The Algorithmic Divide – Three Cases of Epistemic Exclusion

DISPARATE IMPACTS OF ALGORITHMIC BIAS ON PRIMARY AND SECONDARY EDUCATIONAL OPPORTUNITIES

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AGENDA

01 INTRODUCTION

02 BACKGROUND ON “AIED”

03 CHALLENGES OF DIGITAL EQUALITY

04 AREAS FOR FUTURE RESEARCH

05 OPTIONS FOR MITIGATING BIAS

06 CONCLUSION

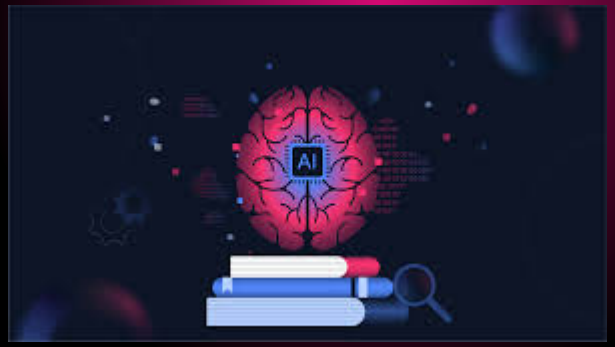
INTRODUCTION

AI is rapidly expanding in primary and secondary education,

offering promise,

but also significant education equity concerns.

BACKGROUND ON “AIED”



“The term “AIED” refers to the various types of artificial intelligence technologies used in education systems…”

7 ROLES OF AI IN EDUCATION

1. Mentor
2. Tutor
3. Coach
4. Teammate
5. Student
6. Simulator
7. Tool

KEY CONCERNS WITH AIED

PROFILING

→Predictions shaped by biased historical data

→Reinforces stereotypes

LACK OF TRANSPARENCY

→Unclear algorithms

→Users can't see embedded bias

IMPACTS ON EQUITY

→Biased grading & behavior tools

→Disadvantage for minority students

IMPACTS ON POLITICAL & SOCIAL PROCESSES

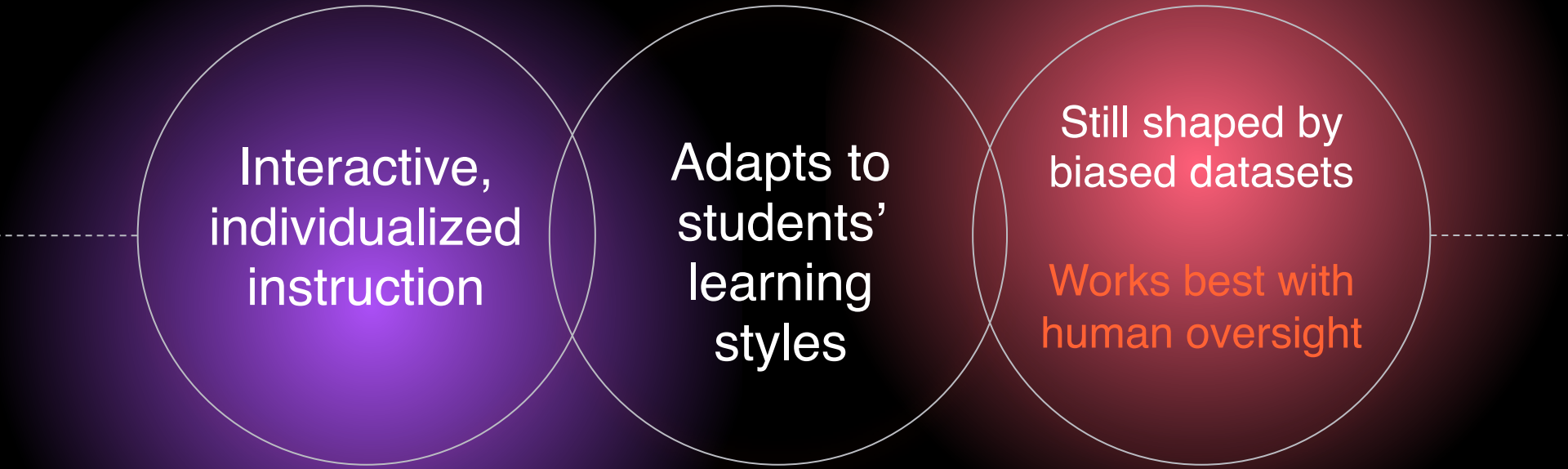
→Data monetization affects future

→Reinforces systemic inequalities

ADAPTIVE LEARNING SYSTEMS

LEARNING ANALYTICS

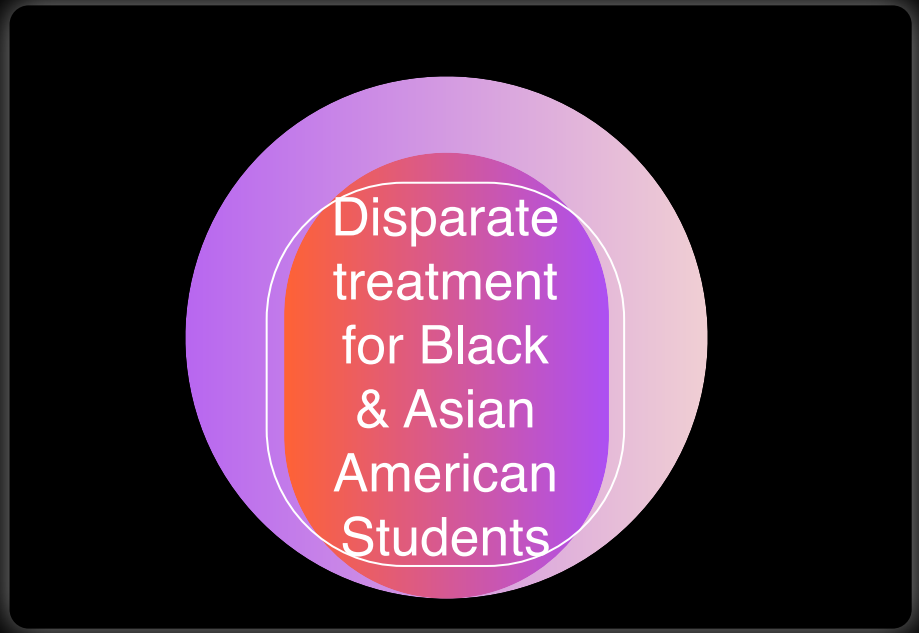
INTELLIGENT TUTORING SYSTEMS (ITS)



AI GRADING TOOLS

- Speeds up grading & reduces some subjectivity
- Automated essay scoring = high risk area
- Training data quality is a major factor

Harsher Scores for ELL Students



BEHAVIORAL MONITORING

01 Used for cheating detection, attendance, & engagement

02 Facial recognition errors highest on darker skin tones

03 Misreads cultural or neurological differences & wrongly flags students

04 Influences teachers perceptions of students

Educational Expectation Bias

- Predictive analytics overestimate failure risk
- Bias worsens when race is included
- Teachers presume accuracy
- Lower expectations, lower achievement cycle

Standardized Testing Bias

- Tests include cultural bias
- AI relies on scores for outcomes
- Lower baselines harms long-term growth
- Growth mindset vs. fixed mindset

Neurodiversity & Accessibility Gaps

- Limited data on neurodiverse learners
- Eye-tracking tools misinterpret behavior
- Cultural differences misunderstood
- High cost of inclusive models

DATA MONETIZATION & PRIVACY HARMS

De-identified data often unprotected

Under-resourced schools sell more data

Students do not consent

Data used by colleges, employers & military

Long-term social and economic impacts

Fundamental & civil rights concerns

STRATEGIES FOR MITIGATING BIAS

Step 01

Increase diversity in training data

- Gather additional data
- Use disaggregated data to reduce aggregation bias

Step 02

Democratizing data

- Improve public access to datasets

Step 03

Strengthen statistical literacy

- Balance open-source access to data with privacy
- Expand access to technology

ECONOMIC & STRUCTURAL REFORMS

- Ethical data monetization could support schools
- Risk of widening achievement gaps
- Limit data retention to avoid re-biasing
- Watch for unequal access to AI tools
- Wealthier students may benefit more

INTERNATIONAL MODELS

FINLAND

- AI Literacy for 4th and 7th Graders
- Students learn about bias directly

SINGAPORE

- AI-enhanced pedagogy certificate for teachers
- Large scale Ville program shows early integration challenges

POLICY LANDSCAPE IN THE U.S.

- Federal push for “AI literacy”
- Definition criticized as too shallow
- Limited attention to ethics & bias
- Commentators push for deeper equity focus
- Students should shape policy

THANK YOU

Comments & Questions

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