

ISEA Logistics and Overview of AI/ML in Education

ISEA Session 1

Dr Min Sun and Dr Lovenoor Aulck
University of Washington
1.26.2024

Learning Objectives/Agenda

1. Introduce the instructors and the students to each other
2. Introduce foundational concepts: data science, AI, ML and human-centered, domain specific data science, data science in education
3. Introduce the human-centered data science cycle and Emphasize the role of governance and responsible AI/ML
4. Provide an overview of the ISEA schedule and resources
5. Get organized: logistics, data collection efforts

Instructors



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Principal Investigator

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**Dr. Patrick C.
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**Dr. Christopher A.
Candelaria**

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Vanderbilt University

Tutors



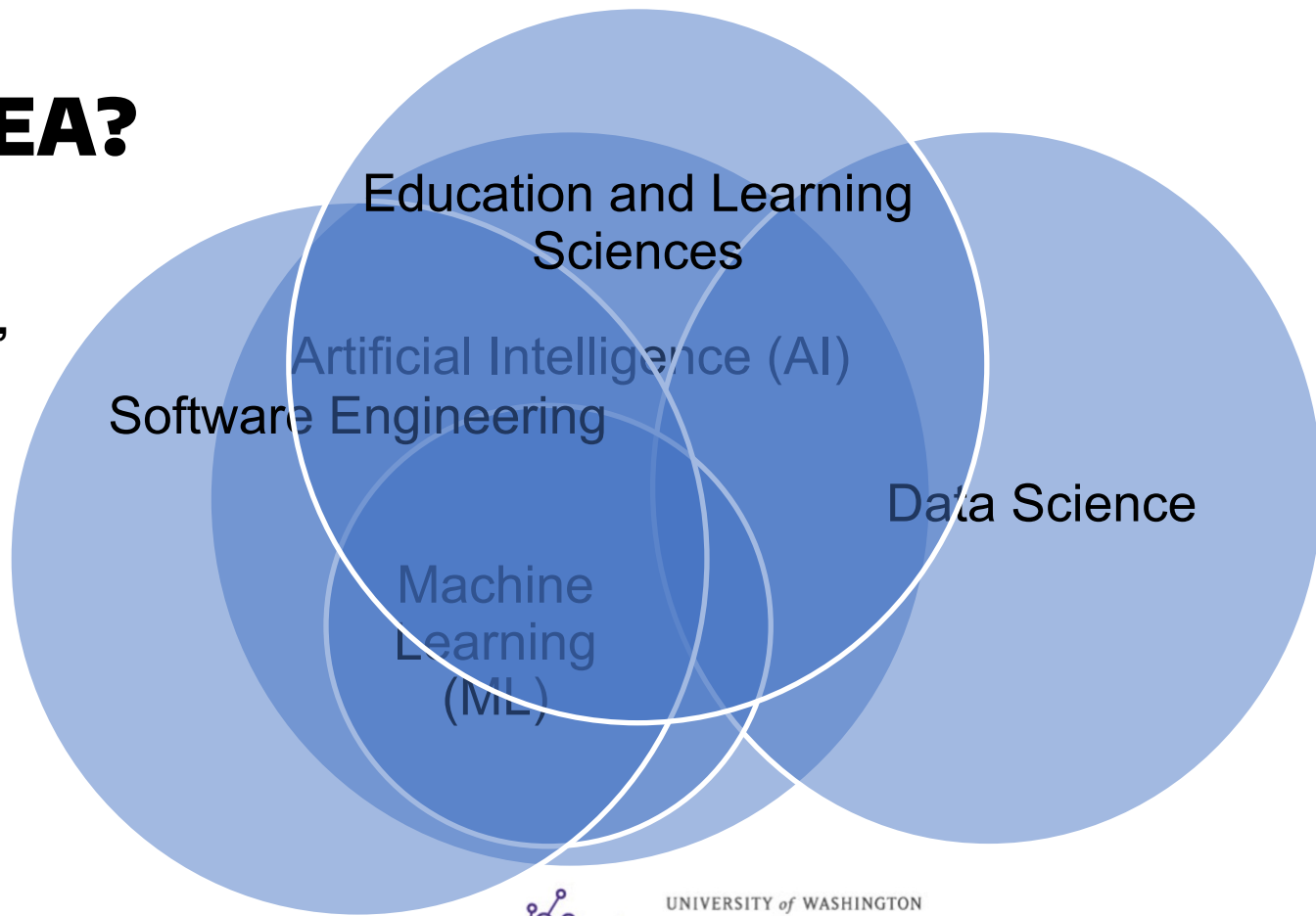
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MS Student
Data Science

What is ISEA?

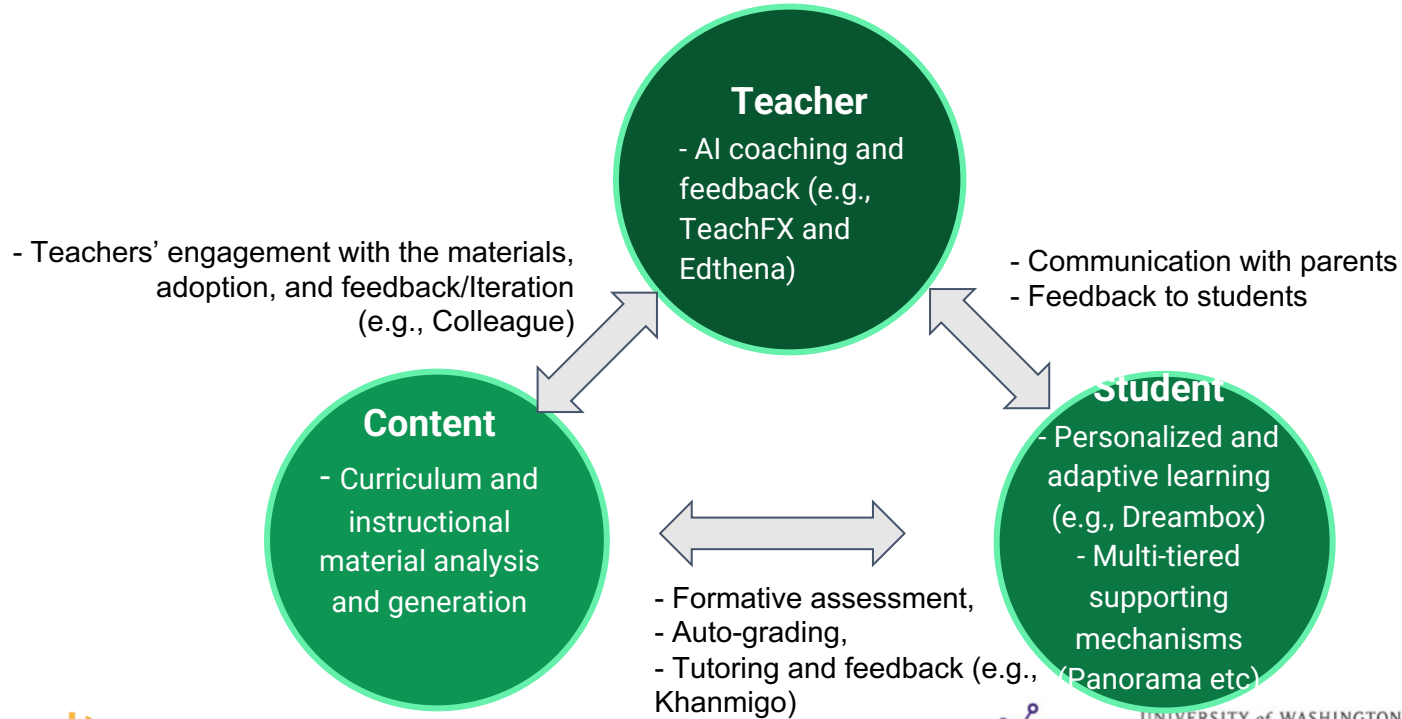
A multidisciplinary,
multisector
intersection focus



My Feeling About This Field:

- > This field is moving so RAPIDLY!**
- > The lines of different disciplines will blur even more.**
- > A new generation of scholars and edtech workforce emerges.**

AI and ML-Powered Data Science Methods Can Influence Many Aspects of Classroom Instruction



AI and ML-Powered Data Science Methods Can Influence Administration/Policy

- > Human resources management
- > Student admission/placement
- > Financial resources allocations

AI in Education Policy and Guidelines

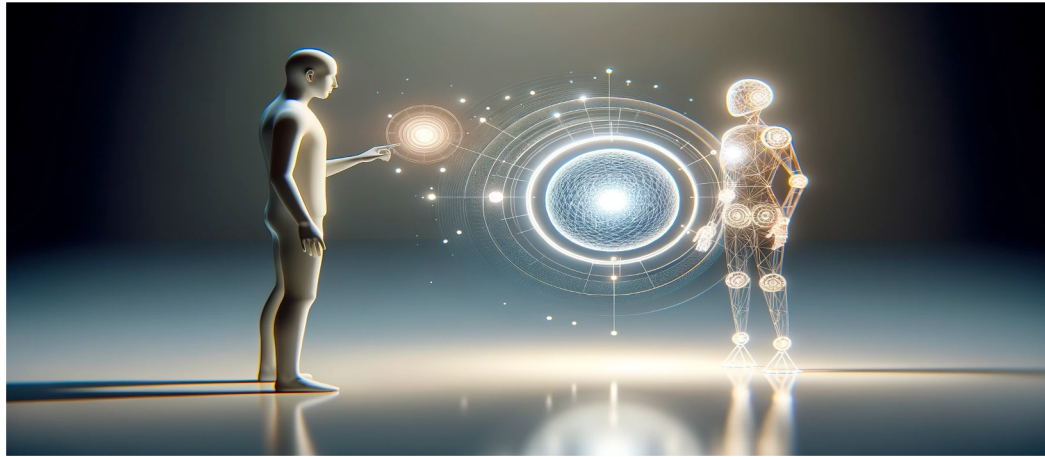
- > [TeachAI Initiative](#)
- > [OSPI's AI Guideline](#)
- > [Council of the Great City Schools](#)
- > [UNESCO's AI Guideline](#)

Goals Of ISEA Web Sessions

1. Stimulate your interests in the intersection of AI/ML, data science, software engineering, and education.
2. Introduce use cases and develop fellows' ability to apply technical skills to solve educational problems.
3. Develop fellows' critical thinking and creativity.
4. Co-construct knowledge and learning among ISEA fellows and instructors.

A Human-Centered Partnership Model of Education Data Science

- > The human-centered partnership model: people, computer, and domain knowledge interact at every stage of data pipeline to enhance learning opportunity, human decision-making efficiency, and organization performance, and system-level equity.



Human-Centered Data Science Cycle

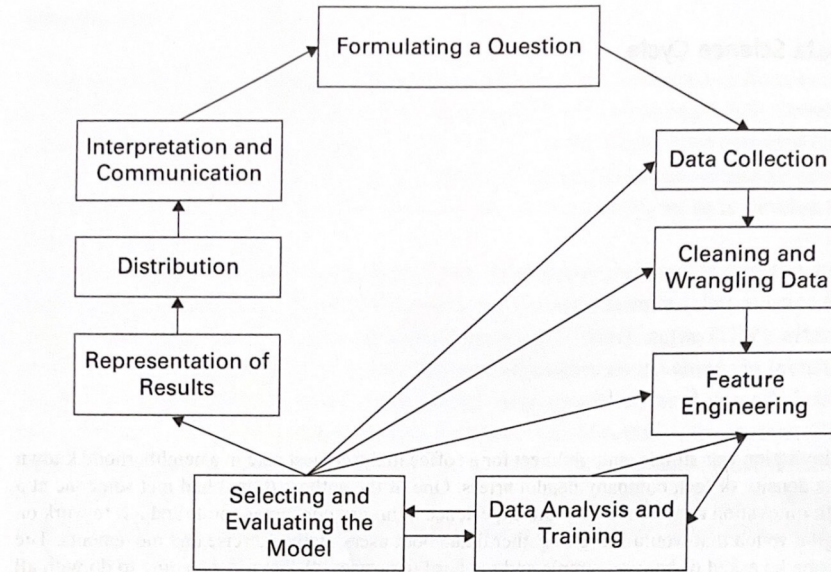
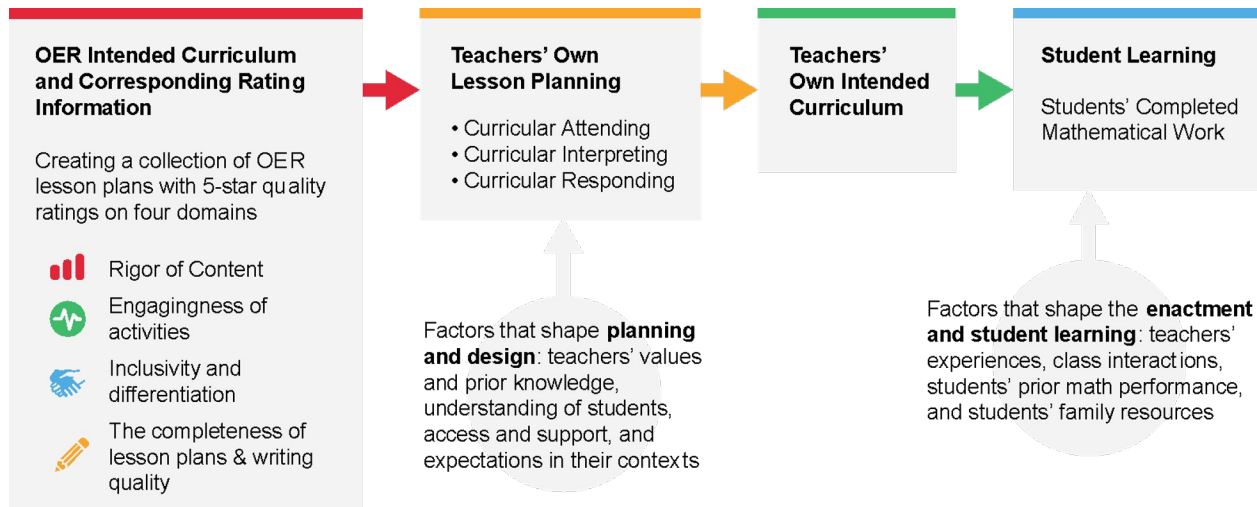


Figure 2.1
The data science cycle.

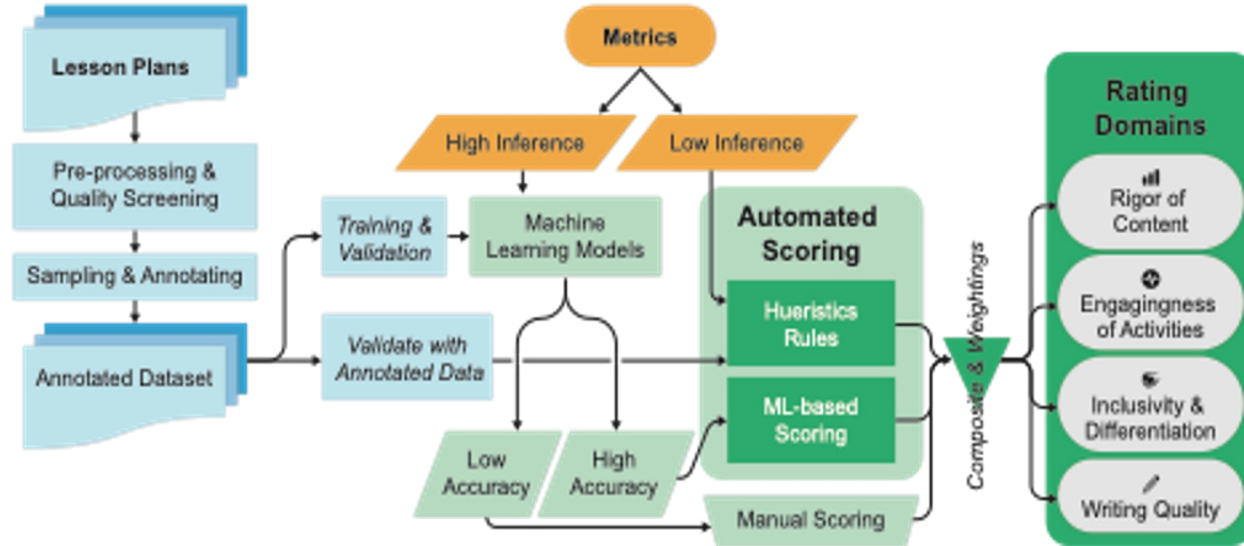
Aragon, C., Guha, S., Kogan, M., Muller, M., & Neff, G. (2022). *Human-centered data science: an introduction*. MIT Press. p.14

Example: Math Lesson Plan Quality Data Pipeline



Sun, M., Ai, W., Liu, J., Males, L., & Boston, M. (2022). Integration of computer-assisted methods and human interactions to understand lesson plan quality and teaching to advance middle-grade mathematics instruction. https://www.nsf.gov/awardsearch/showAward?AWD_ID=2300291

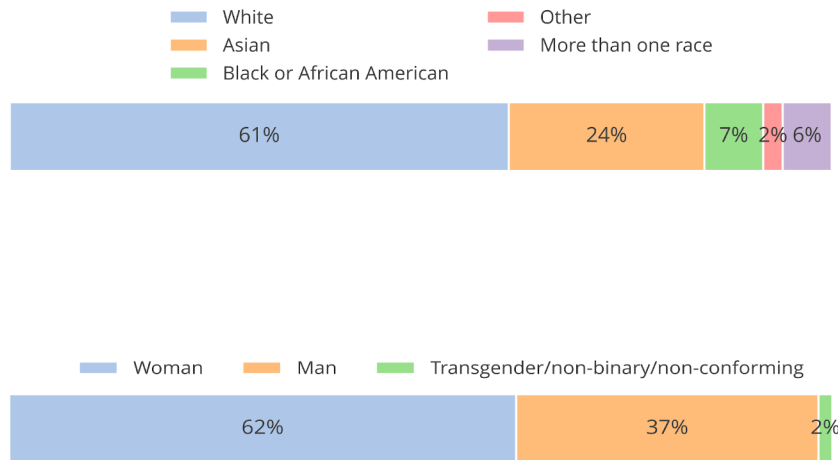
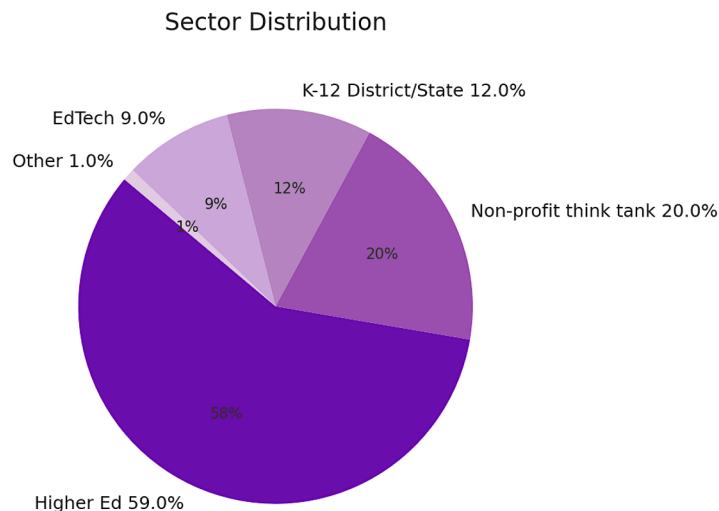
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Educational Data Science and AI Training

For the inaugural cohort, ISEA attracted **186 well-qualified applicants across four sectors: Higher education, non-profit think tanks and research institutions, K-12 district and state agencies, and EdTech industries.**



Fellow Introduction and Break

- > If you haven't done so already, please share your name, organization, role, and your learning interests in data science in education in the Teams space
- > **A small group activity (5 mins)**
 - > Introduce yourself
 - > What drove you to ISEA?
 - > How do you think about the human-centered data science cycle, and how might you use some of the concepts to inform your work?

Session Overview

| Week | Session Date | Session |
|------|--------------|---|
| 1 | 1/26/24 | Overview of AI/ML in Education |
| 2 | 2/2/24 | Software for Data Science I |
| 3 | 2/9/24 | Software for Data Science II |
| 4 | 2/16/24 | Design from a Learning Science Perspective |
| 5 | 2/23/24 | Machine Learning I - fundamentals |
| 6 | 3/1/24 | Machine Learning II - applications |
| 7 | 3/8/24 | Text Analysis I - topic modeling and sentiment |
| 8 | 3/15/24 | Text Analysis II - modeling and classification |
| - | 3/22/24 | BREAK |
| 9 | 3/29/24 | Causal Inference I - A/B testing and RCTs |
| 10 | 4/5/24 | Text Analysis III - measuring instructional practices |
| 11 | 4/12/24 | Text Analysis IV - teacher learning and RCTs |
| 12 | 4/19/24 | Recommender Systems and Social Experiments |
| 13 | 4/26/24 | Causal Inference II - quasi-experimental frameworks |
| 14 | 5/3/24 | Economic Evaluation |
| 15 | 5/10/24 | Data Ethics and Professionalism |

Individual Think and Share

[Use this link:](#)

1. Which are the three topics you are most excited about?
2. Which are the three topics that are most relevant to your work?
3. Any other topics of interests you wish to discuss?
4. Any recommendations /expectations on teaching styles and methods?

Hackweek

- > Week of July 8th-12th on the University of Washington campus in Seattle
- > We will share additional details as they're finalized



Resources

- > **Teams:** Your primary means of communication with those in the program. Feel free to send Lavi a direct message about any program-related issue or question. Feel free to also reach out to your tutors using Teams
- > **Canvas:** Your primary means of managing all the content from the program. Slides and videos will be shared here. Schedules will be updated here (if/when needed)
- > **Computational resources:** more on this soon!

Program Data Collection

- > Emily
- > Data Collection for IES

Homework

1. Preview next week's materials (will be posted soon)
2. Learning about the basics of python programming and Colab environments:
 - https://pandas.pydata.org/Pandas_Cheat_Sheet.pdf
 - <https://jakevdp.github.io/PythonDataScienceHandbook/>
 - <https://colab.research.google.com/>
 - <https://www.statlearning.com/>
3. Complete the surveys
 - Survey about your interests
 - Pre-test of data science knowledge and skills