

Instructing Ethics through Role-Play Scenarios

Ashish Hingle, Aditya Johri, Huzefa Rangwala, Alexander Monea

George Mason University

The Context: Algorithms affect decision-making through many domains in our world today. From communication between people to measuring financial risk, industrial manufacturing to proctoring tools for remote learning, algorithms drive decision-making and affect how people interact with each other and the world. This widespread push for automation of everyday activities relies on computing and technology professionals, who depend on their foundational knowledge of algorithms to create solutions to the human condition. Given the ways in which technology shapes society, it is imperative that students be prepared to design and implement it ethically.

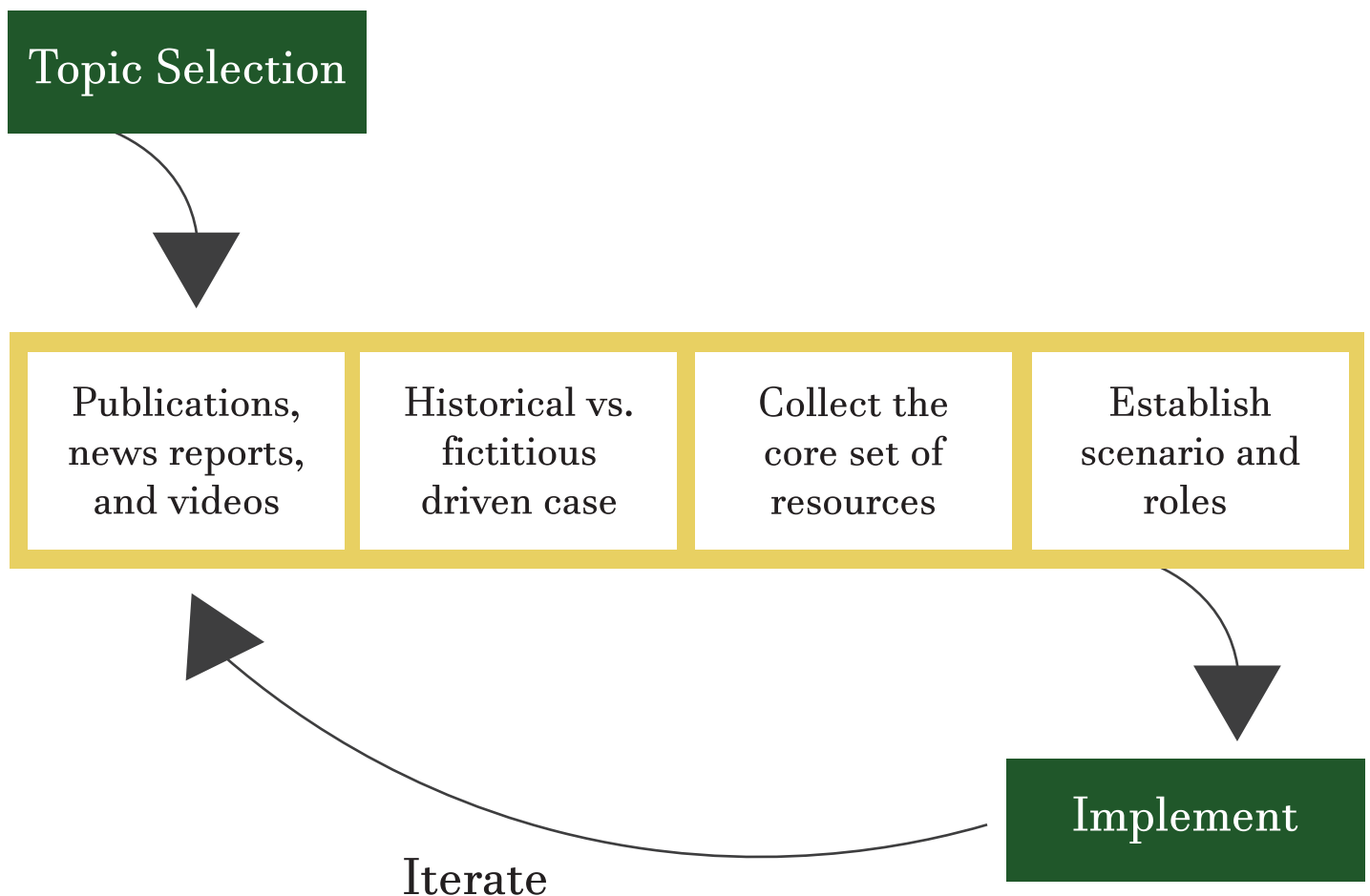
The Issue: Although there are several ways to teach ethics-focused thinking in a classroom, there is no standardized curriculum for ethics coursework. Therefore, it is fundamental that students who are building this foundational knowledge of developing and manipulating algorithms through their coursework are aware of the benefits, implications, and consequences of this decision-making.

Our Approach: We use role-play scenarios (RPS) to teach students ethical decision-making in algorithm-rich work environments. The process includes finding real-world inspired topics, modeling a case along with specific roles after the topic, and allowing students to engage with their peers negotiating and exploring ethical issues. RPS reinforces classroom learning by encouraging students to take on different perspectives and shift one's perspective on a problem or issue.

Case Study Details:

- 2-3 pages including role information + readings/videos related to the topic
- 6 roles for each case
- Moderated by faculty, TA, or self-moderated by the students
- 20-45 mins in length
- Assessment is done through discussion assignments and concept maps

Design Process:



Cases Already Designed and Implemented:

- Boeing 737 Max Disaster (see example on next page)
- Facial Recognition for COVID
- Algorithmic Lending
- Volkswagen Dieselgate

Aviation Transportation Investigative Committee (ATIC)'s Report on the Boeing 737 Max Crisis for U.S. Congress

To better understand the lessons that can be learned from the Boeing Max crisis in order to ensure future safety and to prevent future air transportation disasters the U.S. Congress formed an Aviation Transportation Investigative Committee (ATIC) and instructed it to understand the issues from all perspectives and report back to Congress with recommendations.

Brad Jorgensen and Kathy Schmidt, who had both worked in the aerospace industry at some point in their careers and were now staff members serving members of congress were designated co-chairs of the committee. For assistance, they had assigned different members of their committee, including external experts, different issues to research and present their findings.

When Brad and Kathy took on this responsibility they thought it would be an easy task as the software was at fault but they soon recognized that the solution to the problem might be more complex. They were surprised to learn that competitive pressure from Airbus in terms of losing market share was one of the major reasons for the new model of the aircraft. They were amazed at how quickly decisions were made to be able to compete including changing the design of the aircraft to accommodate the new engine. As they dug in more into existing news coverage, reports, and testimonies they begun to feel the weight of the problem even more.

They were flying to Seattle to speak with Boeing representatives a few months after they started their work and when boarding the flight in Dulles they noticed that some passengers on their flight asked the desk personnel if the aircraft they were going on was a Boeing 737 Max and the one that had crashed. The desk personnel assured them that all Boeing 737 Max aircrafts were grounded. Trust was a key issue.

The initial time period to achieve this goal was set to be 6 months after the second crash but Brad and Kathy quickly realized that they would need more time to better understand the complex structure that makes up the overall ecosystem for the Boeing 737 Max aircraft. They realized that they would need more input in their report from additional external expert members and they reached out to folks from all different areas of concerns and added them to the committee. They are hoping to look towards the future and come up with guidelines that will be enforced not only through the regulatory agencies but also be made public so that there is more trust in the aircraft and the industry.

Today is the final meeting of the committee and five of the external members are scheduled to present their findings in brief and then discuss what they found to come up with a recommendation for the co-chairs to take to Congress.

The questions posed to the committee are:

- 1) Why did it happen and how it could have been prevented?
- 2) How can we ensure future safety and transparency and rebuild trust?

Committee Members – External Experts:

Norman Devlin, Aviation Consultant, is an aviation expert who trained as an engineer and then worked as a pilot for over two decades. He has been an expert witness on similar committees before and given his prior experience, and his sympathies, he is always keen on expressing the viewpoint of pilots. In particular, he is concerned that authority for decisions during flights has shifted from pilots to technology and that decisions about pilot training have been determined by business interests rather than pilots' needs. He often comments that if Boeing had remained an engineering company and hired fewer MBAs, who let its engineering capabilities slip, it wouldn't have had this crisis.

Meera Patil, Professor of Aerospace Engineering, is an expert on aeroelasticity and specifically studies nonlinear aeroelasticity flight dynamics of highly flexible wings. She has been invited as an expert to specifically discuss the decision by Boeing to change the wing placement to incorporate the new, bigger, engine on the Max. She has looked the changed Boeing made and those made by Airbus and she is still not sure what to make of it as she believes she doesn't have all the information she needs to understand Boeing's decision.

Andrew Gelman, Software Engineer, is an expert on human-automation interaction and has written software and designed software for a large number of organizations and even founded a small automation company that was acquired by a large defense contractor in the aviation space. He has seen the complexity of interdependent systems firsthand as he has designed software to manage it and to simulate outcomes. Although he was shocked and distressed by the disasters of Boeing Max planes and wished the tragedy could have been averted he wasn't too surprised. He always thought aircraft design had become too complex for its own good.

John O'Leary FAA Officer (retired) is on the committee for his expertise on regulations and the role of Federal Aviation Agency (FAA) in the disaster. He is concerned with salvaging the reputation of FAA as it has come to light after the disasters that FAA was too close to Boeing, even colluding with them by letting the company regulate itself in order to make quick decisions and compete with Boeing. The funding for FAA had slowly been reduced and it didn't have the staff necessary to provide regulatory oversight.

Mary Bradley, Boeing Representative, is someone who has worked at Boeing for over 30 years and wants to convey how Boeing works and what they have tried to do for safety and what she thinks is the reason this happened. She is also concerned with thousands of parked aircrafts and the cost of this for the company. Although Boeing almost never pays for any trouble, it is always bailed out, she knows this is the low point for the company. She joined the company as a trainee straight out of high school and took part in the excellent training incentives provided by Boeing to complete her undergraduate degree in communications, and, much later, an MBA.

Sarah Bennett, Family Lawyer, represents the passengers and their families. She wants to make sure she their voices don't get lost among all these "experts" and that companies actually work towards safety of people rather than simply setting money aside with the goal to pay people off if accidents occur.

Script for the role-play

After reading the scenario and your role, please answer the following questions (10 min):
[This can be individual where they each type their response or shared with the group]

Q1) What is your response to Brad and Kathy's question about why this happened and how it could have been prevented?

Q2) What is your response to Brad and Kathy's question about how can we ensure future safety and transparency and rebuild trust?

Q3) Why do you think this is the best approach?

Q4) What do you think are the main barriers to this approach?

After answering these questions, discuss the scenario with the group by adopting the stance of the role you represent and agree on a solution/line of action (20 min).

[Discussion]

Then answer the following questions (10 min):

[This can be individual where they each type their response or shared with the group]

Q5) What response was reached following the discussion?

Q6) What criteria were considered to reach this solution?

Q7) Was the response agreed to by all or did one person have more influence? Why?

Q8) Do you personally agree with the response? Why/Why not?

Q9) Any comments on how your group approached the case?

Debriefing (5 min)