all or may rely on faulty cues, such as how easy it is to recall information in the moment. Learners are also quick to assume that partially remembered information is fully correct. Poor self-reflection can lead learners to stop studying too early.

- **Learners should consider how their actions did or did not support their goals and what they should do differently next time**

They should note where they accurately predicted their performance, and where they did not, and use this to change future study strategies. Many learners recognize that they didn't do as well as they wanted but struggle to translate this knowledge into concrete plans for how to do better next time. These learners then struggle to improve their performance over time.

What effective self-reflection looks like

- Actively reflecting on performance
- Basing those reflections on accurate information
- Noting where they did and did not accurately judge their learning
- Using this information to inform future study and performance

What it means for designing learning experiences

- Explicitly prompt learners to reflect on their performance versus their expectations
- Encourage learners to think about what study strategies did/did not work for them
- Provide constructive item-level feedback on learners' performance
- Provide aggregate feedback dashboards aligned to objectives
- Allow learners to incorporate feedback and correct their work
- Provide a way for learners to revise their study plans to prepare for the next test/assignment

Making it inclusive

We aim to design a great learning experience *for everyone*. These considerations will help you get closer to designing a truly inclusive experience.

Accessibility

Accommodations provided to allow learners with specific needs to participate in a learning experience

- Include direct instruction and scaffolding in learning environments to help learners self-regulate their learning. Opportunities to experience effective study strategies and helpful feedback can help learners make better study decisions.
- Self-regulated learning relies on executive functioning skills such as working memory, impulse control, and flexibility. Include additional supports or scaffold to practice self-regulated learning, especially for learners with less well-developed executive functioning skills.

Availability and access

Barriers — often external and systemic — that affect whether the tools and resources needed for learning are available to learners

- Include information about learning goals and objectives, along with pre-requisite details. Learners can identify their current familiarity of background knowledge and identify knowledge gaps.

Identity

The combination of dimensions that define who learners are to themselves and others

- Work with learning designers to carefully craft questions used to prompt metacognitive judgments. Poorly designed questions could activate stereotype threat for some learners, which can have a detrimental effect on their mental state and performance.

Culture

Shared patterns of behaviors and interactions, cognitive constructs, and affective understanding that learners acquire through socialization

- Recognize that terminology around self-regulated learning can be complex. Include prompts to teach learners the language needed to think and talk about their experience with learning without the need for assumed cultural knowledge or background.
- Consider the source and nature of feedback to ensure that cultural sensitivities are addressed, so learners can use feedback as constructive criticism (rather than as a threat/attack) to ask questions and increase confidence.

In partnership with  **CAST**

CAST is a nonprofit education research and development organization that created the Universal Design for Learning framework and UDL Guidelines, now used the world over to make learning more inclusive.

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Kayla Morehead received her Ph.D. in cognitive psychology and a minor in quantitative methods from Kent State University with Dr. John Dunlosky. She is an expert in self-regulated learning and metacognition, and her research focused on how students make learning decisions and engage in effective note-taking. Currently she works at Denver Public Schools as a research analyst, where she evaluates the effectiveness of a variety of district programs.



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Katherine McEldoon is a research-to-practice connector. After earning her Ph.D. in cognitive and learning sciences at Vanderbilt University and a post at Arizona State University's Learning Sciences Institute, she has worked in academia, government, and industry to ensure the best scientific insights support student learning, no matter the context. Katherine has most recently worked as Lead Learning Scientist on Pearson's Efficacy & Learning team, bringing evidence-based insights to Pearson's world of learners.



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Jessica Yarbrow is a Principal Research Scientist on the Efficacy and Learning team at Pearson. Through empirical studies and synthesizing existing research, Jessica supports the development of knowledge and skills frameworks within Pearson products. In particular, she led the development and validation of evidenced-based Skill Development Frameworks for several key Personal and Social Capabilities. Prior to joining Pearson, Jessica received her Ph.D. in clinical psychology from George Mason University.

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