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Nordic AI-BEST launch workshop; August 2023, Gothenburg. Summary report and preliminary recommendations

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Academic teaching: What existing problems can AI help us solve, and what new problems are created?

Nordic AI-BEST launch workshop; August 2023, Gothenburg. Summary report and preliminary recommendations

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Introduction

The intended result of the launch workshop was to “develop teaching and assessment methods to be applied in the fall semester” but in addition to generative AI in teaching and assessment, generative AI also has a role as students’ tutor and legal limitations as a tool at universities. These four aspects are covered in this summary report.¹

The presentations from the workshop have been shared among the participants and a catalogue of ideas taken from the presentations are attached to this report as an annex.

AI in class teaching

In class teaching AI can be used by both students during class when working with problems, and by the teaching to prepare teaching.

Using AI to prepare teaching can be considered as a ladder with four distinct steps:

- 1. Initial Shock:** The first step is to recognize the challenges AI may pose for each course. What are the potential pitfalls and issues specific to the subject matter?
- 2. Efficiency Enhancement:** The second stage involves harnessing AI to improve the teacher’s own efficiency. This phase is inherently technology-driven, focusing on how AI can streamline processes and amplify productivity.
- 3. Teaching Solutions:** The third step is to explore how AI can address long-standing pedagogical and didactic problems. This stage involves using AI as a tool to solve teaching issues that have persisted for years and could potentially be a topic for the Nordic AI-BEST workshop in Aalborg.

¹ Parts of this summary report were drafted by AI based on notes from the workshop. The sections on AI in assessment and AI as a tutor were drafted by *Llama 2 chat 7B Q4_K_S* in LM Studio. It was necessary to rewrite the output so that only the structure of the AI output remained. The sections on AI in teaching and legal limitations were drafted by *ChatGPT 3.5*. The AI output was generally extremely wordy and almost half of all output is omitted. For the remaining output the structure was partially maintained, and some phrases were kept.

4. **Paradigm Shift:** The final level rethinking teaching methods. This could be explored at the Nordic AI-BEST workshop by having participants take part in a game or simulation where an entire course is designed from scratch.

One activity at stage 2, Efficiency Enhancement, that has already been experimented with is the use of AI for generating multiple-choice questions, which leverages the creativity and structure of AI.

When students use AI in class there are other challenges and limitations:

AI cannot take on a central role in assignments, unlike tools like R or Stata. These traditional tools yield uniform output when provided with the same input, ensuring fairness, whereas the random elements in the way AI generates output means that students do not get the same output even with the same input. This discrepancy in output quality based on luck poses a challenge, as some students may benefit from favorable outcomes while others might receive weaker results.

Another new avenue is using AI as a tutor for students. This is covered in a separate section below. Two other problems that arise concern assessment and the ability to compel students to use AI. These considerations also have separate sections below.

AI has an inherent lack of legitimacy. To put it succinctly: students are afraid that the output of the AI would not be positively evaluated in exam situations and thus that the AI should not be trusted. This means that the output of the AI should be curated by the teacher before it is passed on to the students, or that students should have a high legitimacy point of reference such as a textbook for comparison. Alternatively, of course, other AI abilities can be leveraged in student problems such as its creativity in writing.

Recommendation:

1. Using AI to prepare teaching is a ladder of four steps. Do not get stuck at the first step: "Initial Shock".
2. Using AI can provide a large benefit to students so ensure that it is equally accessible.
3. AI can have low legitimacy in the eyes of students and steps can be required to mend this.

AI in assessment

Exams that involve AI pose unique challenges whether the AI is used to prepare the exam or used by students in the exam situation. An AI can prepare beforehand and grade multiple choice questions and while multiple choice questions can seem straightforward, they can be problematic in social science subjects where the correct answer often depends on assumptions. It is probably out of the question to have an AI actively generating output as part of the actual exam situation as outputs are inherently random, which means some students may receive "better" questions than others.

A ban on students using AI can be difficult to enforce unless students can undertake the exam from a situation where they are completely cut off from the rest of the world. And even then, there are AIs that can be run locally. AI means that it can be risky to evaluate students based on output

because it can be very difficult to infer the contribution of the student to the output. Ideally assessment should therefore shift away from the output and towards the process.

Students using AI without explicit reference to the AI should be considered plagiarizing at a level similar to students paying third parties to produce work for them. In study programs where students are evaluated based on their ability to produce some form of programming code the issue is very similar to copying code from sources like Stack Overflow. In these cases it is not a new problem.

Alternatively, assessment can be based on oral presentations. The tradition for using oral exams varies heavily across institutions and disciplines. There is some experience saying that oral exams are not necessarily more time consuming as it removes the need for producing and arguing for a grade for a student paper. On the other hand, there is also experience saying that oral exams are disliked among the competitive students because they fear that their performance becomes contingent on luck, if the oral exam is based on a random draw of a problem, and on the performance of the examiner interviewing the student. A distinct opportunity for oral exams is the group presentation (pitch). In assessment of group assignments, oral presentations (and answering questions) will become more important.

Recommendations:

1. The most practical assessment where students cannot benefit from using AI may be the oral exam.
2. It is important to be careful if using AI to prepare an exam – including oral exams – as each student should have the same precondition for undertaking the exam. A teacher may produce different questions for different students' oral exam – and indeed is likely to do so because students are different and respond differently – the randomness introduced by letting AI prepare an exam is less defensible.

AI as a tutor

AI as a tutor can assist students with various tasks such as database management, reasoning, creativity, and data analysis, and students should learn to use an AI tutor in a responsible and ethical manner. The use should be guided by their own critical thinking and problem-solving skills but formal requirements for the use of AI tutors are also necessary such as requiring students to report the contribution of AI to papers or reports they hand in for evaluation.

In principle, AI can also be used as a simple database - a repository of answers to questions - but using AI for simple search queries means that the student does not exploit the full potential of AI.

Using AI as a tutor is a generic student skill to be applied across elements of study programs. It is a higher-level skill for effective collaboration with AI.

Recommendations when using AI as a tutor:

1. Students need to be aware that the ability to evaluate the output from an AI and decide on its practical usefulness only comes with being able to do the same task yourself. You only know if an essay on a given topic is any good if you have the skill to write an essay yourself.
2. Students need to know both limitations and potentials of AI. Using AI as a database both misses the potential of AI and creates a risk that the data extracted from the database can be dated or misleading.
3. Avoid training students to solve problems only with access to an AI: While AI can assist with problem-solving, it's important to recognize that students should not rely solely on the technology to provide answers, and thus not be able to solve a problem without access to an AI.
4. Notice that competitiveness between students can lead them to be reluctant to share tips and tricks for using AI as a tutor. Incentivize sharing through e.g. peer grading and group work.

Legal limitations on AI

A key point to address is that while we cannot compel students to create profiles with openAI or any AI service, without clear boundaries they might feel compelled to turn to AI solutions because of the desire to be top of the class. A first initiative to address this is to incorporate education on the ethical and responsible use of AI within the curriculum itself, for example in a first semester course dedicated to cultivating good academic practices. By teaching students how AI can be used as a supplementary tool in a responsible manner, we empower them to make informed choices.

This aligns with the idea of guiding students toward the right way to utilize AI effectively, rather than letting them rely on it as a crutch (cf. section on AI as a tutor). The inability to mandate students to create profiles with any platform where user profiles are a norm (most AI services but also Google, academic journal websites, YouTube ...) means that focus should be on AI services that can be hosted on a local machine or server. One solution is LM Studio but a limitation is that these local models often lack the advanced capabilities of cloud-based models due to limitations in terms of computing resources and personnel at universities. This situation might of course change quickly.

Recommendations:

1. Explore solutions for local AI services so students do not need to create profiles with third parties, and the contents of prompts remain local.
2. Train students in ethical and responsible use of AI from the first semester.
3. Have a clear institutional level policy on what is the right and what is the wrong way to use AI.

Outlook

The second workshop in the Nordic AI-BEST project is scheduled for December 2023 in Aalborg. At this workshop the use of AI over the fall semester will be evaluated, and the experiences with AI in teaching, in assessment, as tutor, and with legal limitations on AI use will be updated accordingly.

The various ideas presented at the Gothenburg workshop can be seen in the inspirational list in the appendix.

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Appendix: list of inspirations for using AI in teaching

Some participants presented specific ideas and experience from their own courses while others presented more general ideas. The below list is an attempt at synthesizing it all without too much repetition.

- Use AI to participate in in brainstorming. To add ideas and to argue for or against ideas.
 - AI can be given conditions for the brainstorm. “Location suggestions based on...”
- Use AI to produce examples of a model or a concept.
- Use AI as the devil’s advocate. Have it criticize your work.
- Use AI to produce concrete plans, steps, and processes from overall plans.
- Use AI to guide methods – to suggest questions for a (quantitative) survey or interview guide (qualitative)
 - You can also test your questions on the AI to see the type of responses you are likely to get.
- Use AI to write a text. Then...
 - Improve the text in collaboration with the AI.
 - Add own improvements.
 - Have students write better answers.
- Use the AI tool Dynamic Case Creator (Henri Schildt, Aalto University) to have AI give automatic feedback to students’ work with a case.
- Use AI to produce definitions, which can then be compared to formal definitions and criticized.
- Use AI to generate arguments for and against a point of view and evaluate the arguments based on the curriculum.
 - Ask students to find evidence supporting the arguments.
- Use AI to write a case and to come up with questions for the case.
- Use AI to produce multiple-choice questions. For example, based on a text that you upload. Students can then use the multiple-choice questions to check their understanding of the text.
- Use AI to improve your own text. Student input a short text that they have written to the AI and ask for improvements. They must critically evaluate the AI suggestions.
- Turing test: One student writes an answer, a second student gets an answer from an AI, a third student tries to find out which answer is from the AI. Roles are then changed among the students.
- Use AI for students coding problems. Tell them to ask the AI what is wrong with their code for, e.g., data analysis.