

Designing personalised learning paths with AI

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Learning objective

Learners in vocational classes start with different knowledge and learn at different speeds. This material shows how AI can help teachers design personalised learning paths.

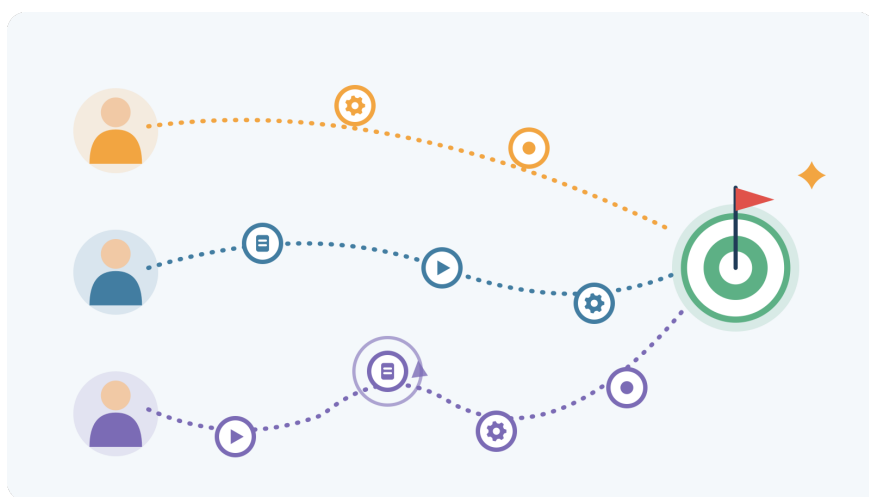
By the end of the learning content, teachers can use AI to describe and evaluate student profiles on a specific topic, as well as modify and approve the AI-suggested route so that their own pedagogical aspects prevail.

Introduction: one goal, several routes

Picture a group of first-year car mechanic apprentices. One apprentice has spent two years helping in a family garage, another has just finished general secondary school, a third is an adult career changer, and a fourth is still learning the language of instruction. They must all reach the same level of professional competence. Yet the same sequence of lessons will bore some and leave others behind.

A **personalized learning pathway** is a planned sequence of learning activities, learning materials, practice tasks, and checkpoints leading to a defined learning outcome, considering their starting point and progress. The approach has longstanding educational foundations: in 1984, Benjamin Bloom reported studies in which individual tutoring, supported by regular assessment, feedback, and targeted practice, proved substantially more effective than conventional classroom instruction. His findings underscore how important ongoing support tailored to the learner's progress can be.

The problem has always been feasibility – no teacher can plan twenty individual routes by hand.



Different starting points and learning speeds – one shared competence goal

With generative AI, teachers can quickly create task sequences and explanations tailored to learners' differing levels of prior knowledge and pace of learning. This can significantly reduce preparation time, but the generated

materials are suggestions: teachers still need to set aside time to review their accuracy and educational suitability.

The building blocks of a learning path

Before asking AI for anything, it helps to know what a good path contains. Whether it is drawn on paper, built in Moodle or set up in a learning platform, a learning path usually has these elements:

- **A clear learning outcome** taken from the qualification or curriculum – the same for every learner.
- **An entry point:** what the learner already knows and can do, identified through a short diagnostic task, observation of practical work or a conversation.
- **A sequence of steps that builds on learners' prior knowledge:** for example, when learning to calculate a discounted price: reviewing the basics of percentages → working through an example together → practising with guiding questions → solving problems independently → checking answers and correcting mistakes.
- **Resources in several formats** – text, video, worked example, simulations, demonstrations – in line with principle of multimodal learning.
- **Practice tasks with feedback**, ideally in realistic workplace contexts and with increasing difficulty.
- **Checkpoints and decision rules:** If successful, the learner can move on or receive a more challenging task; otherwise, they receive additional support.
- **A flexible pace and some learner choice**, so that learners gradually take responsibility for their own learning.

When we adapt the learning process to learners' needs, **we change the path, support and pace – not the requirements.**

How AI can support the design

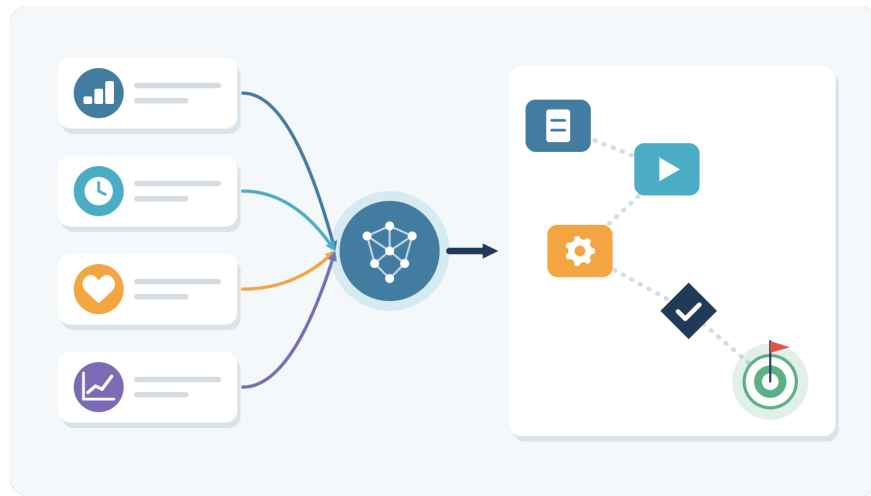
Sequencing learning activities

AI can break a learning outcome into sub-skills, identify prerequisites and propose a logical order of activities. For an electrician lesson on residential circuits, for example, it can suggest moving from safety rules and circuit diagrams through measuring with a multimeter to wiring and testing a circuit. The teacher checks whether the order matches the curriculum, the workshop schedule and the available equipment.

Differentiated learning resources

AI can suggest learning materials at different levels and in different formats: brief explanations for beginners, step-by-step worked examples for learners who need help following the solution process, technical data sheets for advanced learners, and illustrated glossaries for students who need reading support or are learning the language. The accuracy and accessibility of sources recommended by AI need to be checked. It is therefore useful to provide materials you already know and trust – your own resources, content available in Moodle, textbook chapters or manufacturers' manuals – and ask

AI to select the sections relevant to the learning objective and arrange them in a sequence that supports learning. Ask it to create new explanations or practice tasks where the existing materials need to be supplemented.



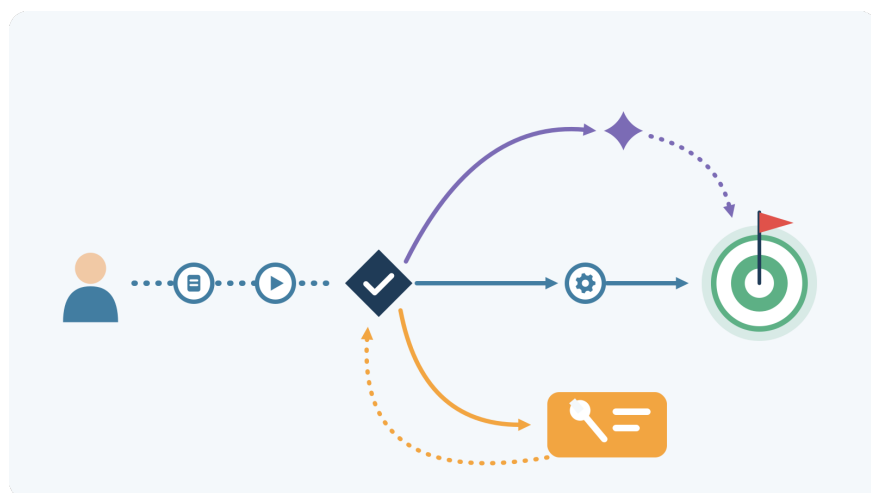
AI turns the teacher's input – prior knowledge, pace, needs, progress – into a draft sequence of learning resources, practice and checkpoints

Practice tasks

AI is good at producing many variants of practice tasks: graded calculation tasks for a welder estimating material, menu-costing cases for a cook, troubleshooting scenarios for an IT technician, short care situations for a nursing assistant. It can add hints for the support route and more open, realistic problems for the extension route. Every learning pathway should include short tasks that prompt learners to recall previously learned material from memory at regular intervals.

Adapting the route

The heart of personalisation is the decision at each checkpoint. AI can help formulate clear **decision rules** – what happens if learner scores low on the entry check, finishes early or gets stuck at the same step twice – and suggest alternatives for learners who need a different pace or extra language support.



At each checkpoint the route adapts: support loop, standard route or extension – all leading to the same goal

Example: a car mechanic unit

A teacher plans a three-week unit on testing the battery and charging system for a group of 16 car mechanic apprentices. A short entry check (five questions and one observed measurement) shows three typical profiles. The teacher describes them functionally – no names, no grade lists, no personal data – and asks a school-approved AI tool for a draft.

Example prompt

You are an experienced automotive VET teacher. Help me design a personalised learning path for a 3-week unit (6 × 90-minute lessons).

Learning outcome: the apprentice tests a 12 V battery and the charging system with a multimeter and a battery tester, interprets the results and decides what to do, following safety rules.

Learners' profiles (anonymised):

A – workshop experience, weak theory;

B – good theory, little hands-on practice;

C – new to both, reads technical texts in the language of instruction slowly.

Resources: textbook chapter 7, our school video on battery testing, the tester manual, 4 test benches.

For each profile, propose activities, practice tasks and two checkpoints with decision rules (support loop / standard / extension). All routes lead to the same final practical task, and learners can switch routes. Use only the listed resources and mark anything new. Answer in a table.

The draft arrives in seconds and is a good starting point – but the teacher's review changes several things. The safety steps for disconnecting the battery are incomplete, so the teacher corrects them. A suggested online simulation does not exist and is removed. Profile C gets an illustrated glossary and a video with subtitles instead of a long text. The extension route receives a real fault-finding case from a partner company. Finally, the teacher makes sure the routes are not fixed: every learner can move to a different route after each checkpoint.

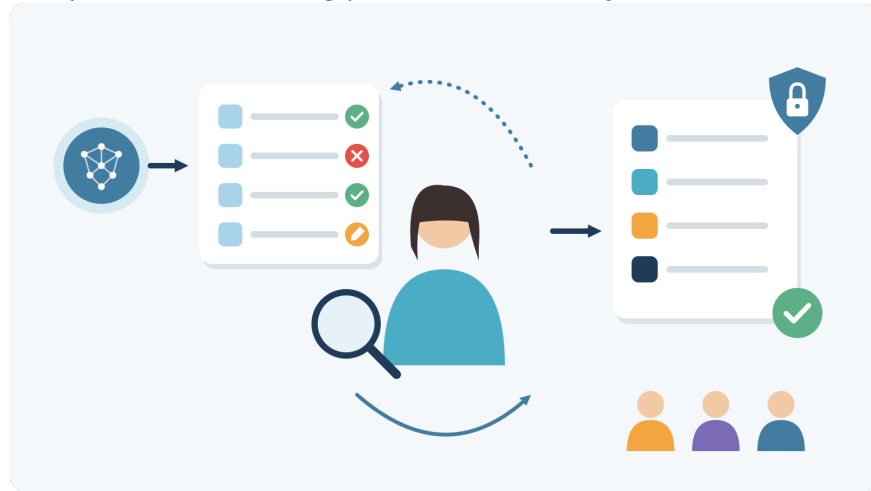
The approved path is shared with the learners as a simple route map in Moodle or on paper, so everyone can see where they are, what comes next and why. Joint workshop tasks remain. Personalised learning path does not mean that everyone works alone.

The teacher stays in control: evaluate, adjust, approve

AI proposes; the teacher decides. Before sharing a path with learners, it is worth checking it against six questions:

- **Alignment:** does every route lead to the same learning outcome and final assessment?
- **Accuracy and safety:** are the technical content and the safety rules correct and complete?
- **Resources:** do all suggested resources exist? Are they reliable, legally available for use and at the right language level?
- **Inclusion:** does any route set "lower track" or a lead to a dead end? Can learners move between routes? Are needs described without labelling the learners?

- **Feasibility:** does the plan fit the timetable, the workshop capacity and the supervision available?
- **Transparency:** can you explain to learners (and parents) why someone is on a particular learning path and how they can move to another one?



The teacher evaluates, adjusts and approves the AI-suggested path before it reaches learners

Limits, risks and data protection

- **Errors and invented resources:** AI output can be plausible and wrong. Check content, links and safety-critical steps every time.
- **Fixed learning routes:** an early assessment should not permanently determine the level of tasks or support a learner receives. At every checkpoint, review their progress and adjust the route as needed, taking their views into account.
- **Over-automation:** a path that runs entirely on an e-learning platform can isolate learners and hide problems. Keep regular personal contact, group work and teacher judgement.
- **Data protection (GDPR):** learners' results and needs are personal data; information on special educational needs or health is a special category. In general AI chatbots, use anonymised profiles only ("Profile A", "Learner 3"). Learning platforms that process named learner data must be approved by the school, with a clear purpose and a data processing agreement, and should collect only the data that is really needed (data minimisation).

Takeaways for teachers

When designing a personalised learning pathway, the learning outcome remains the same, while the steps, support and pace are adapted to learners' needs. Drawing on our own trusted resources, AI can help plan activities, learning materials, practice tasks and criteria for moving on. When using AI, we describe learners only through characteristics relevant to their learning, without including names or sensitive data. As teachers, we review, revise where necessary and approve the proposed pathways before use, checking that they align with the learning objectives, are accurate in their subject content, draw on reliable sources and are accessible, practical and understandable for learners. Pathways should remain flexible throughout: at every checkpoint, it should be possible to adjust the next steps, and learners should understand why they are receiving a particular task or form of support.

References

- Bloom, B. S. (1984): The 2 sigma problem: The search for methods of group instruction as effective as one-to-one tutoring. Educational Researcher, 13(6), 4–16.
- European Commission (2022): Ethical guidelines on the use of artificial intelligence (AI) and data in teaching and learning for educators. Luxembourg: Publications Office of the European Union.
- UNESCO (2023): Guidance for generative AI in education and research. Paris: UNESCO.
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Links

- UNESCO guidance on generative AI: unesco.org
- EU AI Act (official text): eur-lex.europa.eu

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