Practicing AI Ethics Literacy

10 scenarios for engaging with AI ethics in education

Anna Keune, Santiago Hurtado, Živa Simšič, and Verena Kappes
anna.keune@tum.de, s.hurtado@tum.de, ziva.simsic@tum.de, and verena.kappes@tum.de

Scenarios developed and designed by
Prof. Dr. Anna Keune, Santiago Hurtado, Živa Simšič, and Verena Kappes

Table of contents

Scenarios developed and designed by
Prof. Dr. Anna Keune, Santiago Hurtado, Živa Simšič, and Verena Kappes

Practicing AI ethics literacy can enhance the ability to make informed decisions about what AI technologies to use in educational settings and how to use them. The 10 AI ethics scenarios presented in this document show examples of how AI technologies could be used in educational contexts. The scenarios are based on selected reports of how AI technologies have been envisioned for educational settings in student-centered ways. The purpose of the scenarios is to foster discussions about AI ethics, including how AI technologies are implemented in educational settings, what they mean for teaching and learning, and what ethical considerations result from that. Through such conversations, AI ethics literacy can develop, which refers to the ability to identify and communicate about ethical implications of implementing AI technologies in educational settings. The scenarios are productive for fostering AI ethics literacy in relation to a diverse set of AI technologies with different functionalities and associated ethical and legal risks for education.

What is included in the AI Ethics scenarios?

Each scenario includes illustrations along with reflection by educators of using AI tools in education. A list of conversation prompts serves to ground the AI tool used in AI ethics. Each scenario also includes support materials, familiar digital and non-digital tools related to the AI tools of the scenarios. Support materials can be used as props for role-playing hypothetical moments of technology use. Role-playing can encourage engagement with unfamiliar and complex conversations by creating moments that appear real (Boal, 1979). Comparing and contrasting similarities and differences between familiar technologies and AI technologies in education can kindle productive conversations about AI ethics. Lastly, each scenario features a technical description of the AI technology and relevant references to scientific reports and publications.

What are AI ethics?

The scenarios encourage conversations about AI ethics related to the Organisation for Economic Co-operation and Development AI Principles, in short, OECD AI Principles. OECD AI Principles are value-based principles for responsible stewardship of trustworthy artificial intelligence and the first intergovernmental standard on AI (see https://oecd.ai/en/about/background). The OECD AI Principles include five principles with relevance to education. We present these here:

1. Inclusive growth, sustainable development, and well-being refers to the idea that AI technologies in education should benefit all toward developing creativity in equitable ways.
2. Human-centered values and fairness refers to the importance of democratic values and valuing human rights across all stages of AI in education, including “freedom, dignity and autonomy, privacy and data protection, non-discrimination and equality, diversity, fairness, [and] social justice” (see https://oecd.ai/en/dashboards/ai-principles/P6).
3. Transparency and explainability refers to responsible disclosure of information about what AI in education does, how it works in context, and when they are interacting with AI.
4. Robustness, security, and safety refers to the need to provide appropriate and secure tools and technologies that support teaching and learning in a safe manner.
5. Accountability refers to the importance of ensuring that AI in education follows the above principles and functions well. In an educational context, accountability refers to the AI Ethics in Education guidelines for the ethical use of AI Ethics in Education tools.

Each scenario contains conversation prompts associated with three of the OECD AI Principles to facilitate conversations about the relevance of AI ethics and to foster AI ethics literacy.

The design of the scenarios

The AI Ethics scenarios were designed in the context of the *Co-designing a Risk-Assessment Dashboard for AI Ethics Literacy in EdTech* project funded by TUM’s Institute for Ethics in Artificial Intelligence (IEAI). More information is available on the project website (IEAI, 2023).

References

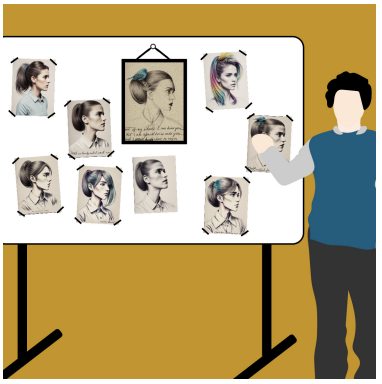
Boal, A. (1979). *Teatro del oprimido y otras poéticas políticas* [Theatre of the Oppressed]. (M.O.L McBride, Trans.). Civilização Brasileira. (Original work published 1979)

Institute for Ethics in Artificial Intelligence. (2023). *Co-designing a risk-assessment dashboard for AI ethics literacy in EdTech*. ieai.sot.tum.de/research/co-designing-a-risk-assessment-dashboard-for-ai-ethics-literacy-in-edtech/

Scenarios developed and designed by
Prof. Dr. Anna Keune, Santiago Hurtado, Živa Simšič, and Verena Kappes

1. AI-generative arts app to create an homage to an artist

Ben and Leon (14 years old) use an AI-generative arts app to design off-shoots of a drawing by the artist Tania Sívertsen.



Ben and Leon present the AI-generated images they created, explaining the similarities and differences between their own work and that of the artist.

The artist Tania Sívertsen shares her experience about the impact of AI technologies in a whole classroom discussion. Ben asks whether he can sell his derivatives of Tania's drawing.

"Tania Sívertsen is an artist I met at a gallery opening. We chatted, and she gave me permission to upload one of her drawings to an AI generative arts app during an art class. I designed an activity for 9th-grade students to explore an AI generative arts app with Tania's drawing. The students used the AI generative arts app to create the most creative derivatives. When we shared and discussed the students' images with Tania, one student asked whether he could call this artwork his and become famous like her. Tania responded by reading a statement about her experience of her work being copied by another artist." – *Ms. Winkelmann*

Support materials *(Appendix A)*

Conversation prompts

Inclusive growth, sustainable development, and well-being
What skills do students develop if they use AI tools in art classes instead of physical art materials?

Transparency and explainability
How did the app apply a certain style? Whose original art style(s) are the derivatives based on, and to what extent?

Robustness, security, and safety
Should youth show their AI-generated versions of an artist's work as their own work, and if so, under what conditions? Did your opinion change after reading Tania's artist statement?

AI-generative arts apps use large training data sets with images and text descriptions to recognize what is visible in the images. Using text prompts, these images are used in training to create unique novel images (Zhou & Nabus, 2023). AI-generative arts apps can augment design and creative processes, including drawing, storytelling, film, and architecture. Such tools can learn and emulate an artist's style, sometimes without their knowledge. AI-generative arts apps can change the tools and processes used by artists and designers (Audry, 2021).

References

Audry, S. (2021). *Art in the age of machine learning*. https://doi.org/10.7551/mitpress/12832.001.0001

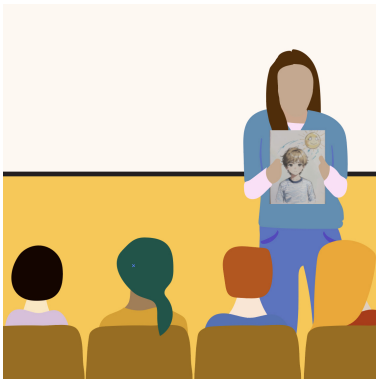
Zhou, K., & Nabus, H. (2023). The ethical implications of DALL-E: Opportunities and challenges. *Mesopotamian Journal of Computer Science*, 17–23. https://doi.org/10.58496/mjcsc/2023/003

Scenarios developed and designed by
Prof. Dr. Anna Keune, Santiago Hurtado, Živa Simšič, and Verena Kappes

2. AI-generative arts app to augment students' drawings

Mary (9 years old) brings one of her drawings to a workshop and uses it as a prompt for an AI-generative arts app.

The AI-generative arts app generates a range of images based on Mary's original drawing.



Mary presents her drawing and the generated images to the class, explaining how the AI app changed the drawing of her brother to show someone else.

"During the project week on 'Emerging Technologies Around Me', I offered a workshop on AI-generative arts for 4th graders to turn their own drawings into stunning professional-looking images. I asked students to upload a drawing to an AI-generative arts app. One student brought a drawing of her brother smiling in the sunshine. The AI-generative arts app translated the student's drawing into a manga-style drawing of a boy. His smile turned into a neutral expression, and his short dark hair had changed into longer blonde hair. The student showed the images to the class and explained: "I like my drawing better because it shows my brother. The AI image looks good but not like my brother at all. I would never draw him like this." – *Mr. Fromm*

Support materials *(Appendix B)*

Conversation prompts

Inclusive growth, sustainable development, and well-being
Can students develop art skills while using AI-generative arts apps and, if so, how?

Human-centered values and fairness
How did the AI arts app change the students' drawing? What biases do you see in the AI-generated content and the associated risks?

Robustness, security, and safety
Should students use AI-generative arts apps for educational purposes? If so, what can they learn, and how can educators prevent misuse?

AI-generative arts apps use multimodal prompting, such as combining text and image prompts (Liu, 2023). This makes it possible to edit images in certain styles, like adding a filter, making a picture of a hand look like a drawing, or vice-versa. Yet, AI-generative arts apps risk further amplifying existing biases and stereotypes because of the data sets that were used to train them (Qiao et al., 2022).

References

Liu, V. (2023). Beyond text-to-image: Multimodal prompts to explore generative AI. In *Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems. CHI '23: CHI Conference on Human Factors in Computing Systems*. ACM. https://doi.org/10.1145/3544549.3577043

Qiao, H., Liu, V., & Chilton, L. B. (2022). Initial images: Using image prompts to improve subject representation in multimodal AI generated art. *Creativity and Cognition*. https://doi.org/10.1145/3527927.3532792

Scenarios developed and designed by
Prof. Dr. Anna Keune, Santiago Hurtado, Živa Simšič, and Verena Kappes

3. AI-generative arts apps to illustrate local celebrations

Erika and Doreen (12 years old) talk about their experience at the spring fair (Frühlingsfest) close to Leipzig, and they collect AI-generated images for a presentation.

The AI-generated images mostly show typical Bavarian traditions and do not reflect Erika and Doreen's experiences in Leipzig.

The students begin their presentation by saying: "At the festival in Leipzig, people wore different costumes, but you get an idea."

"Last week, we covered traditions across Germany. I asked 7th-grade students to showcase their experiences of participating in a festivity. Erika and Doreen worked on a presentation about participating in the spring fair (Frühlingsfest) in a small town near Leipzig. They didn't take pictures and could not find a lot online. I encouraged them to use a text-to-image AI-generative arts app to create visuals to complement their presentation. During the presentation, Erika and Doreen apologized about their images because they all showed Bavarian traditions, which are different from the ones they saw at the spring fair." – *Ms. Maier*

Support materials *(Appendix C)*

Conversation prompts

Inclusive growth, sustainable development, and well-being
Does AI-generative art improve student presentations and, if so, how?

Human-centered values and fairness
What biases can you identify from the AI-generated image of Bavarian traditions?

Transparency and explainability
Are all the people you usually interact with portrayed through the pictures the AI tool generates?

AI-generative arts apps can create compelling visualizations. This can support students to create unique images to visualize their presentations. However, AI-generative arts apps can lack the complexity of reality because of the data used for training the applications (Crawford & Paglen, 2021). One example is the absence of cultural diversity in the underlying AI model. Hence, AI-generated images might reflect common stereotypes and biases related to gender, race, ethnicity, cultural artifacts, and more (Srinivasan & Uchino, 2021).

References

Crawford, K., & Paglen, T. (2021a). Excavating AI: the politics of images in machine learning training sets. *AI & Society*. https://doi.org/10.1007/s00146-021-01162-8

Srinivasan, R., & Uchino, K. (2021). Biases in generative art: A causal look from the lens of art history. In *Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency* (pp. 41–51). ACM. https://doi.org/10.1145/3442188.3445869

Scenarios developed and designed by
Prof. Dr. Anna Keune, Santiago Hurtado, Živa Simšič, and Verena Kappes

4. Deepfake to foster engineering identities

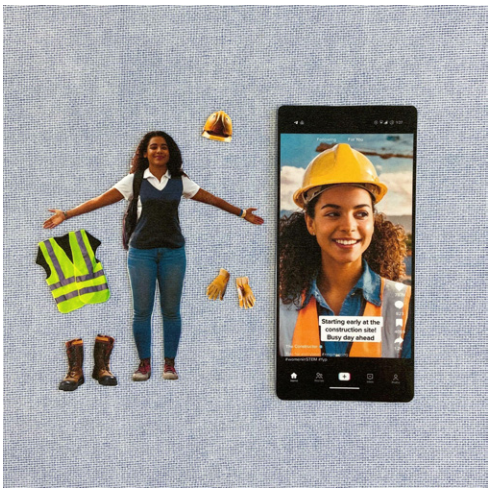
Sonia and Jane (12 years old) are creating a deepfake video, showing themselves as construction engineers.

Sonia and Jane share the deepfake video of themselves as construction engineers on a future construction site.

After the presentation, Lena says that she could imagine Sonia and Jane becoming construction engineers in the future. Their video was very realistic.

“I asked the 7th-grade students to envision themselves as engineers of future sustainable cities. I added a twist and asked them to use AI to illustrate themselves at work. Sonia and Jane generated a deepfake video that showed themselves as construction engineers explaining novel structures they designed. Their presentation was very engaging. After the presentation, I overheard a group of students congratulate the presenters on their success. The students told Sonia and Jane that they could imagine the girls as construction engineers in the future.” – *Ms. Karras*

Support materials *(Appendix D)*



Conversation prompts

Inclusive growth, sustainable development, and well-being
Can deepfakes contribute to broadening student self-identification with construction engineering and, if so, how? How does this compare to other activities?

Robustness, security, and safety
How can deepfake technologies help develop students' skills in identifying “fake” content?

Accountability
What guidelines are needed to use deepfake technologies in the classroom?

Deepfakes use computer-generated images to replace a person's face in a moving or still image with another person’s face while still maintaining mimics (Rossler et al., 2019). AI-powered deepfake imaging tools offer a wide range of opportunities for teaching and learning, such as creating an avatar for digital video-based tutorials. With public access to deepfake technologies, anyone can use AI-generated avatars and adapt them to their needs. This also poses risks as deepfakes become harder and harder to identify (Rana et al., 2022).

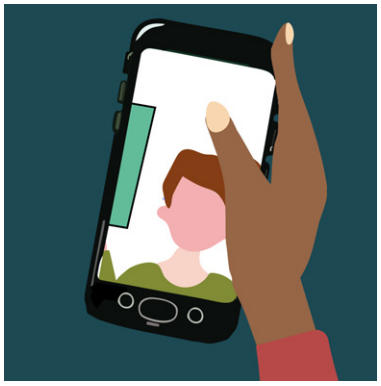
References

Rana, M. S., Nobi, M. N., Murali, B., & Sung, A. H. (2022b). Deepfake detection: A systematic literature review. *IEEE Access*, *10*, 25494–25513. https://doi.org/10.1109/access.2022.3154404

Rossler, A., Cozzolino, D., Verdoliva, L., Riess, C., Thies, J., & Niessner, M. (2019). FaceForensics++: Learning to detect manipulated facial images. *2019 IEEE/CVF International Conference on Computer Vision (ICCV)*, 1–11. https://doi.org/10.1109/ICCV.2019.00009

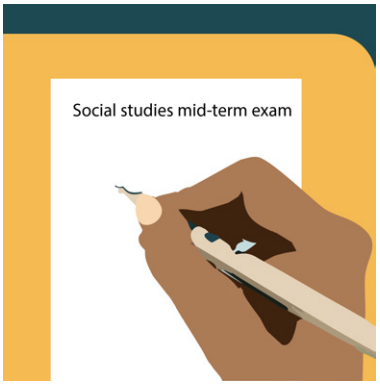
Scenarios developed and designed by
Prof. Dr. Anna Keune, Santiago Hurtado, Živa Simšič, and Verena Kappes

5. Social media recommendation algorithms to support personalized learning



Teresa (14 years old) uses social media daily. She navigates her mobile device and carefully chooses what she wants to see and share by intentionally liking and bookmarking content.

To help herself study for an exam, Teresa creates a new social media account and starts "liking" educational content. Then, she waits for additional relevant video recommendations.



Teresa finds information on topics covered in class and additional information. She feels confident about taking the exam.

"Young people are on social media a lot. They use social media for learning and getting relevant information. For example, students have shared videos they found that helped them learn something they didn't fully understand in class. Generally, I think these platforms can support learning, but I worry about how the platforms filter content. Students have also shared videos that only told one part of the topic, and I have limited resources to ensure that students get the full picture through social media content recommendations. Some students seem to know how to find information and question what they find better than others." – *Ms. Pérez*

Support materials *(Appendix E)*

Conversation prompts

Inclusive growth, sustainable development, and well-being
Does using social media recommendation algorithms support learning, if so, how?

Transparency and explainability
Are other's social media feeds different from yours, if so, why do you think they are different?

Robustness, security, and safety
Are there concerns about data collected from social media platforms? If so, which ones?

Recommendation algorithms are an AI-based social media technology that uses a vast amount of information to deliver content of potential interest. Each social media platform uses different formats to deliver content of potential interest and rely on people's click-interactions and networks (e.g., language, location, friend network, content liked, shared, or posted, and time spent on different features) to build feeds in real-time (Bucher, 2017). The content determined by the AI and delivered to people can provide personalized experiences. Intentionally 'training' social media feeds can be a way to learn about how feeds are generated and the possible working underlying AI and algorithms and can support searching and assessing information on specific topics (Hargittai et al., 2020).

References

Bucher, T. (2016). The algorithmic imaginary: exploring the ordinary affects of Facebook algorithms. *Information, Communication & Society*, *20*(1), 30–44. https://doi.org/10.1080/1369118x.2016.1154086

Hargittai, E., Gruber, J., Djukaric, T., Fuchs, J., & Brombach, L. (2020). Black box measures? How to study people's algorithm skills. *Information, Communication & Society*, *23*(5), 764–775. https://doi.org/10.1080/1369118X.2020.1713846

Scenarios developed and designed by
Prof. Dr. Anna Keune, Santiago Hurtado, Živa Simšič, and Verena Kappes

6. Writing an essay with AI to support creative writing

Sarah (12 years old) composes prompts for an AI chatbot to generate essay outlines.

Sarah edits the AI-generated outline to bring her voice into the work.

Mr. Hanson grades Sarah's essays based on the rubric he typically uses for essay-writing activities.

"I gave 7th-grade students the assignment to write an essay about the impact of climate change. Students were allowed to use a dialogue-based chatbot to support their writing process. They were encouraged to ask for the tool to support the development of outlines, editing content, and improving their language choice. The AI-generative technology sparked joy and fostered a range of writing practices. When I received the essays, I graded them based on my original rubric." – *Mr. Hanson*

Support materials *(Appendix F)*

Conversation prompts

Inclusive growth, sustainable development, and well-being
Should AI assistance be used by students and how? How can student voice and creativity be supported with AI chatbots?

Human-centered values and fairness
How should educators assess AI-assisted student essays?

Transparency and explainability
How is an AI-based chatbot different from using an encyclopedia or a language editor for essay writing?

AI chatbots (e.g., ChatGPT) are based on large language models, which are programs trained on very big datasets to generate answers. AI chatbots can answer questions on a range of topics and offer possibilities for student-centered and project-based learning (Kasneci et al., 2023). In the context of writing an essay, AI chatbots can support students in outlining and structuring their essays, editing content, improving rhetorics, and fine-tuning their language (Levine, 2023). AI chatbots can also become conversational partners that contribute ideas to youths' creative productions that students can edit to ensure their work reflects their voice. AI chatbots can also support formative assessment by providing individualized and productive feedback (Seßler et al., 2023).

References

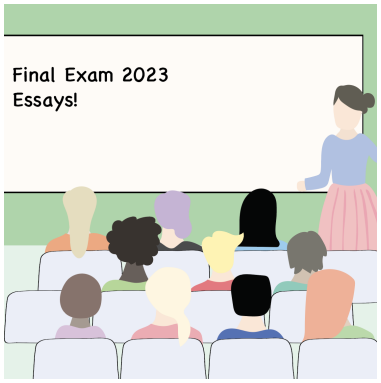
Levine, S. (2023, July 13). *Researching writing* [Conference session]. Pens & Pixels: Generative AI in Education, Los Angeles, United States. https://www.pensandpixels.org/

Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günnemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., . . . Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, *103*, 102274. https://doi.org/10.1016/j.lindif.2023.102274

Seßler, K., Xiang, T., Bogenrieder, L., & Kasneci, E. (2023). PEER: Empowering writing with large language models. In *Lecture Notes in Computer Science* (pp. 755–761). https://doi.org/10.1007/978-3-031-42682-7_73

Scenarios developed and designed by
Prof. Dr. Anna Keune, Santiago Hurtado, Živa Simšič, and Verena Kappes

7. AI-generated feedback to improve the tone of formative feedback



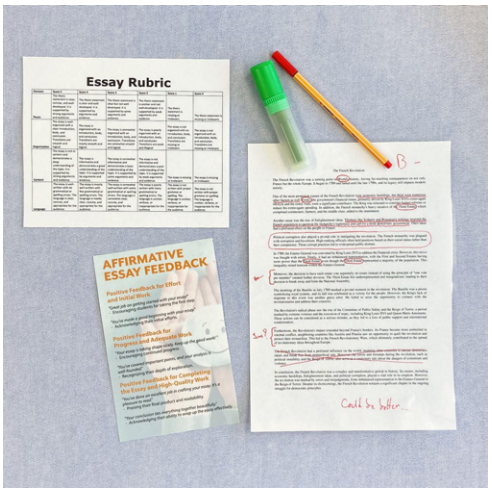
Ms. Maran assigns an essay and informs 7th-grade students that they will receive AI-generated formative feedback on their essays.

The students are working on their essays using different tools to write their essays, including pens, paper, tablets, and laptops.

Ms. Maran reads the student essays and the AI-generated essay feedback before she shares it with the students.

"Keeping up with grading with the current staff shortage has been challenging. I was looking forward to the AI-generated formative feedback and hoped it would reduce my workload. After using the AI feedback tool to provide feedback to 7th-grade student essays, I noticed that many of the comments the AI-generated had a more encouraging tone than the comments I wrote in the past." – *Ms. Maran*

Support materials *(Appendix G)*



Conversation prompts

Inclusive growth, sustainable development, and well-being
Should AI replace educator feedback and assessment, if so, how and to what extent?

Human-centered values and fairness
Is AI-generated formative feedback more or less biased in assessing students' work compared to educators? How so? What might educators learn when collaboratively assessing student essays through formative feedback?

Transparency and explainability
What kind of data should be the concrete basis of AI-based formative feedback of student essays?

AI-generated feedback is part of a larger context of AI-supported grading and refers to the analysis of student work, including scoring, highlighting mistakes, and providing in-depth feedback. AI-generated feedback promises to free educators' time and to increase encouraging and constructive feedback (Mizumoto & Eguchi, 2023). AI-generated feedback can also be more accurate and less biased compared to human scorers and can be trained by using educators' data (Lee, 2023). However, as biases can be present in the model of an AI decision-making process, it is necessary to be aware of possible biases and to determine in what contexts AI-generated feedback is beneficial.

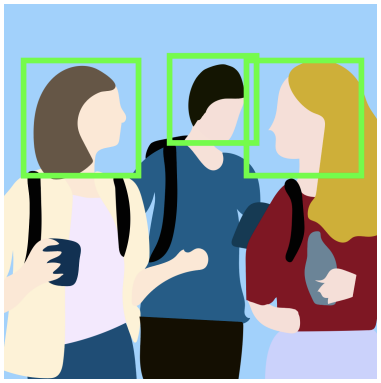
References

Lee, A. V. Y., Luco, A. C., & Tan, S. C. (2023). A human-centric automated essay scoring and feedback system for the development of ethical reasoning. *Educational Technology & Society*, *26*(1), 147-159.

Mizumoto, A., & Eguchi, M. (2023). Exploring the potential of using an AI language model for automated essay scoring. *Research Methods in Applied Linguistics*, *2*(2), 100050. https://doi.org/10.1016/j.rmal.2023.100050

Scenarios developed and designed by
Prof. Dr. Anna Keune, Santiago Hurtado, Živa Simšič, and Verena Kappes

8. Facial recognition technology to promote student well-being



Elena (15 years old) is entering school with her peers. The school's facial recognition technology captures their faces and expressions.

Elena receives a notification from her well-being diary requesting to confirm the AI-generated suggestion of her emotional state. Elena confirms and goes to class.

Later in the day, Mr. Harris meets with Elena and her peers to discuss their well-being diaries and what the students learned from their data.

"Our school implemented facial recognition technology to track student attendance and wellbeing on campus. The system regularly tracks students' facial expressions, translates them to a possible emotional state, and sends push notifications about their emotional state to their well-being diaries. Students can confirm or edit the AI-generated suggestions. Every two weeks, I meet with a small group of students to discuss their data and to see if they notice any changes. This is part of a school-wide initiative to promote mental health and wellbeing." – *Mr. Harris*

Support materials *(Appendix H)*

Conversation prompts

Inclusive growth, sustainable development, and well-being
How should AI-based facial recognition technology be implemented to benefit teaching and learning?

Transparency and explainability
Based on what data can AI-based facial recognition technology make suggestions about students' emotional state?

Robustness, security, and safety
How might the implementation of AI-based facial recognition technology cause harm to individuals and groups of people at the school?

AI-based facial recognition technology is computer-vision-based and can capture facial data to match against a database of faces (Andrejevic, 2020). In education, facial recognition technology promises to facilitate campus security and automated attendance registration, among others (Alam, 2022). However, using facial recognition technology in school raises ethical concerns. For example, a leak of stored biometric data can have unforeseen consequences for individuals.

References

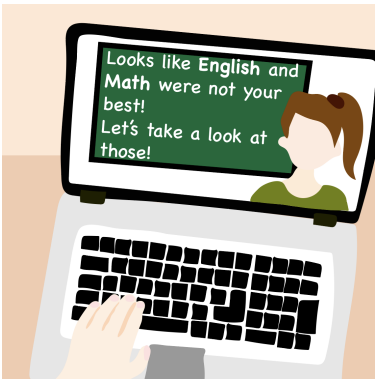
Alam, A. (2022). Employing adaptive learning and intelligent tutoring robots for virtual classrooms and smart campuses: Reforming education in the age of artificial intelligence. In *Advanced Computing and Intelligent Technologies: Proceedings of ICACIT 2022* (pp. 395-406). Springer Nature Singapore. https://doi.org/10.1007/978-981-19-2980-9_32

Andrejevic, M., & Selwyn, N. (2020). Facial recognition technology in schools: Critical questions and concerns. *Learning, Media and Technology, 45*, 115-128. https://doi.org/10.1080/17439884.2020.1686014

Scenarios developed and designed by
Prof. Dr. Anna Keune, Santiago Hurtado, Živa Simšič, and Verena Kappes

9. Intelligent tutoring to facilitate personalized learning

Emre (17 years old) has been using the school's intelligent tutoring system (ITS) to study various subjects.



Emre receives a notification about required improvements to reach the grades needed for his preferred higher education path.

Emre seeks advice from the school counselor and discusses how he could tackle the ITS recommendations.

"As a school counselor, one of my responsibilities is to prepare students for their academic experiences after high school. Through the intelligent tutor at our school, I have access to information about students' performances, including detailed information beyond final grades. This has been very helpful because I can advise students in much more personalized ways when I meet them to discuss particular strategies for improving specific aspects that affect their grades." – *Mr. Gant*

Support materials *(Appendix I)*

Conversation prompts

Human-centered values and fairness
Can an intelligent tutor support educators' autonomy and creativity, and if so, how? What features of an intelligent tutor are needed to ensure student agency?

Robustness, security, and safety
Should the access to student data by the intelligent tutor be limited? If so, how?

Accountability
How should the notifications generated by an intelligent tutor be evaluated?

Intelligent tutors in educational contexts promise personalized learning to address student variability by tailoring content to the needs and interests of individual students (Alfaro et al., 2020). Personalization of learning content is based on data collection and student performance analysis to develop learner recommendations. When an intelligent tutoring system enables people to adjust system recommendations, the system can support student agency (Bernacki et al., 2021).

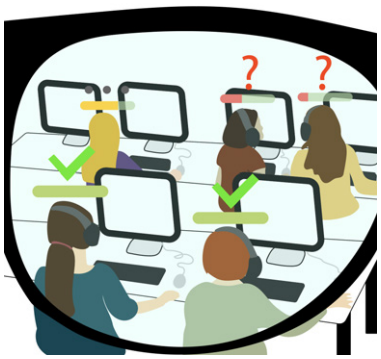
References

Alfaro, L., Rivera, C., Castaneda, E., Zuniga-Cueva, J., Rivera-Chavez, M., & Fialho, F. (2020). A review of intelligent tutorial systems in computer and web based education. *International Journal of Advanced Computer Science and Applications*, *11*(2). https://doi.org/10.14569/ijacsa.2020.0110295

Bernacki, M. L., Greene, M. J., & Lobczowski, N. G. (2021). A systematic review of research on personalized learning: Personalized by whom, to what, how, and for what purpose(s)?. *Educational Psychology Review*, *33*(4), 1675–1715. https://doi.org/10.1007/s10648-021-09615-8

10. AI-based classroom orchestration to ensure personalized feedback

Ms. Lee is putting on augmented reality (AR) glasses to use during her upcoming class.

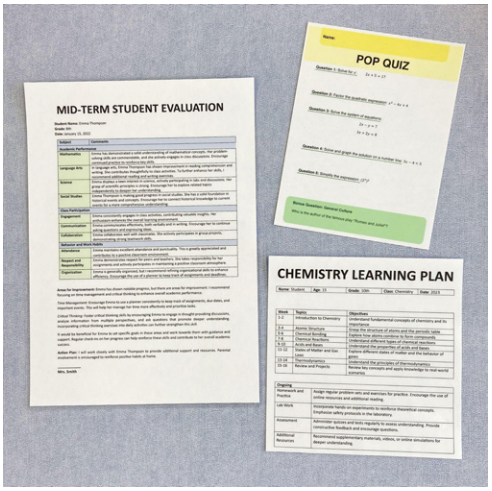


Through her glasses, Ms. Lee sees the students working on computers and icons, showing everyone's progress.

Ms. Lee approaches Ella (10 years old), who appears to be stuck, to support her with the assignment.

"The AR glasses provide me insights about the student's progress during class. I am fascinated by such AI-based classroom orchestration. In my 5th-grade classroom, the AR glasses show detailed information about students' progress in real-time. I can support students in a timely and personalized way." – *Ms. Lee*

Support materials *(Appendix J)*



Conversation prompts

Inclusive growth, sustainable development, and well-being
How should AI-based classroom orchestration support educators in addressing student needs?

Human-centered values and fairness
Can AI-based classroom orchestration complement student-educator interactions in an equity-oriented way? If so, how?

Accountability
How can educators ensure that AI-based classroom orchestration provides productive information toward individually relevant student support?

AI-based classroom orchestration can support educators in performing classroom management tasks, including adapting learning material to students' needs to support their learning progress and process (Alaven et al., 2022). AI-powered classroom orchestration can monitor the performance of in-class exercises that students work on individually. Educators can follow students' work-in-progress in real-time and offer personalized guidance and immediate support (Holstein et al., 2019).

References

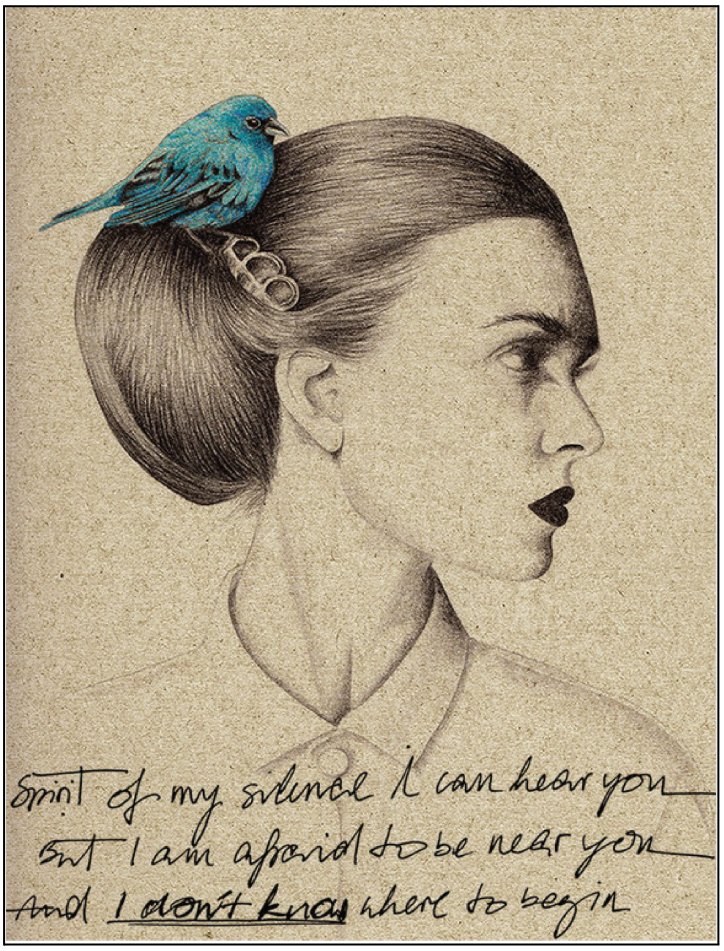
Aleven, V., Blankestijn, J., Lawrence, L., Nagashima, T., & Taatgen, N. (2022). A dashboard to support teachers during students' self-paced AI-supported problem-solving practice. In: *Artificial Neural Networks in Pattern Recognition* (pp. 16–30). https://doi.org/10.1007/978-3-031-16290-9_2

Holstein, K., Mclaren, B. M., & Aleven, V. (2019). Co-designing a real-time classroom orchestration tool to support teacher–AI complementarity. *Journal of Learning Analytics*, *6*(2), 27–52. https://doi.org/10.18608/jla.2019.62.3

Appendix A – Support materials for scenario 1, "AI-generative arts app to create a homage to an artist"

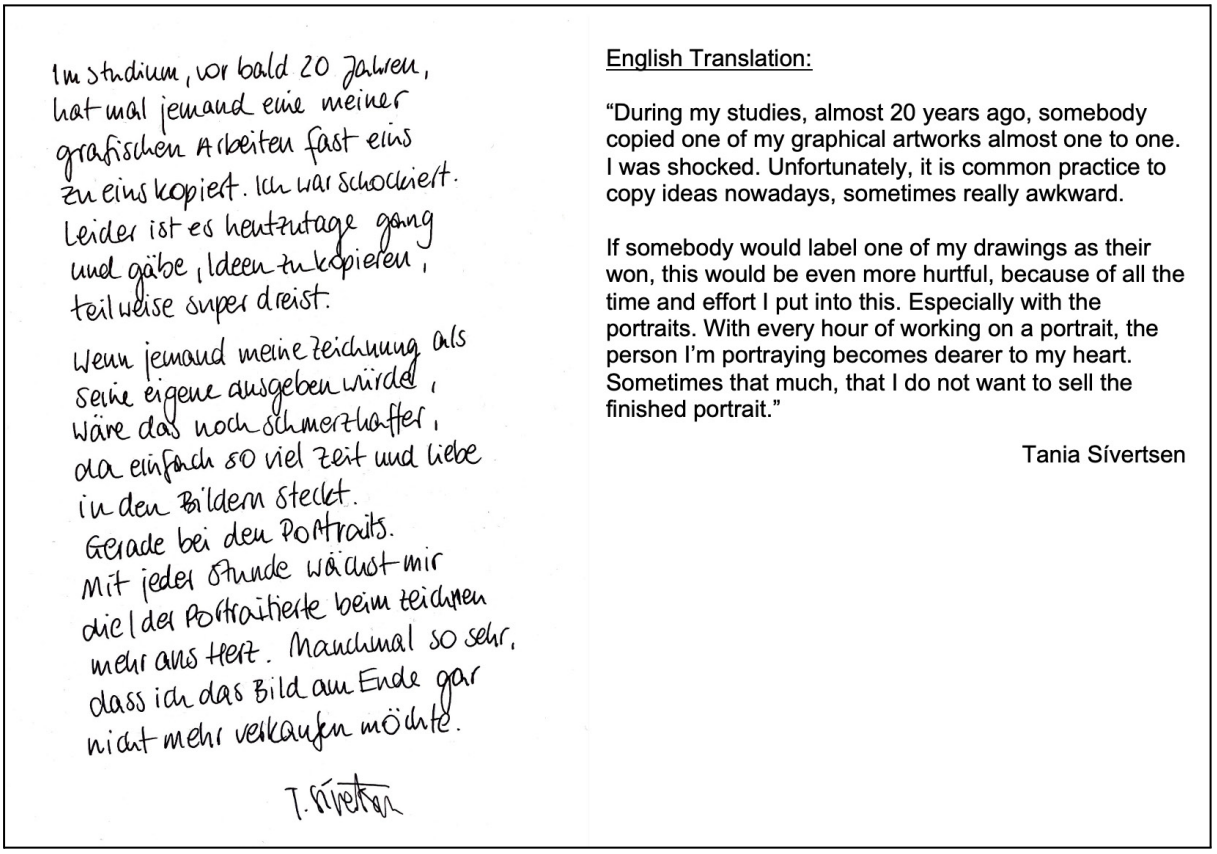
To support discussion about AI ethics in education, including how the use of AI tools compares and contrasts to using commonly used technologies in education, print and edit the materials listed below.

Original artwork by Tania Sívertsen: Print this artwork and cut it out.



AI-generated artworks: Use the above original artwork to generate derivatives of it using an AI generative arts app and play around with different settings that can modify it in many ways.

Original and translated letter from the artist Tania Sívertsen: Print this letter and cut it out.



Im Studium, vor bald 20 Jahren, hat mal jemand eine meiner grafischen Arbeiten fast eins zu eins kopiert. Ich war schockiert. Leider ist es heutzutage gang und gäbe, Ideen zu kopieren, teilweise super dreist.

Wenn jemand meine Zeichnung als seine eigene ausgeben würde, wäre das noch schmerzhafter, da einfach so viel Zeit und Liebe in den Bildern steckt. Gerade bei den Portraits. Mit jeder Stunde wächst mir die/der Porträtierte beim Zeichnen mehr ans Herz. Manchmal so sehr, dass ich das Bild am Ende gar nicht mehr verkaufen möchte.

T. Sívertsen

English Translation:

"During my studies, almost 20 years ago, somebody copied one of my graphical artworks almost one to one. I was shocked. Unfortunately, it is common practice to copy ideas nowadays, sometimes really awkward.

If somebody would label one of my drawings as their won, this would be even more hurtful, because of all the time and effort I put into this. Especially with the portraits. With every hour of working on a portrait, the person I'm portraying becomes dearer to my heart. Sometimes that much, that I do not want to sell the finished portrait."

Tania Sívertsen

Image editing app: Find a logo for a still-image editing application and print it. Then, paste it onto thick cardboard (e.g., cardstock or honeycomb cardboard) and cut it out.

Appendix B – Support materials for scenario 2, "AI-generative arts app to augment students' drawings"

To support discussion about AI ethics in education, including how the use of AI tools compares and contrasts to using commonly used technologies in education, print and edit the materials listed below.

Mary's drawing: Print this drawing and cut it out.

AI-generated drawing: Print this AI-generated image and cut it out.

Image editing app: Find a logo for a still-image editing application and print it. Then, paste it onto thick cardboard (e.g., cardstock or honeycomb cardboard) and cut it out.

Appendix C – Support materials for scenario 3, "AI-generative arts apps to illustrate local celebrations"

To support discussion about AI ethics in education, including how the use of AI tools compares and contrasts to using commonly used technologies in education, collect, print, and edit the materials listed below.

AI-generated image of Bavarian traditions: Print this image, paste it onto thick cardboard (e.g., cardstock or honeycomb cardboard), and cut it out.

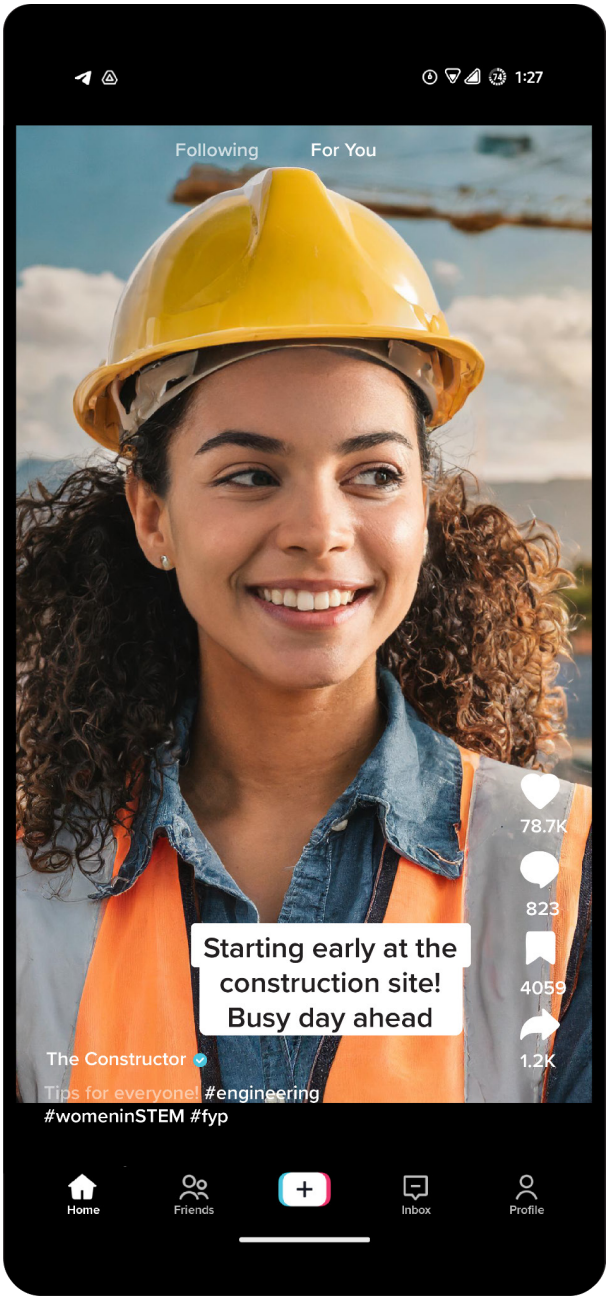
Image editing app: Find a logo for a still-image editing application and print it. Then, paste it onto thick cardboard (e.g., cardstock or honeycomb cardboard) and cut it out.

Camera: Collect a camera.

Appendix D – Support materials for scenario 4, “Deepfake to foster engineering identities”

To support discussion about AI ethics in education, including how the AI tools compare and contrast to the ethics of using most commonly used technologies in education, print and edit the materials listed below.

Screenshot of a TikTok video of The Constructor: Print this image, paste it onto thick cardboard (e.g., cardstock or honeycomb cardboard), and cut it out.



Scenarios developed and designed by
Prof. Dr. Anna Keune, Santiago Hurtado, Živa Simšič, and Verena Kappes

Photos of a woman and construction gear: Print these images, paste them onto thick cardboard (e.g., cardstock or honeycomb cardboard), and cut them out. Use the images to change the woman's appearance. This example references that currently, construction engineering is one of the most gender-non-diverse STEM fields.

Appendix E – Support materials for scenario 5, "Social media recommendation algorithms to support personalized learning"

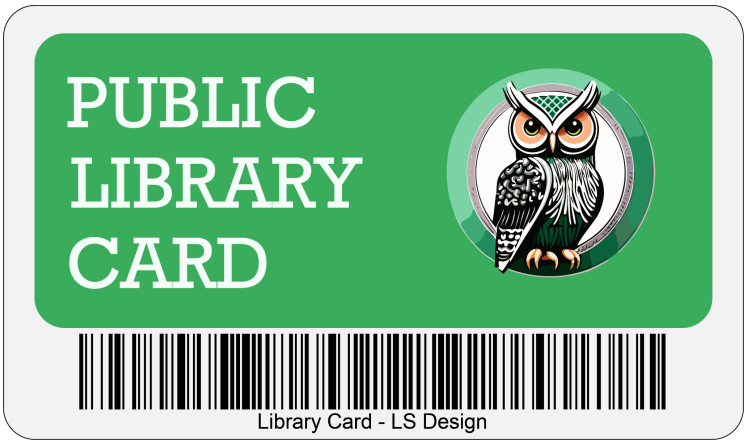
To support discussion about AI ethics in education, including how the AI tools compare and contrast to the ethics of using most commonly used technologies in education, collect, print, and edit the materials listed below.

Smartphone: Collect a smartphone.

Social media apps: Find and print logos, paste them onto thick cardboard (e.g., cardstock or honeycomb cardboard), and cut them out.

Online encyclopedia: Find and print an encyclopedia logo, paste it onto thick cardboard (e.g., cardstock or honeycomb cardboard), and cut it out.

Library card: Collect a library card or print this image, paste it onto thick cardboard (e.g., cardstock or honeycomb cardboard), and cut it out.



Appendix F – Support materials for scenario 6, "Writing an essay with AI to support creative writing"

To support discussion about AI ethics in education, including how the AI tools compare and contrast to the ethics of using most commonly used technologies in education, collect, print and edit the materials listed below.

Encyclopedia: Collect an encyclopedia book.

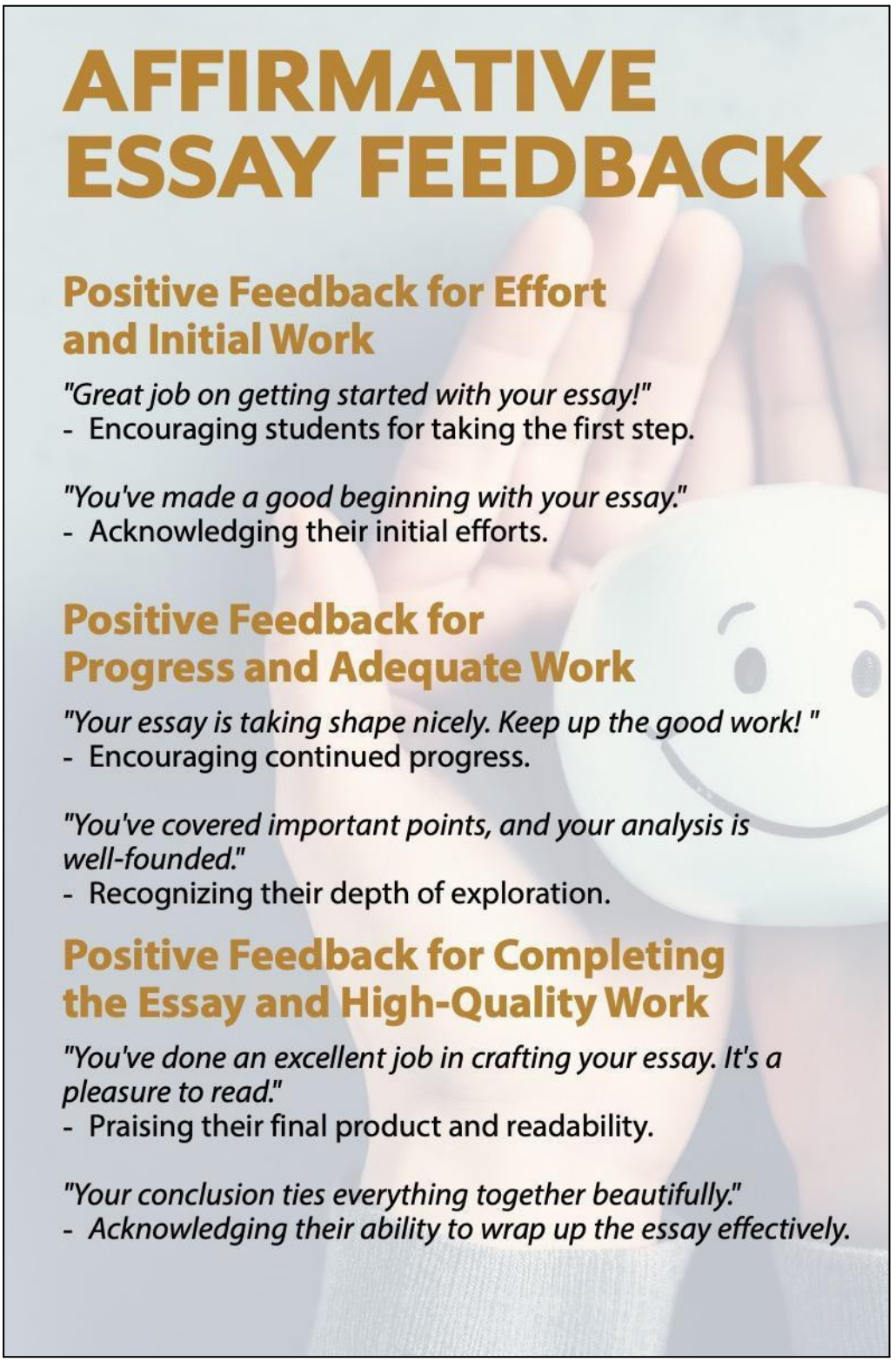
Writing assistance app: Find and print a logo, paste it onto thick cardboard (e.g., cardstock or honeycomb cardboard), and cut it out.

Online encyclopedia: Find and print a logo, paste it onto thick cardboard (e.g., cardstock or honeycomb cardboard), and cut it out.

Appendix G – Support materials for scenario 7, "AI-generated feedback to improve the tone of formative feedback"

To support discussion about AI ethics in education, including how the AI tools compare and contrast to the ethics of using most commonly used technologies in education, print, and edit the materials listed below.

Affirmative feedback flyer: Print this flier and cut it out.



Essay scoring explanation table: Print this table and cut it out.

Essay Rubric

Element	Score 5	Score 4	Score 3	Score 2	Score 1	Score 0
Thesis	The thesis statement is clear, concise, and well-developed. It is supported by strong arguments and evidence.	The thesis statement is clear and well-developed. It is supported by arguments and evidence.	The thesis statement is clear but not well-developed. It is supported by some arguments and evidence.	The thesis statement is unclear and not well-developed. It is supported by weak arguments and evidence.	The thesis statement is missing or irrelevant.	The thesis statement is missing or irrelevant.
Organization	The essay is well-organized with a clear introduction, body, and conclusion. Transitions are smooth and logical.	The essay is organized with an introduction, body, and conclusion. Transitions are mostly smooth and logical.	The essay is somewhat organized with an introduction, body, and conclusion. Transitions are somewhat smooth and logical.	The essay is poorly organized with an introduction, body, and conclusion. Transitions are weak and illogical.	The essay is not organized with an introduction, body, and conclusion. Transitions are missing or irrelevant.	The essay is not organized with an introduction, body, and conclusion. Transitions are missing or irrelevant.
Content	The essay is rich in content and demonstrates a deep understanding of the topic. It is supported by strong arguments and evidence.	The essay is informative and demonstrates a good understanding of the topic. It is supported by arguments and evidence.	The essay is somewhat informative and demonstrates a basic understanding of the topic. It is supported by some arguments and evidence.	The essay is not informative and demonstrates a poor understanding of the topic. It is supported by weak arguments and evidence.	The essay is missing or irrelevant.	The essay is missing or irrelevant.
Language	The essay is well-written with no grammatical or spelling errors. The language is clear, concise, and appropriate for the audience.	The essay is mostly well-written with few grammatical or spelling errors. The language is mostly clear, concise, and appropriate for the audience.	The essay is somewhat well-written with some grammatical or spelling errors. The language is somewhat clear, concise, and appropriate for the audience.	The essay is poorly written with many grammatical or spelling errors. The language is unclear, verbose, or inappropriate for the audience.	The essay is not written with proper grammar or spelling. The language is unclear, verbose, or inappropriate for the audience.	The essay is not written with proper grammar or spelling. The language is unclear, verbose, or inappropriate for the audience.

Graded essay: Print this essay and cut it out.

B -

The French Revolution

The French Revolution was a turning point in World's history, having far-reaching consequences on not only France but the whole Europe. It began in 1789 and lasted until the late 1790s, and its legacy still impacts modern society.

One of the most prominent causes of the French Revolution were economic hardships, but there were numerous other factors as well. Firstly, the government's financial issues, primarily driven by King Louis XVI's extravagant lifestyle and the costly wars, were a significant contributor. The King was reluctant to consider budget reforms or reduce his extravagant spending. In addition, the French monarchy's heavy taxation of the Third Estate, which comprised commoners, farmers, and the middle class, added to the resentment.

Another cause was the rise of Enlightenment ideas. Thinkers like Voltaire and Rousseau's writings inspired the French population to question the monarchy's legitimacy and call for a more democratic government. Their ideas had a profound effect on the people of France.

Political corruption also played a pivotal role in instigating the revolution. The French monarchy was plagued with corruption and favoritism. High-ranking officials often held positions based on their social status rather than their competence. These corrupt practices led to widespread public distrust.

In 1789, the Estates-General was convened by King Louis XVI to address the financial crisis. However, this move was fraught with errors. Firstly, it had an imbalanced representation, with the First and Second Estates having more power than the Third Estate, even though the Third Estate represented a majority of the population. This inequality raised tensions within the Estates-General.

Hm...

Moreover, the decision to have each estate vote separately on issues instead of using the principle of "one vote per member" created further division. The Third Estate felt underrepresented and marginalized, leading to their decision to break away and form the National Assembly.

The storming of the Bastille in July 1789 marked a pivotal moment in the revolution. The Bastille was a prison symbolizing royal tyranny, and its fall was celebrated as a victory for the people. However, the King's lack of response to this event was another grave error. He failed to seize the opportunity to connect with the revolutionaries and address their concerns.

The Revolution's radical phase saw the rise of the Committee of Public Safety and the Reign of Terror, a period marked by extreme violence and the execution of many, including King Louis XVI and Queen Marie Antoinette. These actions can be considered as a serious mistake, as they led to a loss of public support and international condemnation.

Sure?

Furthermore, the Revolution's impact extended beyond France's borders. As France became more embroiled in internal conflict, neighboring countries like Austria and Prussia saw an opportunity to quell the revolution and protect their monarchies. This led to the French Revolutionary Wars, which ultimately contributed to the spread of revolutionary ideas throughout Europe.

The French Revolution had a profound influence on the world, inspiring other countries to pursue democratic ideals and break free from monarchical rule. However, the errors and missteps during the revolution, such as political instability and the Reign of Terror, also serve as a cautionary tale about the dangers of extremism and violence.

In conclusion, the French Revolution was a complex and transformative period in history. Its causes, including economic hardships, Enlightenment ideas, and political corruption, played a vital role in its eruption. However, the revolution was marked by errors and misjudgments, from imbalanced representation in the Estates-General to the Reign of Terror. Despite its shortcomings, the French Revolution remains a significant chapter in the ongoing struggle for democratic principles.

Could be better...

Appendix H – Support materials for scenario 8, "Facial recognition technology to promote student well-being"

To support discussion about AI ethics in education, including how the AI tools compare and contrast to the ethics of using most commonly used technologies in education, print and edit the materials listed below.

<u>Attendance list</u>: Print this attendance list and place it on a clipboard or in a folder.

WEEKLY SCHOOL ATTENDANCE

SCHOOL NAME TEACHER

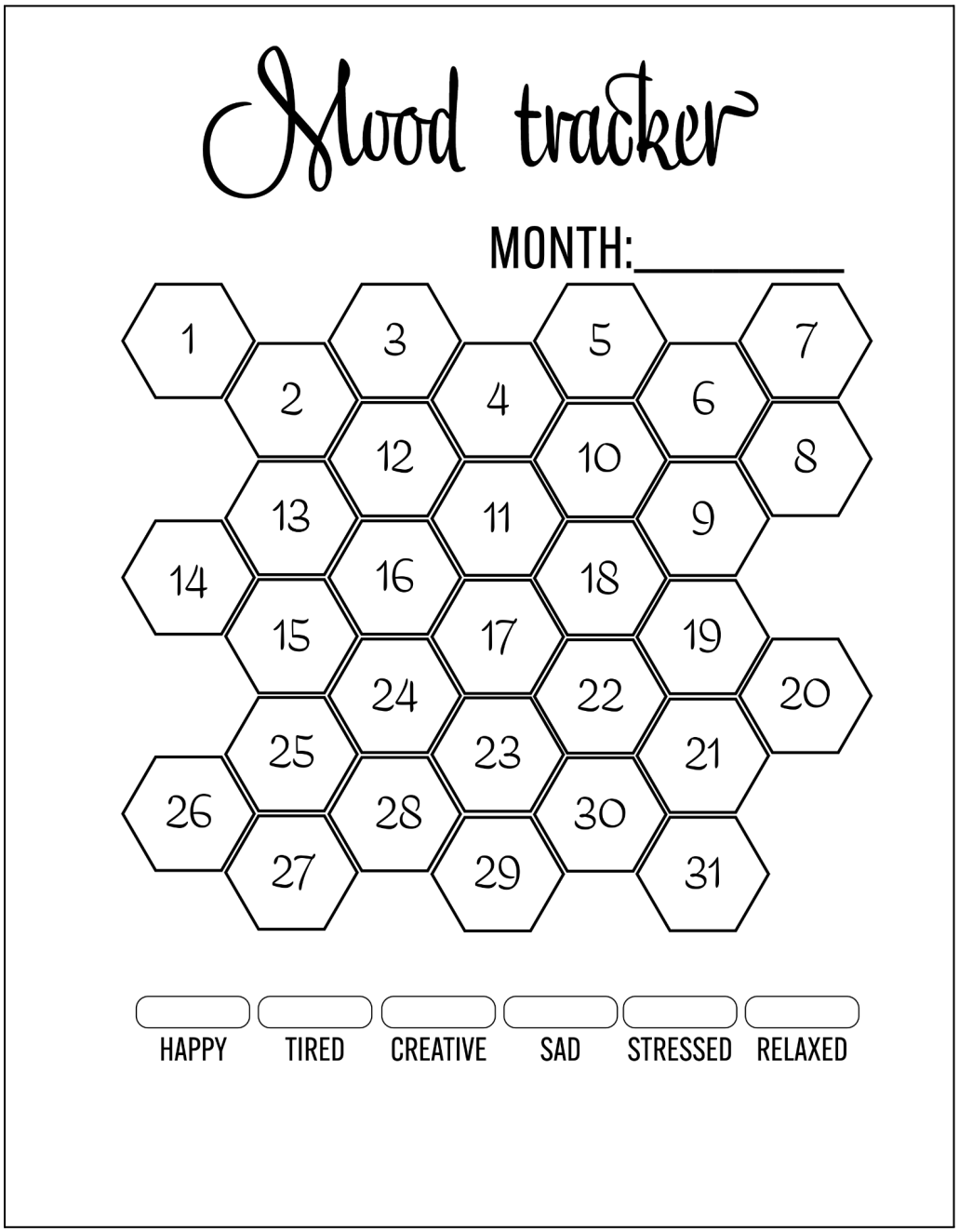
COURSE / WORK WEEK OF

Student Name	Monday			Tuesday			Wednesday			Thursday			Friday			Saturday		
	P	A	E	P	A	E	P	A	E	P	A	E	P	A	E	P	A	E
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Legend: **P** – Present **A** - Absent **E** - Excuse

Well-being flyer: Print this flyer and cut it out.

Mood tracker example: Print this tracker and cut it out.



Appendix I – Support materials for scenario 9, "Intelligent tutoring to facilitate personalized learning"

To support discussion about AI ethics in education, including how the AI tools compare and contrast to the ethics of using most commonly used technologies in education, collect, print, and edit the materials listed below.

Learning portfolio: Collect a notebook and embellish it to resemble a learning portfolio.

Learning resource app: Find and print a logo, paste it onto thick cardboard (e.g., cardstock or honeycomb cardboard), and cut it out.

Picture of in-person tutoring: Print this picture and cut it out.

Appendix J – Support materials for scenario 10, "AI-based classroom orchestration to ensure personalized feedback"

To support discussion about AI ethics in education, including how the AI tools compare and contrast to the ethics of using most commonly used technologies in education, print, and edit the materials listed below.

Chemistry learning plan: Print this learning plan and cut it out.

CHEMISTRY LEARNING PLAN

Name: Student	**Age**: 15	**Grade**: 10th	**Class**: Chemistry	**Date**: 2023

Week	Topics	Objectives
1-2	Introduction to Chemistry	Understand fundamental concepts of chemistry and its importance
3-4	Atomic Structure	Grasp the structure of atoms and the periodic table
5-6	Chemical Bonding	Explore how atoms combine to form compounds
7-8	Chemical Reactions	Understand different types of chemical reactions
9-10	Acids and Bases	Understand the properties of acids and bases
11-12	States of Matter and Gas Laws	Explore different states of matter and the behavior of gases
13-14	Thermodynamics	Understand the principles of thermodynamics
15-16	Review and Projects	Review key concepts and apply knowledge to real-world scenarios

Ongoing	
Homework and Practice	Assign regular problem sets and exercises for practice. Encourage the use of online resources and additional reading.
Lab Work	Incorporate hands-on experiments to reinforce theoretical concepts. Emphasize safety protocols in the laboratory.
Assessment	Administer quizzes and tests regularly to assess understanding. Provide constructive feedback and encourage questions.
Additional Resources	Recommend supplementary materials, videos, or online simulations for deeper understanding.

Pop quiz example: Print this quiz and cut it out.

Name:

POP QUIZ

Question 1: Solve for x: $2x + 5 = 17$

Question 2: Factor the quadratic expression: $x^2 - 4x + 4$

Question 3: Solve the system of equations:

$$2x - y = 7$$

$$3x + 2y = 8$$

Question 4: Solve and graph the solution on a number line: $3x - 4 < 5$

Question 5: Simplify the expression: $(2^3)^2$

Bonus Question: General Culture

Who is the author of the famous play "Romeo and Juliet"?

Mid-term student evaluation example: Print this evaluation example and cut it out.

MID-TERM STUDENT EVALUATION

Student Name: Emma Thompson
Grade: 8th
Date: January 15, 2022

Subject	Comments
Academic Performance	
Mathematics	Emma has demonstrated a solid understanding of mathematical concepts. Her problem-solving skills are commendable, and she actively engages in class discussions. Encourage continued practice to reinforce key skills.
Language Arts	In language arts, Emma Thompson has shown improvement in reading comprehension and writing. She contributes thoughtfully to class activities. To further enhance her skills, I recommend additional reading and writing exercises.
Science	Emma displays a keen interest in science, actively participating in labs and discussions. Her grasp of scientific principles is strong. Encourage her to explore related topics independently to deepen her understanding.
Social Studies	Emma Thompson is making good progress in social studies. She has a solid foundation in historical events and concepts. Encourage her to connect historical knowledge to current events for a more comprehensive understanding.
Class Participation	
Engagement	Emma consistently engages in class activities, contributing valuable insights. Her enthusiasm enhances the overall learning environment.
Communication	Emma communicates effectively, both verbally and in writing. Encourage her to continue asking questions and expressing ideas.
Collaboration	Emma collaborates well with classmates. She actively participates in group projects, demonstrating strong teamwork skills.
Behavior and Work Habits	
Attendance	Emma maintains excellent attendance and punctuality. This is greatly appreciated and contributes to a positive classroom environment.
Respect and Responsibility	Emma demonstrates respect for peers and teachers. She takes responsibility for her assignments and actively participates in maintaining a positive classroom atmosphere.
Organization	Emma is generally organized, but I recommend refining organizational skills to enhance efficiency. Encourage the use of a planner to keep track of assignments and deadlines.

Areas for Improvement: Emma has shown notable progress, but there are areas for improvement. I recommend focusing on time management and critical thinking to enhance overall academic performance.

Time Management: Encourage Emma to use a planner consistently to keep track of assignments, due dates, and important events. This will help her manage her time more effectively and prioritize tasks.

Critical Thinking: Foster critical thinking skills by encouraging Emma to engage in thought-provoking discussions, analyze information from multiple perspectives, and ask questions that promote deeper understanding. Incorporating critical thinking exercises into daily activities can further strengthen this skill.

It would be beneficial for Emma to set specific goals in these areas and work towards them with guidance and support. Regular check-ins on her progress can help reinforce these skills and contribute to her overall academic success.

Action Plan: I will work closely with Emma Thompson to provide additional support and resources. Parental involvement is encouraged to reinforce positive habits at home.

_____
Mrs. Smith