

Npuls
September 2023

Smarter education with AI

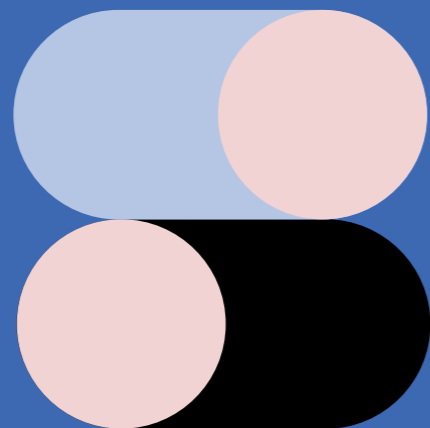
**A guide for teachers
and other educational
professionals**

**Move
education.**

Foreword

Kim: So, Dominique, we get to co-write this foreword together? Great! What should we cover? How this came about, the target audience, and the purpose, I suppose? And I mustn't forget to mention that this idea originated at the University of Twente in the AI (ChatGPT) in education working group.

Dominique: Yes, I think it's good to start there. The 'why' behind this magazine should be clear to everyone! Everywhere, we're exploring how to approach AI in education. With this magazine, we aim to make a tangible contribution. But back to your question: how did this all come about again?



Foreword

by Kim Schildkamp
and Dominique Campman

Kim: The launch of ChatGPT, like many other institutions, prompted us to initiate an AI in education working group. I was asked to chair this alongside colleague Robin van Emmerloot. Within the group, we delved into issues like assessment, policy, infrastructure, and of course, the implications for teachers.

Dominique: Yes, as the former leader of the teacher professionalisation zone of the Acceleration Plan, you'd naturally value that.

Kim: Exactly! Within the group, we thought of creating a sort of magazine for teachers, covering various aspects of using generative AI like ChatGPT in education. That's when I approached you, Dominique, thinking we at University of Twente couldn't be the only ones working on this.

Dominique: You're right! Then, Bram Enning and I, from the former study datazone of the Acceleration Plan, received an email from you about collaborating. We were on board, seeing it as a great kick-off activity for our new Npuls pilot hub study data and AI. Charlotte Heystek from Npuls communications was also enthusiastic and immediately joined.

Kim: I was delighted with that. While I was emailing, I reached out to more people in my network: other former colleagues from the Acceleration Plan, colleagues from the education working group and Human Capital of the NLAIC, SURF colleagues, NOLAI, and colleagues from various institutions. The exciting part was: everyone wanted to participate! In fact, we received 93 contributions.

Dominique: Yes, it was quite a selection task. But Kim, we're using a lot of terms and abbreviations: Acceleration Plan, zones, Npuls, pilothub, NLAIC, NOLAI. Do you think readers can still follow this foreword?



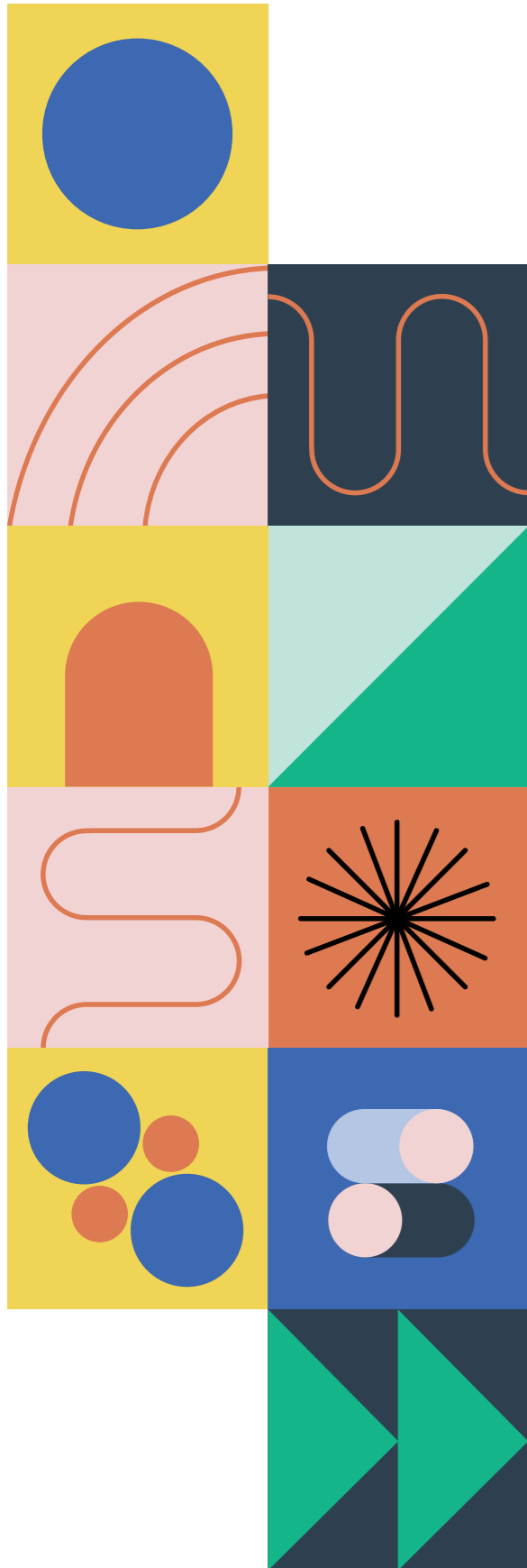
Kim: Good question, but I think the main point is to show that we collaborate on such crucial topics in the Netherlands. And with all these parties involved, the entire educational sector, from primary, secondary, vocational, higher education to research universities, has contributed to this magazine!

Dominique: True, and for those curious about the abbreviations, we have a glossary at the end of the magazine. But back to this foreword. The target audience is teachers, that's clear. Maybe we should mention the purpose? Our magazine offers various tips and tricks for teachers about generative AI in education. Teachers can read interviews and background stories on themes like AI in education in general, AI and testing, ethics, guidelines, and policy. We've also included some inspiring examples.

Kim: Yes, and we haven't forgotten the student's perspective. Dominique, I think we've covered everything for the foreword. All that's left for us is:

Kim and Dominique: Enjoy reading!

Reading guide



This magazine is a selection from the vast amount of content available within (and outside) the Netherlands on the use of AI in education.

Over the past summer, content was provided by more than 50 people, from which a selection was made by an Editorial Board. The content is grouped into 6 themes:

- AI IN EDUCATION**
- AI AND TESTING**
- INSPIRING EXAMPLES**
- AI AND ETHICS**
- AI AND (THE PERSPECTIVE OF) THE STUDENT**
- GUIDELINES AND POLICY AROUND AI**

Where necessary, submitted articles have been provided with an introduction to give a bit more context to the article.

This magazine is explicitly a collection of largely pre-existing content, enriched with contributions written specifically for this magazine and conducted interviews.

Thus, the articles do not reflect ‘the view of the Editorial Board’ but should primarily be seen as tools to inspire the reader and help them take their own steps with AI in education.

And also, because it usually concerns ‘pre-existing content’, in some places students are referred to and in others pupils, in some places teachers and in others lecturers. However, the editorial board believes that all the information in this magazine is of interest to everyone in the Netherlands who teaches!

Not all submitted content is included in this magazine. We have conceived the idea to set up a community for teachers, specifically on the subject of AI in education, as a follow-up to this magazine. There, we also want to make available all the content that didn’t make it into the magazine this time and also offer teachers the opportunity to share content and experiences with each other. Keep an eye on the Npuls website for these (and other) next steps!

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‘We’re asking the wrong questions about chatgpt’

▶ **Interview**
by Michiel Bakker
January 20, 2023
ScienceGuide

Resisting technology like ChatGPT is pointless. Instead, think about how you can utilise it, advises lecturer Bart Wernaart (Fontys Hogeschool). Often, it doesn’t matter if students use such an AI application as a tool, sparring partner, or source of inspiration. Teach them when they should and shouldn’t use it, he argues. Bart Wernaart is a lecturer in Moral Design Strategy at Fontys university of applied sciences and the winner of the first Melanie Peters Prize from the Rathenau Institute (more on that later). As a researcher heavily involved in new technologies and ethics, he follows the discussion about ChatGPT with interest. He also sees how the discussion can be improved. “We are asking ourselves the wrong questions,” is his verdict.

Does it matter if something is made with chatGPT?

“ChatGPT is a technology that allows you to create something that isn’t yours. In education, there’s therefore a fear that a student might submit a paper written not by themselves but by technology,” the lecturer outlines the problem. “However, there’s a deeper question behind this. Does it matter if something is real or not? Does it matter if something was made by a human or not?”

Those who answer ‘yes’ to this immediately face a problem. The difference between a human’s text and a computer’s is almost indistinguishable. One can endlessly search for that difference or develop technology that can find such differences, but then we are always playing catch-up, Wernaart observes. “Administrators sometimes tend to want to regulate the negative consequences of new technology top-down. However, innovation always outpaces regulation.”

Technology vs. Technology – at the expense of creativity

The inclination to use technology to detect automatically generated texts might also mean that human creativity, which we want to protect, is suppressed, Wernaart warns.

“Technology can only detect whether something has existed before or not. Truly new ideas will always be marked as ‘strange’ by technology. If I use technology to detect technology, as is now being proposed regarding ChatGPT, a technological cat-and-mouse game arises where the new Galileo Galilei is automatically out.”

What do we want students to learn?

What should higher education do then? It’s much more sensible to accept that something like ChatGPT exists and to seek a proper way to deal with it, believes Wernaart. Moreover, it’s not all doom and gloom. A student can use the chatbot to cheat during a test, but ChatGPT can also serve as a sparring partner or source of inspiration.

“Equip people from the outset to handle it responsibly,” says Wernaart. “Teach students when they can use such a chatbot for learning and inspiration, and especially teach them when they should invest in themselves by not using such a tool.”

Teachers will therefore need to think carefully about what they really want to teach their students. “Is it important for a student to create everything themselves? If yes, then measures need to be taken. If not, then it doesn’t matter if a student uses a chatbot in some way.”



“If I use technology to detect technology, a technological cat-and-mouse game arises”

Discussion about chatgpt should focus on its use

Back to the deeper question. Does it matter if something is real or not? “We strongly differentiate between fake and not fake,” Wernaart outlines, “but fake doesn’t automatically mean something isn’t true. The reverse is also true. Suppose we make a deepfake video of a politician playing football. That doesn’t mean the politician doesn’t actually play football sometimes, or that the deepfake can’t reflect something that actually happens.”

Some time ago, there was an uproar when an artificial intelligence application, which doesn’t come up with anything new, won a painting competition. “What exactly does it matter that people find such a sophisticated collage of existing images beautiful?” Wernaart asks. “What does it matter if it then wins a prize? There are also computers that can beat the best chess player. So what? That provides the chess champion with opposition, making him better.”

Humans now have the unique opportunity to improve themselves through technology, Wernaart means. “However, you must continue to think carefully about the deployment of that technology. If you use it to influence elections or manipulate news, then your goal is not valid. The discussion about ChatGPT should be about this; are you using technology to make something better? If you use it to visibly improve something, it doesn’t matter if it’s real or fake. If you use it to make something worse, then it does matter.”

Chatgpt is not ethically neutral

Not the authenticity of a technological artifact is most important, but the morality with which the technology is charged and used. “Technology is never ethically neutral. It has a certain moral charge. Someone who pulls the trigger of a gun can have different intentions, but a society with many guns is de facto much more violent than a society without guns. The mere fact that those weapons exist makes society ethically different,” says Wernaart.

Even a chatbot like ChatGPT has an ethical charge – one that might be far removed from the intention with which the software was designed. “The designer of such a bot probably didn’t create it to help students with fake assignments. You always have to check whether the ethical charge that was put in at the beginning still matches the ethical charge of the technology itself. Does that then match what we as a society want? If the answer is ‘yes’ twice, we can use technology to improve something.”

A social medium like Facebook is a prime example of the opposite, says Wernaart. The designers of the current form of the social medium intended to sell as many ads as possible that best match the user. “As a result, the well-known social bubbles emerged unintentionally, and a few steps later you have the storming of the Capitol.”

Think about how you can utilise it

Resisting is pointless; think about how you can utilise it, is the message from the Eindhoven lecturer. “If I want to teach a student to write themselves, I shouldn’t use such a chatbot, but if I want to inspire or guide them, it might not matter at all if I use such a chatbot.”

Article
by Kim Schildkamp
k.schildkamp@utwente.nl

AI as the linchpin: Implications of ChatGPT for the curriculum

When compiling this magazine for lecturers about AI in education, we were certain of two things: (1) it should not solely focus on ChatGPT and (2) an article about ChatGPT must be included. It's important to be aware that ChatGPT is just one example of so-called generative AI. Although this magazine covers various AI applications, this contribution specifically focuses on ChatGPT.

This article summarises 27 contributions we have received about ChatGPT, ranging from blogs and tips to policy documents and even a complete handbook. To provide structure to this diverse content, this contribution has chosen the curricular spiderweb (see Figure 1) as a framework. In the discussion around AI and ChatGPT, I often miss the coherence between the different components of the curriculum, which is beautifully represented in this spiderweb. Many of the discussions, for example, delved into the implications of AI for assessment, without paying sufficient attention to the rest of the curriculum and the possible consequences for, for example, learning objectives, learning content, and learning activities. On social media, many tips were shared about possible learning activities, but again, there was often a lack of a broader view on the other aspects of the curriculum. Additionally, the central question "what are they learning for" is also extremely important given the developments in the field of AI. After all, AI also influences many of the future professions of our students. The job market is changing, so perhaps the answer to the question "what are they learning for" is also changing.

In the spiderweb, the curriculum is represented by a central core and nine threads. These threads represent the most important components of a curriculum. The vision on education serves as the core and the connecting link. Ideally, all components are connected with this vision and with each other to create a coherent curriculum. Van den Akker consciously chose the metaphor of the spiderweb because a spiderweb is fairly flexible. If you pull on one thread, it has consequences for the other threads of the web. If certain threads are overloaded without the other threads moving along, the web can tear.¹



Figure 1. Obtained and translated from slo.nl/thema/vakspecifieke-thema/kunst-cultuur/leerplankader-kunstzinnige-orientatie/handreiking-schoolleiders/curriculaire-spinnenweb)

Vision, learning objectives, and learning content

ChatGPT has an impact on education and the future job market for students, similar to earlier technological developments such as the calculator, Wikipedia, and Google Search². Educational programmes must respond to this and prepare students for a job market where AI plays a role. This includes, among other things, training in the use of AI tools for professional practice and raising awareness of its dangers.^{2,3,4,5,6}

The impact of AI changes the vision on education and influences the learning objectives and content of programmes. Various types of learning objectives are mentioned in the different contributions. Firstly, many advocate for including basic knowledge about AI, with specific attention to ethical aspects such as transparency of algorithms, bias, inequality, and access to these resources.^{2,4,7} Secondly, the advent of ChatGPT also emphasises the importance of digital literacy, including information skills, media wisdom, critical thinking, evaluating ChatGPT responses, and finding a balance between human interaction and interaction with tools like ChatGPT.^{7,8,9,10,11} Thirdly, the importance of research skills comes to the fore, where ChatGPT can also assist in developing research questions, offering theories, and providing feedback on research designs.^{7,9,12}

ChatGPT can also assist in **formulating, refining, and personalising learning objectives**. For example, ChatGPT can formulate learning objectives based on provided content or check and refine already established learning objectives for quality.^{11,13,14,15,16,17}

ChatGPT can also help **clarify learning objectives and success criteria** for students. For example, ChatGPT can generate various elaborated examples of an assignment. You can ask ChatGPT to include a number of common mistakes and misconceptions in these examples. Then you let the students compare these examples and through a joint discussion, you arrive at success criteria that fit the learning objectives formulated in the language of the students.^{11,15}

Teacher roles, learning activities, and resources & materials

The teacher plays a crucial role in **guiding students in the use of ChatGPT**. Students must learn when they can use tools like ChatGPT for learning and inspiration, but also when not to.^{2,12,18,19} It is important to make them aware of the strengths and weaknesses of generative AI like ChatGPT, including the risks around sensitive personal information, accuracy of the generated content, transparency of algorithms, bias, consent, copyright, and privacy issues.^{2,7,11,17,19,20,21} Teachers must help students

to responsibly use AI tools like ChatGPT, both for their own learning process and for their future job market.^{6,11,12,18}

If you use ChatGPT, it is essential that **ChatGPT output is critically evaluated** for accuracy and possible bias (by both the teacher and the student), as emphasised in all ChatGPT publications. Mills (2023) puts it this way: *“ChatGPT is sometimes wrong, sometimes biased and always lacks real understanding. Language models are designed primarily to produce plausible outputs, not true ones. Biases from all the texts they were trained on are baked in, it’s a statistical model of patterns in language, there is no intention or comprehension behind the outputs, though it might seem like there is.”* Compare the use of generative AI with the use of an advanced calculator: it is a useful tool, of which the student must know how to deploy. However, without knowledge of the underlying algorithms and models, the student also runs the risk of receiving nonsense as an answer without knowing it.

ChatGPT can support teachers in **setting up courses and generating teaching materials**, including **generating learning activities and assignments**.¹¹ It is important here that all activities are in line with the learning objectives, subject matter, and assessment (constructive alignment)^{7,15}, where a balance is sought between interaction with ChatGPT and other forms of learning and interaction in education.⁷ AI tools are not a complete replacement for a teacher.²⁰ ChatGPT can, for example, generate the following:

- Study Guides and Syllabi^{9,11,20}
- Lesson plans based on learning objectives and content.^{5,12,13,14,16,20,21} For example, you can ask ChatGPT to design a lesson on topic x for first-year students of course y, with a time indication for each section, using the direct instruction model and exit tickets (a set of questions that give you insight into whether the students have understood the material at the end of the lesson).²²
- Teaching Materials (and ensuring all references are neatly reported in APA style).^{17,23} You can also specify in which media format you want this (e.g., YouTube or literature), or have ChatGPT write scripts for you for podcasts and videos.⁵ It can also improve texts you input for style, grammar, and spelling, and adapt them to your target audience.^{4,5,11}, shorten^{4,5,23}, invent analogies to help students understand certain concepts, and translate into many different languages.⁵ If you use texts from ChatGPT, it’s good to check where

these texts come from and whether you are not committing plagiarism. And it’s good to mention which tool generated the texts.²⁰

- Exercises, (quiz) questions, and (practical) assignments (personalised and differentiated) related to learning objectives and content, including accompanying instructions, answers, and assessment models.^{4,5,7,11,12,14,15,20,21,22,23} For example, it can come up with multiple-choice questions and corresponding answers. You specify what ChatGPT should focus on based on the entered lesson material, for example, on topics that you know are difficult for students.⁵
- Diagnostic questions for identifying prior knowledge, misconceptions, and areas for improvement. The students’ answers to these questions give you, as a teacher, immediate insight into where the students stand and what possible next steps are. Regarding these next steps, you can also ask ChatGPT to generate a possible next step or question for each incorrect answer option for students.¹⁵
- Output that students then critically evaluate and improve.^{2,7,9,11,21,24} For example, they can be asked to compare the generated information with other sources and their own knowledge.^{7,13,17} Moreover, students can provide feedback on the ChatGPT output and improve it at certain points.^{11,22}
- Scenarios (role plays, simulations) that students may encounter in the job market.^{11,22} For example, it could be a scenario where critical thinking is necessary. An example: come up with a scenario that takes place at an ICT service desk where the employee is faced with a moral choice.²²
- Exercises where students engage in conversation with ChatGPT and are invited to ask follow-up and in-depth questions that build on the previously given answers. In this way, they can acquire new knowledge and improve their critical thinking skills.^{20,22}
- Setting up a debate where ChatGPT generates arguments for or against a particular statement in advance or acts as a debate partner during the lecture.²¹
- Feedback to students.^{4,7,8,9,10,11,15,22,23} It can give students personal feedback on their work, for example, by formulating critical questions and responses to help them improve their work.¹⁷ Moreover, ChatGPT can give feedback to students on improving specific skills, such as planning and communication, by generating targeted steps to develop these skills.²²

ChatGPT can also be deployed as an additional teacher (assistant) for students, allowing them to learn independently and in a personalised manner.^{7,11,13} It provides continuous feedback and can be used in various ways:

- Formulas and codes: ChatGPT can assist students with programming and generating and modifying formulas and codes for various applications.^{10,11,20,23}
- Research support: When conducting research, students can consult ChatGPT for additional information and sources. However, students must also always verify whether the information generated by ChatGPT is accurate, as it can also invent references.^{7,8,25}
- Writing and Language Partner: ChatGPT helps students practice writing in different languages and provides feedback on, for example, grammar, spelling, and style.^{8,11,17,22}
- Mathematical Personal Tutor: ChatGPT can assist students in solving mathematical problems and provides step-by-step explanations.⁷

Learning environments, grouping forms, and time

The influence of generative AI on the learning environment is an important aspect that publications do not explicitly discuss, but it is considered an integral part of the learning environment. Rubens (2023), for example, suggests that ChatGPT can contribute to a **flipped classroom approach**, where students work independently at home on topics introduced in the classroom with the help

of ChatGPT. A similar approach is proposed by ROC van Twente and Tranberg (2023), where students can watch knowledge clips before lectures and further deepen the material at home, to then work on assignments during lectures with guidance from the teacher and possibly together with fellow students. ChatGPT can also assist in designing blended learning (for an extensive description of this, see Last, 2023).

As for grouping forms, it is noteworthy that various publications see **ChatGPT as an AI assistant to the teacher or as an extra classmate**.^{7,10,13} The AI can act as a feedback provider for students^{7,8,9,22} and as a sparring partner for complex issues.¹⁰ And as a tutor and supporter, it offers students the opportunity to learn independently and in a personalised manner, wherever and whenever they want.^{7,11,13}

Assessment

Most contributions about ChatGPT focus on its implications for assessment and the detection of **unauthorized use of AI**. As a teacher, you can look for certain points that indicate unauthorized use of generative AI, such as perfect grammar and spelling, missing or incorrect references, a style deviating from the student’s previous works, patterns in the text, overly general content, and few examples.^{2,22,27} If in doubt about the authenticity of a student’s work, it’s important to have a conversation about it.¹² Transparency is essential when fraud or plagia-

AI awareness courses: National AI courses - Dutch AI Coalition (nlaic.com)

These courses are free and specifically target 6 sectors where AI is increasingly important. These courses cover basic concepts to better understand AI but also demonstrate how AI is already being applied in practice.

Which sector appeals to you? AI for Healthcare, AI for Agri & Food, AI for Energy, AI for Education, AI for Creative Industry, or AI for Logistics and Maritime? If your sector isn’t listed, then follow the [general National AI course!](https://nlaic.com)
These courses are available in Dutch only.



Openedu.nlaic.com

rism is detected, and what consequences this has.^{2,4,19} Course regulations should be screened and adapted for assessment forms unsuitable for AI.²

There is also increasing technology available for **detecting AI**, but these are not yet flawless. Bakker (2023) warns that technology can only detect if something has already existed, marking genuine new ideas as ‘strange’. This creates a cat-and-mouse game with technology. Developments in AI are faster than tools and regulations can keep up.²⁶ Saçan (2023) argues that focusing on these tools is a “weak move,” and according to Sims (2023), such focus could lead students to be more concerned with avoiding detection than with actual learning. This also doesn’t contribute to increasing their awareness of academic integrity.

There are also **forms of assessment less sensitive to the use of AI tools**, such as:

- In-person exams, pen and paper exams, exams taken on computers without internet, or oral exams^{6,24,26}, especially for assessing writing skills where supervision is necessary.^{13,26}
- Instead of traditional exam questions, you can ask students to provide feedback on a question and its corresponding answer.⁶ Generative AI can also be used here for assistance.
- Work with intermediate steps where students process feedback from teachers and fellow students and write reflections (partly during lessons). Add a final presentation or interview as part of the assessment.¹²
- Assign tasks on specific (and current) topics and cases in a specific context, making it more difficult for ChatGPT to provide appropriate answers.^{2,12,22,24}
- Have students explain and perform rather than write, for example, by using a role-play, vlog, or video as an assessment form, thereby also developing their presentation skills.^{2,16,22} However, with the advent of generative AI that can also generate videos, this is also a temporary solution.
- Focus assessments on higher-order thinking skills, challenge-based learning, shark tanks, makerspaces, wicked problems, and other aspects where ChatGPT is less suitable.¹¹

Many authors^{4,10,11,20} suggest that it is better to focus on the responsible use of ChatGPT and other generative AI tools rather than prohibiting or avoiding them. ChatGPT can also assist **teachers in developing assessments**. The tools can generate possible assessment forms, questions, rubrics, and evaluation criteria based on learning objectives and content.^{4,11,12,14,16,17,22,23} Teachers are advised to carefully examine the quality and suitability of the generated test questions.²⁸ AI tools can even check texts if you provide specific instructions^{14,20}, but verify this yourself, especially for summative use.²⁰ The teacher, not the AI, is responsible for the final decision.^{14,20}, but verify this yourself, especially for summative use.²⁰ The teacher, not the AI, is responsible for the final decision.²⁷ In fact, OpenAI advises against using ChatGPT for summative assessments due to biases and inaccuracies in the models and because these models are not capable of fully capturing the complexity of students in their context.¹¹

You can also choose to allow students to **use ChatGPT or other generative AI during the exam**. Compare this again with allowing the use of a calculator or taking an open-book exam. A complete ban will be difficult anyway. Students will always find a way to circumvent a ban.²¹ Various contributions also provide different options for the conscious use of ChatGPT in assessment. Assess students, for example, on the type and quality of prompts they use with ChatGPT to gain insight into their subject knowledge and skills.^{6,11,21} Students thereby also work on their skills regarding the use of AI tools^{6,11} or the so-called ‘prompt engineering’.^{17,21} Or have ChatGPT generate pieces of text where students then have to remove the errors and biases, thereby learning to critically deal with ChatGPT texts and develop substantive knowledge.^{21,26}

When using ChatGPT for assessments, it’s important to be transparent about its use.¹² **Mentioning the use of generative AI** will probably also be legally required in the new EU – AI law, so we can always see whether something was made by humans, by AI, or by interactions of humans with AI.²⁵ Rotterdam university of applied sciences (2023), for example, has guidelines stating that if ChatGPT is used, this must be mentioned by the student in the text. The prompts and the output must be put in an appendix.

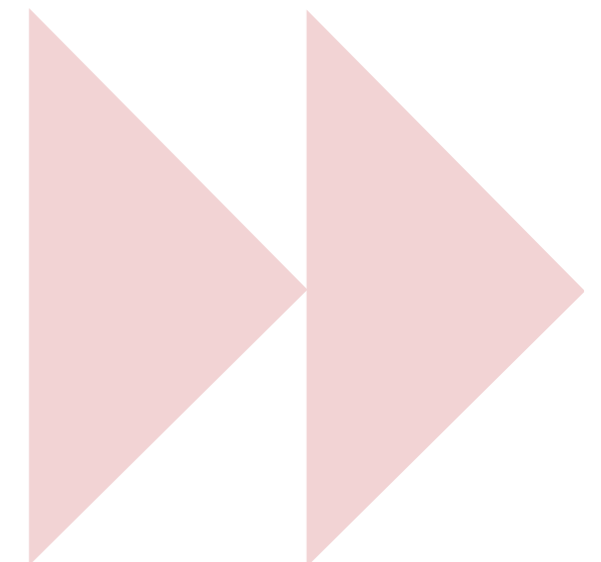
Finally, it is also pointed out that it is good to consider whether formative assessment and the learning process do not deserve more focus.^{2,4,10,22,24} You should also be aware of the limitations of ChatGPT in summative assessments due to biases and inaccuracies in the models.¹¹

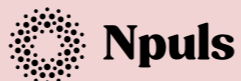
Conclusion

This article begins with the curricular spiderweb, wherein AI is considered a central hub in the web. AI influences all aspects of the curriculum. Therefore, it’s crucial that not just individual lecturers ponder what AI means for their subject or module, but that this is discussed across the entire educational programme. This involves the use of AI for education and learning, as well as the implications of AI on the future workplace of our learners. What impact does AI have on the industry and what we are training for? Should our vision be revised? Do certain learning objectives need to be modified or should new objectives be added? What implications does this have for learning activities, materials, and assessments? Although many discussions focus on ChatGPT in the context of assessments, we must acknowledge that AI has a broader influence on our education. It touches all aspects and requires a holistic approach.

In conclusion, an essential learning objective for both learners and lecturers is AI literacy. What skills do lecturers and learners need to critically and consciously engage with AI? What modifications in our education are required to develop these competencies in learners? Additionally, lecturers must also professionalise in AI literacy, so they can guide learners in learning with AI and prepare them for an industry that embraces AI.

Disclaimer ChatGPT has been used for improving and shortening this text. Additionally, I would like to thank Pierre Gorissen and Bram Enning for their feedback on an earlier version of this text.





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NL AI Coalitie

Kennisnet

Kennisnet

Kennisnet is an expert, guide, and developer in the field of ICT for special education (so), primary education (po), and secondary education (vo). They assist in the professional use of ICT and share their knowledge in numerous ways. Learn more at kennisnet.nl

NL AIC (National AI Coalition)

NL AIC aims to accelerate AI developments in the Netherlands and connect AI initiatives. The Education working group has already started various pilots. The Human Capital working group launched a training and education platform. Learn more at nlaic.com/en/sectors/education and educatie.nlaic.com

NOLAI (National Education Lab AI)

In this lab, scientists and companies collaborate directly with primary, secondary, and special education on smart technology in the classroom from 2022 to 2032. Every year, 10 projects are launched throughout the Netherlands. Have a question or idea for a project? They'd love to hear from you. Learn more at nolai.nl/en

Npuls

The National Growth Fund programme for and by all public vocational schools, colleges, and universities in the Netherlands. Within Npuls, we collaborate to improve the quality of education, increase the agility of education, and enhance the digital skills of teachers and learners. Npuls moves education to the heartbeat of innovation. Follow Npuls at npuls.nl.

Special interest group AI in Education (SIG)

In this open community, the role AI plays in educational innovation is explored, with attention to societal and social aspects. Want to learn more, join the conversation, or share knowledge? Visit communities.surf.nl/ai-in-education

SURF

SURF supports ICT innovation in vocational education, higher education, and research to enhance the quality and flexibility of education and research. Over 100 educational and research institutions participate. Learn more at surf.nl

Overview of AI networks to follow or join

We hope this magazine provides you with inspiration to start working with AI within your educational environment. Sometimes, it's just a matter of getting started! However, since AI encompasses a lot and its application is complex, here's a list of Dutch partners (and links to their English pages if available) eager to brainstorm with you.

In alphabetical order:



SIG AI in Education



AI teach the teacher: Teach the Teacher - Dutch AI Coalitie (nlaic.com)

The Teach the Teacher initiative helps more teachers become familiar with AI, so they can incorporate this knowledge effectively into their lessons and feel well-supported in preparing students for it. The modules can be accessed through Openedu.



NL AI Coalitie

Openedu.nlaic.com

Recommendations on generative AI-tools in vocational, higher and academic education

Recommendations
On nlaic.com, there is also a [version](#) available for primary and secondary education.



The launch of ChatGPT has unleashed a great deal of discussion about the use of generative AI tools in education. To help teachers think this through, the Training & Education working group of the Netherlands AI Coalition has compiled a list of recommendations.

The term “generative AI tools” refers to computer programs that can generate various types of media, such as text, images, videos and even computer programming code, based on instructions (also known as ‘prompts’). These tools are trained using vast quantities of data, such as texts and images, from which they learn patterns and structures that they can then use to generate new results. In some cases, these tools also have a chatbot functionality, letting you communicate with them in natural language. One such tool example is OpenAI’s ChatGPT, which uses large language models to process your questions or assignments, such as writing a paragraph about a topic or generating programming code for performing a mathematical analysis. In addition to ChatGPT, other tools, such as DALL-E, can be used to generate images.

To produce its recommendations, the working group consulted a range of sources, including scientific literature, recommendations from educational institutions, and blogs. Based on that, the working group compiled and discussed an initial list of recommendations in detail. This discussion eventually resulted in the following point-by-point list of recommendations, which is divided into four main categories: fraud (plagiarism) prevention and detection, alternative testing methods, integration in education, and the limitations and ethical points that need to be considered.

Fraud prevention and detection

1. Integrate generative AI tools in codes of conduct and guidelines for fraud and talk about this with students and be transparent with them about the tool [2,5,8,10,16,18,20,23,24,25].
2. In online examinations, where students take an exam at school, creating secure online environments can help prevent the use of generative AI tools such as ChatGPT. One example would be an online environment where it is impossible to access internet sources [24].
3. Using oral explanations and testing are possible alternatives to reduce the risk of fraud via ChatGPT [28].
4. Let all or part of assignments be done during class/lectures [2,25].
5. The use of detection tools [2,24,25,26].
 - a. However, this is probably not a sustainable solution as it may degenerate into a race between AI developers improving their tools and students looking for loopholes [2,24,25,26,29].
 - b. There is also the fear of the consequences of false positives, where innocent students become the victims [2].

Alternative testing methods that are less sensitive to generative AI tools

6. Setting up the topic or question in a way that encourages critical thinking makes the use of generative AI more difficult. The following points have been suggested: [2,8,9,10,12,16,18,24,25,28,29]
 - a. Current events (although future generative AI tools will probably be capable of handling it well)
 - b. Personal events and applicability to them
 - c. Examples from the teaching materials/lectures
 - d. Highly specific and applied topics/questions
 - e. For software subjects: a combination of code-based and concept-based questions [12]
7. Create what are termed ‘authentic assessments’, in which students need creativity and interdisciplinary skills, such as: [2,16,18,22]
 - a. Interviews
 - b. Debates
 - c. Data collection and analysis
8. Focus on the process instead of the result in test formats such as essays. Generative AI tools appear to be less capable of reflecting on their own progress. The following points have been suggested: [2,38,9,16,18,22,24,28]
 - a. Setting up a textual outline
 - b. Submitting multiple versions
 - c. Reflecting on the previous version and/or on peer reviews
 - d. Getting the student to keep an annotated bibliography
 - e. Talking with the teacher about the progress
 - f. Getting the student to submit a logbook or process report based on targeted questions in a template. The students use it to describe how they approached the task and why.



Integrate AI tools in education

9. Generative AI tools can be integrated into tests and assignments by having students criticise texts produced by AI chats, for example [8,9,14,24,25,28].
10. Integrate generative AI tools into the lesson plan and consider how they can help the development of job-specific and other skills such as critical thinking or legal writing [3,4,5,7,8,9,10,14,16,17,20,22,24,28].
11. Have an AI tool solve the assignment beforehand, look at the possibilities, or discuss the answer with students [3,8,9,16,18,20].
12. The tools are also called an 'extra classmate'. Get the students to cooperate with the tools, which they can give practice questions, suggest assignments or use to help inspire a written task [3,10,12,14,16,17,24,25,27,28,29].
13. Utilise the capabilities and risks as classroom material because the students will probably have to be able to work with these tools in the future. Discuss the following topics, for example: [3,5,8,9,10,14,16,17,19,20,24,28,29]
 - a. Detecting and ameliorating disinformation
 - b. Intellectual property
 - c. Ethics and limitations
 - d. Comparing tools and their capabilities/shortcomings
 - e. Developing the correct prompts
14. The tools can also be used to help the teachers. For example, they can assist teachers in the following tasks: [10,17,21,23,25,26,27]
 - a. Developing a lesson plan
 - b. Making a schedule
 - c. Creating a rubric
 - d. Creating answer model
 - e. Help in assessing examinations and assignments

Limitations of generative AI tools and ethical points to consider

15. The tools can allow students with linguistic or other deficiencies to keep up more easily [8,9,27]. However, there is a chance that privileged students will have access to AI tools, while other cannot afford it [8,9]. Think about how your institution wants to handle this, for instance whether it should purchase a licence for an AI tool for all students.
16. Inherent bias of the AI tools requires attention and consideration [8,9,14,18,19]
 - Be aware of the dependencies and the revenue model of any AI tool. Check the policy and the conditions under which the company offers that tool [31,34,36].
 - The tools are often closed-source so you have no clear picture of how the results are generated, and there is also little general information about the topic from independent parties [31].
 - The use of generative AI has more benefits in English and the English-speaking world due to the limited representation of Dutch society in the datasets. As a result, generative AI often interprets topics such as legislation, healthcare and education from a non-Dutch perspective [35].
17. The rights and responsibilities require the use of AI by both teachers and students to be thought through carefully. If disinformation is copied by a student, who is responsible? [8,10,11,14,18,22,26,30]
18. Be aware that using AI tools can infringe intellectual property rights as the output may be based on material obtained from individuals who did not give permission [33,11].
19. The tools are sometimes also trained with user input, so it is advisable to make students aware of the privacy dangers. Make clear that their data may be used [2,19,20].
20. The tools also have ecological consequences due to the large amounts of electricity consumed [1,19].

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The Dutch AI Coalition (NL AIC) is a public-private partnership in which government, industry, educational and research institutions, and civil society organisations collaborate to accelerate AI developments in the Netherlands and connect AI initiatives within the country.

The coalition focuses on key application areas and cross-cutting themes, each organised into its own working group where participants can join. These working groups serve as a source of knowledge and experience for participants and determine their own approach based on the knowledge and experience of the participants.

We have been able to plot the outcomes of the breakout sessions into three action lines, namely:

1. Becoming AI literate
2. Education about AI
3. Professional development

In each action line, there are elements to work on for teachers and/or educational institutions.

Working Groups on Education and Human Capital

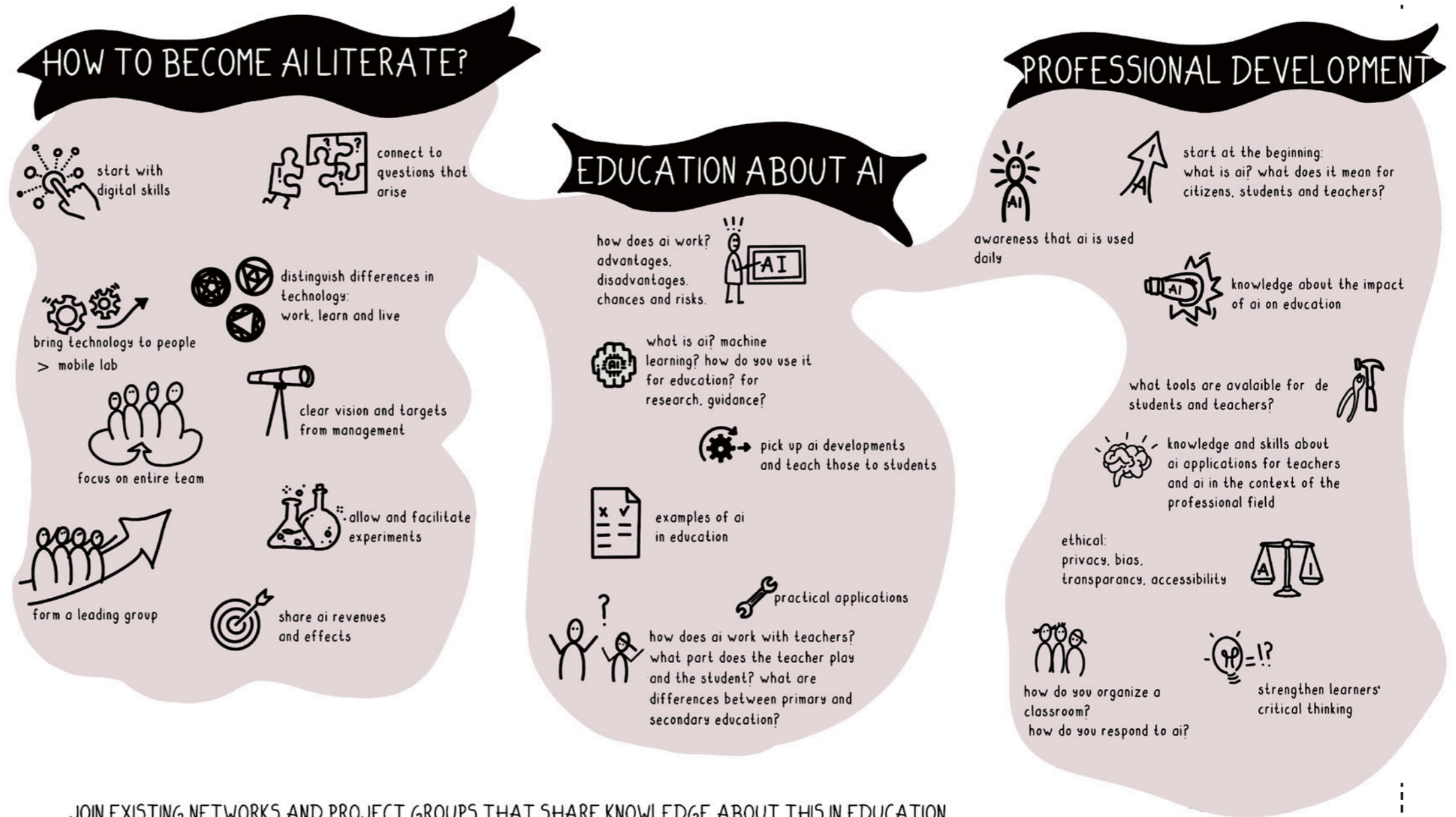
For the development of knowledge and experience in the application of AI, it is important to focus on sectors relevant to the Netherlands, where good results can be achieved and where knowledge and experience can be scaled up. Education is one of those sectors. The Education working group focuses on **creating awareness about AI in education, identifying the biggest opportunities and challenges for AI in education, and connecting collaborative partners.**

Additionally, within the coalition, there is a focus on five cross-sectoral themes, including the **Human Capital** theme. In the Human Capital working group, topics such as education and training with AI, Lifelong Learning, and the acquisition of AI knowledge and skills are discussed.

Collaboration between Education and Human Capital Working Groups

The Education and Human Capital working groups have initiated a fruitful collaboration and kicked off this spring with an inspiring work session. During this interactive meeting, the theme of 'AI literacy' was discussed. In breakout rooms, participants talked about the knowledge and skills that should be present among students and teachers to successfully implement AI in education.

From this session, a discussion chart has been developed, which will serve as a guideline for upcoming activities this year.



JOIN EXISTING NETWORKS AND PROJECT GROUPS THAT SHARE KNOWLEDGE ABOUT THIS IN EDUCATION

AI in education: ensure proper safeguarding of the human-social relationship

Inge Molenaar is the director of the National Education Lab AI (NOLAI) and leads its scientific programme. She researches the pedagogical, societal, and social consequences of intelligent digital educational innovations. Molenaar is an international expert in the field of AI in education, especially concerning the role of technology in learning and teaching processes. As a professor of education and artificial intelligence, she is affiliated with Radboud University in Nijmegen.

What do you find an inspiring example of AI in education?

The French professor Pierre Dillenbourg developed a detector that maps out the problems children have with learning to write. He automated data collection on how children learn to write. A detector was developed that identifies various types of writing problems. This is then used for improvements in writing education and therapeutic interventions for children to learn to write.

This detector can identify a child's problems at a much higher level of detail than a human can. Through this, we learn much more precisely the problems these children have in learning to write. This enriches the theory about writing problems and processes. In my opinion, we should broadly seek such examples of AI in education.

What do you think is the main risk when it comes to AI in education?

As soon as AI plays a certain role, it also takes control from humans. The control relationship between humans and AI is very complex, and we know very little about it. People tend to think that technology is better than they are, pushing personal information and knowledge to the background. This phenomenon is also seen in education. And I find that very dangerous. The AI writing detector, for example, knows in detail how the child writes. But it knows nothing else about that child. Nothing about motivation or how best to work with the child. That's precisely what you, as a teacher, bring, and it determines the educational relationship.



“I believe we will increasingly move away from screens.”

know which sets of rules are deployed. These forms of AI are used most in both primary and secondary education. In primary education, for example, 50 to 60% of children work with an adaptive learning tool, such as Snappet and Gynzy, every day. In secondary and higher education, it's slightly less, but adaptive learning systems are indeed used in vocational and higher professional education.

And let's look 5 to 10 years ahead. What role will AI play in our education then?

People often think of the future as classes with all students behind a laptop. I think that will no longer be necessary. I have an e-reader here, which I can simply write on, with automatic recognition of the written text. We can use this in the near future to have children complete assignments and provide immediate feedback, as is now done on tablets and laptops. The input, processing, and feedback then run via a connection in the cloud. I believe we will move away from screens and embed AI in learning processes in the “ordinary” learning environment more, through sensors and the ‘Internet of Things’.

Additionally, I think we will use different data streams for learning processes, such as eye tracking and automatic speech recognition. The dialogic interaction with an AI is improving rapidly, and this will certainly be converted into new education systems. The development of digital twins in the classroom is progressing rapidly (a digital twin is a virtual version of a physical object, process, or location). The application of this technology in education is very interesting; having your own learning buddy becomes possible this way. The setting will indeed look different than now, but there are certainly not more screens in the classroom. And a robot in front of the class? No, such an artefact has absolutely no added value.

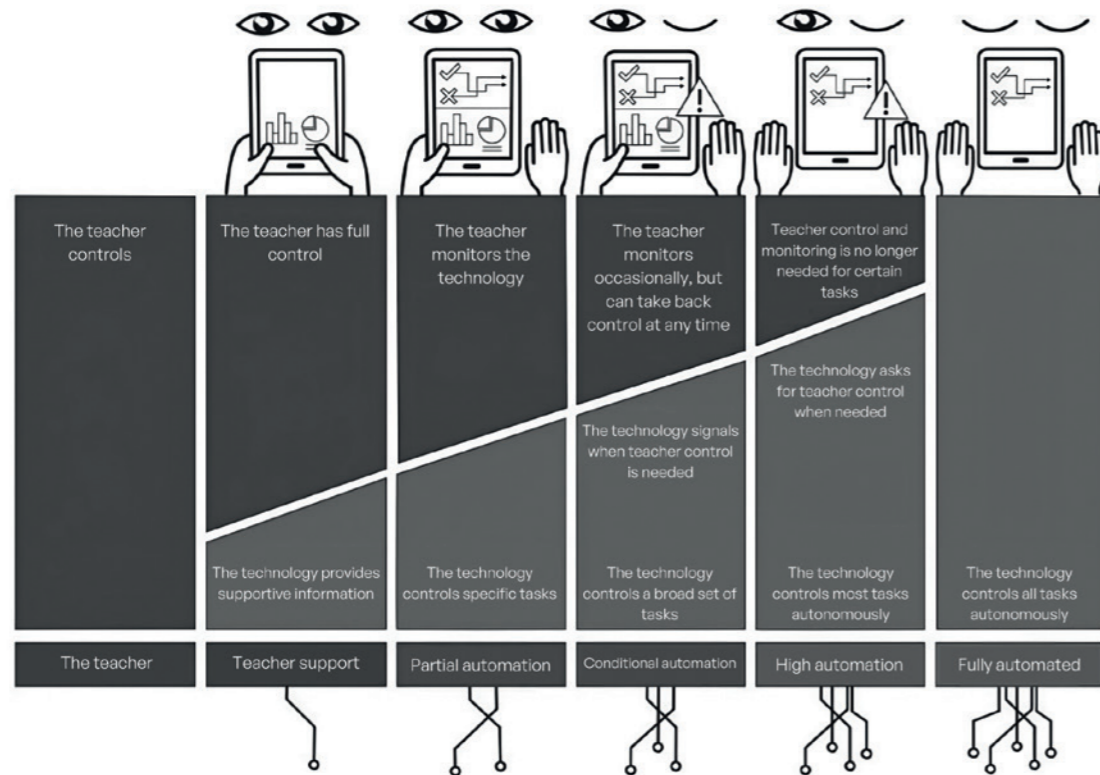
Current AI systems are one-way; the systems collect data and inform people about its analysis or carry out tasks themselves. At present, teachers can hardly transfer their existing knowledge as additional information to an AI system to improve or enrich the systems. We need to develop systems that allow two-way traffic so that the teacher can supplement, improve, and enrich the AI. We also need to ensure that we properly safeguard human and social relationships in education, even when using AI technologies.

Looking at our current education, what role does AI play in it?

The form of AI that we still see most in education is aimed at modelling human thinking and knowledge development. Adaptive learning tools are generally traditional knowledge systems, using transparent rules, and we

Let's move on to the model you developed; can you briefly explain it?

Yes, this model is about the control between AI and the teacher. In the teacher assistance step, the AI provides information to the teacher, and all control and monitoring



TITEL OF THE MODEL: 6 layers of automation in an educational context.

for the implementation of that information remains with the teacher. While in the high automation step, various tasks are also transferred to AI, and with it, control and monitoring are increasingly transferred.

You can use this model to look at the technology and gain insight into the tasks that AI can take over and what that means for the role of the teacher. For me, the teacher ultimately has control over those choices, and this model helps with that. The origin of this model is in the automotive industry, indicating the steps needed to develop a self-driving car. There, the ultimate goal is that technology takes over everything, a goal we certainly don't have in education. An important question is: What is the right level of control over AI in education?

To what extent are teachers generally in control when we now look at the place AI has in education? And are there differences between foundational education and vocational/higher professional/university education?

With primary education, we see many forms of partial automation and partly even towards conditional auto-

mation, as adaptive learning tools sometimes already perform tasks at multiple adaptivity levels. Secondary education is mainly focused on teacher assistance. There are many dashboards with information about what students have done. But there are few adaptive learning tools. Students do use applications, such as Duolingo, with a high degree of automation. So, in secondary education, there is a significant difference between the formal learning tools students use in school and the tools they informally use at home.

There are significant differences between vocational, higher professional, and university education. In university education, we make almost all our material ourselves, so with the exception of a few large-scale subjects such as statistics, you hardly see any adaptivity because it is not yet available. Vocational education makes more use of large-scale methods from major publishers with adaptive learning tools and is therefore on partial automation. But I'm less familiar with that market.

And what does your ideal picture look like, as you just said we don't want to end up entirely on the left or right?

As mentioned above, in Dutch primary education, we see various applications moving towards partial/conditional automation, and in secondary education, we mainly see teacher support. Since generative AI, I do see more shift; awareness is emerging. People see that we can use certain applications with high automation well. Such as vocabulary training and practising basic skills. This model is really meant to think about different arrangements in which people work with AI in education. I think we will eventually end up somewhere in the middle, and that seems to me to be a healthy balance.

Teachers sometimes complain about a lack of certain skills in students, such as self-regulation and metacognitive skills. Can AI play a role in this, and what does that look like?

AI is currently used in education mainly for teaching basic skills. The way we do that takes away much of the monitoring and control skills from students. After all, you don't have to check for yourself whether you're doing it right because you immediately hear that from the system through direct feedback. And if you make mistakes, the practice material automatically becomes easier. Thus, the steering of one's own learning process is largely taken over by AI. I see a risk in that.

Firstly, because you don't develop the skills to monitor and control your learning yourself, and secondly, because you don't have adaptive learning tools to learn for your whole life. We are now researching how we can use adaptive learning tools to develop self-regulation skills. AI can distinguish those very fine-grained action patterns, which provide insight into the self-regulation processes of students at a higher level of detail. After a student has completed a task, insight can be given into the way the learning process was carried out. This provides a good basis for a discussion about self-regulation. That is certainly not done by AI but by the teacher. Self-regulation is a nuanced process; there is not necessarily a right way or the ideal self-regulation process. For reflection on learning processes, AI can provide insight, but I prefer the human-to-human discussion about the choices made.

EXPERIMENT: INTERVIEW QUESTIONS FOR INGE MOLENAAR FOR CHATGPT

As an experiment, we posed some of the interview questions intended for Inge to ChatGPT. We then presented ChatGPT's answers back to Inge. Her comments and ChatGPT's responses can be found below.

From this experiment, we can conclude that ChatGPT is a useful tool, providing a wealth of information in a short time. However, human knowledge and experience are crucial to properly interpret the given answers. We also see in the responses some instances of AI where humans are no longer in control, a direction we might question. Lastly, ChatGPT mentions examples that raise ethical and legal concerns (e.g., the use of biometric data).

Question 1: This magazine was created due to the uproar around ChatGPT in education. However, in the realm of AI, there's much more than just ChatGPT. What do you find an inspiring example when it comes to AI in education?

Answer ChatGPT: An inspiring example of AI in education is the use of adaptive learning platforms. These platforms use artificial intelligence to personalise the learning process for each individual student. A notable example is Khan Academy. This platform offers a wide range of educational videos and exercises that adapt to the level and progress of each student.

Here are some reasons why this is an inspiring example:

- **Personalisation:** AI enables the platform to understand where a student struggles and which concepts they have already mastered. This allows them to receive targeted exercises and assistance, making learning more efficient.
- **Accessibility:** Due to the online nature of these platforms, students worldwide can access high-quality educational resources, regardless of their location.
- **Autonomous learning:** AI-supported educational platforms encourage autonomous learning. Students can work at their own pace and delve into topics that interest them.
- **Data-driven insights:** The gathered data can provide teachers with insights into student performance and identify areas needing additional attention. This can assist in adjusting lesson plans and providing personalised support.
- **Scalability:** AI-supported platforms can serve thousands of students simultaneously, enabling education on a large scale.
- **Continuous improvement:** These systems can learn from how students respond to different learning materials and continually refine their approach to maximise effectiveness.

The success of these platforms demonstrates how AI can enrich and adapt traditional education to meet the unique needs of each student while also enhancing the role of teachers.

Response Inge: It's important to note here that OpenAI (creator of ChatGPT) collaborates closely with Khan Academy and oversees the integration of the Khan amigo, the agent within the platform. ChatGPT also mentions autonomous learning, to which Inge responds: This advocates for full automation, a form I would only advocate for very specific learning tasks.

Question 3: What role does AI play in our current education, and what role could it play?

Answer ChatGPT: AI already plays a significant role in our current educational landscape, albeit with variations depending on the level of implementation and available resources. Some of the current roles of AI in education are:

- **Adaptive learning:** AI is used to create adaptive learning platforms that adjust to the individual needs of students. These platforms offer exercises, quizzes, and teaching materials tailored to each student's level and progress.

- **Automation of administrative tasks:** AI can be employed to automate repetitive administrative tasks, such as processing administration, generating reports, and managing student data.
- **Analysis of learning outcomes:** AI can assist in analysing data on learning outcomes to identify trends and patterns. This helps teachers and schools understand student performance and adjust their teaching methods accordingly.
- **Language processing and translation:** AI-powered translation tools and language processing software can assist students in learning various languages and understanding complex textual information.
- **Digital tutors and chatbots:** AI chatbots can support students by answering questions, explaining concepts, and offering assistance outside of class hours.
- **Plagiarism detection:** AI systems are often used to detect plagiarism in submitted assignments and papers by performing text analysis and comparing sources.
- **Virtual Reality (VR) and Augmented Reality (AR):** AI-supported VR and AR technologies can create an interactive and immersive learning environment, making complex concepts more tangible.

In the future, AI could play an even larger role in education:

- **Personalised learning:** AI can gather and analyse even more data to tailor learning paths more precisely to individual students, increasing their engagement and understanding.
- **Smart learning materials:** AI can create and adapt learning materials to suit students' needs and learning styles, leading to more engaging and effective learning experiences.
- **Collaboration and social interaction:** AI can be used to create virtual collaboration environments, allowing students globally to communicate and collaborate on projects.
- **Student monitoring and early intervention:** AI can identify early warning signs for students who might be struggling, allowing teachers to intervene promptly to provide support.
- **Support for special needs:** AI can deliver customised educational resources for students with special needs, enabling more inclusive education.

However, it's essential to carefully guide these developments and ensure a balance between technological innovation and students' needs while addressing ethical and privacy issues.

Response Inge: ChatGPT lists various applications of AI in education: see also Holmes et al. 2022¹ for a comprehensive overview. ChatGPT also mentions examples leaning towards full automation, and it's questionable whether that's indeed a wise choice. Regarding biometric data, Inge states that this is an unlikely scenario in Europe due to the AI act.

Question 6: Teachers sometimes complain about a lack of certain skills in students, such as self-regulation and metacognitive skills. In which type of skills could AI play a role, and how?

Answer ChatGPT: AI can certainly play a role in developing and enhancing skills like self-regulation and metacognition in students. Here are some ways AI can contribute to the development of these skills:

Self-regulation:

- **Automated feedback:** AI can provide immediate feedback on assignments and exercises, allowing students to evaluate their performance and identify areas for improvement.
- **Personalised learning paths:** AI can assist students in determining their individual learning paths, giving them insights into their strengths and weaknesses and encouraging them to focus on their weaker areas.
- **Planning and time management:** AI-based tools can help students plan their study time and deadlines, helping them develop time management skills.

Metacognitive skills:

- **Self-evaluation:** AI can encourage students to reflect on their own learning by asking them questions about their understanding and strategies during studying.
- **Reflective practices:** AI-supported platforms can encourage students to write reflections about what they've learned, how they've learned, and how they can improve their learning strategies.
- **Deep learning:** AI can challenge students with complex questions and problems that require metacognitive skills, such as reflecting on their thought process and the strategies they use.

Critical thinking:

- **Diversity of sources:** AI can expose students to a wide range of sources and perspectives, aiding in the development of critical thinking skills and the ability to critically evaluate information.

- **Simulations and scenarios:** AI-supported simulations and scenarios can challenge students to make complex decisions and consider the potential outcomes of their actions.
- **Problem-solving:**
- **Adaptive exercises:** AI can offer adaptive exercises that gradually expose students to more complex problems as their skills improve.
- **Feedback loops:** AI can provide students with immediate feedback during problem-solving, allowing them to adjust their approach and improve iteratively.

However, it's important to note that AI cannot fully replace these skills but rather serves as support and encouragement. It's vital that teachers still play an active role in guiding and encouraging students to develop these skills.

Response Inge: It's notable that here the AI takes over monitoring and control. This very action reduces the space for developing self-regulation skills. I advocate for a transition from the AI to the students, where personalisation and adaptivity are phased out to work on self-regulation skills².

¹ Holmes, W., & Tuomi, I. (2022). State of the art and practice in AI in education. *European Journal of Education*, 57(4), 542-570.

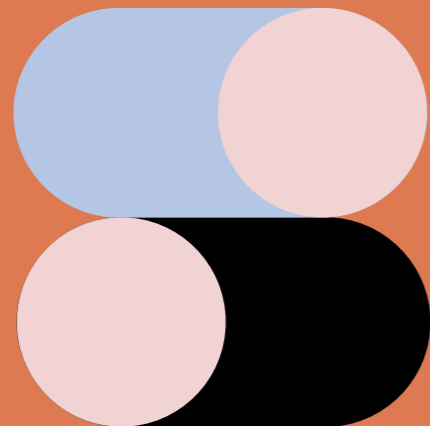
² See also, Molenaar, I. (2022). The concept of hybrid human-AI regulation: Exemplifying how to support young learners' self-regulated learning. *Computers and Education: Artificial Intelligence*, 3, 100070.

3 tips from Inge Molenaar

Tip 1: Remember that AI always has a limited view of the educational situation. It may seem as if AI knows a lot, but it doesn't. As a human, you always know much more than the AI, so act accordingly.

Tip 2: Find the right balance between what you, as a teacher, can add to your education versus what AI can contribute. Think about it in that way. This way, you keep control in your own hands.

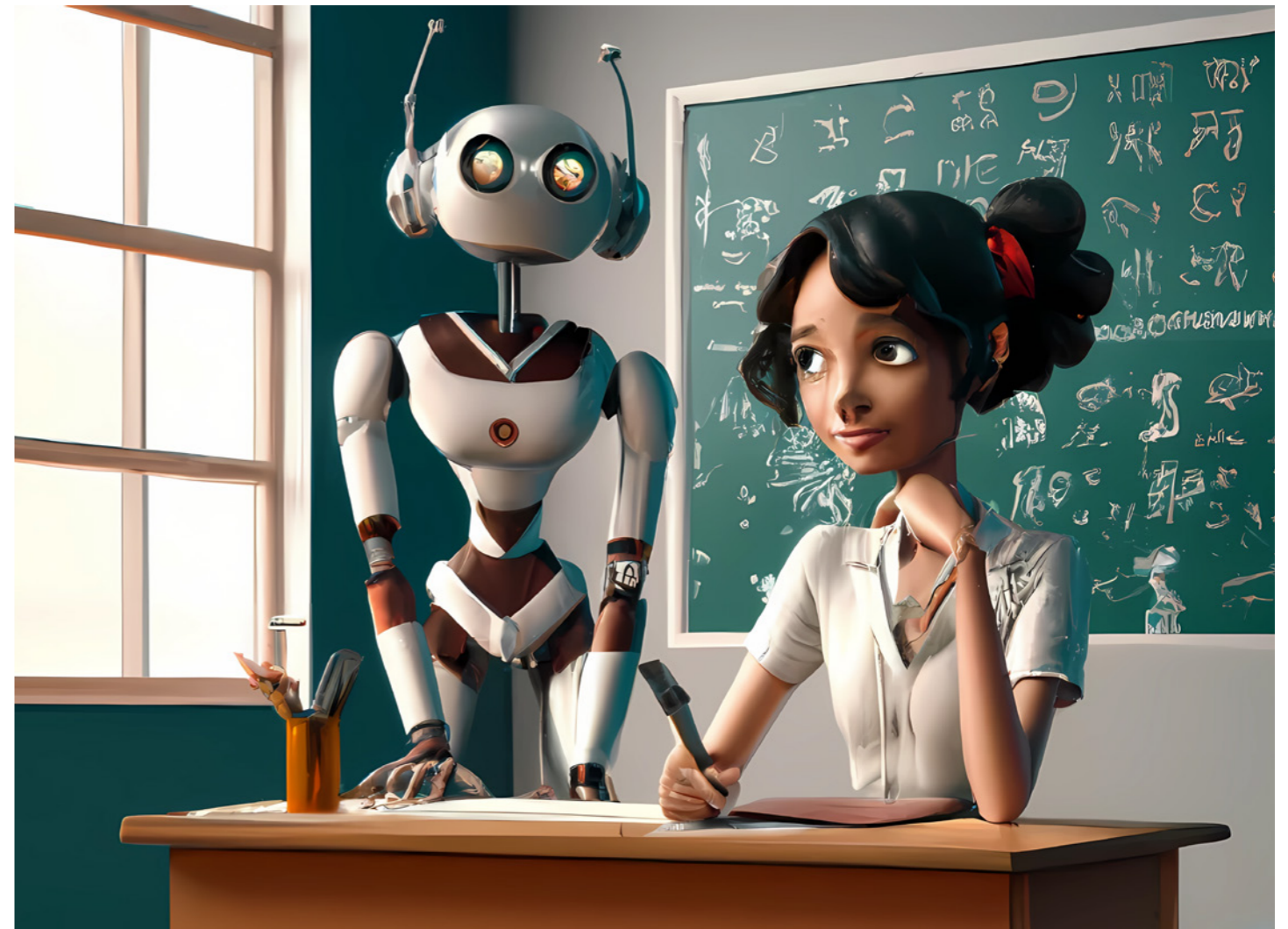
Tip 3: Make it a habit to try out new possibilities without obliging yourself to apply it every day in your teaching. Feed your curiosity, not your workload. This gives energy, and it helps you broaden your horizons, even as a teacher.



▶ **Article**
by Hendrik Haverkamp
October 30, 2022
The Decoder

A teacher allows AI-tools in exams - here's what he learned

AI tools are making their way into classrooms: even in schools today, students create texts, presentations, images, and translations at the click of a button. How can teachers deal with AI's new possibilities?



DALL-E 2 prompted by THE DECODER

For many teachers, homework, papers, and tests raise the question of autonomy. How should they grade exams if it's not clear who did the work - the examinee or an AI? A common reflex to digital developments in education is to regulate these possibilities, to put digital devices into exam mode without network access, or to ban AI tools.

The Evangelisch Stiftische Gymnasium in Gütersloh, Germany, is taking the opposite approach: laptops and iPads have been widely used there for 20 years. GPT-3 and co. are being tested in German lessons and are even required for class tests.

Since the pandemic began, the school has been experimenting with digital exam formats that are more closely aligned with the realities of later life. Part of this new culture is the use of AI in exams: Students can do all or part of their work with the assistance of text AI.

But doesn't the use of AI tools contradict the core idea of exams: that students must perform on their own?

Not necessarily. There is a rule that prevents this: Copied parts are marked as AI citations. At the end, students have to justify in a reflection why they took certain parts of their work from the AI or intentionally wrote them themselves.

Students learn personal responsibility through the use of AI tools

Class 8a waits tensely in the classroom on exam day. The students compose written arguments, as always on their laptops - without exam mode, there are no restrictions on network access, and they have free access to the AI tools. They enter their arguments into the AI system's input form. It only takes a few seconds for them to create the first text.

Anyone who thinks that the students can now sit back and relax is mistaken. Their work is just beginning: They have to critically examine the AI text.

In previous lessons, the students had learned that it is unwise to simply adopt AI-generated texts: In the week leading up to the class assignment, for example, they addressed whether smartphone use should be allowed in schools.

Most of the texts produced by the AI advocated for a smartphone ban and extolled the virtues of all-analogue teaching, sometimes with strange arguments that lacked evidence, such as that students send too many SMS messages at school.

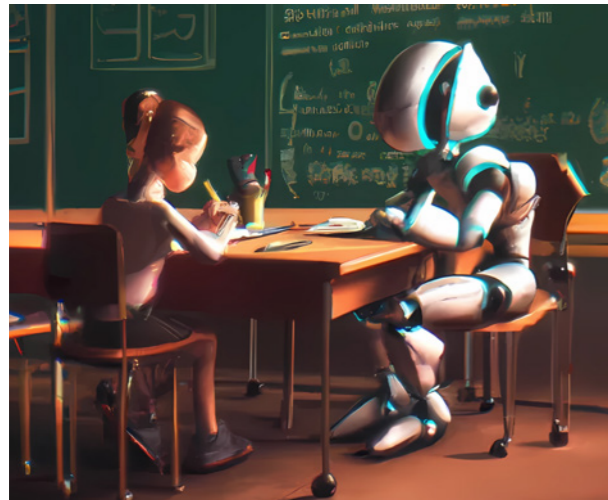
Four problems with ai texts and how students deal with them

- AI texts sometimes reflect societal stereotypes and conservative views.
- AI texts rely on outdated information - for example, GPT-3 was last updated in 2019.
- Grammatically and stylistically, many German AI texts need major improvement.
- Work assignments are often poorly fulfilled by AIs, or the AI strays from the topic and provides too little evidence for arguments.

Switching languages shows students how much room there is for improvement: English-language AI texts are significantly more up-to-date, sophisticated, and consistent than German texts.

This encouraged students to combine different AI tools: They started with an English-language prompt to generate English text. For the translation into German, they also used an AI tool (deepl.com). This was followed by stylistic and grammatical revision using LanguageTool or Papyrus Author.

In the exam, no student is satisfied with the AI text he or she created. Suitable passages are adopted by students in their argumentation. Mostly, however, the AI texts serve as a quarry for ideas or as a whetstone for their position, as they are confronted with new arguments that contradict their own.



Students accept AI systems as support, but do not see them as substitutes for their own work. Future experiments could include, for example, having students interpret images generated by DALL-E 2 from literary texts. | Picture: DALL-E 2 prompted by THE DECODER

Many students do additional research on the Internet to verify the information in the AI texts or to sift through additional evidence, expert opinions, and studies. Often, as described above, they combine multiple AI tools to achieve better results.

After 90 minutes, students submit both parts - the argumentation part and the reflection part. They will be equally weighted in the grading.

Students do not blindly rely on AI

The AI exams produced an important finding: no student blindly relied on the AI texts. Moreover, those who did not know how to construct and write an argument before the test and lacked expertise were overwhelmed when dealing with the AI texts, uncritically adopted incorrect information, and did not benefit from the suggested reasoning.

The students found the AI text suggestions helpful as they made their work easier. They would also like to use AI tools in class in the future.

Perhaps their wish will soon come true: The school's next idea is to feed the image AI DALL-E 2 with literary texts. The students are then supposed to make their own analysis of the text based on the generated images, which can be understood as a visual interpretation of the text.

All in all, AI creates new opportunities for teaching, but also makes it more challenging: A part of the students will use AI to do less work and present AI products as their results. Another part will use AI tools to outsource routine tasks they have long mastered to have more time for complex and interesting questions. For this very reason, dealing with AI and its reflective use in schools is also a question of educational equity.

Summary

- At a German high school, eighth-grade students were allowed to write an exam using text AI tools.
- Beforehand, they learned about the advantages and disadvantages of different AI systems in class.
- The most important finding from the experiment: The students are more reflective when dealing with AI texts and see AI tools more as support than as homework automation.
- Moreover, those who did not know how to construct and write an argument before the test and lacked expertise were overwhelmed when dealing with the AI texts.

▶ Interview
by Bram Enning
bram.ening@npuls.nl

Invest in Teacher Professional Development and AI



BIO

Kim Schildkamp is a professor of "data use for learning and development" at the University of Twente



'The strength lies in the combination'

BIO

Pierre Gorissen is an associate professor in Learning with ICT at HAN University of Applied Sciences.

You have been advocating for the professional development of teachers for years. Why is this so important?

KS: It is crucial for the quality of education. Society is changing, the job market you are training for is changing, and this also requires adjustments in the training. Therefore, as a teacher, you constantly need new skills. The magic term nowadays is 'lifelong development'. With the rise of AI and the questions teachers have about it, professionalisation is essential.

PG: The British call it 'continued professional development', which I find an even better term. The Dutch term might suggest that teachers are not yet professionals.

KS: The professionalisation of teachers is also important because, as soon as research provides new insights into how we can improve education, we must also be able to implement them in education.

You both have experience in various educational sectors. Is the professionalisation of teachers the same everywhere?

PG: No. The role of a teacher varies greatly, from pre-school to university. In primary education, teachers have a class, teach all subjects, and are strongly focused on the development of students. This is significantly different from a professor who both conducts research and provides education. Professionalisation must also respond to this. Additionally, scale also plays a role. In a primary school, for example, you work with a team of often fewer than twenty teachers for an entire school. Professionalisation is sometimes done with the entire team, and then you quickly reach school-level developments. This is different from the professionalisation of teachers at a large vocational or higher education institution where a few thousand people work, spread across different courses, departments, and locations.

What differences do you see regarding the use of AI in education?

PG: The way AI plays a role in education varies. In primary education, especially since the corona pandemic, a lot of adaptive software is used, like Snappet and Gynzy. AI functionalities are almost unnoticed creeping into this adaptive software, making AI increasingly used as a teacher's tool. Whereas a teacher in higher education deals with (almost) adult students who are already using more and more AI themselves.

Whether software uses AI is not always clear, but that doesn't really matter. If the software uses a complex algorithm that, as a teacher, you don't exactly understand why a student is offered the next assignment, then you have a challenge. Whether that's AI or not. That software does something you don't exactly know why, and as a teacher, you must, of course, know whether the software you use supports your students in the right way.

Regarding AI and algorithms, teachers need something like 'professionalisation'.

KS: Yes, you really have to invest in that. Help teachers understand what's in that black box, that they understand that there is also bias in it, that their judgment and their knowledge are also very important. As a teacher, you have to make a combination. This applies to teachers in all educational contexts. Teachers must feel that they retain control over the educational process. Such an AI system can really help because it knows things that you as a teacher do not know. But you as a teacher also know many things that AI does not know. The strength lies precisely in that combination.

PG: The system can also support the teacher in getting a picture of the student. If you combine the information that AI provides with what you see in that class; does your previous image still hold? Teachers must, therefore, learn to combine these two matters into a more complete picture of a student. That is not easy and therefore a reason to help teachers with this. And we would like to do research on this and learn from it. To what extent do teachers adjust their image, for example, and can they explain why they do that? And this applies not only to experienced teachers. We see that beginning teachers often already have their hands full with managing the class

and other things, so they sometimes rely too blindly on a dashboard that tells them how their students are doing. You have to teach them to also use their own professionalism as a teacher.

How can institutions support their teachers in using AI?

PG: Apart from demythologising the phenomenon, teachers need to get a feel for what the system does. This ranges from "how does ChatGPT work?", "what information does such a dashboard provide?", "where are the limitations?" and "when can I trust it?". You can, for example, develop a working method together for using such a dashboard in your education. You don't do that by telling teachers that they must now use the dashboard, but by discussing it with them. Then you redesign a part of an educational process together, and you let teachers think about it.

KS: Together is very powerful in, for example, professional learning communities. This is quite complicated material, and you shouldn't do it alone. You have to invest in it together. I am referring to the teachers, but it also requires support from management or school management. An educational ICT professional is needed who has the expertise. Based on the example that Pierre just gave, we can connect very well from professionalisation. This way, you integrate professionalisation with the existing tasks of the teacher, and then it doesn't come on top of it.

PG: We know anyway that professionalisation doesn't work if you do a course for an afternoon. That is too short-lived; more time is needed. And a teacher must see the added value. So you have to offer that professionalisation when it is needed. Redesigning a part of the education is such a moment, and then it is also relevant to offer that support. Then it can be applied immediately in what they are already doing, in a way that it is integrated into the whole.

KS: I also think it is good that you not only sit at the module level but at the training level. That you think about what are, especially when it comes to AI, the consequences of this for my entire training, instead of redesigning one or two modules. By choosing the approach

of an entire training, you can also work on the continuous learning line in your curriculum. This way, AI gets a good embedding in your education.

Three tips for teachers regarding the use of AI

Pierre Gorissen & Kim Schildkamp

KS: I'll name two. The first is to start experimenting. It's good to try out many things yourself, play around with it a bit, also together with your students. Be honest about it and have a conversation with them. You can implement that immediately. The other tip is to make AI discussable with your training director or, for example, your team of teachers. Ask questions like: 'How important is this for us in the training?' And if that is important, how are we going to implement that in the entire training?

PG: And our third tip is that if you are going to experiment, make sure you can still hold the steering wheel and also know when you can let go. Immediately tackling the exams of a subject to integrate them with AI is probably not a wise choice for an experiment. The risk of adverse effects for students is then much too great. While experimenting with formative testing with automatic feedback that can help teachers and students is a good choice for a safe experiment.

Clair, a conversational agent for collaborative learning



▶▶ Inspiring example

by Adelson de Araujo & Pantelis Papadopoulos

This example is previously published in the AID-E magazine of the UT: AI and Data in Education

The Collaborative Learning Agent for Interactive Reasoning

The Collaborative Learning Agent for Interactive Reasoning ('Clair') is a conversational agent that aims to support students in small group discussions in science learning to be more productive. Clair was developed at the University of Twente to address some limitations that similar technologies have. Our first prototype has been tested in secondary classrooms in Brazil and the Netherlands. Among the main challenges for designing collaborative conversational agents are "what to say?" and "when to say it?". To address what, Clair has a set of "talk moves" or questions to ask to students. These talk moves are derived from a classroom talk framework called Academically Productive Talk (APT). To decide when, we designed fuzzy logic-based triggers for each of these talk moves. These triggers are designed to be interpreted and configured by humans while still relying on patterns from data.

A chatbot for enhancing the quality of students' discussions

As students are working together online in small groups and using chat discussions to understand these concepts, having a productive discussion is critical. Teachers can assist students by asking questions to make them deepen their reasoning or clarify the ideas at hand. This is usually very time consuming for teachers, and in some cases, they do not guide student chats at all. In addition, the quality of discussions can greatly vary, from engaging and productive to distracting and unproductive. For example, a more verbal student will contribute more while the partner just agrees, or another student may barely build on the partner's contributions. Conversational agents for collaborative learning are seen as a promising approach to scale productive talk support among student groups, particularly in cases where a teacher cannot be present.



The importance of conversational agents

From this project, we have learned that recent advancements in machine learning can support the design of conversational agents that can work across various science topics and languages while also providing flexible triggers for a range of talk moves. By having a conversational agent that is reliable across multiple contexts, educational researchers can further study how to dynamically provide productive talk supports to student groups, teachers can have more flexibility with online classroom orchestration, and students can reflect on their discussion and internalize practices of productive talk into their lives.

Want to know more?

de Araujo, A., Papadopoulos, P., McKenney, S., & de Jong, T. (2023). Supporting Collaborative Online Science Education with a Transferable and Configurable Conversational Agent. CSCL 2023 Conference Proceedings.

de Araujo, A., Papadopoulos, P., McKenney, S., & de Jong, T. (2023). Automated coding of student chats, a trans-topic and language approach. *Computers & Education: Artificial Intelligence*, 4, 100118.

For questions, please get in touch via: a.dearaujo@utwente.nl or p.m.papadopoulos@utwente.nl.



TOWARDS A HEALTHIER FUTURE: CHALLENGES WITH CHANGE PROCESSES AND MANAGEMENT OF INNOVATION AT THE ALEXANDER HOSPITAL.

Using AI-generated cases to engage students more

What can a teacher do to make the curriculum more appealing? And how do you ensure that students can apply the knowledge they have acquired in practice? These are questions that many university teachers grapple with. The introduction of AI chatbots offers new possibilities for educators. This article elaborates on one example of how chatbots can be used to make lectures more engaging.

▶▶ Inspiring example

by Maarten Renkema
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This example is previously published in the AID-E magazine of the UT: AI and Data in Education

The introduction of AI chatbots has caused a stir worldwide. This is certainly true for universities. Since then, lecturers, students, and policymakers have been reflecting on the implications of AI for education and the work of academics¹. And it doesn't stop at reflection, as many are already using chatbots like ChatGPT². As a result, lecturers need to adapt their teaching methods. Some universities and schools have chosen to ban the use of chatbots³, while others see potential benefits⁴.

I align myself with the latter group. Chatbots are not just a risk; they also offer an opportunity. Lecturers can choose from a multitude of electronic tools, such as interactive quizzes and videos. Chatbots add a valuable tool to this arsenal.

AI-generated teaching case

I teach at the University of Twente within the Health Sciences programme. One of the courses I teach is a first-year course called "Change Processes and Management of Innovation in Healthcare". What could be better than having students apply change models and innovation processes in practice? As a student, I experienced the most enjoyable and educational lectures when we had to analyse cases using theory. More importantly, this aligns with *the learning objective of applying insights about change strategies and approaches to describe innovation outcomes in healthcare organizations*. However, developing a good case study is time-consuming, especially the writing process.

Enter ChatGPT. The tool had been available to the general public for just a few weeks, and I had long been toying with the idea of developing a case study for my students. The case would focus on a significant organizational change in a hospital. I experimented with ChatGPT to write the text and used DALL-E to create accompanying images to make the case appealing.

The "Alexander Hospital"

Meet the "Alexander Hospital", a fictional hospital facing several significant challenges. First, I asked ChatGPT for suggestions on what the case should revolve around. It gave me ten suggestions, from implementing a new electronic patient record to using a surgical robot. Pretty good and relevant examples! I then used several "prompts" to further develop the case, such as *developing a case about option 1 (implementation of EPR) and adding a persona for the hospital manager responsible for this change*. Students read the case from the perspective of Karen, who, according to ChatGPT, has 20 years of experience in the hospital world and a reputation for



THIS IMAGE WAS GENERATED BY MIDJOURNEY WHERE THE ORIGINAL PHOTO FROM DALL-E WAS USED AS SOURCE MATERIAL AND THE FOLLOWING PROMPT WAS ADDED: "IMAGINE THIS IMAGE BUT MORE REALISTIC WITH THE POWER OF MIDJOURNEY."

¹ Renkema, M., & Tursunbayeva, A. (2023). Demystifying the future of knowledge workers: implications of Artificial Intelligence in academia. In *European Academy of Management 2023 Conference proceedings*.

² rtlnieuws.nl/tech/artikel/5378644/chatgpt-app-nederland-chatbot

³ ny.chalkbeat.org/2023/1/3/23537987/nyc-schools-ban-chatgpt-writing-artificial-intelligence

⁴ utwente.nl/nieuws/2023/7/1052023/universiteit-twente-benut-kansen-ai-en-is-zich-bewust-van-risicos#ai-vaardigheden

effectively implementing change! I then had ChatGPT elaborate on several other ideas: background information about the hospital, the hospital's financial data, and a dilemma.

Colleagues from the University of Twente have developed several teaching cases for bachelor students over the past few years. I studied these – along with the cases I still had from my studies and some real examples from hospitals – to understand what makes a good case. There need to be several personas playing the main role, a choice or dilemma to be made, some events, and a lot of background information. Dialogues were missing in my case, so I instructed ChatGPT to present Karen with a dilemma and generate a dialogue. It emerged that Karen is dealing with a financially troubled hospital – and she has been tasked with solving these problems while the hospital needs to become more innovative.

With all this input, I got to work. I used Karen's case as an introduction and supplemented it with additional information. I had to adjust and check the organization description somewhat. The financial results turned out to be unusable after checking the annual accounts of several local hospitals. In other words, the writing process was a co-creation between ChatGPT and myself, where ChatGPT was asked to come up with ideas, generate texts, and provide options – while I checked the texts for usability. This ultimately resulted in a 16-page teaching case about the Alexander Hospital.

Application of the case

I used the case in the three tutorials of the course – where students had to formulate answers to questions such as *which change management approach did the Alexander Hospital choose? Which aspects of this process are good, and which could have been better?* Some groups were asked to present, and then the answers and theory were discussed in class. We also did a role play several times, where students had to make suggestions from different roles in the hospital to solve the organizational problem. This enabled students to practice applying theory in practice and to practice dilemmas where dif-

ficult choices have to be made. They found it educational and fun to work on the case, and although it was a bit daunting to perform a role play, they said they learned a lot from it. They also recognized certain aspects of the Alexander case in guest lectures by innovation managers from healthcare institutions, which were also organized in this course. In the course evaluation, students appreciated the chosen approach: *“During the tutorials, often the same list of stakeholders, etc., so you became well acquainted with the case, and this was good preparation for the exam. Tutorials very interactive, and you benefited a lot from them.”*

The positive side of AI chatbots

AI chatbots pose real challenges for teachers. However, they can also be used to improve education and facilitate work. If I had had to develop the teaching case myself, it would have taken me a lot of time, and I probably wouldn't have done it. Nevertheless, the chatbot is not a panacea, and you need to check everything carefully. However, chatbots provide quick suggestions and a starting point for further elaboration of (new) educational ideas.



Summary report

‘Promises of AI in Education’

By Bertine van Deyzen. Voor het hele rapport: surf.nl/en/promises-of-ai-in-education

The SURF report from June 2022 highlights practical applications in education and describes how these applications can transform education. The primary goal is to provide educational professionals with a starting point from which they can explore the potential applications of AI in education. The foundation for this is not based on theories about AI in education but on its practical application within the classroom or educational institution. The three levels discussed in the report are a useful tool to view AI in education from different perspectives and to see its impact. The first level is ‘AI in the Classroom’, with a great example showing how the relationship between a teacher and their students can change. The second level is ‘AI at the Institution’, where the use of AI changes administrative tasks and the accessibility of information. The third level is ‘AI from Outside’, with ChatGPT being the most recent example.

The chosen example for ‘AI in the Classroom’ is Perusall, as it shows both the lecturer's and student's perspectives. Perusall is an application for students to assist in preparing classroom materials to increase engagement. It encourages students to delve deeper into the content, ask questions, and engage in discussions. Furthermore, Perusall can automatically assess annotations and provide feedback to improve students' reading and note-taking skills.

For lecturers, Perusal offers new possibilities to change teaching practices, such as promoting interactive discussions in class and gaining insight into individual students' reading performance. By understanding students' discussion topics on the material, lessons can be adjusted to align with the discussion.

The example for 'AI at the Institution' is the chatbot Jill Watson, showing how the relationship between students and the institution changes. Jill Watson is a virtual educational assistant and can be used in various courses to support large-scale learning. Additionally, Jill Watson can reduce social barriers between students in online courses and build a community. Jill can answer frequently asked questions and assist students in submitting assignments.

For students, Jill is available 24/7, making it easier to ask questions. For support staff and educational administration, Jill can lighten tasks, freeing up more time to answer more complex questions. However, organisational decisions are required, and it takes time and money to develop and implement. Support staff may also need new skills and training to work with the conversational agent.

And thirdly, two chosen examples of 'AI from Outside' are PhotoMath and GPT-3. These AI applications enter the classroom from outside the school, are hard to control, and it's often unclear how much they are used by students.

PhotoMath is a mobile application that can scan mathematical equations and provide step-by-step explanations on how they can be solved. It makes it easier for students to solve complex mathematical problems and can be used both in the classroom and at home. While the use of PhotoMath by students can raise concerns about cheating and reducing strategic thinking, it can also serve as a useful tool for self-study and parental involvement.

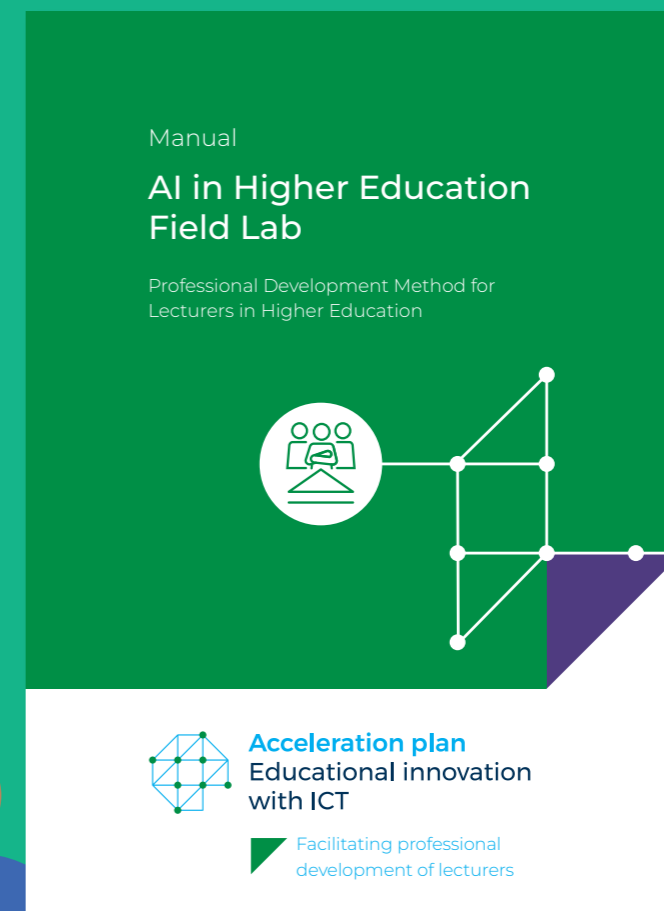
GPT-3, a predecessor of GPT-3.5 on which ChatGPT is trained, is also a text predictor and can produce coherent and understandable texts. The discussion about plagiarism and cheating is ongoing since students can use language models to generate essays or get answers to assignments without developing the relevant skills.

The beauty of this example is that it shows that existing AI technologies can be disruptive to education if deployed differently. For the existing GPT technology, OpenAI, besides improving it, primarily reduced accessibility, leading to its widespread use.

The use of AI in education brings new questions and challenges, such as the proper implementation of a system, dealing with automatic assessment, and ensuring fair and impartial evaluation. It's also essential to consider access to technology and internet connections for all students. But training and further education are also needed to allow teachers and support staff to use AI. Challenges related to social engagement and building trust between students, lecturers, and the institution are also highlighted.

Should institutions ban or limit the use of AI? How do these systems influence students' development and educational practices? How can educational institutions deal with responsibility and liability issues related to these systems that are beyond their control? This discussion will need to be continuously held in the educational field, perhaps even for each individual application.

Finally, the report has a valuable appendix with examples of AI applications for education, worth checking out.



Field lab

In an era where technology is transforming the world of education, the 'Acceleration Plan for Educational Innovation with ICT' provides guidelines for educational professionals. The Acceleration Plan was a four-year programme from 2019 to 2022 with the ambitions to improve alignment with the labour market, stimulate the flexibility of education, and enable smarter and better learning with technology.

Within this context, multiple 'Field Labs' have been developed for lecturers to combine good examples of educational innovation with ICT with effective lecturer professionalisation. The 'Field Lab AI in higher education' serves as a compass for educational professionals wanting to navigate the world of AI.

What is AI and why is it important?

AI refers to machines that can perform tasks that normally require human intelligence. This includes learning, reasoning, and self-correction. The value of AI for higher education is immense and offers numerous benefits. From personalising learning paths to improving administrative processes, AI has the potential to transform the educational landscape.

Risks and ethical considerations

As with any technology, AI also brings challenges. It's crucial to understand that AI systems learn from data. If this data is skewed or biased, the AI can make decisions that are also biased. In an educational context, such biases can lead to unequal treatment of learners. Therefore, it's essential to follow ethical guidelines and ensure transparency in how decisions are made by AI.

Practical implementation with AI

One of the most exciting aspects of the 'Field Lab AI' is the focus on hands-on learning. A work package has been made available for organising a Hackathon, consisting of a preparation document, a basic structure, and extension modules.

The preparation document provides background information on AI, including ethical considerations and risks. Learning objectives and prerequisites for the Hackathon are also covered, as well as an explanation of the basic structure. The basic structure includes information for participants, task descriptions, and group presentations. The extension modules for the Hackathon offer the option to add support and judging. In short, everything you need to organise a successful Hackathon.

Lecturers are encouraged to participate in an AI Hackathon where no prior knowledge is required. Teams collaborate to develop solutions using AI in a short period. It's an opportunity to experiment, learn, and see how AI can be applied to tackle real challenges in education.

Conclusion

AI is no longer a distant future vision; it's here and now. The 'Acceleration Plan for Educational Innovation with ICT' and the 'AI in Higher Education Field Lab' provide a comprehensive framework for educational professionals to learn, experiment, and innovate with AI. With the right tools, knowledge, and ethical considerations, AI has the potential to elevate higher education in the Netherlands to unprecedented heights.


For the work package, visit versnellingsplan.nl/en/Kennisbank/field-lab-for-professionalization/field-lab-ai-in-higher-education.



CREATED BY MIDJOURNEY WITH THE PROMPT: "IMAGINE AN AI ARTWORK WHICH I CAN USE IN AN AI MAGAZINE TO SHOW OFF WHAT MIDJOURNEY CAN GENERATE."

Not like that

The video “How China Is Using Artificial Intelligence in Classrooms” is a short (less than 6 minutes) report by the Wall Street Journal from 2019.

 **Video**
introduction by
Pierre Gorissen

In the video, reporters visit a school in China where students wear a headband. This headband measures the students’ brain activity and sends this information in real-time, during the lesson, to the teacher, who can then see which students are paying attention or not. And it’s not just the teachers who see this information on their screen at the front of the class; parents of the students also receive an update via the app group about how well (or not) their child is paying attention in class.

For reassurance: the experiment in China has since been discontinued. Nevertheless, the video remains an excellent starting point for a conversation with lecturers, learners, and parents about the use of AI in education.

The video explains that the company wanting to test the technology in practice received permission from the parents without any issues. The teachers also primarily saw the advantages of the technology. The initial reaction from Dutch lecturers is often that they would certainly not allow or implement something like this. However, there are plenty of examples in the Netherlands of parents who can have insight into their children’s academic performance at any time, or lecturers who readily delegate parts of educational support to systems whose workings they do not sufficiently understand to oversee the educational activities carried out by the learners.

Regarding the example in the video, discussion partners often quickly agree, but how do we in the Netherlands find the balance between supporting the learning process of the learners and offering freedom? There are several toolkits and aids available for education to make such ethical considerations, such as the [Ethiekkompas](#) (Ethics compass) from Kennisnet or the [Technology Impact Cycle Tool](#) from Fontys, and Europe has also provided [clear guidelines for lecturers](#) when it comes to AI use. It is important that those involved in education are aware of these and consciously apply them in making these considerations.



Ethically Responsible Application of AI in Education

In this third blog in the series written by the Learning & Education theme from Platform PRIO for the Month of AI in Education (#mvai), I address the ethical considerations we must make when working with AI in education.

It is clear that we cannot prohibit AI, but embracing it uncritically is also not the intention. The question I keep getting from teachers is: how then?! In my opinion, the responsible application of AI requires a critical and open conversation in educational teams, discussing the ethical balance between opportunities and risks.

Why should we apply AI in education?

Artificial intelligence (AI) can do a lot, and more and more, and it’s fast. Efficiency as the only outcome is, in my view, too one-sided to decide on the deployment of AI. Often it is not clear what we would want to spend the freed-up hours on. And the consideration of whether the use of AI is worthwhile is a multifaceted question that should be viewed holistically. If you let AI take over tasks from the teacher, you change the learning environment, which will have consequences for the learner that you need to think through carefully.

Fortunately, AI has much more potential than just efficiency gains or the often-mentioned increase in productivity. The Education Council mentions in its report (which appeared in the fall of 2022) a range of educational goals, such as personalization and differentiation (such as with adaptive learning technology), increasing inclusivity and accessibility (such as with automatic subtitles or reading software), enabling independent and flexible learning (such as with the Honest Mirror app from the PRIO blog of June 12), and social and interactive learning (such as with an intelligent tutoring system or a personal AI assistant).

What should we try to prevent?

In addition to numerous opportunities, AI also brings many risks. An obvious downside of AI is large-scale and non-transparent data use. I am referring to both personal data that is not processed according to the GDPR and products that are copyrighted and used without permission to train the huge models. Steps are being taken against this with the recently adopted European AI Act, but it will take time before this law is fully implemented. Until then, we must also remain vigilant about our dependence on Big Tech companies, of which a few now dominate the AI market.

Other, perhaps less obvious, risks are related to the nature of generative AI systems like ChatGPT and Dall-E. They are inherently non-deterministic, meaning that a certain degree of randomness (based on probability) is used to arrive at an answer to the user’s question. That’s why you don’t always get exactly the same answer, and sometimes even a completely incorrect one. Beginners in a certain domain often lack the basic knowledge to recognize such errors or hallucinations in the output of AI systems. How can they use this technology to master that basis?

Because AI models are trained on (large amounts of) data on the internet, we know that biases in our society can be perpetuated by the system. Or even worse: magnified. The inequalities in the world are also reflected in the data on which the systems are trained: not only in content, but also the origin of this data is not well globally distributed (‘pale male data’). This can lead to disad-



vantaging people from minority groups. Finally, AI can be used for ethically reprehensible purposes, such as creating and spreading disinformation or hacking systems by generating code that exploits vulnerabilities in, for example, school systems.

How then?

When teachers ask me: how then?! I actually have to disappoint them. There are no ready-made answers because we don't know so much yet. For example, we don't know how we can continue to teach basic skills that AI will be able to perform better than a large part of the working population in a few years. But to learn advanced skills, you first have to master the basic skills: you can't just skip them. If we, as humans, were to decide that we no longer need to be proficient in math and arithmetic because AI is better at it than we are, who will still check these complex systems based on complex statistical models? In all domains, we must explore what people will still need to be able to do in the future and what we can leave to AI.

AI will soon be able to perform all kinds of tasks better than us, and in any case faster. But learning takes energy and involves failure, preferably in a safe environment. To develop ourselves, we must show perseverance and resist the temptation to bypass the required effort by using AI. This is not new: before AI, we had to restrain ourselves from looking at the answer booklet or asking someone who knows the material better. But perhaps in the future, at some point, it will be *ethically irresponsible* not to make a certain AI system available to your students because it turns out that learning is more fun, efficient, and effective with that system?

We also don't really know how to find the balance in the added value of personalized learning environments compared to the personal data we have to release for this. Finally, I am concerned that we have not yet set up checks & balances to monitor fairness - and if necessary, correct it - of possibly biased decisions that AI systems make and that can have serious consequences for our students. I hope that the implementation of the AI Act will make significant progress here.

The critical and open conversation

To *shape the future of education with AI together*, we must inform ourselves about what this technology entails, how it works, what we can and cannot (or do not want to) do with it. A highly recommended book to demystify the concept of AI is "Slim, slimmer, slimst" by Bennie Mols. The Teaching, Learning, and Technology research group at Hogeschool Inholland also recently wrote a short note on AI literacy. Or let yourself be informed and inspired by all sources about AI in education from universities of applied sciences that we recently inventoried from Platform PRIO. The AI in higher education pilot developed in the Acceleration Plan for Educational Innovation with IT is also very practical and aimed at lecturers and educational advisors. For a broader view of the professional development of teachers, I would like to refer to the PRIO blog of June 19 by Pierre Gorissen on this subject.

Based on this knowledge about AI, we must engage in conversation with each other. Even if we have very different opinions. It doesn't help to label people as either overly optimistic hype followers or as people who complain about algorithmic bias. We must critically question each other and learn from each other about the opportunities and risks. Because anyone who claims to have all the answers, I distrust that person.

In lectures and workshops on this theme, I always work with questions. (The attentive reader has already seen many of them in this blog.) Because the consideration of what responsible AI use is will differ depending on the context and depend on the type of education (level and domain), the educational vision, characteristics of the target group (students and pupils AND teachers), the specific learning objectives, etc.

I, myself, hope for a future in which AI is used to serve humans in a way where humans are always ultimately responsible. More IA (*intelligence augmentation*) than AI. I don't find the 'human-in-the-loop' principle ambitious enough: I hope for *human-in-the-lead*.

To conclude this blog, I would like to refer to some sources that can help to have the critical and open conversation. Regarding public values such as humanity, autonomy, and justice, Kennisnet and SURF developed the Value Guide for digitisation in education in 2021 (there is also a board game of it) and in the fall of 2022 the report "Put humanity first in digitization in education". Although these documents appeared before AI became widely available to people without specialist it knowledge, they remain valid and useful for education professionals after this major development.

To have a conversation about more personal values of yourself and your team, and how AI could contribute to realizing your educational vision, other tools are needed. I developed the tool "9 questions for AI-proof education" and a workshop based on that tool. I hope that we can also share the materials for that workshop openly in a while. In addition, in the research group, we are working on a game called 'The Best of Both Worlds' about finding the optimal combination of man and technology in education. With these efforts, we want to help as many teacher teams as possible to have that important, critical conversation.



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I wrote the third and final blog in the series for Platform PRIO as part of the Month of AI in Education #mvai. In this blog, I delve into how we can apply AI in an ethically responsible manner in education.

Links to the two previous blogs: 12th June: Honest Mirror, learning to present with AI: lnkd.in/eJmXZaSj
19th June: Teacher Professionalisation in the Age of AI: lnkd.in/eDr-uMP4

#AI #TECHNOLOGY #EDUCATION #APPLIEDRESEARCH #DIGITALDIDACTICS #FUTUREPROOFEDUCATION

Summary
by Bertine van Deyzen
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Summary Education Council Report 'Use of Intelligent Technology'

onderwijsraad.nl/publicaties/adviezen/2022/09/28/inzet-van-intelligente-technologie

More and more applications of intelligent technology are finding their way into society, bringing about fundamental changes in education. This impacts learning, teaching, curriculum development, and educational organisation. The Education Council, the largest advisory body for the government and parliament in the field of education that has been providing both solicited and unsolicited advice since 1919, received a request from the Ministers of Education, Culture, and Science to conduct an exploration with the main question: what changes does the use of intelligent technology bring to education? The report contains the findings of this exploration.

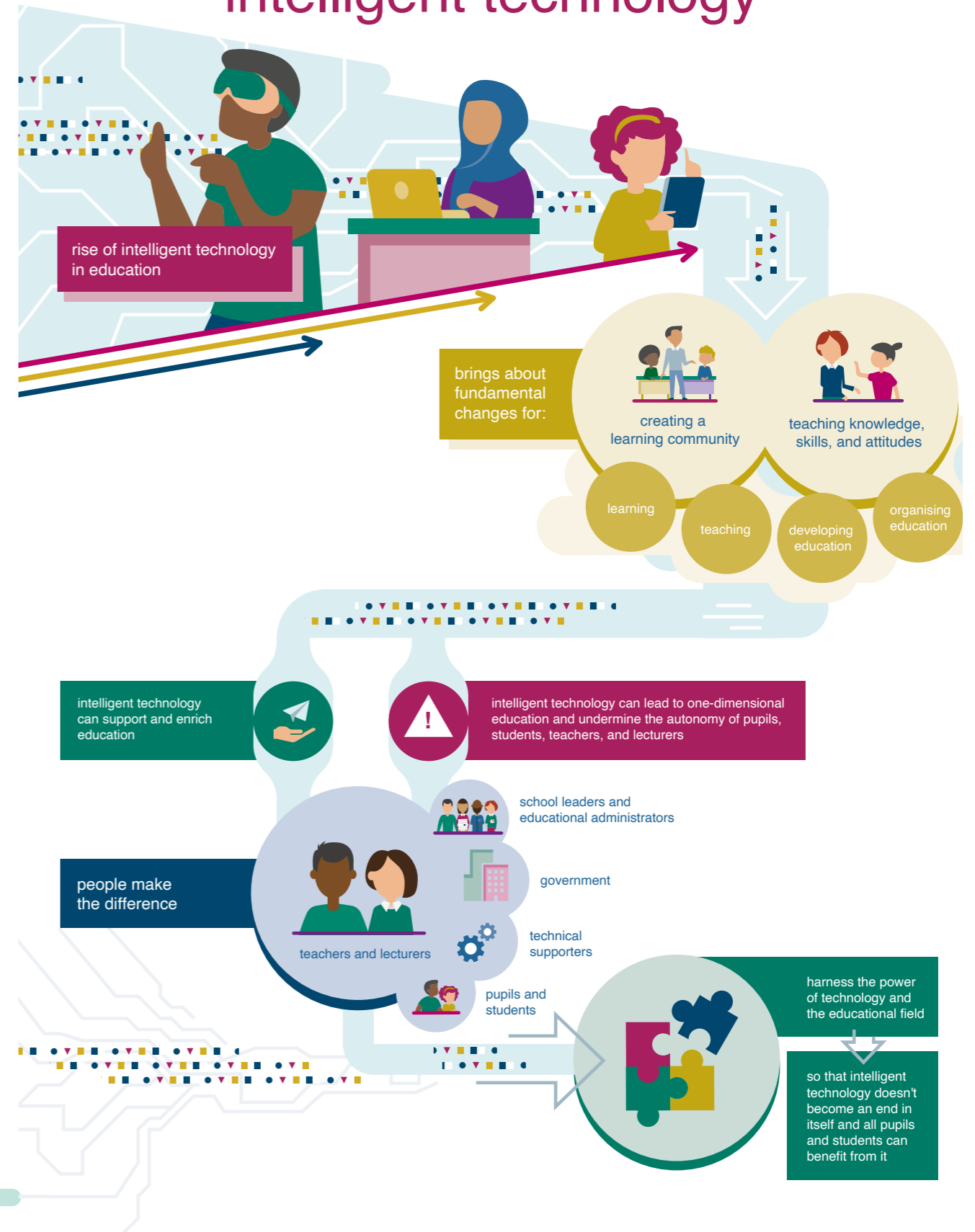
A notable aspect of this report is that the term 'AI' is avoided, and reference is made to 'intelligent technology'. This is very appropriate because AI is a very broad term, and many people have different perspectives on the technology. The definition follows the wording of the WRR from the 2021 report 'Opgave AI'.

The findings in the report are thought-provoking. While intelligent systems can lead to more diverse and inclusive education, they can also inadvertently result in one-sided education and an increase in inequality due to discrimination and widening of the digital divide. While intelligent systems are intended to free up lecturers' time or for personalized learning, they can also reduce interaction between students and lecturers and decrease the opportunity for students to learn from others, collaborate, and develop social relationships. While intelligent systems can assist with learning, they can also place too much emphasis on learning outcomes, thereby promoting undesirable forms of competition or reducing well-being due to performance pressure.

The Education Council, therefore, calls for active involvement of the educational field in reflecting on and steering the use of intelligent systems. This is something we also heard a lot during the activities of the Month of AI. We are all responsible for creating a healthy and safe learning community where people make a difference. It is also important that there is a clear division of roles and that all actors in education are equipped with the knowledge, skills, and attitudes to work with intelligent systems. Furthermore, co-creation is essential, and we must consider the diverse educational needs of students.

In conclusion, the deployment of intelligent technology should not be an end in itself, but we must ensure that all students can benefit from it. The technology is supplementary, and the human being is central.

deployment of intelligent technology



Blog
by Duuk Baten
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The AI Act at a glance!

In June 2023, the European Parliament (EP) approved a proposal for the upcoming AI regulation (AI Act), concluding the EP's deliberations on AI regulation. The EP was the third in line, following the European Commission and the Council of Ministers. This means that the Commission, Council of Ministers, and the EP are now entering the long-awaited negotiation phase (the so-called 'trilogue') with the aim of merging the three proposals into a final legal text.

What you read below is a collected insight into the AI Act so far, but this cannot provide certainty until the AI Act has not been approved. For questions, we recommend contacting your legal department.

A Brief History:

- April 2019: The European Commission's 'High-Level Expert Group' publishes guidelines for trustworthy AI.
- April 2021: The European Commission publishes an initial proposal for AI regulation, the 'AI Act'.
- November 2022: The European Council publishes their revised version of the initial proposal.
- June 2023: The European Parliament approves their version of the AI Act, with substantial amendments.

The AI Act in Brief:

- It's a proposal for AI regulation (within the EU). The primary goal of the regulation is to introduce and use AI that is safe and respects fundamental human rights.

- It's a harmonised regulation, meaning member states have limited options to implement the regulation based on their interpretation.
- The focus is on developing, offering, and applying AI, not on AI in general.
- A risk-based approach to the AI in question (low risk, limited risk, high risk, and unacceptable risk) with many rules and obligations, especially for high-risk AI. AI applications classified as unacceptable simply cannot be offered or used.
- Some AI applications in education fall into the high-risk and unacceptable risk categories. Think of AI for emotion recognition (prohibited) and AI for admission (high risk).
- In addition to risk classification, the Act also looks at the role a party plays in AI, which can be a provider (including developer), distributor, importer, or user of AI. The role and risk type of AI determine the requirements to be met.

What is Described in the AI Act?

In short, the EU AI Act is a law that ensures safe and responsible AI by limiting and controlling the risks of AI. Fundamentally, it's a product regulation, primarily focused on the development and applications of AI rather than the technology in general.

The AI Act is based on risk profiles of different AI applications. Depending on the risks, AI systems are seen as unacceptable (then it's simply prohibited), high risk, and low. There's also a category of applications with specific transparency requirements. This risk classification determines which rules and requirements apply to providers (including developers), distributors, importers, or users. Finally, there are the remaining applications seen as low to no risk and are not regulated by the AI Act.

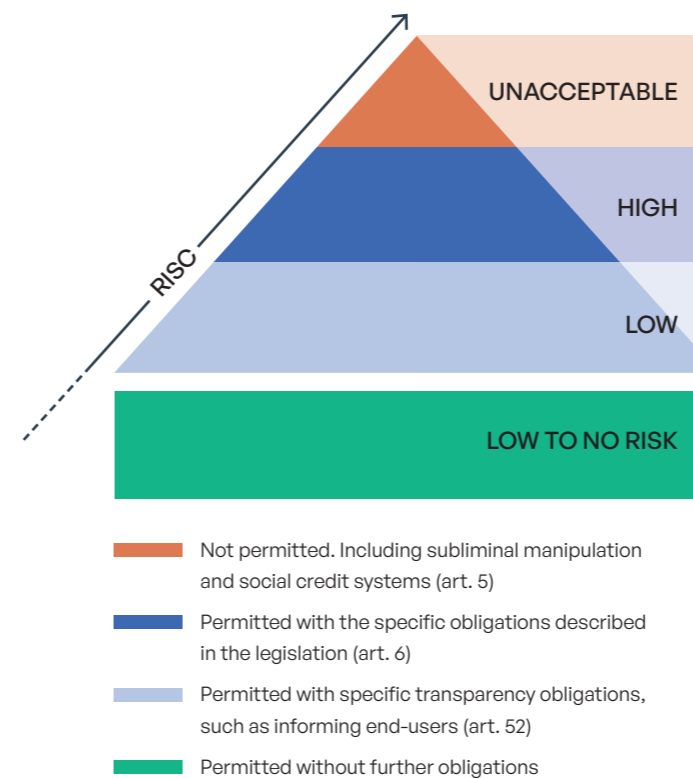


Figure 1 A representation of the different risk levels described in the AI Act

Obligations for AI in Education:

The AI Act also specifically addresses education and includes several specific articles on the application of AI in education. This is because, according to the EU, AI systems in education can have a significant impact on people's life paths and their ability to provide for them-

selves. Poorly designed AI applications could potentially violate the right to education and the right to non-discrimination¹.

Art 5 (prohibited applications): A ban on marketing or using AI to detect emotions in, among other things, the workplace and educational institutions.

Art 6 (high-risk applications):

- a) AI intended to be used to make or influence decisions regarding access, admission, or allocation of individuals to education.
- b) AI intended to be used for student assessment within the institution and for admission; also testing for the recommended level of education and detecting prohibited behaviour during testing.

How these will be incorporated into the final legislation is still unclear, as different interpretations are described in the three different draft texts. But it's clear the use of AI in education will be regulated by the AI Act.

What are the obligations?

Most rules and obligations apply to the high-risk category (described in Chapter 2 of the legal text). When *offering* and *developing*, think of rules and obligations around having risk and quality management systems for AI and throughout the AI's lifespan, quality of data(sets), technical documentation, transparency about the AI, providing information to users (also by providing user instructions), conducting a conformity assessment, and registering the AI in an EU AI product database. These requirements are similar to the requirements for bringing products to market (including having a declaration of conformity and CE markings for certain AI).

As a user of high-risk AI (e.g. an institution purchasing a system for education or business operations), you are responsible for following the provider's instructions, human supervision with sufficient expertise and authority, responsible for the relevance and quality of the input data, and you must conduct a *fundamental rights impact assessment* for the AI. *Distributors* and *importers* also have certain obligations, although these are not as extensive.

¹ These lines of thought are described in the so-called considerations (recitals) at the beginning of the legal text. Specifically, consideration 35..

Whether all these rules and obligations will make it in this form is still unclear, as is how this will work in practice. What is clear is that educational institutions cannot ignore the AI Act and that several potentially important applications are affected by rules and obligations for high-risk AI.

It's also important to realise that in addition to the AI Act, the GDPR also applies if the AI uses personal data (e.g. for training and developing a model). The GDPR applies regardless of the risk classification of the AI (high, limited, or low risk).

What now?

The expectation (hope) is that the final text of the AI Act will be approved at the beginning of the new year. From that day, there's a 2-year period until it comes into effect. This also gives institutions a 2-year period to determine the impact of the AI Act and implement it within their organisation. Our estimate is that this preparation time is also much needed given all the changes, especially the development and use of high-risk AI. After these two years, the AI Act is in force, and supervisors can enforce it.

Relevant Background Information (most of these sources are in Dutch):

- Find the three draft versions side by side here: europarl.europa.eu/cmsdata/272920/AI%20Mandates.pdf
- The Dutch delegation for education in Brussels (Neth-ER) also writes about the AI act: neth-er.nl/onderwijs/parlement-eens-over-ai-act-dit-kan-onderwijs-en-onderzoek-verwachten
- The Ministry of Education, Culture, and Science commissioned an impact analysis report by Dialogic. The AI act is also discussed here (p. 15), but note that this is not based on the most recent draft texts. open.overheid.nl/documenten/ronl-7be0a6a61418a619bd-633787bfa456a397c86d80/pdf
- ICTRecht on the AI act: ictrecht.nl/blog/de-ai-act-door-het-parlementwelke-regels
- The guidelines of the high-level expert group can be found here: europarl.europa.eu/cmsdata/196377/AI%20HLEG_Ethics%20Guidelines%20for%20Trustworthy%20AI.pdf



Interview

by Dominique Campman
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Make Assessment and Evaluation AI-proof

‘The conversation
becomes most
important’

BIO

Erdoğan Sağan is a lecturer and researcher at Fontys University of Applied Sciences ICT; until September, he was a Practor at ROC Tilburg. He is an expert in educational technology, inclusive artificial intelligence, and generative AI. Sağan publishes books, blogs, articles, and podcasts about current technological developments and education.

Publication: [Inclusive Artificial Intelligence fontys.nl/actueel/asset/1285705/544070fontys-boek-erdincsaacan-bw-en-v3-digitaal/](https://fontys.nl/actueel/asset/1285705/544070fontys-boek-erdincsaacan-bw-en-v3-digitaal/)

Podcast AI Garage: open.spotify.com/show/0hDFsglp8xvDsajgqZ6Jdf?si=bc-98f837af534957



Erding you've published a lot on generative AI. Is it just another hype or is it here to stay?

AI has been around for over fifty years. Generative AI gained more attention with Text-to-Image, DALL-E and MidJourney. But since the rise of ChatGPT and its competitors, even my father and my children, aged nine and fourteen, are using it. AI is now everywhere around us. When people see how ChatGPT or, for example, Google Bard generates output, they are genuinely amazed. Many journalists and businesses see its impact, keeping it continuously in the news. There are still many questions and very few answers. How do we deal with copyright and intellectual property, for example? Is it safe to upload something? But if used correctly, it really has an impact on some professions. That's why I think it's here to stay.

What does AI mean for learners in vocational education training schools?

From the Practorate, we created a factsheet for all lecturers at ROC Tilburg in March, focusing on the do's and don'ts of generative AI, especially about ChatGPT. We wanted to train the lecturers first, as we knew and know that learners are already using it. In preparation for a world with AI, we start by informing the lecturers.

Then you see a division. Colleagues who are open to new things explore the possibilities of AI and use it. But there are also lecturers who stick their heads in the sand; they think they can just do their thing and it will be fine. I sometimes see lecturers grading work created by AI. A waste of time and effort. Because the focus of the lecturer, and also that of the institution at a strategic level, should be on making assessments and evaluations AI-proof.

Take-home exams or writing an essay can be done with ChatGPT. I see learners having their reflective reports written by AI. If something can be created by AI, you should not assign it anymore. Attention to the process is therefore becoming even more important, and you need time as a lecturer for that. You need to have time every week to talk to your learners about what they have done and whether they understand it. Many institutions are already working on this, but there are also many institutions, especially research universities, that still struggle with it.

You're saying more personal contact, but how do your colleagues react?

They say they don't have time for that. You can think about other forms of work. For example, organise a debate in the classroom on the subject or have the learners present it. If they learn it by heart, fine. Even if they have the presentation made by AI, they still have to verbally explain a few things. I'm not saying that verbal communication becomes the most important, but the conversation, the communication, does become the most important.

Citizenship formation is an important task for vocational education training schools. Do you see AI also having an influence or playing a role in that?

Yes, it's important to think about which professions will still exist and how professions will change. But it's also about bias, about prejudices. Learners must realise that almost all large language models come from America. If you look at the 'text-to-images', then those images smile in an American way. In the current generative AI, the culture, the way of writing, and the prudishness are American. Therefore, it is very important that learners are aware of the data that go in, as they determine which data come out.

Prejudices that we have are magnified and reinforced by AI. It is 100% our task to make learners aware of prejudices and how they are intertwined in technology. Ethics is therefore becoming increasingly important, but I still see that only to a limited extent at institutions. Media literacy is needed everywhere, as well as awareness of the use of sources and fact-checking.

What do you already see happening with AI in vocational education training schools?

Some colleagues have work checked by AI. Is that where we want to go? Other colleagues just want to generate a teaching method or form of work. It varies enormously in vocational education training schools per institution and per lecturer. I am very pleased that Kennisnet and SURF have already organised many sessions on this and that various documents are available. Because as an institution you really have to think about how to deal

with learners who use generative AI. I think that is the most important topic for all institutions, whether you are secondary education or vocational education training school, university of applied sciences or a research university. Generative AI is an agenda item that should be at the top of the administrative agenda.

And what do you think the world of education will look like in 5 years?

Some lecturers already want all learners to have ChatGPT accounts. I think you can't demand that; ChatGPT is a tool you can use. Although ChatGPT may be the best-known name and is constantly evolving, it is important to assess which AI is most suitable for each application. Otherwise, you use a hammer for every problem, instead of the entire toolbox.

In five years, the way of testing, assessment, and giving homework will be adapted. Then we will think, okay, this is what you should be able to do. This is what AI can do, and we will really be able to see it more as a tool. I sometimes speak to lecturers who say we are going back to pen and paper. That is impossible because the business world is not waiting for that. Fortunately, we in education are not alone with these issues; the whole world has the same challenges.

TIPS

Do you have three tips for teachers regarding the use of generative AI?

"Experiment, experiment, experiment. I am genuinely surprised that despite all the attention in the news and the widespread belief that it has an impact on education, there are still colleagues who have never even tried it. If that's the case, you're not taking yourself seriously as a teacher; I am very firm on this.

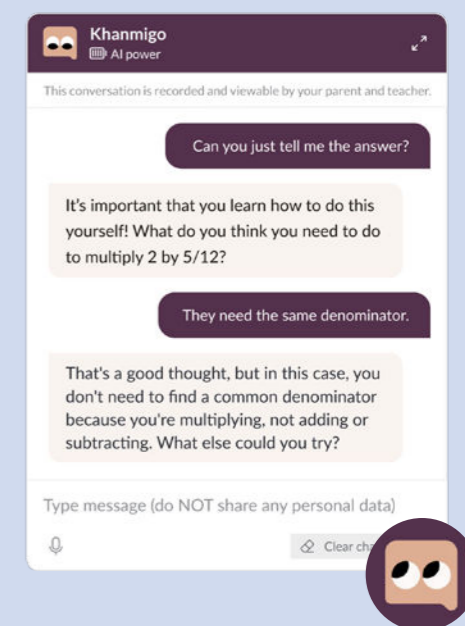
At least try it once or twice for your own subject area. And don't just have a poem written, as some teachers do. But create a table, give an assignment to write a SWOT analysis. Get to work and discover what ChatGPT means for your subject area."

DO YOU WANT TO TRY SOMETHING BESIDES CHATGPT?



KHANACADEMY.ORG

Take a look at **Khanmigo**. An A.I. programme specifically designed for education.




Tips & tricks

 KU Leuven
 kuleuven.be


Tips & tricks for the responsible use of GenAI

Build on GenAI

GenAI applications can sometimes be used as a tool for assignments (visual, writing and programming assignments). We expect students to build on this content and add argumentation, critical analysis, correct citation of sources, creative input, personal views or reflection, innovative character, connection with social context, etc. Make sure that you are able to discuss or have a debate about your assignment.

Give meaning to GenAI

When people hear a sentence, they attach a meaning to it, connecting language to reality. A generative language model only has access to the format of sentences, but cannot connect to reality in any way. This means you have no guarantee that the system's texts are actually correct. The system's only concern is to generate texts that seem as plausible as possible; truth or reality don't matter to the model.

Verify GenAI

Use GenAI if it's allowed, but don't blindly trust technology. The more responsibility you give the system, the more you will need to verify, check and explain the output. Sometimes, AI output seems very convincing but it's perfectly possible that the answer is incorrect or even made up ('hallucinating AI'). In most cases, there's no way to find out how the algorithms came to a particular result and there is no transparency about the sources the system used ('black box'). Carefully check the content you want to use and look for existing sources to refer to. After all, you are always responsible for the content of the assignment you submitted.

Avoid plagiarism with GenAI

ChatGPT is known for generating fictitious references. GenAI's output sometimes lacks transparency about the sources the system used, increasing the likelihood of plagiarism. There is also a real risk of copyright infringement. GenAI builds on other people's work, and that always requires proper acknowledgement of the sources used.

Don't humanise GenAI

AI applications (chatbots in particular) are not human, even if it looks that way because of the very interactive responses. These applications are not influenced by personal experiences or their close surroundings. They can, however, be taught ethical principles by feeding them specific data. It's important to keep in mind at all times that AI applications are only technological tools.

Watch out for GenAI's bias

AI applications are trained with certain datasets, which are not always very representative. There is no transparency about the filters they apply, which raises a lot of ethical questions. If you blindly copy the output, you risk spreading incorrect information, certain stereotypes or prejudices.

Never give GenAI sensitive information (in terms of privacy)

There is little transparency about what developers do with the information fed to the system. Do not give personal data or confidential information to these GenAI applications. Check whether you have the necessary permission to enter copyrighted content. If you are in doubt about whether information is confidential or not, you can check with the provider of the information.

Reduce GenAI's energy consumption

Know that the servers for AI applications have a very high energy consumption, so use them only when they can add value.

Report transparently on GenAI

You can only show that you have learned something if you are transparent about using AI output and add your own contribution to the assignment. Keep in mind that if you are not transparent, this can be considered an irregularity and you risk a penalty. If there are no clear guidelines on this topic in the assignment description, ask your teaching staff about it.

Potential specific rules for your master's thesis

There are also [guidelines for researchers on how to use GenAI \(in dutch\)](#). More specific provisions from these recommendations may apply in the context of your master's thesis. If you use GenAI in your research, discuss this with your supervisor(s).

▶▶ **Interview**
by Bram Enning
captain of
transformation pilothub
study data and AI

Chairperson of ISO on AI: ‘You can’t ignore it’

At the time of our conversation, Demi Janssen is still enrolled as a second-year student of Liberal Arts & Sciences at University College Maastricht, where she studies a combination of business administration, psychology, and cognitive sciences. She is preparing for a year as chairperson of the Inter-city Student Consultation, where she is also part of Npuls’ steering committee. ISO considers AI an important topic and, together with its 41 member organisations, is preparing a position paper.

When did you last use AI?

Yesterday. I had to write an invitation for a meeting and had ChatGPT brainstorm with me. Quite handy for brainstorming and inspiration. I say ‘definitely’ because when you Google, you’re already using AI, but it’s not always noticeable, sometimes we don’t even realise it!

Which direction is the position paper on AI taking?

That’s still a topic of discussion. But of course, I hear what’s going on, and it presents a complex puzzle. The development of AI is rapid; we see opportunities but also downsides. AI is here to stay, and you can’t ignore it. It will soon be a standard part of the professional field – for instance, doctors will have to work with AI results. Stu-

dents need to be able to handle that. If they don’t, they’ll miss out on the job market.

So, a mandatory ‘prompt engineering’ course for every freshman?

Well, I’m not sure about that, but handling such techniques requires skills, and those can be learned. Digital skills – we call it ‘technological citizenship’ – are an essential part of what you learn during your education. This also includes students learning about the ethical side and being able to decide whether or not to use AI.

By the ethical side, I mean, for instance, that we know biases exist in AI, and they come out again. Suppose you use AI to draft a job advertisement. In that case, it’s not



always clear if and what bias is present. And when you ask a question, it’s not always evident if the answer is correct or if AI is ‘telling the truth’. You need to be aware of this and learn how to deal with it. Accessibility is also an issue; if paid services emerge, not every student will be able to afford them. This could increase inequality of opportunity.

Are you advocating for an institution-wide license so that all students have equal access?

If an institution is going to deploy AI, it must be accessible to all students. The financial aspect is just one side of accessibility. It’s also about students who struggle with screen work. They too must be enabled to participate fully in our education.

Where do you see opportunities for the deployment of AI?

One area is learning analytics. AI can help personalise education and make guidance more efficient. However, it’s crucial students know what happens with their data and have control over it.

Speaking of personal. It’s often mentioned that in a few years, we’ll have a virtual assistant, an assistant that’s very personal because it has a lot of personal data and is an assistant because it knows how to combine it with many other data. Is that a nightmare or a dream for you?

In my programme, I choose my courses. As an experiment, I once put my curriculum into ChatGPT and asked what the common thread was. As some kind of a study advice assistant. Some things came out that I recognized, but also some very special ones.

The corona pandemic was a period when students relied heavily on themselves and digital tools. We’ve seen that it didn’t do well for well-being. So, it’s fine if a virtual assistant can act as a brainstorming assistant or sparring partner, but it should never replace personal contact.

Do you have any advice for teachers?

Here at the ISO office, we see examples of AI deployment. One I personally liked was where students were asked to improve a response from ChatGPT. It challenges students’ critical skills, teaches them to think about the reliability of such techniques, and also addresses the ethical aspects. I would urge teachers not to ban AI but to be open to the opportunities it offers and to use such creative and safe solutions in their education. 🌟



Guidelines

by Veronique Scharwächter
July 20, 2023



If you want to see the status of AI guidelines at an institution, visit scribbr.nl/ai-tools-gebruiken/chatgpt-ai-richtlijnen/ (Dutch only)

Do you see an AI guideline from an educational institution that is no longer up to date or needs to be adjusted? Please send an email to ai-tools@scribbr.com.

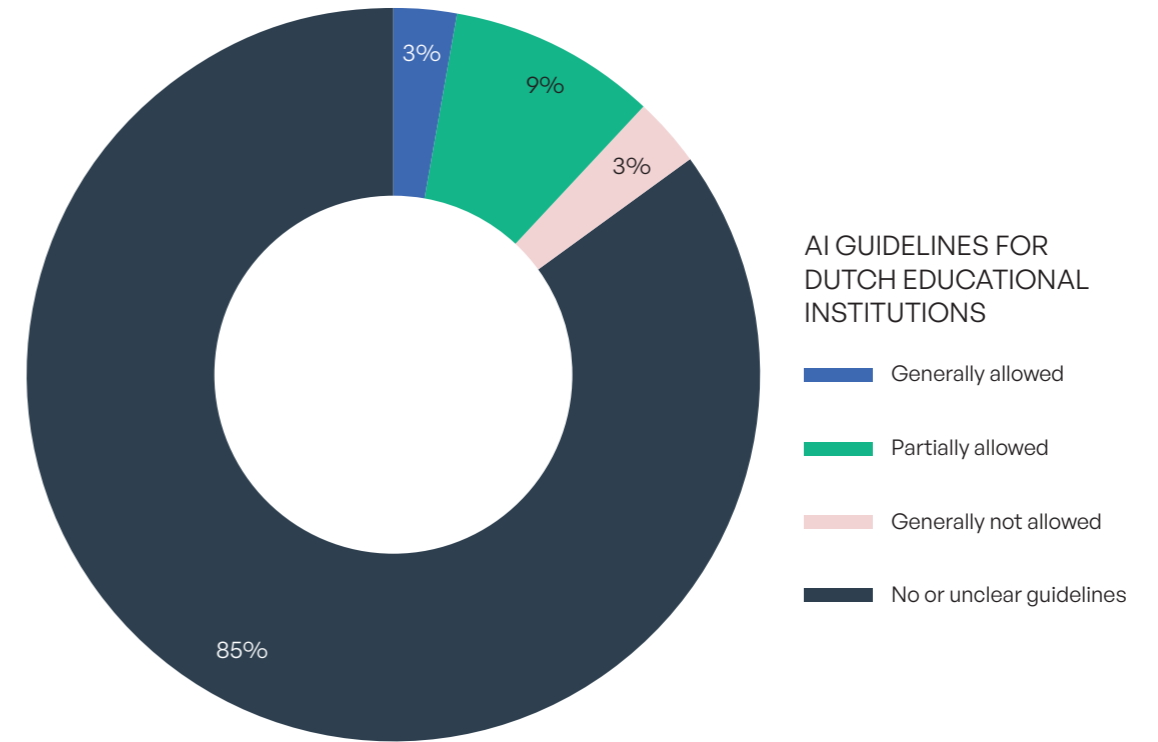
ChatGPT: Overview of AI Guidelines by Educational Institutions

[Here](#) you will find a current overview of the AI guidelines of educational institutions regarding the use of ChatGPT during your studies, for example, for your thesis and exams.

With the advent of ChatGPT and other AI tools, the question arises whether and to what extent you may use these tools according to your educational institution during your studies. Currently, teachers are still figuring out how to respond to these tools: whether and how students can use the tools for assignments, and how they can be used in accordance with academic integrity.

For this article, we researched the AI guidelines for vocational, higher professional, and scientific education in the Netherlands:

- At **3%** of educational institutions, the use of AI is generally not allowed.
- At **9%** of educational institutions, the use of AI is partially allowed.
- At **3%** of educational institutions, the use of AI is generally allowed.
- At **85%** of educational institutions, there are no or unclear guidelines.



Note

Although we try to keep this overview as up to date as possible, there is currently a lot of discussion about the use of ChatGPT and other AI tools during your studies. It is therefore essential to always consult the current guidelines of your course regarding the use of AI. Contact your teacher, mentor, or study coordinator to be sure of what is allowed and what is not.

Current AI Guidelines in Education

Most universities and some universities of applied sciences, and vocational schools have announced their position on the use of AI tools (e.g., ChatGPT). Since the academic year has already started, there is often no official policy.

Each guideline currently states that using ChatGPT or other AI tools for your study assignments is not allowed if you do not refer to the tool. In that case, you are guilty of **fraud** (and, more specifically, plagiarism). An AI-generated text is not your own original work, and pretending it is, violates the standards of academic integrity that most educational institutions uphold.

However, most institutions also recognise the opportunities that a tool like ChatGPT offers. For example, the tool can help students with their studies, and teachers can use ChatGPT to create study assignments and a syllabus. Explicitly using AI for a study assignment, for example, by analysing ChatGPT's answers, can stimulate critical thinking and elevate a text. A lecturer at the University of Amsterdam conducted a small-scale study on the use of AI among students from two disciplines. According to this survey, more than 95% of the students surveyed use AI.

Tip

If an assignment from your study does not **explicitly** mention that you may use ChatGPT or another AI tool, always assume that it is not allowed in principle. If in doubt, ask your lecturer what is permissible.

NOLAI Reference framework 2022

This reference framework serves as a guideline for shaping the articulation of needs and the co-creation programme of NOLAI. Each year, we update the reference framework based on new insights and developments. Questions? Feel free to send an email to nolai@ru.nl. You can read more about us at nolai.nl.

Why a reference framework?

Within NOLAI, school administrators, school leaders, teachers, teacher trainers, scientists, and individuals from the business sector collaborate to improve primary and secondary (special) education through AI. This requires a shared language.

Common starting point

We develop intelligent educational innovations with the aim of improving the quality of primary and secondary education through AI. The deployment of AI supports and strengthens the role of the teacher and promotes equal opportunities for all students.

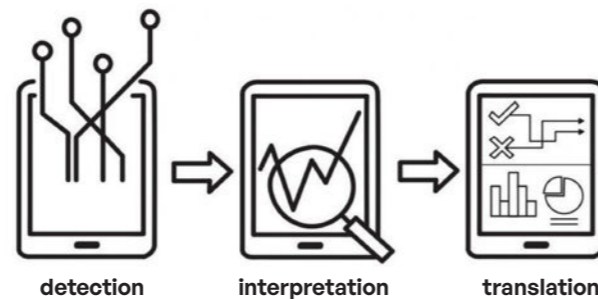
Our key questions

The learning of the student and the teaching of the teacher serve as the starting points for NOLAI and its partners. Together, we answer the following questions:

1. How does technology work? In other words, how does intelligent technology function?
2. What does technology offer? In other words, what forms of adaptivity are possible in intelligent technology?
3. Who is in control? In other words, to what extent are the teacher and/or the intelligent technology in charge?

Question 1 | How does the technology work?

The functioning of the AI serves as the basis for existing and future technologies. Broadly, we distinguish three components that are executed in conjunction:



Detection of data in intelligent technologies. For example, consider a student's answer to a question.

Interpretation of detected data in intelligent technologies, based on key elements. For example, consider vocabulary.

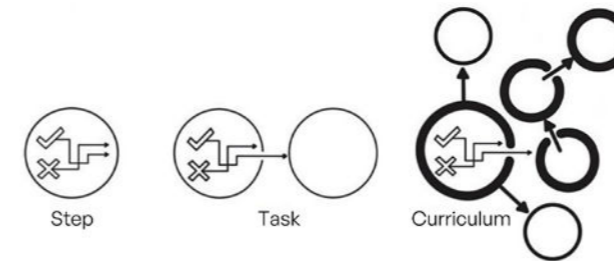
Translation of the interpretation into useful information for students, teachers, and/or actions. For example, consider feedback or a dashboard.

Question 2 | What does the technology offer?

Intelligent technologies deployed for students, teachers, and/or actions vary in how they meet the estimated learning needs of the student (adaptivity).

Different forms of adaptivity

Intelligent technologies can offer one form of adaptivity, or a combination of adaptivity.



STEP

Feedback within a task that the student performs.

TASK

Selection of the most suitable next task for the student.

CURRICULUM

Selection of the learning path and the associated learning objectives for the student.

Different learning functions

These forms of adaptivity can also focus on different learning functions: knowledge (cognitive), self-regulation (metacognitive), emotion (affective), and motivation. Current technologies usually focus on knowledge, particularly within structured domains such as arithmetic, spelling, reading, and mathematics.

Question 3 | Who is in control?

A characteristic of intelligent technologies is that roles between AI and humans shift. The concept 'Every student has their own tutor' has long been central to our thinking about AI in education. This may have given the impression that the teacher could be replaced by technology.

Hybrid Intelligence

There are things that AI is better at, and there are things that humans are better at. Artificial and human intelligence can complement and strengthen each other. Therefore, we adopt the concept of hybrid intelligence: the meaningful combination of human and artificial intelligence.

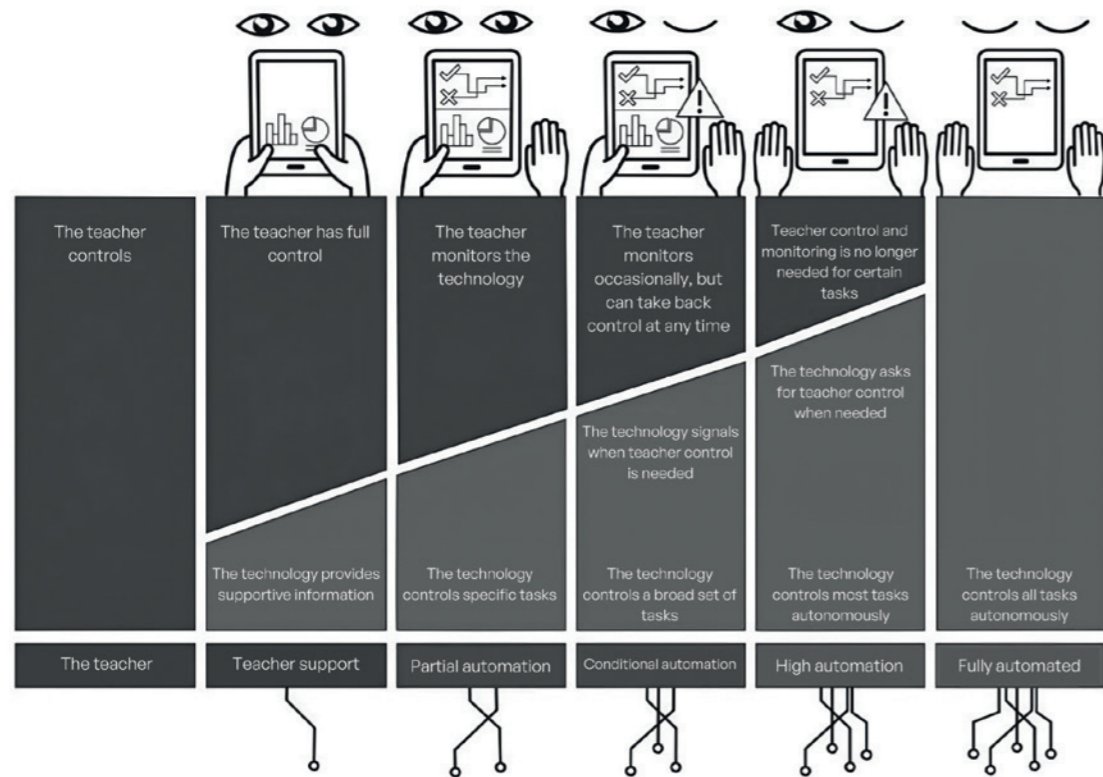
Human Intelligence

- Creative thinking
- Collaborative problem-solving
- Connecting and interpreting different perspectives

Artificial Intelligence

- Rapid data analysis
- Classification of specific behaviour
- Diagnosis of knowledge
- Suggestion of appropriate actions





THIS MODEL IS ALSO MENTIONED IN THE INTERVIEW WITH INGE MOLENAAR (SEE PAGE 24 IN THIS MAGAZINE). PLEASE LOOK AT PAGE 24 FOR MORE INFORMATION ON THIS MODEL

Levels in Hybrid Intelligence

Various combinations of human and artificial intelligence are possible. At one extreme, the teacher controls and monitors the intelligent technology. At the other extreme, the intelligent technology operates autonomously. Between these, four other levels of control and monitoring can be distinguished.

Level 1 | Solely the teacher, no support

The teacher acts independently, without support or intervention from the intelligent technology.

Level 2 | Teacher support

The teacher receives additional information from the learning resource, but the intelligent technology does not act independently.

Level 3 | Partial automation

The intelligent technology takes over minor tasks from the teacher. A specific form of adaptivity is executed by the intelligent technology.

Level 4 | Conditional automation

The intelligent technology performs a broader set of tasks and monitors the teacher when extra human actions are needed. Here, the intelligent technology combines different forms of adaptivity.

Level 5 | High automation

The intelligent technology largely acts independently but asks the teacher for input or supplements when needed. Different forms of adaptivity can be offered without the teacher's intervention.

Level 6 | Fully automated

The intelligent technology acts independently, without intervention from the teacher.

Sources

A detailed explanation of these models can be found in these two international publications:

- Molenaar, I. (2022). Towards hybrid human-AI learning technologies, *European Journal of Education*, online first
- Molenaar, I. (2021). Personalization of learning: Towards hybrid human-AI learning technologies. In *OECD digital education outlook 2021: Pushing the frontiers with AI, blockchain, and robots* (pp. 57-77). OECD Publishing

UNIVERSITY OF TWENTE.

HACKATON: ARTIFICIAL INTELLIGENCE (AI) IN EDUCATION

8, 9 & 10 november 2023



THE UNIVERSITY OF TWENTE PRESENTS:

HACKATON AI IN EDUCATION

Do you want to make checking easier? Do you want students to receive better feedback? Do you want students to quickly find the right resources? These are questions where AI in education can potentially assist. Is this something you want to get involved with, then join the AI Hackathon 2023!

During this hackathon for primary, secondary, vocational, and/or higher education, participants will work on their own case under the guidance of experts. Afterwards, all teams will present their findings to an expert jury, and a winner will be announced. We invite teachers, school leaders, managers, students, learners, and other interested individuals to form a team to learn together about AI in education.

IN BRIEF

- **For whom:** teachers, school leaders, managers, students, learners, and other interested individuals (team of 6-8 people).
- **When:** 8,9 & 10 november
- **Location:** University of Twente
- **Time:**
 - » Wed 8 nov: 5:00 PM - 8:15 PM
 - » Thu 9 nov: 9:00 AM - 8:00 PM
 - » Fri 10 nov: 9:00 AM - 3:30 PM
- **Costs:** Free

MORE INFORMATION & REGISTRATION

Visit the website for more information about the program and registration. If you have any questions, please contact pro-u@utwente.nl.

WWW.UTWENTE.NL/PRO-U/HACKATON-EN



VIDEO

Watch the aftermovie of the Hackathon 2022 here





Example
 KU Leuven
 kuleuven.be



Responsible use of Generative Artificial Intelligence

(2022-2023 academic year)

Can GenAI be used at our University?

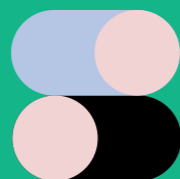
KU Leuven wants to use GenAI responsibly. After all, GenAI tools have found their way into the professional field, where you will encounter them when you graduate. It's important for students to understand how GenAI works so you can maintain academic standards and retain ownership of the written text.

With the end of the second semester and the start of the examination period in mind, we want to be clear about what we expect from you in terms of submitting assignments or master's theses.

What is Generative AI?

Generative Artificial Intelligence (GenAI) is a type of machine learning. It's the umbrella term for a group of algorithms that can create new content. This content can take different formats: text, code, images, videos, and music, or a combination of all of these.

GenAI generates output in response to a query/prompt using generative models such as Large Language Models (LLMs), relying on large datasets to achieve this. Some well-known examples are text generators such as ChatGPT, ChatGPT's integration into Microsoft Bing, and image generators such as DALL-E and Midjourney.



Before you start ...!

- The guidelines on this webpage apply to the whole university. If necessary, **the teaching staff member, the study programme or the faculty** can give you additional information about you whether or not you are allowed to use GenAI for assignments (visual, writing and programming assignments).
- **2 basic principles** apply:
 1. you have **full responsibility** for what you submit;
 2. you make sure that the assignment **allows the teaching staff to evaluate which competences you have acquired as a student.**
- **Always consult** with the coordinator of the assignment (teaching staff member, supervisor, assistant, ...) in advance if you want to generate **audio or visual content** with GenAI for the assignment, especially if there's no clear information on expected transparency. **Explain why** the way you want to use GenAI will not violate Article 84 of the Education and Examination Regulations (OER).

Tip Have a look at '[Motivating use of GenAI](#)' at the right side to see what you should discuss in your motivation.
- A clear misuse of GenAI - where any output was largely generated by GenAI and you were not transparent about using the tool can be considered an **irregularity** under Article 84 of the OER.

Motivating the use of GenAI for audio or visual content

How can you reassure the coordinator of the assignment that Article 84 of the OER is not compromised if you use GenAI to generate **audio or visual content** ?

When you talk to them about it, explain:

- why the use of GenAI is necessary;
- how you will still retain ownership of the assignment by adding your own input to the GenAI output;
- that you will still achieve the learning goals this way.

Always be transparent about your own contribution versus GenAI output.

How can you use GenAI?

A GenAI model can be used for all sorts of assignments. Certain uses are very similar to what we already do with other tools and do not require additional transparency. Other uses could potentially hide your own input and are therefore not allowed, with some exceptions.

Always check the description of the assignment to see whether the use of GenAI is allowed. **Teaching staff, study programmes or faculties can always decide not to allow a certain use of GenAI, independent of** the general guidelines below.

GenAI: What is allowed?

- **Using GenAI As a language assistant** for reviewing or improving texts you wrote yourself, provided that the model does not add new content. In this case, the use of GenAI is similar to the spelling and grammar check tools we already have today, so you don't need to explicitly mention using GenAI for this. Again, you always make sure that the use of GenAI does not interfere with an examiner's evaluation of your achieved learning goals.
- **Using GenAI As a search engine** to get initial information on a topic or to make an initial search for existing research on the topic. This way of gathering information is similar to using an ordinary search engine when working on an assignment. After this initial search, look for scientific sources and conduct your own analysis of the source documents. Interpret, analyse and process the

information you obtained; don't just copy-paste it. If you then write your own text based on this information, you don't have to mention you used GenAI.

Note If you do copy-paste certain parts of GenAI output (for instance because of the nature of the assignment), you have to cite your sources.

- *Note* The output that ChatGPT (or similar tools) generates is not always correct and could be different for each prompt. ChatGPT is not a reliable tool for factual information. You always need to the generated information by consulting other sources.
- **If the teacher explicitly allows it**, you can use GenAI to generate some code as part of a larger assignment.

GenAI: What is definitely not allowed?

- **Any form of copy-pasting** of any content generated by GenAI **without fully acknowledging the source** (citing, referencing). After all, if you want to produce any academic work, you need to check the original sources. Using GenAI with proper referencing can only be done in exceptional situations.
- **Any use of GenAI that prevents the teaching staff from assessing your skills.** For example: using paraphrasing tools on texts you did not write yourself to cover up plagiarism, misuse of translation software.
- **Any use of GenAI during on-campus examinations or other forms of assessment when the teaching staff have indicated that the use of GenAI is not allowed.**

Citing and referencing GenAI

This applies to the exceptional cases where you are allowed to use (copy) GenAI-generated content.

Although GenAI does not require a specific citation format, it's important to correctly attribute any information or ideas extracted from it. Currently, clear guidelines on citing and referencing GenAI can already be found for different reference styles (e.g. [APA](#), [MLA](#), [Chicago](#)). For other reference styles, these guidelines are still being developed.

In the meantime, you can use the guidelines for 'personal communication' or unpublished text from the [manual of the reference style](#) you are using. This is because AI-generated material does not have a consistent information source and is based on randomly constructed prompts. Also include the date of generation or the version of the used GenAI model (as is also done for APA, see below).

APA reference style example

In the text

Author of the GenAI model, year of the version used

Example:

(OpenAI, 2023)

OpenAI (2023)

References

Author of the GenAI model used. (year of the GenAI model used). Name of GenAI model used (Version of GenAI model used) [Type or description of GenAI model used]. Web address of the GenAI model used

Example:

OpenAI. (2023). ChatGPT (April 20 version) [Large language model]. chat.openai.com

How can you be transparent about the use of GenAI?

Referring (and citing) is the first step to being transparent. 'Being transparent' is essential to ensure that the teaching staff can always assess your knowledge, understanding and/or skills correctly. However, it's difficult to lay down in general guidelines how exactly you can be transparent. This is usually related to the objective of the assignment and can be inferred from the **assignment description**. Faculties or study programmes may ask you to fill in a form.

A good way to be transparent is to **keep track of how and why you used GenAI**. This can be done in different ways:

- Make screenshots of the complete exchange with GenAI. You can highlight any relevant parts in these screenshots.
- Explain how GenAI was used (e.g. to generate ideas, text fragments, longer pieces of text, arguments, evidence, illustrations of concepts, ...)
- Write down why GenAI was used: to save time, to combat writer's block, to stimulate reflection, to manage increasing stress, to better understand a concept, to translate, to experiment with GenAI, etc.

You can report this in different ways. Check whether the assignment description clarifies how to do this.

In addition to **citing the source** and **including the use of GenAI in the references**, the teaching staff can ask you to add the elements mentioned above **to a section on (materials and) methods used, or to an appendix**. If there are no additional indications, use the guidelines in this university-wide framework.

If it's not clear how you should best report on the use of GenAI, consult with the assignment coordinator (teaching staff, supervisor, assistant, etc.).

Detecting the use of GenAI

At KU Leuven, we use the tool Turnitin for plagiarism detection. This tool can also generate an AI score, which can be used in the assessment, but is mainly indicative. There are other indicators as well (specific to how GenAI works) that may indicate that a student used GenAI.

Be aware that you can always be asked to explain how you created (certain parts of) an assignment. Examination committees can also ask students to discuss the assignment they submitted. This will give you a chance to be more transparent and shed light on how you used GenAI. After all, correct use of GenAI and being able to explain it's an essential part of acting with scientific integrity.



KU Leuven continues to develop these texts, so for the most up-to-date version, you can also click through to their [website](#).

No education without a vision on AI

As you leaf through this magazine, you'll see what we - in the education sector - excel at: assessing the impact of new developments and quickly adapting to them. The emergence of the first practical, widely available forms of AI has led, after some initial panic, to institutions modifying their education and examination Regulations, teachers experimenting in the classroom, and using AI tools for their own work. Policy advisors are presenting initial guidelines, effects and possible applications are being investigated, and discussions are taking place about whether and how the use aligns with our core values. We're doing this not as isolated islands but in exchange with each other, across sectors. This magazine is a fine example of that.

But if we can successfully detect AI fraud and have taught our students to write smart prompts, have we reached our limit? Could the use of AI go further?

We know that students who receive one-on-one guidance perform better than those who receive classroom instruction. Individual guidance that meets the needs of a student, featuring challenging yet encouraging feedback and an appropriate mix of reflection and action, works better. It allows more students to perform better but is currently unaffordable and unattainable.

Sal Khan, founder of the free online education platform Khan Academy, believes that AI can assist in providing individual feedback in student guidance. He is working on an AI digital coach, Khanmigo, which encourages students to find answers themselves without merely judging an answer as right or wrong.

And there are more examples to consider. What if we could create adaptive learning materials with custom exercises that challenge students and build confidence, but are also free from bias? Materials that teachers not only understand but also know how to guide, effectively giving them superpowers.

If experiences with new technology in education over the past 20-30 years have taught us anything, it's that such dream scenarios don't become reality on their own. It requires blood, sweat, and tears, and not just from the teacher. It demands the commitment of an entire institution, perhaps even the entire education sector. AI must become a permanent part of educational visions and curriculum revisions, in the setup of IT infrastructure, and in teacher professional development.

Such a change that goes beyond 'learning to cope with' requires a vision on AI in education. We had reserved a chapter for this in the magazine, but couldn't yet find mature examples to fill a 'Vision' chapter. With such a vision, AI can truly contribute to the core of our public education: creating equal opportunities for everyone. It's crucial that this vision is developed, and that presents a wonderful task for us in education!



BRAM ENNING



PIERRE GORISSEN

Glossary

AI	Artificial Intelligence (in Dutch: KI or Kunstmatige intelligentie)
AI Act	The AI Act is a proposal for AI regulation (within the EU). The primary aim of the regulation is to market and use AI that is safe and in compliance with fundamental human rights. It is expected (hoped) that the final text of the AI Act will be approved at the beginning of 2024.
Big Data	Large and complex datasets that can form the basis for machine learning.
ChatGPT	A large-scale AI language model developed by OpenAI that generates human-like text. The GPT in ChatGPT stands for Generative Pre-trained Transformer (technology).
DALL-E	DALL-E is an AI model that creates images from textual descriptions. It is a product developed by OpenAI and a variant of the GPT model.
Generatieve AI	A branch of AI focused on creating models that can generate content, such as images, music, or text, based on patterns and examples from existing data.
Hubs and Pilotheubs	The substantive components within the Npuls programme.
Machine Learning	A component of AI focused on developing algorithms and models that allow computers to learn based on data, without being explicitly programmed. It enables AI to discover patterns and insights in large amounts of data, such as in large language models that form the basis for ChatGPT.
Midjourney	Midjourney is a generative AI platform that generates visual content based on textual prompts, allowing users to bring their ideas and concepts to life in a visual way.
NLAIC	Dutch AI Coalition. The NL AIC is a public-private partnership where government, business, educational and research institutions, and civil society organisations are committed to accelerating AI developments in the Netherlands and connecting AI initiatives in the Netherlands.
NOLAI	National Education Lab AI. Funded by the national government, scientists and companies will work from 2022 to 2032 with primary, secondary, and special education on smart technology in the classroom.
Npuls	The National growth fund programme for and by all public vocational education training schools, universities of applied sciences, and universities in the Netherlands. Collaborating to improve the quality of education, increase the agility of education, and improve the digital skills of teachers and learners. Npuls moves education at the heartbeat of innovation.
OpenAI	OpenAI is an American company that conducts research and develops products in the field of artificial intelligence (AI).
SIG AIED	Special Interest Group AI in Education. A SURF community.
Smart technology	A collective term for adaptive software used in education, often containing components that apply AI.
Versnellingsplan (VP)	The Acceleration Plan for Educational Innovation with ICT was a four-year programme (2019-2022) that capitalised on the opportunities offered by digitalisation for higher education in the Netherlands, thereby contributing to the quality of education.
Zones	The substantive components within the Acceleration Plan programme.

Colophon

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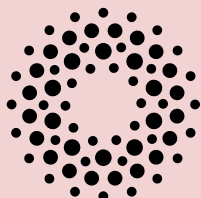
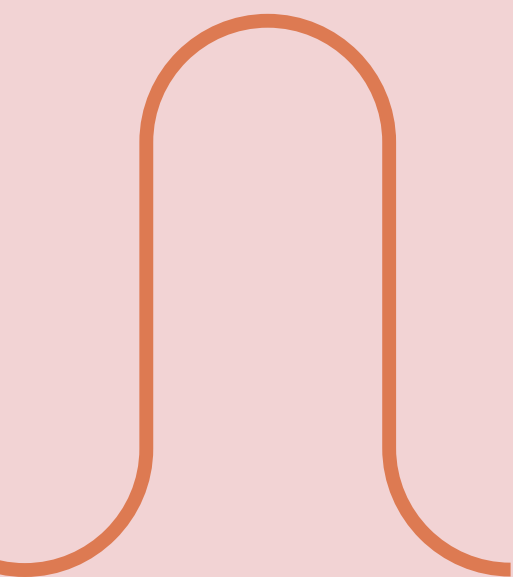
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Translations The texts were translated using ChatGPT-4 (and are peer reviewed after the translation)

Images Dall-E and Midjourney 5 were used for creating images. The image on the title page was generated with Midjourney 5. The prompt for this image was: 'Imagine teenage students interacting with high-tech interfaces in an educational environment, 4k, hdr, realistic'

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