

# A *theoretical framework* for integrating AI into HPE

*Six design principles grounded in how professional learning works.*

**THE PROBLEM.** Existing frameworks for AI in education focus on what practitioners need to know **about** AI – competencies, literacy, tool use. The question they leave open is what conditions support professional learning **with** AI. Without an answer, integration is either defensive – treating AI as a threat to manage – or opportunistic – exploiting efficiency gains while the quality of learning quietly erodes. When AI can generate a well-structured clinical reasoning chain, produce a plausible reflective entry, or summarise a lecture more efficiently than attending it, the question is not how to prevent this but what it reveals about what was already not working.

**THE IDEA.** Four learning theories – social constructivism (*how* learning occurs), critical pedagogy (*why*), complexity theory (*where*), and connectivism (*what*) – were mapped across six dimensions of learning interactions. Six convergences emerged: conditions where all four theories arrived at similar insights despite different starting points. These were translated into design principles grounded in how learning works. The principles hold whether or not AI is present; they become urgent because AI can either support or undermine each of them depending on how it is integrated.

## The six principles

*Apply as design constraints, not a checklist. Ask which principle each AI interaction supports, and which it risks undermining.*

### 1 Dialogic knowledge construction

Knowledge is constructed through dialogue, not transferred. AI interactions that generate content for learners to accept bypass this process and produce surface understanding regardless of output quality.

**Apply by** · Designing tasks where learners evaluate, challenge, or extend AI-generated content – not consume it. The dialogue is the learning, not the output it produces.

### 3 Adaptive expertise

The question is not whether learners can reproduce known procedures but whether they can act when procedures do not apply. Reproductive responses are now computationally trivial to generate; adaptive expertise is not.

**Apply by** · Designing scenarios requiring knowledge application across edge cases, contradictions, and contexts where standard procedures break down.

### 5 Metacognitive development

Without awareness of their own reasoning, learners cannot distinguish genuine understanding from its appearance. AI can produce the feeling that learning has occurred while bypassing the processes that actually drive it.

**Apply by** · Requiring learners to narrate their reasoning alongside AI interactions – not just their conclusions. Surface the difference between a correct output and a sound process.

### 2 Critical consciousness

Effective learning requires awareness of what shapes what counts as knowledge – including AI's assumptions, limitations, and whose interests its outputs serve.

**Apply by** · Asking learners to compare AI reasoning with clinical reasoning: what each surfaces, what each conceals, and why the difference matters for practice.

### 4 Contextual authenticity

Healthcare practice is complex, relational, and particular. Learning environments that remove this complexity produce practitioners who are underprepared for the environments they actually enter.

**Apply by** · Using AI to incorporate social determinants, resource constraints, and communication complexity into cases – not to simplify them away.

### 6 Networked knowledge building

Healthcare's most pressing problems cross disciplinary boundaries. Learning that stays within silos produces practitioners who cannot navigate the knowledge networks that complex problems demand.

**Apply by** · Designing tasks that require connections across disciplines and professions, with AI helping surface what siloed thinking conceals.

#### → Apply these principles

Use them at three levels. **Learning activity design:** when structuring an AI interaction, which condition does it support? **Curriculum and assessment:** does this assessment measure artefact production or the reasoning behind it – and does AI simply make that distinction more visible, or more urgent? **Institutional policy:** is the AI policy grounded in how professional learning works, or in what is easy to audit?

**Remember** · The pedagogical question stays constant even as AI evolves: are we creating the conditions under which learners develop the reasoning, judgement, and adaptive capacity that healthcare demands?

## THE BASIS

The six principles describe conditions for effective professional learning that converge across multiple theoretical perspectives. They do not depend on current AI capabilities – which means they remain relevant as those capabilities change. The full analysis, including the comparative matrix, empirical implications, and limitations, is available as a preprint.

## CITE AS

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