Accessing and Democratizing AI for Whom?

Student Learning through an Algorithm-Centered Supply Chain Case Study

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RESEARCH OBJECTIVE

Questioning who has access to knowledge, skills, tools, and data becomes paramount as algorithms and the artificial intelligence (AI) systems they support find widespread applications. Broadly, "democratizing AI" allows more people to work with and understand AI, but a central question remains: for whom is AI being democratized? This research explores student recognition and learning about how the values underlying the tech can alter for whom access to AI is made available.

1. Develop Case Study
2. Implement Role-Plays
3. Explore Student Learning

1. CASE STUDY NARRATIVE

GOLDENGRAPH

One of the only grocery stores in a small, isolated town is closing, and community members are worried about the impact – especially since many residents rely on SNAP. A resident intends to establish a food co-op called GoldenGraph that uses algorithms to model the community's needs and ensures residents can access groceries.

There are 2 technology components needed: 1) ***the forecasting tool*** *and 2)* ***the user-facing application****. The forecasting tool allows the co-op to forecast resident's grocery needs based on demographic data. The user-facing app allows residents to communicate needs/requests, and receive notifications from the grocery co-op. Full case available.*

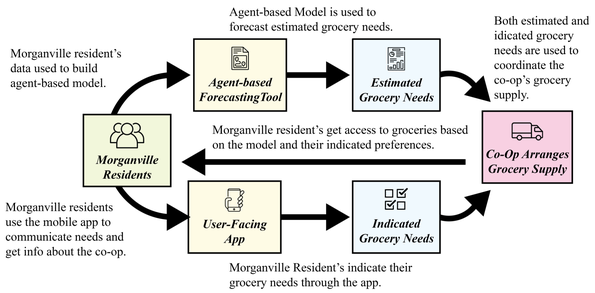

Figure 1: Input/Output Diagram of GoldenGraph's Technical Components.

CASE STUDY ROLES

Albert Simmons
President, Morganville Independent Farmers Inc. (MIFI)

Veronica Cale
Human-Computer Interaction Prof. at the University of Virginia

Danielle Foccart
Computational Scientist at a State Research Lab in Virginia

Arani Desai
Regional Manager at Queen Foods (neighboring grocer)

Catalina Flores
AI Sustainability Analyst, National Cybersecurity Consulting firm

Maxwell Lord
City Official in the Mayor's Office of Morganville

2. ROLE-PLAY IMPLEMENTATION

Role-Plays are one way to have students engage in a collaborative, peer-learning activity that use case studies to highlight important themes.

Through previous work, we have used role-plays to broach topics on technology surveillance, algorithmic lending risk, and other broad topics. Role-Plays are especially helpful with non-expert participants.

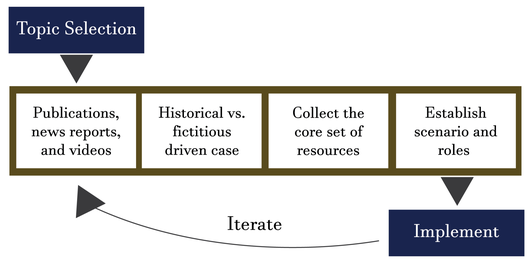

Figure 2: Case study and Role-Play Design Flow.

- 30-45mins Semi-structured conversation.
- 5-7 participants groups + a moderator.
- Must reach a group consensus/decision.

ROLE-PLAY PARTICIPANTS

- 70 undergraduate students, 12 Groups.
- Role-play done in October 2023.
- 2 sections of "Technology Ethics" course.
- College of Engineering and Computing.

DATA PREPERATION AND ANALYSIS

- NLP-aided Thematic Analysis approach.
- Reviewers explored participant responses individually and initially coded, then came together to discuss and group into themes.
- Generated codes iteratively and denoted recognition of AI democratization types outlined in *Seger et al. 2023.*
- Data corpus includes:
  - Pre- and post-role-play assignments and transcripts.

DEMOCRATIZING AI (Seger et al. 2023)

The framework highlights four categories of AI democratization through: AI (1) use, (2) development, (3) profits, and (4) governance.

3. ASSESSING STUDENT RECOGNITION

Responses were analyzed for students' recognition of the democratization type.

Student Recognized Democratization Category from Seger et al. 2023

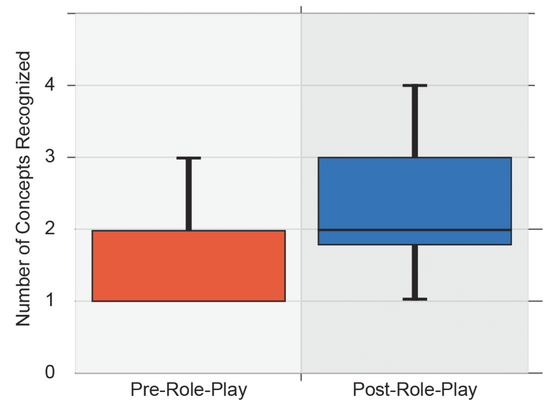

Figure 3: Box plot of scores before and after the Role-Play activity.

A Wilcoxon signed-rank test (V) was used to determine that student's recognition of AI democratization types outlined in *Seger et al. 2023* was significantly higher after participating in the role-plays (*Md = 2.00, n = 70*) compared to before (*Md = 1.00, n = 70*), V = 0 $p < .001$.

STUDENTS HIGHLIGHTED (COMMON THEMES)

Exploring Complexity through Discussion:

"The role-play surprised me with how nuanced it was. At first, I had thought the *GoldenGraph* system a no-brain pick, but the more we as a group discussed the sustainability, potential misuse of user data, and security concerns, the greyer the subject seemed to get. This discussion provided me with a greater perspective on the difficulty of instating radical changes in a community with such limited preplanning. Discussing with my group helped broaden my view of the scope of the project." – **Student 3**

The Pros and Cons of Algorithmic Approaches:

"The role-play underscored the importance of balancing the potential benefits of technology with the ethical considerations." – **Student 34**

"It taught me that one has to ensure that technology does not create disparities in access or advantage." – **Student 12**

Learning through Different Perspectives:

"Taking on the role's perspective didn't change my perspective. I'm in agreement with the role I played. However, this role did allow me to appreciate how technology can have a profound effect on the logistics of a farmer's organization (or any organization)." – **Student 1**

"Assuming the moderator role in the discussion offered me a unique vantage point to appreciate the multifaceted nature of decision-making in community projects involving AI and technology. It underscored the importance of considering diverse viewpoints, ensuring data privacy and security, and fostering community trust. This role illuminated the intricacies of managing such projects, which I might not have fully grasped from an outside perspective." – **Student 34**

"I believe that taking on the perspective of the role assigned made my insight about data-driven analysis much more complex and detailed compared to before." – **Student 14**

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