OER 3

Storyboarding

Imagining Fair and Non-discriminatory Educational Technology and AI Usage

Pedagogical guideline for educators

The goal of the OER

This OER provides you with a session template and material for reflecting with learners on how the use of AI and technology in education can lead to (unintentionally) discriminatory and unfair outcomes, and for imagining more just ways to apply tech in education through the method of "storyboarding for empathy". At the end of the session, the participants have:

- reflected on how using AI and educational technologies can (unintentionally) lead to discriminatory or unfair outcomes, and how difficult it can be to spot and circumvent these,
- imagined scenarios for using AI and technology in educational settings in fairer and less discriminatory ways,
- developed an understanding of what to pay attention to when aiming for a fairer and less discriminatory use of AI and technology in education.

The OER was designed for **Higher Education educators and students** as the main audience, but feel free to adapt it and try it out in other contexts and with other (age) groups.

We recommend a group size of up to 30 students.

Please consider the level of existing knowledge in your group. If needed, you could precede the use of the OER with a session on non-discrimination and how it refers to technology use in education (see box below).

The OER is intended for one seminar session (90 minutes).

Optional:
Introduce the concept of "diversity, non-discrimination and fairness"

To provide an ideal preparation, you could precede the use of the OER with a preparatory session, in which the learners familiarise themselves with the EU principle of "diversity, non-discrimination and fairness" (based on the EU Commission's "Ethical guidelines on the use of artificial intelligence (AI) and data in teaching and learning for educators", or the preceding "Ethics Guidelines for Trustworthy AI").

As material, you could use:

- the introduction text from the OER page,
- the case study and action points from the ETH-TECH Framework,
- if working with other teachers: the ETH-TECH self-reflection tool,
- this "friendly definition" developed in the ETH-TECH framework:
  All teachers and students should be able to access the AI (or Ed-Tech enhanced by AI) in the same manner and the AI system should be designed to accommodate for the diversity of all students, including those with special needs. AI systems should not facilitate discrimination or other inequitable practices.

What you need to prepare in advance

The key material you need is the interactive comic on our website that guides through the entire session. Open it on your computer and also make sure your learners have access to it. Ideally, the participants of the sessions should bring laptops and have internet access to navigate the interactive comic (it is no problem if not everyone has a laptop as students can work in pairs and groups).

You further need the exercise sheet for the interactive task. Finally, you should print the storyboard template and bring additional paper, pens, markers etc. for analogue storyboarding.

Do you want to use this OER in an online seminar?

These guidelines detail how to use the OER in an in-person class. However, you can easily adapt the usage to an online synchronous setting:

What you need to prepare in advance:

- The students need access to the interactive comic.
- Set up a collection point for the created storyboards, e.g. a virtual whiteboard. You could also place the storyboard template there.
- Prepare breakout rooms, in which the students can work in small groups. These should be adaptable in their size and members, as two groups will present each other their results in the second part of the activity.

Even in an online seminar, the students can create the storyboards analogue or with digital software / AI. When working analogue, the members of one group can develop their story together and either guide one student (the "designer") in drawing the images by hand or each draw one image of the storyboard and later compile them digitally. Afterwards, they can upload a photo of the hand-drawn storyboard to the whiteboard. When working with digital software or AI, the students can collectively create the storyboards through sharing the screen of one group member and developing the visuals together.

Recommendations: the recommended number of participants is up to 30 in online systems. A higher number of participants might prevent the participants from engaging in the reflective dynamics. You should also consider how to moderate and wrap up the final plenary discussion.

The first steps

Explain the goal for the session, the structure of the session and the principle of diversity, non-discrimination and fairness, for example based on our “friendly definition” (see above).

Make sure the learners have access to all materials:

- Interactive comic that guides through the session. The students can navigate this alone or in pairs.
- Laptops, access to internet (for navigating the interactive comic + possibly for digital storyboarding)
- For analogue storyboarding: storyboard template + paper, pens, markers, etc.

Stage 1: Inspiration

Ask students to click through the interactive comic to get an idea of how AI use in education can unintentionally lead to discriminatory and unfair outcomes. They could work individually or in pairs. This first task serves as an inspiration and introduction to the topic.

The students navigate through the interactive comic by clicking on contextual on-screen-buttons and following displayed instructions. Over the course of the comic they will be able to decide between two pathways and they discover the story of Maria and the story of Max. After having chosen one story path, they can jump back to discover the other one. Ideally, the learners have viewed both stories at the end of the activity.

Stage 2: Storyboard creation

After the students navigated the interactive comic, an interactive exercise begins. You can find the exact task in this exercise sheet, which you can show to the students. This is the most extensive task of the session and should be given ample time (we suggest at least 45 minutes).

The students’ task is now to work in small groups to create their own storyboard that shows how a university teacher could use AI or other technologies in the classroom while adhering to the EU principle of diversity, non-discrimination and fairness. It might be helpful to keep the ‘friendly definition’ of the principle visible for the students during this exercise (see above and also the last slide of the comic).

For the story they are developing, the students can choose:

→ They can stick to the story in the comic and empathetically imagine a fairer and less discriminatory way, in which Professor Schneider could have applied AI for the storyboarding task in this setting.

→ Or they could select a different scenario for AI or tech usage in higher education and imagine strategies for action that educators can take up to enhance compliance with the EU principle. If the students decide to work with their own scenario, you should encourage them to select a scenario that is very specific and has a clear connection to the EU principle of non-discrimination.

To create their storyboards, the students can either work analogue or with the help of digital software and AI.

If working analogue, the students simply draw a storyboard on our storyboard template or a blank piece of paper. For this, they should be supplied with printed storyboard templates, further paper, pens, markers, etc. One advantage of working analogue is that the visualization and the wording of the story stems entirely from the students' minds and is not influenced by possible technological presuppositions. However, the images will likely not look as refined as those created with the help of technology, and the students need to feel comfortable to draw images by hand.

Alternatively, the storyboards can be created with the use of digital software and/or Generative AI. It is possible to generate the entire storyboard (images and text) with AI, or students could use a text-processing software to combine AI-generated images with text descriptions and speech bubbles. If students choose to use Generative AI, they should be aware of formulating the prompts in a way that the images represent what they actually had in mind. As highlighted by the character of "Maria" in our interactive comic, it can be challenging to prevent the AI from including details and assumptions that were not prompted, or possibly even hallucinating unrealistic settings. Thus, the students might need some support in this careful prompting. Furthermore, they should be made aware that while using AI can lead to refined-looking visuals, it often takes many tries and considerable time to develop images that align with their expectations.

Stage 3: Storyboard presentation

After the students have imagined and created their storyboards, two groups work together to present each other their results (page 3 on the exercise sheet). They discuss:

→ What does the other group think of this scenario? Does this support a fair and non-discriminatory use of AI and tech in education?

→ Did the creators think of every aspect from the 'friendly definition' of the principle?

There should be enough time for the students to discuss both storyboards and potentially make small adjustments.

Stage 4: Plenary discussion

Finally, the class comes together in a plenary session that is moderated by the educator. You can discuss the following guiding questions (page 4 in the exercise sheet):

→ Were you able to fix all potential challenges for a fair and non-discriminatory use of AI and tech in higher education in your selected scenario?

Note: We in the ETH-TECH project believe that an entirely unbiased use of technology in education is (currently) not possible. Moreover, we all carry our own perspectives and experiences and it is very challenging to act in truly objective and unbiased ways. For example, even when developing the story of Max and Maria and aiming to reflect on stereotypes that are reproduced by AI, we unintentionally reproduced sexist stereotypes (why does Maria (have to) worry about the way her looks are portrayed, while Max' issues are related to money?). Thus, the intention behind this question is to trigger critical thinking and discussion and make students aware of the dilemmas and limitations around trying to use tech ethically and balancing the needs of diverse users.

→ For the challenges you could not solve: What is necessary to address these?

→ What is your conclusion: What should we pay attention to when using AI and tech in higher education settings?

If your students struggle to come up with concrete courses of action for the third question, you could provide them with suggestions, for example:

- Our ETH-TECH Framework provides specific action points for a diverse, non-discriminatory and fair usage of AI and tech for educational institutions, teachers and students (p.24-27).
- The online course "Methods of Bias Reduction for Socially Responsible AI Design" on the "AI Campus" provides learners with methodological tools for identifying and avoiding stereotypical distortions, unfair or discriminatory content and procedures. You could recommend the course to your learners as a follow-up, or work through the course yourself in advance and provide your students with specific suggestions from the course.
- Moreover, it is a good idea to consider which tool to use, as some are known to be more biased or to represent specific ideologies. As these models are continuously evolving, we unfortunately cannot give specific recommendations, but recommend researching recent analyses that compare the level of bias in different tools.
- The most crucial step for avoiding discriminatory AI output is to be aware of potential, also implicit or hidden stereotypes and biases that might be represented in the generated content. A good practice is to closely interrogate the generated content with regard to potential stereotypes and biases.
    - Once these are identified, it can help to specifically ask the AI to avoid the identified issues in a second step.
    - It can further be helpful to ask the AI for potential stereotypes, e.g.: "Identify stereotypes in the generated material", or: "Generate content without stereotypes".

- However, while these steps can lead to more diverse and less discriminatory outcomes, it is virtually impossible to entirely eliminate biases and inequalities from AI outputs or other technology uses, as – simply put – the algorithms behind these systems have been built and trained based on data from an unequal and unfair world. Thus, a crucial course of action is also to discuss areas of non-usage of AI and tech in higher education.

The Result & Implications

As a result, the learners have reflected on how the use of AI and tech in educational settings can (unintentionally) lead to discriminatory outcomes, and have developed strategies for avoiding these, for using educational technologies in a fairer and more diverse manner, and for deciding where (not) to use AI and tech. If desired, these insights could be transferred to your specific institutional setting in a final, optional step in order to end on a constructive and empowering note, and to discuss further uses of the developed storyboards (see box below and page 5 on the exercise sheet).

Optional:
Implementation in your university setting

As an optional final step, you could discuss with the students what steps are necessary to implement the non-discriminatory use cases of AI and tech that they developed in their storyboards within your institutional setting.

- Which concrete steps are needed? (e.g., university policies, teacher training, better software, ...)
- Who is responsible? Where do we have agency?
- How could we use our developed storyboards or storyboarding as a method to foster discussion on a fair and non-discriminatory use of AI and tech in our institution? (e.g. organize an exhibition, a public discussion with different stakeholders, ...)