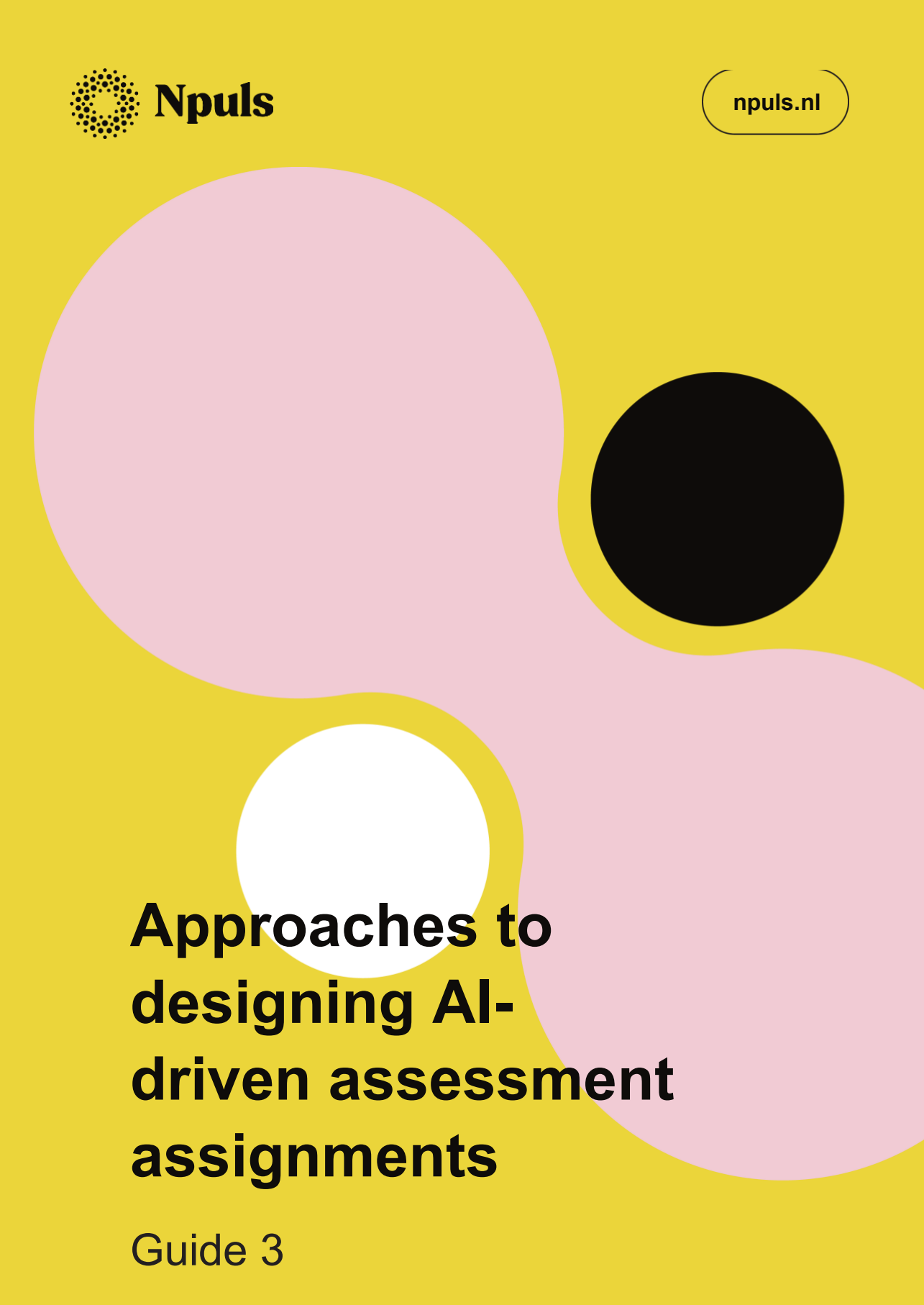




Approaches to designing AI- driven assessment assignments

Guide 3

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Contents

1. Introduction	5
2. Designing assessments	9
3. The Two-Lane approach	13
4. Towards AI-aware assessment assignments: A step-by-step plan	21
5. Conclusion	29
Reference list	30
Annex 1 Sector-specific recommendations and examples	33

1. Introduction

The rise of generative artificial intelligence (hereinafter AI), which includes tools like ChatGPT, Gemini or DALL-E, is shaking up the field of education. This groundbreaking development is compelling educational institutions to fundamentally reconsider their assessment practices and develop *AI-aware assessment practices*, as described in the (Dutch) national vision on assessment and examinations on which this guide is based.

Whereas previously a written final product (essay, design, report) or a traditional exam was sufficient to assess students, it is now often unclear to what extent AI contributed to that result. Moreover, recent studies show that approximately 80% of students use AI tools during their studies (Ma, 2025). It is not only the authenticity but also the validity, reliability and inclusivity of assessments that come under pressure as the use of AI becomes more widespread (Bearman et al., 2024; Bakker et al., 2024). At the same time, AI offers unprecedented opportunities for personalised feedback, adaptive learning environments and authentic simulations (Lim et al., 2025; Mollick & Mollick, 2023). This presents a dual challenge for higher education institutions. On the one hand, there is a need to prepare students for an AI-driven labour market by equipping them with knowledge about, skills in and insights into AI applications and, on the other, there is a need to safeguard the quality and value of diplomas and qualifications (Bearman et al., 2024). These challenges require a systematic approach in which constructive alignment – aligning learning objectives, educational activities and assessment – is the foundation (Biggs & Tang, 2011).

Moreover, society demands AI-literate graduates – professionals who can use AI in a responsible, critical and ethical manner in their field of expertise. Educational institutions must prepare students for this; in addition to subject knowledge and complex skills, they must also learn how to use AI and understand its limitations and ethical implications. AI literacy has become a critical competence, with students expected not only to develop technical skills but also critical thinking and ethical awareness (Promma et al., 2025; Tsai et al., 2023). This includes the ability to critically evaluate AI output, recognise bias, consider ethical implications and make responsible choices about when and how to use AI (Ng et al., 2021; Sperling et al., 2024).

AI is and remains a technological tool that can be used to optimise learning processes – not to replace them. Developing a solid foundation of knowledge remains as important as ever – including in AI-driven learning environments – to enable critical reasoning about output or the ability to make connections (Fawns & Schuwirth, 2024).

For assessment and examination, this means valuing not only objective, well-founded decisions but also the guidance and evaluation of learning processes focused on the learning objectives.

Purpose of this guide

Rapid developments in AI require a fundamental rethinking of what constitutes valuable education and how we can assess it in an authentic way. The key message of this guide is that with a strong, evidence-informed vision of AI-aware assessment and examination, we can combine the best of both worlds. We deliver assessment and examination that is fair, valid, and reliable while embracing innovation and future-oriented skills.

This guide builds on the Dutch national vision document on assessment and examinations and translates the Two-Lane approach described in that document into concrete approaches for designing AI-aware assessments (assessment assignments) in tertiary education. In this guide, we have drawn on recent scientific insights and case studies and aim to present approaches that can be shared across educational sectors. We acknowledge that implementation will differ according to sector (vocational education and training, higher professional education, research-oriented education) and discipline, but the underlying principles apply universally.

This means not resorting to prohibiting the use of AI or making assessments “AI-proof”, but rather designing ethically responsible, reliable assessments where AI is used to achieve the intended learning objectives without compromising the quality or reliability of the assessments.

Key principles

This guide uses the same key principles as set out in the national vision document, translated here into curriculum design:

- **Human-centred and transparent:** AI applications can support educational and assessment practices, but human agency remains crucial. This means that curriculum designers must explicitly record where, when and how AI is used and what role it plays in achieving learning objectives.
- **Fairness and inclusion:** AI should not create new barriers or exacerbate existing inequalities. Curriculum design should consider differences in access to AI tools, language barriers and digital skills. All students should have equal opportunities to develop AI literacy (Bakker et al., 2024).
- **Validity and reliability are paramount:** Curricula must be designed in a way that ensures assessments remain valid and reliable, regardless of AI use. This requires a considered mix of assessment methods, with AI use sometimes permitted or even required (Lane 2) and sometimes excluded to allow for assessment of individual competence (Lane 1), as set out in the Two-Lane approach.

- **Constructive alignment as a compass:** Learning objectives, educational activities and assessments must be designed (or redesigned) in concert, with AI integration as a means to reach learning objectives, not as an end in itself (Biggs & Tang, 2011).
- **Flexibility and agility:** Curricula must be able to evolve in sync with technological developments without losing sight of the essential core of education. This requires a flexible structure that allows for adjustments (Liu et al., 2023; Lodge et al., 2023).

2. Designing or redesigning assessment assignments

Ideally, assessment serves two aims. On the one hand, process-oriented assessment supports, fosters and strengthens learning and learning outcomes for students. On the other, it determines quality and level of proficiency through valid, transparent and reliable assessments of the student's actual performance. AI brings a new dimension to this (Perkins et al., 2023). AI must be integrated into assessment and examination processes consciously and responsibly – both by providing the necessary support for learning processes in AI-driven environments and by critically reviewing decisions about learning outcomes. Research shows that AI integration in assessment design is most effective when linked to clear learning phases (Crocco, 2025; Lyanda et al., 2024). This can be achieved by analysing the educational offer according to learning phases, allowing more targeted choices to be made from assessment functions that align with the learning objectives: acquisition (knowledge acquisition), retention (consolidation in similar contexts) and transfer (application in new contexts). The integration of AI in education and assessment also calls for a review of cognitive levels. The revised Bloom's Taxonomy (Oregon State University, 2024) offers the following concrete guidelines:

- At lower cognitive levels (recall, understanding), AI can assist by supplying factual information and explaining concepts;
- At intermediate levels (applying, analysing), AI can act as a problem-solving sparring partner;
- At higher levels (evaluating, creating), human skills such as ethical reflection, creativity and judgement are central.

This division helps assessment designers make well-considered choices about where AI integration is valuable and where human competence must remain central.

Constructive alignment

The educational principle of “constructive alignment” remains fully relevant and foundational to designing (or redesigning) education and assessment towards an AI-aware educational practice. In vocational education and training, this often means coordinating core assignments and work processes with how AI is used in professional practice, with examination boards ensuring the quality of examination according to the Dutch Adult and Vocational Education Act (*WEB*). In higher professional education, this requires redesigning competence-based curricula with explicit inclusion of AI literacy in learning outcomes. Research-oriented education requires particular attention to academic integrity and the balance between AI-assisted knowledge creation and individual research skills. These principles make it possible to design a coherent curriculum, with learning objectives, educational activities and assessment carefully and consistently aligned so as to reflect the vision on education and assessment.

Adjusting learning objectives: Evolving professional practice requires study programmes not only to revise but also to explicitly expand their learning objectives so that graduates continue to meet current professional standards. The rise of AI means that students must acquire AI literacy as well as comprehensive domain knowledge (Ng et al., 2021). The same applies to teaching staff. AI literacy goes beyond using AI as a tool. Recent research shows that effective AI literacy is built on four pillars: AI awareness, AI use, AI evaluation and AI ethics (Laupichler et al., 2023). This means, among other things, learning to critically analyse AI outputs, purposefully interpret data and use AI tools responsibly (Sperling et al., 2024).

Revised learning objectives now include, for example, that a student ‘knows how to use AI applications effectively and responsibly to gather information and improve their performance’, ‘can demonstrate how they assess AI output for accuracy and potential bias’ and ‘understands the ethical implications and risks of AI use in a specific context’. A traditional objective such as “The student can write a business letter in English” thus becomes the expectation that the student can draft a business letter and edit it for accuracy and tone with the help of AI, but also independently evaluate the quality of the AI-generated text. In vocational education and training, this translates into practical work processes such as “The student applies AI tools in accordance with industry guidelines”, in higher professional education into competencies such as “The student integrates AI tools into professional practice with a critical eye”, and in research-oriented education into academic skills such as “The student evaluates methodological implications of AI use in research” (Tan et al., 2025). In this way, students gain clarity about what is expected of them in AI-driven environments, while teaching staff can align educational activities and assessment methods with this comprehensive set of competencies.

Designing or redesigning assessment assignments: Constructively aligning assessment to learning objectives and activities requires reasoned choices about the assessment approaches and the desired implementation. Research (Black & Wiliam, 1998; 2009) shows that assessment based on different assessment functions contributes to steering, supporting and achieving quality in teaching and learning, on the basis of careful alignment with intended learning objectives and activities:

- **Assessment for learning** (assessment as a means of learning) aims to support the learning process through formative assessment: learners and teaching staff receive feedback that provides insight into progress and learning needs, which allows the learning process to be adjusted accordingly. Examples of AI-driven assessment during learning include AI-assisted practice simulations with real-time feedback in vocational education and training (Ifenthaler et al., 2025); AI-enriched project evaluations in higher professional education where students learn to reflect on AI-generated suggestions (Katona & Gyonyoru, 2025); and NLP-supported peer review processes at research universities that stimulate deeper academic discussion (Wood, 2022).

- **Assessment as learning** (assessment as the starting point for learning) emphasises the active role of the learner, using assessment as a tool for self-reflection and self-regulation. This helps learners to understand and take responsibility for their own learning process. Nieminen et al. (2025) emphasise that digital self-assessment tools can enhance student agency, provided these tools are designed according to principles of universal design and inclusiveness.
- **Assessment of learning** (assessment of learning outcomes) is decisive and intended to establish what learners have learnt, for instance in terms of reports, certification, graduation or marking. Examples include assessments in controlled environments where direct supervision remains essential to uphold academic integrity.

These proven educational concepts for assessment – as a means of learning, as the starting point for learning or to determine the quality of learning – remain unchanged and highly relevant, irrespective of technological developments and possibilities. The aim is not to revise assessment assignments solely with a view to using AI, but to implement *AI-aware assessment practices* where we integrate AI in a controlled manner wherever it enriches the learning process, while at the same time preventing AI from undermining learning and providing proof of learning. This holistic approach ensures coherence and continuity in learning pathways instead of separate components, and provides a consistent learning experience and educational quality, (Boud et al., 2019), even when AI is fully integrated in the curriculum. After all, AI interfaces with all three components (learning objectives, activities, assessments).

Future-oriented educational activities: AI opens up a wide range of possibilities to reshape educational and learning activities. AI tutors can generate individualised practice questions, enrich brainstorming sessions or simulate semi-realistic scenarios; elsewhere the same technology serves as a sparring partner, teaching assistant, project supervisor or feedback provider, leading to collaborative assignments in which students develop a product using AI tools (Mollick & Mollick, 2023; Micheni et al., 2024; Lim et al., 2025). While this potential makes education more flexible, adaptive and inclusive, it does call for a well-conceived design in which the role of AI is explicitly addressed and responsible use is central (Mollick & Mollick, 2023). Within this design context, teaching staff are already experimenting with working methods that integrate AI into the learning process. For instance, they have students use ChatGPT to produce a draft version of a report, project plan or lab logbook, and then discuss its strengths and weaknesses in groups. This way, students learn to critically evaluate both the content and the AI contribution. In practicals, students verify and correct an AI-generated data analysis – an exercise that enhances precision and analytical thinking while AI acts as an assistant. Teaching staff consciously alternate this approach with AI-free assignments to embed fundamental knowledge and skills, after which similar assignments are carried out with AI assistance to help apply that foundation at a higher level. This way, students experience and recognise where independent performance is required and where smart collaboration with AI leads to better results.

These examples illustrate how innovative, AI-assisted teaching formats within a carefully designed didactic framework not only align with modern professional practice but also foster critical reflection and responsibility among teaching staff and students.

3. The Two-Lane approach

Designing and structuring a well-considered assessment programme is complex, and the impact of AI as an additional factor has made existing challenges even more explicit. Ideally, assessment serves two purposes – supporting and strengthening the student's learning process (developmental assessment) and taking valid, transparent and reliable decisions about the student's learning outcomes (summative assessment) (Black & Wiliam, 2009; Heeneman et al., 2021). A careful balance must be struck between innovation and safeguarding assessment quality.

AI influences learning objectives by altering professional profiles, compelling training programmes to adapt or re-examine current objectives. Moreover, educational and assessment activities must be aligned accordingly (Mollick & Mollick, 2023). The inevitable integration of AI into teaching and assessment brings new dimensions to assessment and examinations (Bearman et al., 2024; Perkins et al., 2024; Vargas-Murillo et al., 2023). The most pressing question for every educational provider is: "What are we preparing students for in a world where AI is permeating professional and personal life, what does this mean for the required knowledge, skills and competencies and how do these considerations translate into assessment practice?"

Assessment designers often adopt an approach where intended learning objectives are taken as the starting point. Then, on the basis of interim information and/or evidence, they determine how students can be supported in achieving learning objectives or how student output can be demonstrated (Wiggins & McTighe, 2005). This holistic approach to designing assessment assignments ensures coherence in continuous learning pathways, a consistent learning experience and educational quality (Boud et al., 2023). The content of these intended learning objectives (in the form of learning outcomes or final attainment levels) varies across education providers in terms of knowledge and application level, discipline and occupational profile, and must be meticulously aligned in consultation with the professional field. The rise of AI is leading to changing professions and the need for new knowledge and skills, which affects existing learning objectives. In many cases, both adjustment and expansion of existing and new learning objectives are required. For students to be able to achieve these new learning objectives, education and assessment must be aligned accordingly. There are various innovative possibilities to design AI-driven educational activities, and the same applies to assessment (Mollick & Mollick, 2023). However, AI should be used as a means to support and enhance educational offerings – not as a substitute for learning and learning outcomes. AI therefore needs to be integrated consciously and responsibly into the foundation of assessment design.

Approach for integrating AI into assessment assignments

A promising approach for integrating AI into existing assessment assignments is the Two-Lane approach. This framework is grounded in international recommendations and guidelines (Liu et al., 2023; TEQSA, 2023; Lodge et al., 2023) and established assessment theories (Black & Wiliam, 1998; 2009). It provides guidance for integrating AI appropriately and responsibly into existing and new assessment assignments through a proposed two-lane approach based on two fundamental principles. Building on the two key principles (integrate AI where possible, and safeguard diploma quality), the Two-Lane Approach proposes two “lanes” for integrating AI into the assessment programme, based on the **function** of the assessment and coverage of the learning objectives.

Lane 1: Assessment of learning: Assessment in Lane 1 focuses on determining the quality of student learning and outcomes in relation to the learning objectives, based on valid and reliable data-informed decision-making. This type of assessment takes place under controlled conditions and supervision, and AI use is either not permitted or only permitted to a limited degree. In vocational education and training, these include practical exams where students perform procedures under observation in accordance with the qualification file, such as a nursing student checking vital signs on a simulated patient (Andreou et al., 2024). In higher professional education, controlled knowledge assessments and criterion-based interviews are used where students account for their project work orally without AI assistance (Schellekens et al., 2023). In research-oriented education, this may involve viva voce exams where doctoral candidates defend their research, or closed-book examinations that assess conceptual understanding without external aids (Evangelista, 2025).

AI may only be used if the learning objectives require it **and** the student's individual contribution is directly verifiable and traceable. This ensures that reliable, valid decisions can be made regarding the demonstrated performance and the student's individual efforts. But it also ensures that it can be determined with sufficient certainty **whether**, and to what extent, the student has independently mastered certain critical knowledge and skills – either without direct or indirect interference from AI or with conscious and directly traceable use of AI aligned with the learning objectives. Consider assessment methods designed so that AI has no influence on the performance being measured, such as classroom-based exams with proctoring, oral examinations, practical skills assessments or observations.

If AI is permitted in this decision-making assessment of the quality of learning and/or results of a student, it must be clear in advance how and under what conditions AI will be used. It must also be established how validity, reliability and measurability of the results will be safeguarded. Examples of AI use in Lane 1 include AI-driven simulations in which an examiner determines, in a semi-authentic context based on observations, whether and to what extent the student has acquired the desired proficiency in the intended knowledge and skills.

For example, performing complex medical procedures. For example, performing complex medical procedures or complex skills/competencies in simulated challenging contexts or exceptional circumstances (such as demonstrating customer care in the hotel industry when dealing with a demanding guest). Another example is adaptive assessment, where AI analyses the student's responses during the assessment and dynamically adjusts the difficulty of subsequent questions. Human quality control in automated rating remains crucial for ensuring fairness and validity in adaptive assessments (Jung et al., 2025).

Irrespective of whether AI use is permitted in Lane 1 (restricted, with supervision and controllable); the assessment must safeguard integrity and ensure that the performance assessed is genuinely the student's own work.

Lane 2: Assessment for & as Learning: Assessment in Lane 2 focuses on making student learning visible and optimising it throughout the learning process, as well as on the outcomes in relation to the learning objectives. This type of assessment serves as a starting point and a means of steering the learning process. Assessment in Lane 2 focuses on data-informed support, adjustment and reinforcement of learning processes and providing direction in achieving the intended learning outcomes. In this lane, the use of AI is permitted, desirable, or even mandatory (depending on the learning objectives, and within legal frameworks and possibilities). The emphasis is on learning with, through and in collaboration with AI. This type of assessment focuses explicitly on the skills and insights needed for critical, ethical and correct use of AI. In this approach, students must demonstrate when and how they used AI, and how it contributed to their learning process and results. In the uptake of AI feedback, students primarily use cognitive strategies (Zhan & Yan, 2025). For assessment assignments in Lane 1, metacognitive reflection and self-regulation strategies must be explicitly encouraged – especially if the quality of this AI-integrated development is taken into account in the final assessment.

Assessment in Lane 2 has an open character, since assessment assignments do not necessarily take place under supervision or are not fully controllable. Consider, for instance, the use of AI in writing assignments, design assignments or gathering evidence for portfolios. Assessment in this lane prepares students for situations where AI use is desirable or unavoidable and encourages them to work with AI in a proper and responsible manner. AI is used to support and enhance processes and outcomes. Critical reflection and accountability for the learning process weigh heavily in this type of assessment. For instance, it must be made transparent which AI tools have been used and how AI-generated output and feedback have been processed. This makes learning visible and optimally develops critical reasoning, problem-solving ability, creativity and AI literacy in authentic contexts.

The table below lists the key differences:

Approach for effective, responsible and appropriate AI integration in assessment practices		
	Lane 1	Lane 2
Function of assessment	Valid, reliable quality measurement to determine whether and to what extent the individual student has achieved the intended learning outcomes, on the basis of demonstrated output, with consequences for student progress.	Cyclical, development-oriented assessment in which evidence is gathered (during or at the start of the process) about the student's development in relation to the learning objectives; teaching staff, students and peers use this information to support, adjust and reinforce their own learning process and ownership of the intended learning outcomes.
Degree of supervision and control	Assessment takes place under direct supervision of an examiner. In principle, this is individual and verifiable. The student's work is authentic and was produced by the student themselves.	Assessment takes place without direct supervision of an examiner. It may be carried out individually and/or collaboratively, and the outcome is not fully verifiable at the level of the individual student.
Role of AI	Depending on the intended learning outcomes, AI use may be limited or excluded (for example, deliberately excluded in tasks where the student must demonstrate skills without AI, or limited in cases where correct AI use itself is being assessed).	Depending on the intended learning outcomes, AI use may be permitted or even required (for example, to teach students responsible AI use and encourage it where it adds value).
Examples	Personal, interactive oral assessments; viva voce assessments; simultaneous assessments and skills development in class; assignments and examinations. Vocational education: AI-driven simulations in healthcare involving a student who, under observation by an examiner, performs complex care-related tasks, where the AI generates different patient scenarios, but the actions themselves are performed by the student. Higher professional education: Adaptive knowledge assessments where AI adjusts the level of the questions, but all answers are given directly by the student. Research-oriented education: Oral defences where students explain and defend their thesis. AI detection can be used for screening, but the final assessment is always by the examiner.	AI to prompt reflection, perform critical analyses of output, suggest structure, brainstorm ideas, summarise literature, create content, propose counterarguments, improve clarity, provide formative feedback, and so on. Vocational education: Workplace assignments where students use AI tools as professionals would in practice – for example, an administrative assistant learning to work with AI-assisted invoicing systems. Higher professional education: Project assignments in which teams use AI for research and development, with mandatory process reports on AI use. Research-oriented education: Research projects where AI is used for literature or data analysis, with critical reflection on methodological implications.

Coherence & demarcation: The strength of the Two-Lane Approach lies in the deliberate and reasoned integration of AI applications, and in students' (acquired) responsible and correct use of these applications throughout their studies. It contributes to an AI-aware assessment practice that is aligned with educational activities and learning objectives. Students do not need to explicitly experience this two-lane division; it is the responsibility of the design team to ensure coherence and continuity in the approach. Every assessment programme should ideally include both Lane 1 and Lane 2 forms of assessment for each learning pathway, educational unit or course (Liu et al., 2023), in a logical sequence and alternation. The two lanes complement each other and ensure constructive alignment within the overall educational offerings (Curtis, 2025). Critical learning objectives are safeguarded in the first lane, thus ensuring the value of the diploma, while assessment in the second lane ensures that students are prepared for professional practice where AI use is a reality.

In fact, existing assessment programmes already incorporate various assessment functions – balanced and well-founded – that are aligned with educational activities and learning objectives. The Two-Lane approach supports the integration of AI into this already well-considered range of assessments, while making clear where assessment requires adjustment or revision when an existing assessment method no longer matches the intended function.

Design principles: This means that for each assessment, the following questions must be explicitly asked: What is the **purpose** of this assessment? Can or should students demonstrate having achieved the intended learning objectives through output achieved in collaboration with AI, or must they also be able to do so independently of AI? Is the purpose to make decisions about student performance based on the established quality of the outcomes (Lane 1), or to support and encourage student development towards the intended learning outcomes (Lane 2)? To put it more concretely, is the learning objective aimed at acquiring or consolidating knowledge or skills? In that case, AI assistance can certainly be valuable (Lane 2). Is the learning objective aimed at complex applications in new contexts? Lane 2 assessments offers possibilities for development and adjustment. Should it be possible to determine the extent to which individual students have achieved the learning objective in complex applications or new contexts on the basis of demonstrable effort? In that case, Lane 1 applies, as this includes controllability and direct supervision (Crocco, 2025).

A useful guideline here is: If a learning objective can be assessed fairly, transparently and reliably with AI, design a robust assessment using the Lane 2 approach. If the use of AI should **not** influence reliable decisions about quality and control, an assessment method that is either AI-restricted or AI-free must be designed for that learning objective. This assessment must be administered in a controlled environment and under supervision.

In situations where weighty decisions are to be made about a student's level of attainment and performance in relation to multiple learning objectives based on a holistic assessment, for example in portfolio assessment, it is crucial to ensure that the compiled set of evidence consists of information and data (where AI has been permitted and/or excluded) from both lanes, with clarity about the assessment criteria and assessment method. Only in this way can valid and reliable assessment decisions be made.

A key consideration is to prevent “grey areas”: it should be crystal clear for every assessment or examination whether and how AI may be used. Uncertainty about AI use poses the greatest threat to assessment integrity (Curtis, 2025). It leads to unfair situations and potentially to cases of fraud, which examination boards then have to deal with. An assessment matrix or blueprint helps to systematically ensure that all essential learning objectives are assessed appropriately. The Two-Lane approach can be implemented in every educational sector, although its content and execution will vary between domains, disciplines and sectors.

The Two-Lane approach

Principle 1: Students learn to use AI effectively, consciously and ethically.

Principle 2: Reliable assessment tailored to learning objectives without compromising them.

Lane 1: Measuring the quality of learning and outcomes

Purpose:

Assessment as the endpoint of learning, where the quality of student output in relation to the learning objectives is established validly and reliably (attribution of learning outcomes), in a controllable environment and under full (or limited) supervision: AI use restricted or not permitted.

Lane 2: Development-oriented assessment

Purpose: Assessment as the starting point of (or during) the learning process. Information about student performance is used for process-oriented support and guidance of learning processes towards the intended learning objectives: AI is encouraged or required. Not fully controllable or under full supervision.

Why is this approach valuable? The Two-Lane approach ensures that integrity and innovation go hand in hand. Students learn to make optimal use of AI applications based on responsible, appropriate use, while the reliability and quality of assessment and final level are assured. Rather than ignoring or prohibiting AI, the technology is embraced in a controlled way wherever it enhances the learning process. At the same time, inappropriate or unauthorised use is minimised wherever AI threatens to undermine learning or evidence of learning. In this way, students acquire professional competence but also greater understanding of how to use AI tools responsibly. This framework is thus in line with widely held international views that assessment should be both AI-aware (ensuring the quality and robustness of assessment despite and thanks to AI) and encourage students to develop relevant knowledge and skills using AI collaboratively (TEQSA, 2023). This approach requires careful communication to all parties:

- Students must understand why some assessments exclude AI, while others require integration of AI;
- Teaching staff need professional development to design AI-aware assessments;
- Examination boards must set clear guidelines for permitted AI use;
- External stakeholders (employers, accreditation bodies) must have confidence in the value of qualifications.

In brief, the Two-Lane approach embraces the maxim: *“Learn with and about AI, but assess essential understanding”*. In practical terms, this means excluding AI where necessary and integrating AI in learning and assessment wherever possible or desirable. Not only does this keep the focus on student development, it also maintains the quality of education and assessment and teaches students to navigate an AI-driven world rather than circumvent it.

4. Towards AI-aware assessment assignments: A step-by-step plan

The Two-Lane approach supports AI integration in assessment assignments and thus contributes to AI-aware assessment programmes by using AI as a means to support and enhance learning processes and intended outcomes – not as an end in itself to replace or outsource learning activities or processes. Under no circumstances may the use of AI fully replace proof of having attained the learning objectives or final attainment levels. This framework is thus in line with widely held international views that assessment should be both AI-aware (ensuring the quality and robustness of assessment despite and thanks to AI) and encourage students to develop relevant knowledge and skills using AI collaboratively (TEQSA, 2023). The strength of this approach lies in combining both perspectives.

When implementing the Two-Lane approach, the premise is that restricting AI is pointless at times when supervision is not possible. Cotton et al. (2024) confirm this principle, proposing that effective strategies should focus on continuous assessment, transparent communication about AI use and the development of academic integrity, rather than focusing solely on detection and prohibition. It is therefore proposed that certain assessment activities should be conducted under supervision in controlled environments wherever learning quality and outcomes must be established and where insight into the individual's own efforts is required. AI may be permitted where it is appropriate for the formulated learning objectives. It is also proposed that AI use may either be **freely** permitted or required in situations where assessment activities cannot take place in fully controlled contexts or where supervision is limited or not possible. Both types of assessment, based on their different functions, generate information and data that can be taken into account in evaluations, depending on the intended learning objectives.

Current assessment assignments

When designing or redesigning assessment assignments, it is essential to critically examine where potential vulnerabilities lie:

- Where do we have doubts about whether it is the student who is learning?
- Where do we have doubts about the reliability of assessment assignments in terms of learning outcomes?
- How do we teach students to use AI consciously and responsibly in assisting their learning, rather than undermining it?
- How do we teach students to use AI ethically and responsibly (with attention to technical aspects as well as pedagogical-didactical implications)?

Redesigning assessment assignments

1. Evaluate the learning objectives and reformulate or supplement them. Designing an assessment assignment is predicated on the learning objectives. Determine which knowledge, skills and attitudes are to be assessed. Are the learning objectives still appropriate, clear and relevant, or do they need to be reformulated or expanded? Should AI skills be added to the revised learning objective? (For example: “is able to write an argumentative essay” remains a learning objective, but we may add “is able to effectively use tools like AI in the writing process and explain the limitations of doing so”). Where possible, also formulate learning objectives concerning process skills (such as critical reasoning, analysing and connecting ideas), since AI mainly influences product-related objectives.
2. Determine the possible influence of AI use on the current assessment assignment in terms of the student’s development and/or attainment of learning objectives. Use the Teacher Feedback Literacy Competency Framework (Boud & Dawson, 2023) to identify which aspects of the assessment assignment could potentially be performed by AI and where human expertise remains vital.
3. Evaluate the current assessment method for suitability. Check whether the existing assessment, based on its function, still aligns with the learning objectives, given current AI possibilities. A traditional take-home essay exam may have become less appropriate (since AI can easily provide assistance), whereas a presentation or an essay written under supervision ensures that the student performs the assignment without AI-assistance. If not, consider making adjustments.
These may range from minor modifications (for example, adding oral questions to verify understanding) to an entirely different assessment method.

In vocational education and training, this may mean supplementing traditional knowledge assessments with practice simulations using Mixed Reality technology (Bödding et al., 2025). In higher professional education, this may include enhancing portfolio assessment with mandatory reflections on AI use. In research-oriented education, this may mean supporting peer review processes with tools that facilitate academic discussions (Wood, 2022). Document these considerations, especially in vocational education and higher professional education. This way, the Examination Board or Programme Committee can take them into account when establishing the assessment.
4. Determine the function of the assessment and, when revising or designing the assessment assignment according to the Two-Lane approach, pay attention to the frameworks, possibilities and guidelines for Lane 1, Lane 2 or a combination of these.
5. Analyse the role of AI in the assessment assignment and the desired level of integration. Investigate whether – and if so, how – AI can be used to support learning in preparation for the assessment. This step concerns the didactic integration of AI. Can AI serve as a practice tool, feedback provider or creative sparring partner for students as they prepare for the assessment? If so, encourage the use of AI with clear guidelines.

AI-generated feedback can be as effective as human feedback for writing skills, but students need explicit guidance on how to interpret and apply this feedback (Escalante et al., 2023). An example: “Students may use ChatGPT for this report to get feedback on language and structure, but not to have it write paragraphs (content).” Also consider which AI skills students need to engage with this responsibly (for example, critically evaluating AI output or writing effective prompts). Where appropriate, include such skills in the learning objective. If AI use is not, or only partly, desirable in learning (for example, because it undermines a core skill), think about whether and how you will communicate and enforce this.

6. Evaluate the risks of AI use with this type of assessment: Identify where and how students might be tempted to use AI assistance inappropriately during the assessment assignments. Ask this question: Is it possible for a student to use AI where this is not intended or permitted? If not, the assessment assignment can remain unchanged. If the risk is unacceptable, and it can be explained why and for whom this is the case, measures must be taken: adapt the assessment method (see Step 2) or introduce control measures (see Steps 6 and 7 below). Bear in mind that as of 2025, the EU AI Act imposes strict requirements on AI systems in educational contexts, especially those involved in decisions on access to education or student assessment (high-risk category). This requires transparency, human oversight and supervision (European Commission, 2023). Also consider technical/ethical risks: When students use AI, they may be sharing data – is this safe and permitted? This should be part of the risk analysis.
7. Ensure transparency in expectations and rules. Develop clear guidelines for AI use – both for students and for teaching staff. Students should know before starting the assessment whether they may use AI, when, why and in what form. For example: “For this assignment you may use generative AI to brainstorm ideas. Include an appendix describing which AI tools you used and how.” Transparency also means institutional and programme-level consistency: lay down the general policy in assessment agreements or protocols (and make allowances for discipline-specific interpretation).
This contributes to fairness – everyone knows what to expect – and prevents confusion (“I thought I could use it here because it was allowed in module X”).
8. Safeguard the validity and reliability of the assessment. Develop concrete measures to ensure that the assessment of student work is fair and substantively accurate, despite (or thanks to) any use of AI. Examples include additional oral checks (for instance, a short oral exam after a submitted essay to assess whether the student has truly understood the written work), encrypted or supervised assessment sessions (for digital exams: proctoring or lockdown browsers if AI is prohibited), or explicitly integrating AI use as part of the

assessment (see Step 4 and the example below).

Human quality control remains crucial, especially when it comes to weighty decisions. Jung et al. (2025) recommend a hybrid model where AI rating is always complemented by human verification through random sampling.

9. Adoption: In vocational education and training, exam tools are usually reviewed by an Examination Board to determine quality (validity, reliability, etc.). If AI introduces new risks, explicit validation criteria must be established. Such as: is the assessment method appropriate, and have adequate measures been taken to ensure that the Examination Board can confirm that the results genuinely reflect the intended outcomes in line with, for example, Section 7.4.5a of the Dutch Adult and Vocational Education Act (*WEB*)? In higher professional education, Examination Boards must, under Section 7.12b of the Dutch Higher Education and Research Act (*WHW*), safeguard the quality of assessments and exams, with AI use explicitly included in the Education and Examination Regulation (*OER*). In research universities, PhD regulations must be updated when AI tools are used in research (UNL, 2024). This step may vary by sector, but the underlying principle applies to all tertiary education sectors.
10. Integrate AI into assessment assignments where relevant and feasible. This step essentially reverses the risk-based approach – explore opportunities to give AI a positive role in assessment. Can AI be used to create more authentic assessments or to elicit higher-order thinking skills? By embedding AI into the assignment, you enhance ethical and transparent use because it becomes part of the learning or output process. Of course, this must align with learning objectives and remain fair for all (i.e. only do this if all students have equal access to the same tool). Some practice-based ideas include: have students use AI to generate counterarguments which they must then refute in a debate (assessing argumentation skills); give students an assignment where they must recognise and improve an AI-generated text (evaluating critical thinking); or allow students to consult an AI assistant during a practical as this might be done in professional practice, and assess how effectively they use this resource.
11. Develop a diversity of assessment methods. Avoid relying on a single type of assessment assignment for a key learning objective; instead, combine multiple methods to offset weaknesses of one with strengths of another. For example, rather than only a written exam (with AI assistance as a possibility), use a mix, e.g. a practical assignment with a presentation and a written assessment. Because AI will not be equally effective or permitted in all these formats, students will have to be able to demonstrate multiple competencies. This mix of assessment methods increases the likelihood of obtaining a complete picture of someone's competencies and makes it harder to bypass the system through any shortcut (AI or otherwise).

Moreover, variety often makes assessments more engaging and more relevant to professional practice. Ensure that the workload remains manageable for students and staff – diversification should not result in even more assessment pressure, but in well-chosen assessment components.

12. Continuously evaluate and optimise assessment policy. Developments in AI are moving fast. What seems futuristic today may be reality next year. Institutions should therefore adopt a learning approach to AI in their assessment policy. Plan an evaluation after every assessment cycle: Were there any incidents (fraud or other issues)? How did students experience the process and the rules? Were the learning objectives achieved, or were there unexpected/unintended effects of using AI? Use this feedback to adjust policies and assessment assignments. This can be formalised through, for example, the Examination Board or quality assurance structures – make “AI use” a standing item in evaluation meetings. Further education of educational professionals is also vital. Professional development of staff should not focus only on technical skills but also on fostering trust and understanding. This ensures that AI-aware assessment remains future-proof *and* allows for proactive anticipation.

Recommendations: ensure reliable and inclusive assessment assignments

It is essential to focus on reliability (consistent, objective evaluation) and inclusivity (fair assessment for all students) in both assessment lanes. Some key considerations here are:

- Combine different assessment methods: Do not rely on a single assessment tool. A mix provides a more comprehensive picture. For example, assess writing ability not only through a single written exam but also by observing the writing process or requiring an oral explanation. For practical skills: combine a practical assessment with a theoretical reflection.
- Clear assessment criteria: It must be clear to assessors and students what is being assessed, when and by whom. Make it clear how the use of AI is handled.
- Professional development and increasing assessment competence: In all educational sectors, it is vital that assessors are competent and consistent in their assessment practices, especially now that AI has become a relevant factor. Invest in the professional development of education providers and assessors in the area of assessment competence. Pay explicit attention to AI literacy among teaching staff, knowledge and insight into AI's impact on assessment, the possibilities and opportunities it offers, and proactively anticipating or managing its risks as well as the ethical and legal dimensions. Kohnke et al. (2025) emphasise that comprehensive AI literacy curricula for teaching staff should include technical skills, pedagogical integration, ethical understanding and practical experience with AI tools.
- Accessibility: For some students, AI can be an aid (for example, students with dyslexia using a language model for as a spelling checker). Find out what support facilities are available and make reasonable adjustments.

Bakker et al. (2024), however, warn that AI can also introduce new inequalities if not all students have equal access to premium AI tools or the digital skills to use these effectively.

- Privacy and ethics, finally, are also integral components of reliability. Do not oblige students to perform privacy-sensitive tasks with AI (such as submit personal data to external AI platforms) and make sure to abide by the GDPR. Where possible, choose AI tools that ensure data security and have been approved by the institution. Together, these measures contribute to an assessment programme that is appropriate, relevant and responsible.

Checklist: Assessment assignments with AI integration

1. **Does this invite students to submit their own work? To what extent** do the learning activities or assessment assignments invite active student contribution based on their own efforts, or could these be 'outsourced' (fully or partly), whether this is allowed/desirable/required or not?

2. **Role division between AI and student?**

Is AI use a deliberate component of the learning objective?

If it is: integrate it explicitly. Document how and where the student and AI collaborate in the assignment and how this is part of the assessment. For example: "The student uses AI to generate at least three improvement suggestions for their design and responds to these in a logbook."

If it is not: Consider whether you want to state this explicitly in the learning objective or assessment criteria. For example: "The student demonstrates individual writing skills without AI assistance." In that case, the assessment method and setting must allow for this (for example, in-class writing without aids). Communicate clearly that AI may not be used for this assignment and explain why. Design the assessment environment so that this is feasible and controllable.

3. **Adjustment in case of negative impact?**

If AI use proves to undermine the learning experience or to be ethically undesirable in a specific assignment, make adjustments.

Action: Be flexible and creative. For instance, add additional assessment assignments or modify the assignment so that AI use does not directly provide the answer (for example, by making the assignment more complex or personalised). There is room for the curriculum to evolve: if teaching staff notice that AI negatively impacts students' learning, take corrective action.

4. **Authenticity risk:** Are we sufficiently certain that the assessment results genuinely reflect the student's own performance? In other words, is the risk mitigated that AI or other sources have contributed inappropriately?

Action: If uncertain or negative: Take additional measures.

Possible actions:

- Different level of supervision: Move the assessment to a setting with direct supervision.
- Immediate verification: Add an observation, oral defence or criterion-based interview.
- Documentation requirement: Require evidence of the steps/action taken towards the demonstrated output. For example, require prompt logging – the student notes which prompts were given to AI, what outputs were returned and how these were used. This evidence can be reviewed to assess how and to what extent the student used the AI output or whether this use was appropriate.
- Observed learning process: Have all (or parts) of the creation process take place under observation. For example, have students work on key issues in interim assessments in class to observe each student's thought process.
- Set out clear restrictions in advance: Determine and communicate explicitly which AI tools may or may not be used, and for what purpose.

5. **Recalibrating learning objectives^a:**

Do we need to adjust our learning objectives because of AI?

Action: In many cases, we do. If certain skills become less relevant in the professional field due to AI, consider adjusting the objective. If certain existing skills become more relevant due to AI, or new skills are required in the professional field, consider expanding or adding learning objectives. These considerations vary by discipline, domain and future professional field.

Involve the professional field and the current professional context in this process. Vocational and higher professional education should focus mainly on practical relevance: which competencies do employers expect, and how does AI relate to these competencies?

Research-oriented education should consider academic skills: for example, is it still important to conduct manual literature searches, or can AI be used as long as critical thinking is maintained? Adjust learning objectives only if they no longer align with what graduates require, but always safeguard the core of the programme.

Promoting conscious and ethically responsible use of AI by students

As AI becomes embedded in education, students must learn how to use it fairly and responsibly.

This calls for agreements on transparency in AI use:

- Acknowledgement/disclosure of AI use: Agree that students must always state if and how they used generative AI when completing an assignment. For example, add a standard sentence to each submission of work:

^a Learning objectives refer to learning results or learning outcomes. In vocational education and training, these are the generic and specific qualification requirements as described in the qualification files, as well as the requirements of the elective modules.

“In this assignment, I used [AI tool] for [purpose]. I processed the output by [action]”. In cases of limited use, this may be a brief statement; for more extensive use, you may require a separate AI-use log or appendix. For example, students can submit their prompts and AI-generated text as appendices, or write a reflection describing what AI contributed and what they did themselves. This makes AI use visible and open for discussion.

- **Guidance on correct use and citation:** Teach students that AI is not a traditional source (it is not an “author” of ideas). They do not need to list ChatGPT as an author in the reference list, but they must mention that and how they used it (as in the above standard sentence). The APA Style Guide (2024) recommends documenting AI use in the methods section or as a footnote, specifying the tool, version, date and prompts used. Discuss with students that AI content should never be accepted uncritically and that verification is essential. Ethical use also means not entering sensitive data, recognising bias and refraining from AI use where not permitted.
- **Detection software:** AI detection tools are not always completely reliable. Our advice is to use detection only as a conversation starter – never as conclusive evidence. The focus should be on awareness and clear agreements, not on punishments based on uncertain detection results.

In suspected cases of fraud, rely on more robust methods (such as a targeted oral assessment or comparing the output with the student’s previous work).

- **Guidance and support:** Offer short training sessions for students on how they can use AI for learning, such as workshops on “Working with ChatGPT”, where its limitations are also addressed. Make sure students know they can always ask teaching staff questions about this without fear of immediate accusation. Open dialogue is the best way to ensure students use AI appropriately (Lodge et al., 2023; see also the AAIN-guidelines (2023) in Australia, which emphasise this point).

By explicitly defining permissible and impermissible use and guiding students accordingly, we normalise AI as a tool in the same way as we do books, calculators or online sources. It becomes part of students’ key skills to know when AI use is appropriate and how to account for it. This contributes to a culture of integrity and responsible use in AI-driven education.

Conclusion

This guide outlines how educational institutions in vocational, higher professional and research education can revise their assessment assignments in the age of AI. At its core is the balance between two objectives in the Dutch national AI vision document: supporting learning (with AI where possible) and validating learning outcomes (with certainty that it is the student’s own work). The proposed Two-Lane approach provides a clear framework to put this into practice. Development-oriented assessment and validating assessment are both indispensable; when used purposefully, they reinforce each other.

In practice, this means:

- Educational professionals design assessment assignments relevant to an AI-driven professional landscape and include AI skills as learning objectives where appropriate.
- At the same time, they safeguard the validity and reliability of assessments used for decisions about learning outcomes, ensuring that diplomas and qualifications continue to represent genuinely achieved competencies.
- A future-proof assessment programme is developed through a series of steps involving analysis, design (and redesign), clear agreements, guidance and continuous evaluation (analyse – diagnose – conclude – adjust). This is not a one-off activity but an ongoing quality assurance process.
- All stakeholders – management, teaching staff, examination boards, students – are involved and informed, ensuring shared understanding of what is and is not permitted in terms of AI in assessment. Clear communication and regulations prevent abuses and create room for innovation.

Finally, it is important to emphasise that AI need not be a threat to assessment, as long as we adapt our approach accordingly. It mainly compels us to be even more explicit about why and how we assess, and what we aim to assess. Vocational education, higher professional education and research-oriented education should learn from each another as these developments continue to evolve apace. Engage collaboratively, share best practices and exchange insights. AI in assessment and examination is new territory for everyone; a culture of knowledge sharing and open dialogue with all stakeholders ensures that we, as education providers, can deal with this coherently and effectively.

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Appendix 1

Sector-specific recommendations and examples

The impact and application of AI in assessment differs by educational sector. While the general principles (as described above) apply to everyone, vocational education and training, higher professional education and research-oriented education each have their own context, rules and challenges. Below are some specific recommendations and examples for each educational sector.

Vocational education and training

Context:

In vocational education and training, the focus is on occupational competencies. Assessment mainly consists of practical exams, skill demonstrations and knowledge exams, often according to national qualification files. In vocational education and training, the examination board focuses solely on monitoring assessment quality and the legality of examinations as defined in the Dutch Adult and Vocational Education Act (WEB). Sectoral agreements from 2016 stipulate that assessment tools must be procured from certified assessment suppliers in accordance with the product requirements of the *Valide Examens mbo* (VEMBO) foundation.

Recommendations for vocational education and training:

- Discuss AI implementation with examination boards and assessment suppliers: Certified exam providers play a crucial role in the constructive alignment of validating (qualifying) assessment with qualification files and professional practice in a world with AI. This means that examination boards must actively engage with suppliers about AI-aware assessments. When establishing examinations, the examination board must assess whether a particular assessment method is susceptible to fraud by AI and whether adjustments are necessary. MBO Digitaal reports that SintLucas has already introduced a policy where students in creative programmes use Adobe Firefly for design inspiration but final evaluation focuses on the originality of their own contribution (MBO Digitaal, 2024).
- Emphasise professional authenticity: When administering assessments, focus on situations drawn directly from professional practice, where students must demonstrate their skills in person. Performing medical procedures or demonstrating customer care in the hotel industry can be a component of AI-driven simulations, but the actions themselves must be performed by the student. Encourage teaching staff to use AI in development-oriented (formative) educational activities and assessment by promoting AI use as a learning tool in classes and assessments.

Research shows that prompt engineering as a skill is essential for AI literacy (Ng et al., 2021). Have students ask AI questions in their subject field and evaluate the usefulness of the answers, or have them practice a scenario generated by AI. This way, students learn the limitations and possibilities of AI. Clearly communicate that stricter or different rules may apply in the actual examination, but that this serves as preparation for them.

Concrete example (vocational education and training):

In a Marketing & Communication programme, students are tasked with developing a communication plan for a local entrepreneur.

AI use:

They may use tools like ChatGPT to generate a SWOT analysis based on entered data.

However, during assessment they must defend their strategic choices orally and account for the reliability of the AI output. For instance, the teacher might ask: “How did you develop this target group description?” The student explains that an initial version was drafted by AI and then tailored to a regional context. This way, AI is integrated but the assessment verifies the student’s ability to use the tool critically. The examination board approved this because it aligns with the learning objective of “critically developing and substantiating a marketing plan”, where AI is not the assessment criterion itself but a tool which the student had to use appropriately.

Higher professional education

Context:

In higher professional education, programmes combine theoretical knowledge with applications in complex professional contexts. Students at universities of applied sciences are prepared for a professional environment in which digital skills are increasingly pertinent. Assessment ranges from written knowledge assignments to project reports, presentations, portfolio assessment and internship evaluations. Examination boards in higher professional education monitor and safeguard the quality of assessment and certification on the basis of the Dutch Higher Education and Scientific Research Act (WHW).

Recommendations for higher professional education:

- Develop an institution-wide AI assessment policy, as universities of applied sciences have considerable autonomy for each study programme. Guidelines for AI in assessment can be drawn up in the assessment policy as part of the examination regulations. For example: a policy document that provides rules and guidelines (“AI may not be the author of submitted work, but may serve as a tool provided it is properly acknowledged”) and examples of good practices. Examination boards can ensure this is implemented in the programmes.
- Foster authenticity and professionalism by drawing on the reality that professionals in practice will also use AI tools. AI is already used daily in many fields, from marketing to journalism and logistics to HR. This offers opportunities to prepare students for this reality, for example through assignments where AI is purposefully used in combination with critical reflection.

- Use portfolio assessments, with extra attention to process assessment. Assessment in higher professional education should not focus solely on the level and quality of the end product, but also take into account the entire process. This ties in with the updated Bloom’s taxonomy, where higher cognitive levels like evaluating and creating require uniquely human skills that AI cannot replace (Oregon State University, 2024).

Concrete example (higher professional education):

In a Law programme at a university of applied sciences, students are given a case for which they must write a legal advisory report for a fictional client.

AI use:

They may use an AI tool to search case law or prepare a draft version of the report, provided they verify and rephrase all AI-generated content in their own words. On submission of the work, students include an appendix with prompts used and the AI’s raw output. Assessment focuses both on the final legal advice (accuracy, argumentation, appropriate language) and on the student’s critical stance on using AI (for example, did they recognise and correct AI errors? Was AI use acknowledged properly?). In this way, students develop professional AI literacy relevant to legal practice (e.g. using case-law search engines/databases), while the assessment remains valid because the assessor can verify that the student has understood and internalised the information/work.

Research-oriented education

Context:

In research-oriented education, the emphasis is on knowledge development and creation and on academic integrity. Students are trained to be critical thinkers who are able to independently process complex information. Assessment often consists of essays, exams, research papers, theses and oral exams. Academic integrity is a cornerstone in this educational sector: originality, correct referencing and independent work are all highly emphasised.

Recommendations for research-oriented education:

- Revise assessment methods by repositioning assignments to higher cognitive levels. Evangelista (2025) advocates for “rethinking exam design,” replacing traditional recall questions with tasks that require critical thinking and creativity.
- Integrity and ethics require explicit attention in the curriculum. There are concerns about maintaining writing skills and that AI could lead to scientific inaccuracies or fraud – for example, fictitious sources or students having a thesis written by AI. Universities must therefore not only develop policies, but also actively educate students about the ethical implications of AI use in an academic context.
- Use oral assessment strategically as a verification instrument. A centuries-old tradition in academia (colloquia, oral examinations), oral assessment remains a highly effective way to verify that the student genuinely understands the submitted work.

Concrete example (research-oriented education):

In a psychology course at a research university, students must write a research proposal.

AI use:

They may use AI to search literature and generate an outline for the theoretical framework.

However, they must account for theoretical underpinnings, methodological reasoning and design decisions orally. On submission of the proposal, students indicate which parts involved AI assistance. An oral colloquium then follows where the lecturer might ask, “Why did you choose this research method?” or “Could you elaborate on this theoretical background?” This reveals whether the student truly understands the material or simply submitted AI-generated text.

