

Expertise Sequence Design Guide

Mapping AI roles across the novice-to-expert arc

How to Use This Guide

This guide is a planning tool. Use it when you're mapping the full arc of a course, program, or credential, and need to make deliberate decisions about where AI supports learning and where to fade.

It works alongside LX Studio's upstream strategy tools:

Tool	What it does	How this guide connects
Learner Snapshot Canvas	Defines who the learner is	Informs what 'novice' looks like
Learning Strategy Board	Maps learning outcomes and strategies	Establishes what the full arc needs to produce
Focus Board	Aligns each learning objective with LEM blocks	Identifies each phase in the design sequence
LEM Blueprint	Sequences all activities into a visual flowchart	The place where AI roles, once mapped, get built

The Central Design Question

Where does AI support decrease — is that fade visible in your design, or left to chance?

AI is the first learning scaffold in history that never fades on its own. It's available at full capacity on day one and day one hundred. That means the fade has to be a design decision — engineered through structured moments where AI access decreases and learners must perform with less support.

What's in this guide:

Page 3–6	Phase Planning Worksheets One page per phase. Design questions, AI role prompts, and space to plan.
Page 7	Sequence Map A single-view map of AI's role across all four phases of your program arc.
Page 8	Design Principles The five rules for AI-integrated expertise development.

MODELING

PHASE PLANNING WORKSHEET

AI ROLE

Generate examples, simulate expert reasoning, produce contrasting solutions

LEARNER ROLE

Observe, compare, identify patterns in expert thinking

DESIGN PRIORITY

AI doing the work here is intentional — the learning goal is observation, not production

Where do learners observe expert reasoning before they are asked to produce it?

Think about: worked examples, think-alouds, contrasting cases, expert demonstrations

What is AI generating for learners to analyze at this phase?

e.g. competing solutions, annotated examples, simulated expert reasoning

How will you know learners are building a conceptual model — not just watching passively?

Consider: analysis tasks, comparison questions, pattern-identification prompts

COACHING

PHASE PLANNING WORKSHEET

AI ROLE

Prompt, hint, surface gaps, provide iterative feedback — without completing the task

LEARNER ROLE

Attempt the task, revise based on feedback, attempt again

DESIGN PRIORITY

AI supports the edges of the learner's thinking — the learner owns the core reasoning

Where do learners attempt the task with support — and who or what is providing that support?

Think about: feedback loops, AI prompts, peer review, instructor check-ins

Is AI providing feedback on the learner's reasoning — or completing the reasoning for them?

The test: can the learner explain the thinking behind their revised draft?

What does the iterative cycle look like here? How many attempts do learners make before moving on?

Consider: number of drafts, feedback intervals, revision requirements

SCAFFOLDING → FADING

PHASE PLANNING WORKSHEET

AI ROLE

Decreasing — from active support to restricted access to absent

LEARNER ROLE

Perform with decreasing support; self-monitor reasoning without AI prompts

DESIGN PRIORITY

The fade must be designed explicitly — it will not happen on its own

Where in your sequence does AI access decrease — and is that decrease visible in your design?

e.g. AI available for lookup only, AI unavailable for reasoning tasks, timed AI-free exercises

What structured moments require learners to perform without AI reasoning support?

Think about: AI-restricted practice tasks, in-class work, timed assessments

Can your learners defend their reasoning when AI is not present? How do you know?

Consider: oral check-ins, process notes, revision logs, defensibility tasks — see Trust but Verify

INDEPENDENT PERFORMANCE

PHASE PLANNING WORKSHEET

AI ROLE

Absent — or available only if learner justifies and verifies its use

LEARNER ROLE

Perform, explain, transfer, and defend reasoning without AI support

DESIGN PRIORITY

Summative evidence should require the learner to own the skill — not just the output

Where must learners demonstrate the skill without AI support?

Think about: summative assessments, oral defenses, live performance, transfer tasks

Does your evidence task distinguish between 'produced a good output' and 'owns the reasoning'?

The test: can the learner explain, extend, and apply the thinking in a new context?

What self-monitoring capacity do learners need to evaluate their own reasoning at this phase?

Consider: metacognitive prompts, confidence calibration, self-assessment criteria — see Metacognition 2.0

Expertise Sequence Map

Use this map to visualise AI's role across the full arc of your course, program, or credential. For each phase, note the key activities and the level of AI support. The fade should be visible here — if AI's role looks the same in every column, the sequence isn't built yet.

Modeling	Coaching	Scaffolding → Fading	Independent Performance
<i>AI: Generate examples Learner: Observe & analyze</i>	<i>AI: Prompt & feedback Learner: Attempt & revise</i>	<i>AI: Decreasing support Learner: Perform with less</i>	<i>AI: Absent or justified Learner: Perform & defend</i>
Key activities at this phase			
Where AI appears			
Where AI is removed or restricted			
Evidence of learner performance			

AI SUPPORT

→ DECREASING ACROSS THE SEQUENCE →

INDEPENDENT

Five Design Principles

These principles apply across disciplines, program types, and delivery formats. They are the design logic behind the cognitive apprenticeship sequence.

1**Define AI's role at the sequence level, not the activity level.**

Where AI appears — and where it doesn't — should be a deliberate decision made when designing the full arc, not improvised task by task.

2**AI doing the work in modeling is a feature, not a failure.**

In the modeling phase, the learner's job is to observe and analyze. AI generating examples, simulating reasoning, or producing contrasting solutions is exactly what the design calls for.

3**The fade must be engineered. It will not happen on its own.**

AI is available at full capacity regardless of learner readiness. Structured moments of reduced or absent AI access have to be built into the sequence — they will not emerge from good intentions alone.

4**Defensibility is the measure of independent performance.**

A learner who can produce good output with AI is not the same as a learner who can explain, extend, and defend that reasoning without it. Design your evidence tasks accordingly.

5**The sequence question is a strategy conversation.**

Where AI's role gets defined — and where it gets removed — should be decided at the Learning Strategy Board and Focus Board level, before any activity is built. Bolting AI onto a completed design is always a compromise.

This guide is part of a series on AI and learning design from LX Studio at the University of Central Oklahoma. For the full series and additional tools, visit lxstudio.org.