In the Age of AI, Pedagogy Is Still the King

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CITE AS	Hanif, H. (2026, August 16). In the Age of AI, Pedagogy Is Still the King. Hack(edu).tech Chronicle. https://doi.org/10.5281/zenodo.21963530
PUBLISHED	16 August 2026
DOI	10.5281/zenodo.21963530
LICENCE	CC-BY-4.0
AVAILABLE AT	https://hackedu.tech/articles/in-the-age-of-ai-pedagogy-is-still-the-king

ABSTRACT

Amid the noise of successive technology revolutions in education, this article argues that pedagogical design remains the decisive factor in learning. Drawing on meta-analytic evidence, the TPACK framework, and Malaysian research on technology integration, it contends that effective lessons are marked by student change, not technology use. Impactful teachers follow a sequence: content first, pedagogy second, technology last. Artificial intelligence raises the stakes, amplifying strong pedagogical intent while accelerating cognitive offloading where intent is absent. Pedagogy, not the tool, remains king.

KEYWORDS

Pedagogy, Technology

Every generation of teachers has been promised a revolution.

Radio was going to transform the classroom. Then television. Then the computer lab, the smartboard, the tablet, the MOOC. Each arrived with fanfare, each was declared the future of education, and each eventually settled into its proper place: a tool on the shelf, useful in some hands, gathering dust in others. Now it is artificial intelligence's turn, and the noise is louder than anything we have heard before.

So let me say the quiet thing plainly, before the noise drowns it out. Amidst all of this, one thing still holds everything together, and it is not the technology. It is pedagogical design. In the age of AI, pedagogy is still the king.

This is not nostalgia talking. It is evidence. A recent meta-analysis of technology-assisted instruction reached a conclusion that should be printed on the box of every EdTech product sold to our schools: it is contextual and pedagogical factors, not the features of the technology itself, that drive effectiveness (Li & Zhang 2026). Decades of research keep arriving at versions of the same finding. The tool does not teach. The design of the learning does.

There is an old saying in the technology world that I repeat, perhaps too gleefully, in every training session I run: a fool with a tool is still a fool. Hand the most sophisticated AI platform to a teacher with no pedagogical intent, and you get a faster way to deliver a bad lesson. Hand

a whiteboard marker to a teacher who understands how learning happens, and you get magic. I have watched a teacher in a rural school hold forty students spellbound with nothing but a story, a question, and impeccable timing. I have also sat through a presentation drowning in animations, drones, and QR codes where nobody, including the presenter, could tell me what students were supposed to learn.

Here is the test I offer educators, and it is deliberately uncomfortable. A good lesson is marked not by how well technology is integrated, but by whether the lesson moves students. Did something shift? Did a misconception crumble? Did a student who walked in believing "saya memang lemah Matematik" *(I'm weak at Mathematics)* walk out willing to try one more problem? Learning, at its core, is a change in behaviour and in belief. If nothing moved, the technology decorated a lesson that did not happen.

The research community formalised this intuition years ago in a framework called TPACK, or technological pedagogical content knowledge, which describes effective teaching with technology as the intersection of three kinds of knowledge: knowing your content, knowing how to teach it, and knowing your tools (Mishra & Koehler 2006). The framework's enduring insight is that these cannot be separated. Technology knowledge alone predicts very little. A large study involving over 1,300 preservice teachers, co-authored by a Malaysian researcher, found that it is precisely this blended knowledge that predicts whether teachers actually integrate technology meaningfully during their teaching practicum (Sofwan et al. 2023). In other words, the teachers who use technology well are the ones who understand teaching well. The tool follows the thinking. It never leads it.

And this, I would argue, is exactly what separates a mediocre teacher from an impactful one. It is not enthusiasm for gadgets, and it is certainly not the number of apps on their laptop. It is a specific professional skill: the ability to look at the content you must deliver, ask which pedagogical approach best suits it, and only then select the tool or platform that supports the kind of interactivity you want in your classroom. Notice the sequence. Content first. Pedagogy second. Technology last, and only in service of the first two.

A teacher planning a lesson on ecosystems might decide the concept demands inquiry, so students should predict, test, and argue. Only then does the question of tools arise: perhaps a simulation, perhaps the longkang behind the school, perhaps both. Meanwhile the mediocre version of that lesson starts from the other end: "we have new VR headsets, what can we do with them?" The tool is the same. The thinking is not, and the students can always tell the difference.

Artificial intelligence raises the stakes on both sides of this divide. Used within a strong pedagogical design, AI is the most capable assistant teachers have ever had: research consistently identifies planning, assessment, and feedback support as its clearest contributions, while noting that these systems still fall short of teachers' actual classroom needs (Celik et al. 2022). Studies in teacher education similarly find real potential in generative AI for lesson planning and even for cultivating critical thinking, always with the caveat that these are tools to support teaching, never to replace the teacher (van den Berg & du Plessis 2023).

But used without pedagogical intent, AI does something the smartboard never could. It thinks for you, or appears to. And here the evidence turns cautionary: heavy reliance on AI tools has been linked to weaker critical thinking through cognitive offloading, the slow outsourcing of our mental work to the machine (Gerlich 2025). A teacher who lets AI decide the objectives, the activities, and the assessment has not integrated technology. They have abdicated pedagogy. The lesson may look complete. The king's chair, however, is empty.

I say all this as someone who builds and champions these technologies for a living. I train teachers in AI, VR, and AR precisely because I believe in what these tools can do. But I have learned that the first question in every training session cannot be "how does this app

work?" It must be "what do you want your students to become?" Every technology decision is downstream of that answer.

So to my fellow educators drowning in webinars, product demos, and ministry circulars about the latest platform: breathe. You are not behind. The fundamentals you already carry, knowing your subject, knowing your students, knowing how understanding is built, are not relics of a pre-AI era. They are the operating system that decides whether any of this new machinery produces learning at all.

Technologies are courtiers. They come and go with every season, each one bowing lower and promising more than the last. Pedagogy sits on the throne, as it always has, deciding which of them actually serves the kingdom.

The king is not dead. The king has never been more necessary.

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