ALGORITHMIC BIAS

LESSON PLAN
LESSON #3

IDH
INSTITUTE FOR DIGITAL HUMANITY

LESSON RATIONALE:

The usage of algorithms is expanding. They are currently used to determine criminal status, sort applicants in the job hiring process, and create playlists on our favorite streaming services. But what happens when those algorithms cause harm to particular communities and individuals? What happens if they sway elections or find the wrong person guilty of a crime? While algorithms can help streamline certain processes , there may be errors programmed into them.

This unit provides students with a quick and simple methodology to understand, analyze, and evaluate the costs and benefits of a particular algorithm. This lesson focuses on the second way that algorithms can be unreliable (and possibly unethical) through a look into **Biased Data**.

Students will learn how to analyze and evaluate algorithms in terms of bias, both implicit and explicit. They will also role play scenarios where this bias has the potential to become algorithmic discrimination.

INTRODUCTION (5 MINS)

As a warm-up, remind students that prejudice is a premature judgment or belief formed about a person, group, or concept before gaining sufficient knowledge or by selectively disregarding facts. Prejudice is often directed toward people in a certain identity group (according to their race, religion, gender, etc.). Have students respond to the following question on paper:

Have you ever felt like someone has been prejudiced towards you? How did it make you feel?

After providing time to write a response, call on a few students to share their responses with the class. If no students volunteer to share their answer, share your own experience or a time when you witnessed prejudice. Explain to students that today they will focus on how algorithms can implicitly or explicitly prejudge people, and therefore discriminate against people.

GRADE LEVEL

High School
Grades 9-12

TIME

45-50
minutes (mins)

COMMON CORE STANDARDS

CCSS.ELA-LITERACY.SL.9-10.1

CCSS.ELA-LITERACY.RH.9-10.3

CCSS.ELA-LITERACY.RST.9-10.5

MATERIALS

Paper
Writing Utensil
Algorithmic Bias Video
Definition Graphic for Biased Data
The Game of Algorithmic Life Worksheet
Game of Algorithmic Life online interface

LESSON OBJECTIVE(S):

Explain algorithmic bias and discrimination.

Explore how to apply Biased Data to assess whether an algorithm is discriminatory.

Evaluate the costs and benefits of using biased algorithms.

Explain how students made an ethical evaluation about a potentially biased algorithm.

ESSENTIAL QUESTIONS:

How do you analyze an algorithm for bias?

While measuring the costs and benefits, how do you evaluate whether it is ethical to use a biased algorithm?

KEY VOCABULARY

Algorithm
Messy Data
Biased Data
Algorithmic Unreliability
Algorithmic Discrimination

ALGORITHMIC BIAS VIDEO (5 MINS)

Play the Algorithmic Bias Video for the students. While watching, have students write down any questions or surprises from the video.

After the video, display or distribute the Messy Data Definition graphic. Ask students to reflect on the video as a whole group by asking these questions aloud:

- **What surprised you about this video?**
- **What questions do you have about "messy" data?**
- **What questions do you have about algorithmic reliability?**

Explain to students that, just like humans, some algorithms -- either by design or accident -- are programmed with biases that can lead to discrimination against certain individuals or communities. A bias is an inclination or preference, either for or against, an individual or group that interferes with impartial judgment.

THE GAME OF ALGORITHMIC LIFE SMALL GROUP ACTIVITY (15 MINS)

Explain to students that they are going to practice using Biased Data to analyze whether or not a particular algorithm discriminates against any communities or individuals.
Tell them they will begin with a small group activity then present their findings to the entire class

Introduce **The Game of Algorithmic Life s**mall group activity. Tell the students that role-playing makes it easier to see -- for themselves -- how algorithmic bias and discrimination can impact the lives of individuals.

Put students into four teams: **A, B, C**, and **D.** Hand out the Game of Algorithmic Life worksheet for that team. Have the students read about their assigned character.

Instruct the students to complete the **Game of Algorithmic Life worksheet** for their character as they encounter three algorithms: in health, employment, and facial recognition.

Have them use the Game of Algorithmic Life interface to see their character's success or failure with each algorithm: https://www.institutefordigitalhumanity.org/adl

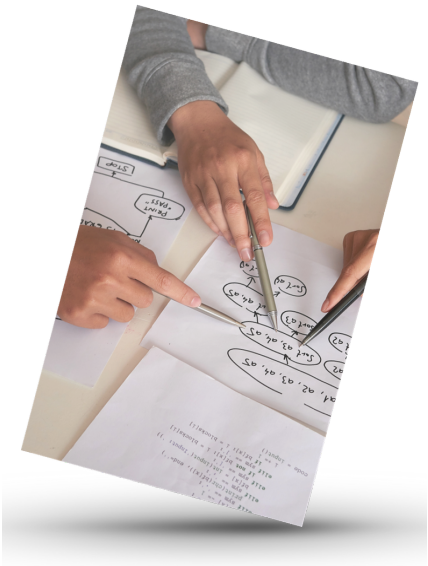
Students will record the character's success or failure with each algorithm.

THE GAME OF ALGORITHMIC LIFE CLASS DISCUSSION (10 MINS)

Have each team report on how algorithmic bias did or did not affect their character.
Then ask them the following:

Did this game of life seem fair for your character?

In which area of your character's life did you sense algorithmic discrimination?



WRAP UP (5 MINS)

Remind the class that algorithms can be discriminatory based on factors other than race and gender. Ask them to think about what other ways an algorithm could be biased against a particular community or identity group.

Need help facilitating classroom discussions centered on technology, algorithms, AI, digital ethics or more?
The IDH can help! Reach out with any questions or concerns!

www.institutefordigitalhumanity.org

Name:
Date:

BIAS DATA
ALGORITHMIC GAME OF LIFE

Step One: Every character starts with the same story. You are a 27 year old with a college degree. Before the COVID-19 pandemic, you worked as the president of a data management company that used algorithms to predict behavior. You are relatively healthy, but you have had a stressful life and heart problems run in your family. You have never committed a crime.

Step Two: Each team's character has been assigned a race and a gender. Each team's character has a playing card according to their identity.

- Team A is a white male
- Team B is an African American male
- Team C is a white woman
- Team D is an African American woman

Step Three: For each character, read each algorithmic encounter out loud. Then use the Game of Algorithmic Life program (at institutefordigitalhumanity.org/ADL) to find out if your character won or lost. Mark your answers below.

Scenario One: Employment
Your character is unemployed due to theCOVID pandemic. They have executive experience -- they used to run a digital startup company -- and are looking for a similar job to the one they lost. All employers in the Game of Algorithmic Life use algorithms to place job ads and find the "best candidate." But since these algorithms use who has been historically hired for a position to determine the best candidates, everyone's odds of being hired are different.

Did Your Character Receive the Executive Job Ad?
If yes, go to Scenario Two. If not, go to Scenario Three.

Did Your Character Win or Lose with the Hiring Algorithm?

What do you think happened next in your character's life after they won or lost? Were they discriminated against by the algorithm?

Name:
Date:

BIAS DATA ALGORITHMIC GAME OF LIFE

Scenario Two: Health Algorithm
Your character is experiencing chest pains and wants to go to their doctor immediately. In the Game of Algorithmic Life all health care decisions about a course of treatment are first made by an algorithm. Health care algorithms use the amount a racial group has historically spent on healthcare to predict their immediate need for care, so everyone's odds of receiving the healthcare they need are different.

Did Your Character Win or Lose with the Health Algorithm?

What do you think happened next in your character's life after they won or lost? Were they discriminated against by the algorithm?

Scenario Three: Facial Recognition (or Public Safety)
Your character is at the airport ready to board their plane. In the Game of Algorithmic Life, in order to pass through the security checkpoint, everyone must have their face scanned with facial recognition technology to determine whether or not they match the image on their identification. Note that it is more difficult for facial recognition algorithms to correctly identify women and people with a darker skin tone.

Did Your Character Win or Lose with the Facial Recognition Algorithm?

What do you think happened next in their life because they won or lost?

SCENARIO ONE: EMPLOYMENT

MARK DANKI

Algorithmic Game of Life

Mark is a 27 year old African-American male who graduated from the University of Illinois in 2015 with a degree in engineering. Growing up Mark's dad worked in a large tractor factory and his mother was a school teacher. Mark now works for a data management company.

MARTHA BYNES

Algorithmic Game of Life

Martha is a 27 year old white female who graduated from the University of Iowa in 2015 with a degree in restaurant hospitality. Growing up Martha ran track and field and worked in her father's food truck. Martha now works for a data management company.

JOSEPH MONGE

Algorithmic Game of Life

Joseph is a 27 year old white male who graduated from the Buena Vista University in 2015 with a degree in marketing. Growing up Joseph had a side hustle of selling thrifted clothing with his brother. Joseph now works for a data management company.

MELANIE THOMAS

Algorithmic Game of Life

Melanie is a 27 year old African-American female who graduated from Northwest Missouri State University in 2015 with a degree in English. Growing up Melanie wrote poems for her local newspaper. Melanie now works for a data management company.

When an algorithm uses correlation to create bias towards a person or certain group of people

Algorithmic Discrimination

THE IDH