AI and Ethics: A Mini-Unit for High School

Lesson Set Two

Activity Overview: This activity set is a week-long unit designed for 90-minute class periods utilizing curriculum and materials from the DAILy Workshop, aimed at introducing students to AI, how it works, and ethical considerations/impacts. If the class period is shorter than 90 minutes, the lessons will likely need to be broken up into two chunks.

- Day One: Students will learn about what AI is, how it works, and identify areas of their life where they use AI.
- Day Two: Students will be introduced to supervised machine learning, including classifying and generating. Students will then build their own teachable machine and examine how data sets influence results.
- Day Three: Students will learn about algorithmic bias and begin considering ethics as they related to artificial intelligence.
- Day Four: Students will learn about socio-technical systems and examine the goals of these systems by examining the recommender algorithm on YouTube.
- Day Five: Students will continue their learning about socio-technical systems, algorithms, and ethics as they redesign the recommender algorithm for a stakeholder group they select in order to make it less bias and more ethical.
- Day Six: Students will look at how they use AI in their own lives and devise a plan to use it ethically.

Extension Options: Any activities from the DAILy Workshop curriculum can be integrated into this mini unit to extend learning and/or challenge students as needed.

Target Grade Levels: 9 - 12

Target Subject: Computer science, technology, engineering (Note: Lesson is suitable for various content areas)

Notes for Educators: These lessons were originally taught in a 9th grade ELA class, but can be modified to fit any secondary classroom. Basic lesson structure and materials were taken from the DAILy Workshop and the MIT AI Ethics Education Curriculum. Links to both sites, as well as links to additional resources, can be found at the end of this unit plan.

Materials: Students will need access to a device with internet access (iPad or laptop/computer). Teacher will need access to an interactive board, such as a SmartBoard or Newline. The lessons work best if the teacher and students have access to Google Chrome and Google education suite (Slides, Drawing, Docs, etc.).

Day Four – Socio-technical Systems: The YouTube Recommender

Lesson Resources:

- Socio-technical systems diagram and info from Geeks for Geeks
  - https://www.geeksforgeeks.org/socio-technical-systems/
- MIT AI Ethics Education Curriculum section on how algorithms can have various motives and goals (page 95-97)
  - https://docs.google.com/document/d/1e9wx9oBg7CR0s5O7YnYHVmX7H7pnITfoDxNdrSGkp60/edit

Guiding Questions:

- What are socio-technical systems and how do they function in our society?
- How are AI ethics and socio-technical systems connected?
- What ethical considerations need to be made when designing a socio-technical system?

Objectives:

- Understand that all technical systems are socio-technical systems. Understand that socio-technical systems are not neutral sources of information.
    - Understand the term "optimization" and recognize that humans decide the goals of the socio-technical systems they create.
    - Reason about the goals of socio-technical systems in everyday life and distinguish advertised goals from true goals (for example, the YouTube recommendation algorithm aims to make profit for the company, while it is advertised as a way to entertain users).
    - Map features in existing socio-technical systems to identified goals.

Catch/Hook: Once class has started, ask the students the following questions: How many of you have used YouTube before? How do you decide which YouTube videos to watch?

Activity Instructions:

1. Tell students that today we are going to consider socio-technical systems (put the diagram from Geeks for Geeks on the SmartBoard). On a very basic level, a socio-technical system can be referred to as the mixture of people and technology. It is the study of how technology is used and produced and looks at people, software, hardware, data, and laws/regulations. It is important to note that socio-technical systems always have a goal in mind and are not neutral sources of information. There are often many stakeholders in a given system (think program developers, users of differing backgrounds/needs, etc.) and these types of systems can impact them in different ways.
2. Next tell students we are going to use YouTube as a socio-technical system and examine its recommender function. Utilize the MIT AI Ethics Education Curriculum section on how algorithms can have various motives and goals (starting on page 94) to lead students through an activity examining the algorithms of the YouTubes recommender.
3. Lead the group in a short discussion about the possible ethical impacts of the existing algorithms of the recommender, they will continue this train of thought on their exit ticket. Are the recommender algorithms ethical or not? How can they perpetuate the spread of misinformation? How do they exclude groups of people?

Review: Review the term/concept of a socio-technical system, remind students that these systems are not bias free and usually have some sort of motive or goal. Review the main facets of AI ethics.

Assessment: Have students fill out an exit ticket where they write three to five sentences reflecting on the ethical implications of the YouTube recommender algorithms. How have they seen these implications reflected in their lives or the lives of others?

Standards:

- L1.IC.C.01 Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.
- L2.IC.C.01 Evaluate the beneficial and harmful effects that computational artifacts and innovations have on society.

Day Five - Ethical Algorithms: Redesigning YouTube

Lesson Resources:

- YouTube Redesign from the MIT AI Ethics Education Curriculum (page 98 – 102) (https://docs.google.com/document/d/1e9wx9oBg7CR0s5O7YnYHVmX7H7pnITfoDxNdrSGkp60/edit)
- Redesign YouTube script and slides from DAILy Workshop
    - Script: https://docs.google.com/document/d/1kUFD1U4r8SGVY36fbgl-JAgIGInNCVkU0uU-Q6EPc3k/copy
    - Slides: https://docs.google.com/presentation/d/1QwViFC9hLPsfGFRDADByoPw0r1vnV4NLSN1QASMqyLs/copy

Guiding Questions:

- Who are potential stakeholders in socio-technical systems?
- What are different ways socio-technical systems can impact stakeholders?
- What ethical considerations need to be made when designing elements of a socio-technical system?

Objectives:

- Recognize there are many stakeholders in a given socio-technical system and that the system can affect these stakeholders differentially.
    - Identify relevant stakeholders in an socio-technical system.
    - Justify why an individual stakeholder is concerned about the outcome of a socio-technical system.
    - Identify values an individual stakeholder has in an socio-technical system, e.g. explain what goals the system should hold in order to meet the needs of a user.
    - Construct an ethical matrix around a socio-technical system.

Catch/Hook: Upon arrival, students brainstorm ways they could change the YouTube recommender to better serve their friend group. This can be done on paper or, if seated in groups, students could discuss with their tablemates.

Activity Instructions:

1. Remind the class that last time you met, the group looked at the goals of the YouTube recommender and considered what impacts it has on stakeholders. Tell them that today they are going to redesign the YouTube recommender to better serve a group of stakeholders they select.
2. Put students into groups or let them select a group to work with. Using the slide deck from DAILy Workshop in the Redesign YouTube activity and the worksheets from the MIT AI Ethics curriculum, walk students through designing their own version of the YouTube Recommender, pausing as you go along to give the groups time to make decisions and fill out their sheets.
3. Have a few groups share their new algorithms!

Review: Review the concept of a socio-technical system, and why stakeholders/users are an important part of designing these systems.

Assessment: Each group will turn in their worksheets for their new algorithm.

Standards:

- L2.AP.PD.07 Modify an existing program to add additional functionality and discuss intended and unintended implications.

- L2.IC.C.01 Evaluate the beneficial and harmful effects that computational artifacts and innovations have on society.

Day Six – AI, Ethics, and You

Guiding Questions:

- How do I use AI in my daily life?
- How do I see examples of bias and/or ethical issues in the AI around me?
- What can I do to make sure I am using AI ethically in my life?

Objectives:

- Be able to define bias and ethics and explain how they relate to artificial intelligence.
    - Provide real-world examples of each and explain why ethical issues are present
- Define various ways to use AI ethically in life.
    - Know how to identify bias and other ethical issues in AI algorithms.
    - Be able to define ways to ethically use AI.

Catch/Hook: Students will do a quick write to answer the question "How do you use AI in your daily life?"

Activity Instructions:

1. Quickly review all the concepts covered during this mini unit – what is AI, what is supervised machine learning, bias in algorithms, socio-technical systems, and what AI ethics are/why they matter.
2. Ask students to think about how they interact with AI in their daily lives. Have them write down examples of the interactions they have, then have students evaluate whether or not the AI they encounter is biased or unethical in any way.
3. In small groups, have students consider how they are using AI in their daily lives. Have each group outline three ways that students can be ethical users/creators of artificial intelligence.
4. Have each group share out the ways they suggested for students to ethically use/create AI. Consider gathering the suggestions and posting them somewhere for the group to reference as needed.

Review: Completed in the first step of the lesson.

Assessment: Have students look back on the paragraph they wrote at the beginning of class on how they use AI in their daily life. Based on what they have learned during this mini unit, have them choose one area of their life where they could improve their use of AI. Have students craft a SMART (specific, measurable, achievable, relevant, and time-bound) goal to improve their use of AI in that area in order to become a more responsible and ethical AI user.

Standards:

- L1.IC.SLE.04 Using grade level appropriate content and complexity, discuss the legal, social, and ethical impacts associated with software development and use, including both positive and malicious intent.

Resources and Acknowledgements:

The DAILy Curriculum for Middle School Students was created by the MIT Media Lab Personal Robots Group and the MIT STEP Lab. More information, including links to the full curriculum, can be found at https://raise.mit.edu/daily/.

The MIT AI Ethics Education Curriculum is from the Ethics of Artificial Intelligence Curriculum for Middle School Students and was created by Blakeley H. Payne with support from the MIT Media Lab Personal Robots Group, directed by Cynthia Breazeal. The full curriculum can be found at https://docs.google.com/document/d/1e9wx9oBg7CR0s5O7YnYHVmX7H7pnITfoDxNdrSGkp60/edit.

Additional resources can be found on the AI4K12 website at https://ai4k12.org/ and Everyday AI at Resources | Everyday AI (everyday-ai.org)

The Wyoming Computer Science Content and Performance Standards can be found here https://edu.wyoming.gov/wp-content/uploads/2021/04/2020-CS-WYCPS-with-all-PLDs-effective-04.07.21.pdf.

Printable Lesson Resources

- Exit ticket for Day Four – Socio-technical Systems: The YouTube Recommender
- SMART Goal Worksheet for Day Six – AI, Ethics, and You

EXIT TICKET

YOUTUBE RECOMMENDER

What are some ethical implications of the YouTube recommender algorithms?

IMPLICATIONS

How have you seen these implications reflected in your life or the lives of others?

EXIT TICKET

YOUTUBE RECOMMENDER

What are some ethical implications of the YouTube recommender algorithms?

IMPLICATIONS

How have you seen these implications reflected in your life or the lives of others?

SMART GOALS

Setting realistic and achievable outcomes.

My goal is:

S **SPECIFIC**	What do I want to happen?	
M **MEASUREABLE**	How will I know when I have achieved my goal?	
A **ATTAINABLE**	Is the goal realistic and how will I accomplish it?	
R **RELEVANT**	Why is my goal important to me?	
T **TIMELY**	What is my deadline for this goal?	