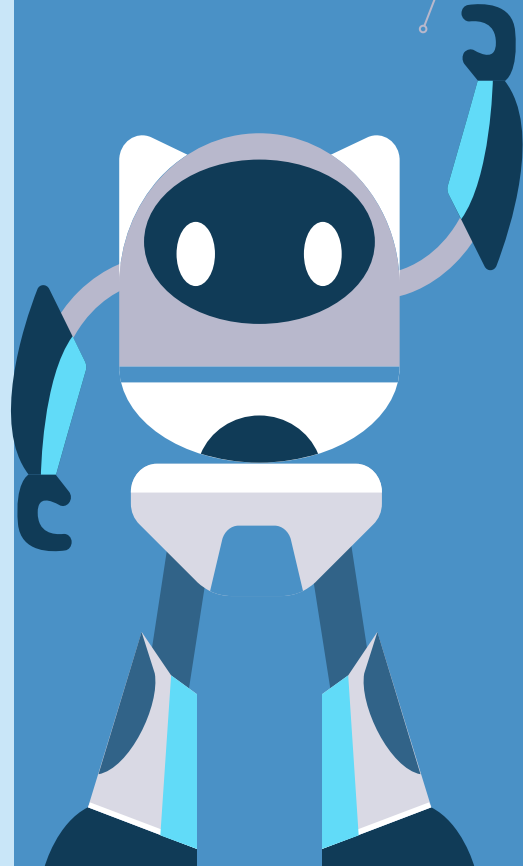


Student Perspectives on AI: Insights from a Student Professional Learning Community

Julie Jacobi – Assistant Director for Science Programs (CSME)

Courtney Barcus – Clinical Assistant Professor (SOE, T&L)

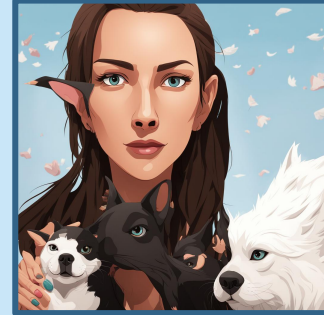
Loyola University Chicago, FOTL Conference, Spring 2025





Julie Jacobi

Science Educator,
Reader,
Plant lover



Courtney Barcus

Special Educator &
Mathematician,
Animal lover

Agenda

01

Context for Learning

School of Education, Secondary STEM
Professional Learning Community

03

Our Lessons Learned

- Student Perspectives
- Unexpected Dilemmas

02

PLC Learner Experience

1. AI Thought Exercise
2. Voicethread Summary
3. AI Policy Exploration

04

Implications for Practice

- Grade 6-12 Classrooms
- Undergraduate Classrooms



■ The Secondary STEM Professional Learning Community

Who?

Undergraduate secondary STEM education students, freshman through senior

Students join a PLC, beginning as freshmen, and continue until they graduate for the Teaching & Learning Program. They typically have the same colleagues and instructor(s) and develop strong relationships with other members the learning community.

What?

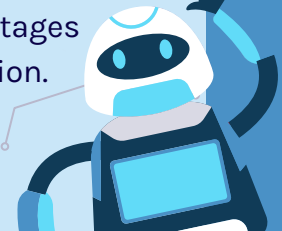
Collaborative community centered on a shared problem of practice

Each semester, instructors select a different discipline specific topic for the PLC to explore. In Fall 2024, the secondary STEM PLC chose to explore “AI Use in the 6-12 STEM Classroom.”

When?

Three Monday evening sessions at the end of each Fall & Spring semester

PLC members have the opportunity to tackle interesting and challenging topics in their discipline with a familiar cohort of colleagues across all stages of undergraduate education.



2024-2025 STEM PLC Student Demographics

86%

Mathematics Major

All secondary candidates

36%

Underclassmen

Freshman & Sophomore

14%

Science Major

50/50% secondary & middle grades

64%

Upperclassmen

Junior & Senior



“AI Use in the 6–12 STEM Classroom” Session Overview



Artificial Intelligence in the STEM Classroom

This semester, we will be exploring the use and abuse of Artificial Intelligence (AI) in Math and Science classrooms!

- Class 1: Artificial Intelligence, Real Dilemmas
- Class 2: Chalkboards and Chatbots: What's Going on in the Professional Landscape?
- Class 3: The Human Teacher Behind Machine Learning



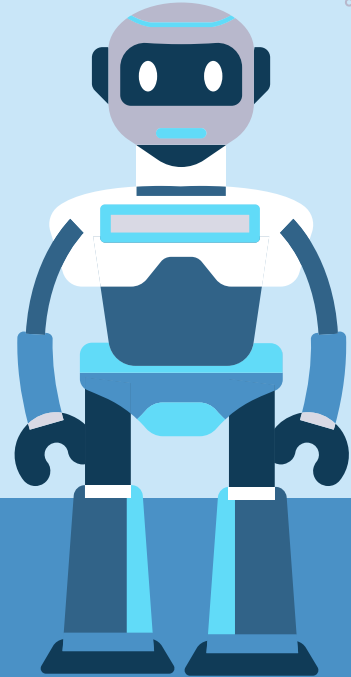
**Actual
STEM PLC
Slide**

- Learning experiences are highly collaborative.
- A main goal is for students to apply their learning to create an asset that can be used in their future classroom.

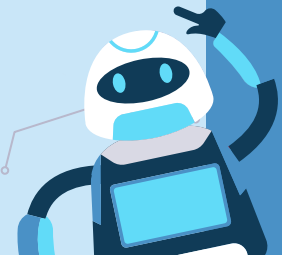
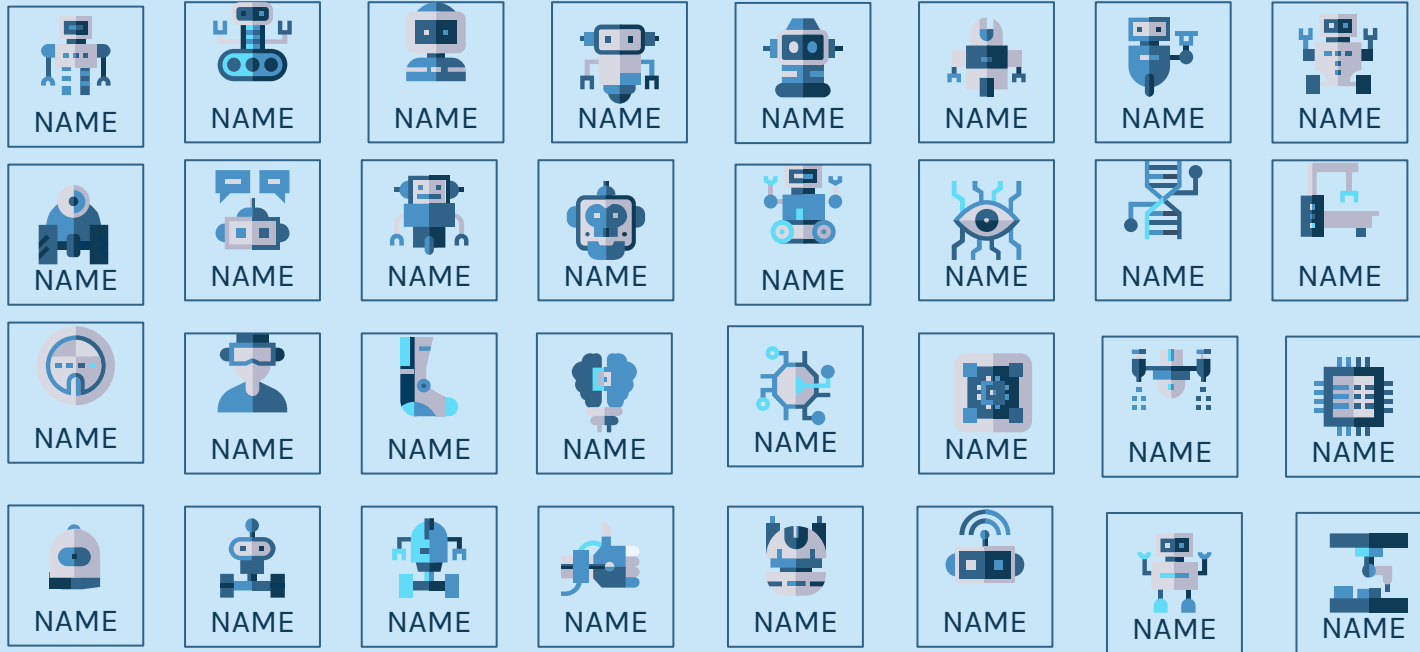
01

STEM PLC Session 1

Artificial Intelligence, Real Dilemmas



Icon pack



Slide to Decide

AGREE

NOT SURE

DISAGREE



Julie



Courtney

SHARED DECK: <https://bit.ly/402aJ0N>

Statements for the Slide to Decide

Activity

AI can personalize learning better than human teachers.

AI will eventually replace teachers in the classroom.

AI systems are inherently biased and will reinforce existing inequalities in education.

The use of AI in the classroom will lead to students becoming overly dependent on technology.

The integration of AI into education will inevitably lead to more standardized, one-size-fits-all teaching methods.

AI in education could increase the focus on performance metrics and reduce the emphasis on creative and critical thinking.

Teachers should have the final say in how AI tools are implemented and used in their classrooms.

Session 1: Knowledge Mining

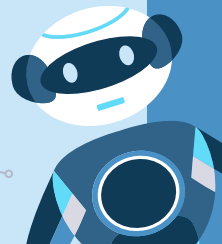
After engaging in the thought exercise, students completed a KWL chart to communicate their current understanding and misunderstanding of AI and its use in classrooms.

What Do We Know? What Do We Wonder?

Regarding AI uses in the math and science classroom:

We think we KNOW...	We are WONDERing...
<ul style="list-style-type: none">Using tech can help prepare students for future careers.Students are able to use AI as a tool when they are confused or stuck on a homework problem rather than emailing the teacher back and forth and waiting a response for how to do a problem.There are lots of examples of students using AI to both help and hinder, in both STEM and Humanities disciplines.Can be used to help with lesson planning.AI is a neutral tool that can help both teachers and students.	<ul style="list-style-type: none">How to effectively teach students to utilize AI correctly (because it is often misused)?How would you track student's growth if allowing the use of AI in class?To what extent will AI take over classrooms and possibly teachers jobs altogether?How do we limit the usage of AI at home?Should there be a black and white AI policy in classrooms?In what ways can AI be used ethically when grading, lesson planning, student evaluations, etc?What effects does AI have on students in classrooms and homework? (In other words, it seems easier to detect in English classes, but more difficult to detect in STEM courses)

Actual
STEM PLC
Slide



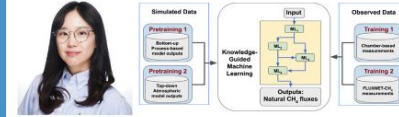
Class 1: Benefits of AI Use

- **Potential to Address Widespread Societal Challenges:** Groups like “ESIL” from UC Boulder use large data sets with AI Enhancement to solve major environmental problems (CU Boulder, 2024)
- **Prevent Burnout & Automate Tasks:** AI can be used to create basic lesson plans, generate prompts, extra practice sheets, or to score student work.
- **Individualize Instruction:** Teachers use AI to provide remediation support for those who are behind, and enrichment lessons for those who are more advanced.

Harmonizing Natural Methane Datasets using Knowledge Guided Machine Learning

Short title: AI for Natural Methane

PI: Yumi Oh (University of Colorado Boulder), Co-PIs: Sparkle Malone (Yale University), Gavin McNicol (University of Chicago), Licheng Liu (University of Minnesota)



**Actual
STEM PLC
Slides**

Atmospheric methane (CH₄) is the second most powerful greenhouse gas after carbon dioxide and grew at the rate of 1.5% per year from 2003 to 2018. Atmospheric CH₄ will require an improvement in energy efficiency. Energy efficiency budgets are responsible for ~40% of the total abatement potential.

AI in the Classroom: for TEACHERS...

Chat GPT Search for Chrome says,

best AI tools for teaching: best AI tools for planning:

1. **Canva:** Best for educational content design and customization.
1. **LessonPlans.ai:** Crafting the Future of Education
2. **Curipod:** Best for lesson creation and gamification.
2. **Education Copilot:** Your Classroom Ally
3. **MagicSchool:** Best all-around teaching assistant.
3. **ChatGPT:** Conversational Crafting of
4. **Diffit:** Best for lesson differentiation.
5. **ChatGPT:** Best for generating prompts, queries, and feedback.



AI in the Classroom: for STUDENTS...

Chat GPT Search for Chrome says,

best AI tools for individualized student support:

1. **Julius AI:** A math tutor that helps students solve complex math problems by scanning the problem and providing detailed, step-by-step explanations. It's known for its advanced computational capabilities and photomath capabilities.
2. **Socratic by Google:** A free mobile app that provides educational resources and detailed explanations to students' questions across a wide range of subjects, including math.
3. **Photomath:** A mobile app that uses computer vision and AI to provide instant solutions to math problems by recognizing and solving them with a camera.
4. **Mathway:** An app that offers instant solutions to a wide range of math problems, recognizing and solving problems in various formats.
5. **Chat GPT:** A free AI resource that can be used to explain complex concepts through the use of the large language model.
6. **Elicit AI:** AI tool to find 'seed articles' and to mine for keywords/subject headings. When you enter a question, it returns alternate questions that can lead to further "seed" articles.



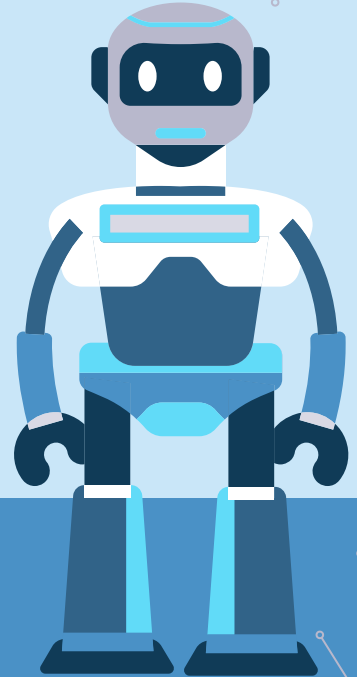
■ Class 1: Ethical Issues with AI Use

- **Privacy concerns:** data unintentionally shared widely ([Princeton Review, 2024](#))
- **AI hallucination:** “seeing things that don't actually exist in images”
- ([Estroff Marana, 2023, para. 11](#))
- **Machine-translated garbage:** poor translation between languages ([Roscoe, 2024](#))
- **AI drift:** “attempts to improve... cause other parts to perform worse” ([Ortiz, 2023, para. 2](#))
- **Bias in AI algorithms:** distribution of biased data leads to biased algorithms ([Princeton Review, 2024](#))
- **Significant environmental impact:** high energy consumption ([Heikkilä, 2023](#)) and high water usage ([Gordon, 2023](#))
- **Exploited Workers:** OpenAI (ChatGPT) uses prisoners and refugees in low-income countries ([Hao & Seetharaman, 2023](#))

02

STEM PLC Session 2

Chalkboards and Chatbots:
What's Going on in the Professional Landscape?



Session 2: Knowledge Development

Students explored AI use within the STEM discipline context. They then began to solidify their learning from Session 1 and 2 by identifying their values related to AI use and also hearing their colleagues perspectives.

Week Two - Chalkboards & Chatbots: What's going on in the professional landscape?

Weekly Topic

TOPIC – Chalkboards and Chatbots:

What's going on in the professional landscape?

"In this session, teachers will explore position statements from leading STEM professional organizations [NCTM & NSTA] regarding the use of AI in education and STEM fields. After reviewing these resources, teachers will reflect on what they have learned, and how their views have shifted" (OpenAI, 2024).

Asynchronous Session –

The work should take about 60 minutes to complete. All components of the Asynchronous Session must be completed prior to the start of out Week 3 class meeting on December 2nd at 4:15pm.

Actual
STEM PLC
Sakai Page

Week's Activities

- Complete all asynchronous steps below for credit for Week 2
- Step 1: Review content from W1 (10 min)
- Step 2: Explore Professional Recs (15 min)
- Step 3: Watch informational Videos (15 min)
- Step 4: Complete the Voice Thread assignment
- Attend

STEP 1: Review Content from Week 1 (estimated 10 min)

SUMMARY FROM WEEK 1:

As you engage with the steps of this Asynchronous Exploration, consider some of the BENEFITS and ETHICAL ISSUES related to the use of AI Technologies.

In class, we discussed several **BENEFITS** to the use of AI. Some are listed here:

- Reduces teacher burnout
- Enhances personalized learning
- Unlimited data collection opportunities and access to large data sets
- Streamlines administrative tasks
- Fosters collaborative learning environments
- Increases accessibility for a wide range of people
- Reduces lead times and material waste through automated systems
- Improves workplace safety
- Advances in medical field such as diagnosing life-threatening health problems
- Improved customer service through error minimization and automation
- Improved decision making related to climate change and climate change mitigation
- Detection of deadly weapons

In class, we discussed several **ETHICAL** issues here:

- Loss of human connection
- Potential for job displacement
- Stereotyped, biased results
- Privacy and security of intellectual property
- Privacy of personal sensitive data
- Potential for academic dishonesty
- Environmental impacts - Water use
- Environmental impacts - Energy, Emissions
- Human rights violations - Exploited
- Human rights violations - Screening
- Limited transparency of data collection

REFLECTION QUESTION: (Consider and take notes as needed.)

- In what situations do I feel comfortable using AI technologies in my daily life?

STEP 4: Share your Reflections (estimated 20 minutes)

Consider the steps that you have explored:

1. Review of Week 1 Content
2. Video: UNESCO "Ethics of AI" &
3. Video: Financial Times "AI can be a Climate Warrior"
4. Professional Guidelines (NCTM, NSTA, & CPS)



Discuss your thoughts on **ONE** of the three REFLECTION QUESTIONS in the Voicethread below:

- Where do I feel comfortable using AI technologies for my personal use?
- What do the experts in my field recommend for responsible AI use in STEM classrooms?
- What values do I hold related to AI use that will be important to communicate with my future students?

Then, view the "Student Gallery" and **respond to at least ONE colleague's recordings** by making a comment on their

STEP 2: Explore Professional Recommendations (estimated 15 min)

SITUATE YOUR VALUES WITHIN THE EDUCATION LANDSCAPE:

As teachers we must be able to identify *our own personal* VALUES. Those values will often guide our decision making and influence the experience of engaging in our classrooms. However, as teachers, we must seek to teach our future students to explore and identify *their own personal* VALUES as citizens of the world, without imposing our values upon them.

To begin this consideration, take some time to learn from the leading professional organizations on their recommendations for use of AI in STEM classrooms.

1. Read the

- Math
- Intel
- Science
- All M

REFLECTION QU

- What do the e

STEP 3: Watch TWO Informational Videos (estimated 15 min)

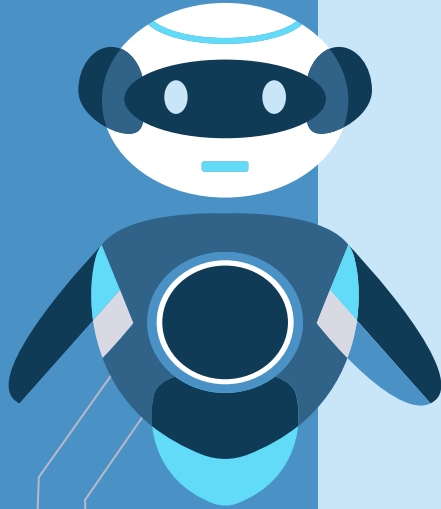
As you watch, consider the BENEFITS and ETHICAL ISSUES related to AI use.



UNESCO video, "Ethics of AI: Challenges & Governance"

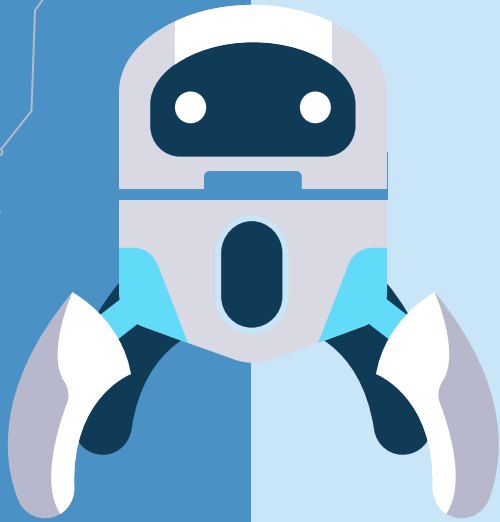


Financial Times video: "AI can be a Climate Change Warrior, but what about its Carbon Footprint?"



We asked:

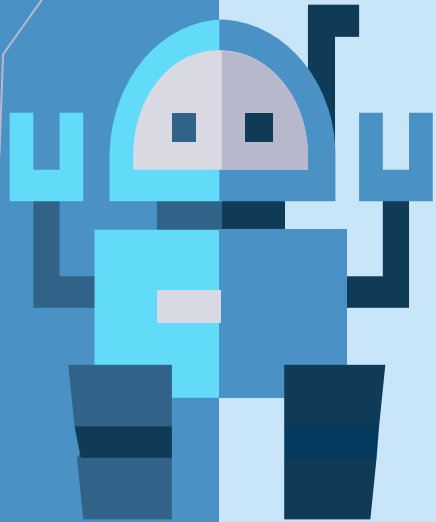
“What values do you hold related to AI that will be important to communicate to your future students?”



“I want students to be honest with me when they do use it.”



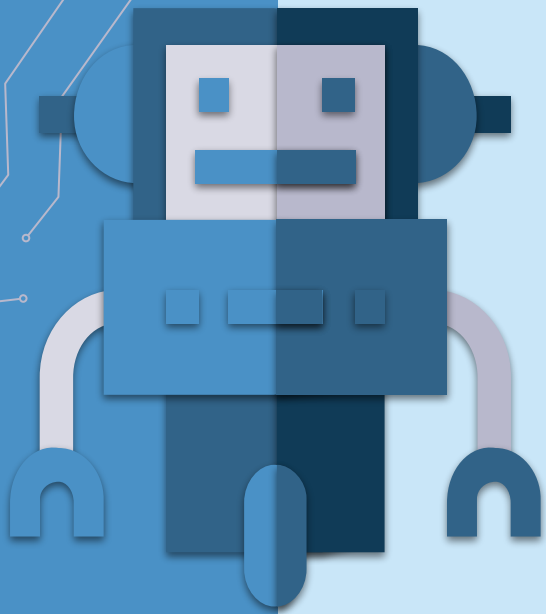
—**Stephen W., Junior**



“We need to start giving students assignments that they see as being important in their every day-to-day lives.”



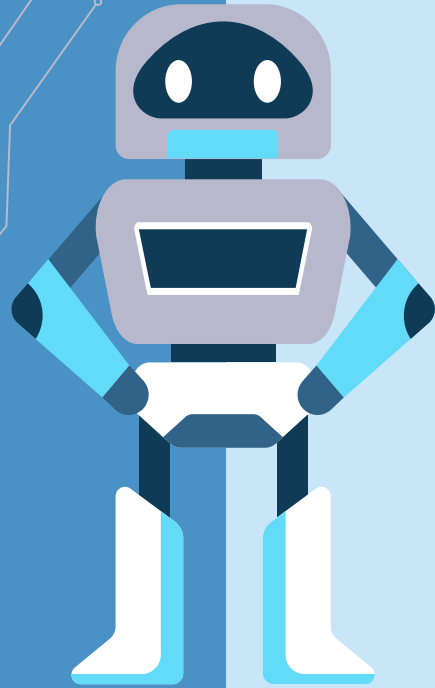
—**Rubi M., Junior**



“An actual teacher...will always be the best option for students to succeed.”



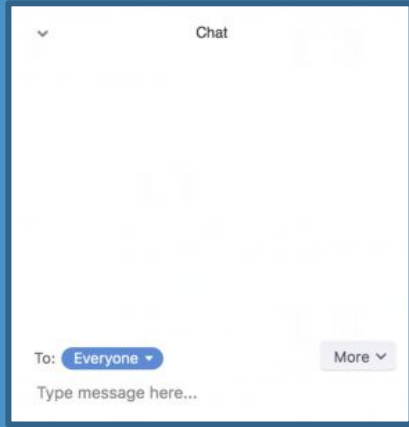
—**Katie E., Senior**



“I would strongly encourage them to think about their usage of [AI]...how that’s inhibiting them.”



—**Tommy F., Sophomore**



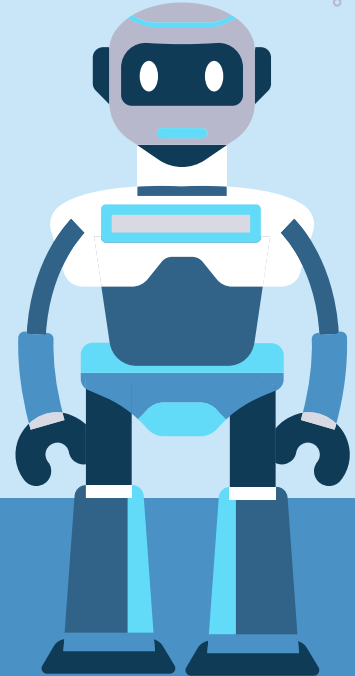
What stands out to you about these students' perspectives?

Share in the chat!

03

STEM PLC Session 3

The Human Teacher Behind
Machine Learning



Session 3: Knowledge Application

Students utilized their newly identified values in combination with their new knowledge of AI to create course policy statements they can use in future 6-12 Math & Science Classrooms.

Directions

2

1. Create a **slide** for your draft policy submission.
2. Consider how you will respond to each of the **elements** below in your policy.
3. Share your policy on your slide(s).
 - If you have questions or requests for specific feedback from your peers, include this as a **comment on your slide**.
 - If you need more than one slide, **add another below your first and follow the same format**.

AI Use:

When is it acceptable/unacceptable for students to use AI?

Ethical considerations:

When AI is allowed, how can students use it responsibly (plagiarism, overuse, discipline focused, etc.)?

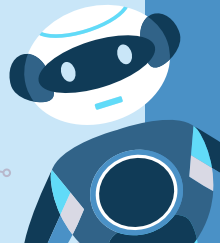
Privacy:

What are the approved tools and the associated risks?

Secondary STEM PLC
AI Policy Statements
Collection

STEM PLC
Fall 2024

Actual
STEM PLC
Slide



Breakout Room Directions



1. **Read** the student-created policy assigned to your group.
2. **Discuss** as a group:
 - Does this policy reveal any interesting insights into the student's **current understanding** of AI?
 - What does this student's policy tell you about their **values** as they relate to the use of AI in the classroom?
 - What **implications** arise from this policy for how you might approach the use of AI in your own higher education courses?
3. **Create one sentence** to share about what you're taking away from your policy statement.

■ Group 1

AI use is allowed provided it is not used to explicitly generate any work. This means that using AI to explain the steps on how to solve a problem, provide other practice problems to reinforce understanding, or check the work for a problem you have already solved are positive uses while using AI to answer a homework problem for you is not allowed.

AI should generally be used as a last resort. Ask for help from me or others students in class before resorting to using AI. Make sure that AI is reinforcing your learning, not a substitute for it. You won't be able to use AI on tests so you are still responsible for learning the material we cover.

Students should understand that AI is not infallible and should check any answers AI give with their peers or me. Tools like wolfram alpha and photomath are great for checking answers and providing steps. Chat GPT should be used **VERY** sparingly as it tends to make the more mistakes.



■ Group 2

AI Use:

- Students are allowed to use AI as a supplemental tool in addition to their other course approved materials
- AI can be only be used to aid in the completion of assignments
- AI will not be used during exams, quizzes, summatives, and tests
- AI may be used to aid in writing essays but it must be stated and the work will be put through various AI checkers

Ethical Considerations:

- How AI has many negative impacts on the physical world around us
- Students are not allowed to outright copy from AI and must explain/show their work in their own words
- Students will be told numerous times that they must be able to understand the material because they will be tested on it in a non-AI/online setting
 - This will allow for more free thinking and hopefully de-incentivize the over use of AI leading to less reliance and more individual problem solving

Privacy:

- Privacy in math/science AI use is not as big of an issue because the problems will mainly be theoretical/practical>personal

■ Group 3

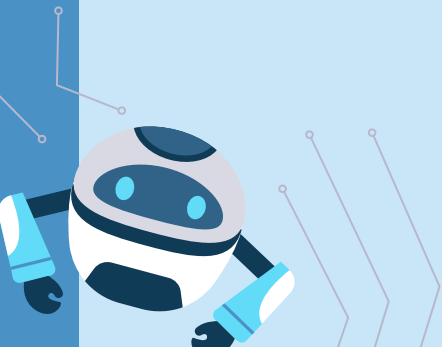
The Do's and Don'ts of AI in the Classroom

DO	DON'T
Ask me if you have any questions about using AI or when it is appropriate	Use AI to answer questions on homework, worksheets, quizzes, or tests
Cite any time you use AI in a paper, either for summarizing information or generating ideas/outlines	Provide AI with any personal information when using it
Use AI to help you clarify or reteach topics, come up with practice problems and answers, or generate research topics	Use AI text or images without fact-checking and looking at potential plagiarism
Fill out the form about AI use so that I will be able to see what I need to work on in my teaching	Rely on AI to be able to help you solve all kinds of problems

Remember!!

- AI does not replace your own learning in the classroom, it does not teach you think critically, understand topics conceptually, or problem solve
- AI is a tool, not an all-knowing entity, it makes mistakes
- AI programs have implicit bias which can impact the responses it gives you
- AI has human rights and environmental consequences

*I would pair this policy with a day of exploration on what AI is, what the implications are, how the privacy policies works, similar to what we have done in the PLC (videos, articles, data, etc) so that students can be apart of deciding how they feel about it and how they want to use it. I would also share some examples of how AI answers questions and we can see the pros and cons of the response it gives.†



■ Group 4

Before you AI you MUST:

Know that your AI use has an impact on the world around us!

Know that AI can be/ has been wrong- check the info you get.

Never copy and paste direct quotes (plagiarism).

Determine whether using AI now will help you on assessments and projects where AI use is not allowed.

- Understand you can't rely on AI in fast real-world situations.

Before using AI you SHOULD:

Ask a friend to help.

Ask the teacher to provide any tools that they may have.

Watch a youtube video.

If you choose to use AI, please submit at least one sentence to explain your reason for using AI.

Reasons to use AI:

- You are having a difficult time generating ideas for STEM fair.
- You are asking for a science concept to be explained in a context you understand (sports context, art context, baking, etc.)





Lessons Learned



Be careful not to make assumptions about student knowledge.



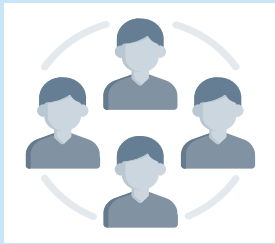
Ethical dilemmas are important to discuss and address.



Students are eager to learn about how AI can provide benefits.



Peer-to-peer, collaborative learning structures are impactful.



Implications for Practice

Begin course
planning
with a
foundation
of social
justice.

Intentionally
explore to
identify our
own values
is key.

Clear policy
Statements
are a good
way to share
our values w/
students.

Engaging
students as
co-creators
of that policy
is highly
effective.

Resources

Here are several resources we referenced to create the course and support student learning :

Professional Organization Position Statements/Guidance:

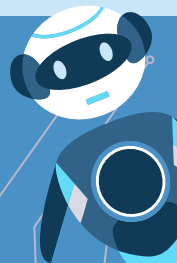
- NSTA: <https://www.nsta.org/blog/understanding-ai-teachers-guide>
- NCTM: <https://www.nctm.org/standards-and-positions/Position-Statements/Artificial-Intelligence-and-Mathematics-Teaching/>

Higher Ed Resources:

- ChatGPT Resource Guide: <https://libguides.luc.edu/ChatGPT>
- Collected Syllabuses: https://docs.google.com/document/d/1RMVwzjc1o0Mi8Blw_-JUTcXv02b2WRH86vw7mi16W3U/mobilebasic

AI Ethics:

- Video: [AI Can Be a Climate Warrior, but What About Its Carbon Footprint?](#)
- Video: [Ethics of AI: Challenges and Governance](#)
- Article: [Lee & Perret. \(2022\). Preparing high school teachers to integrate AI methods into STEM classrooms](#)



Thank you!

Do you have any questions?

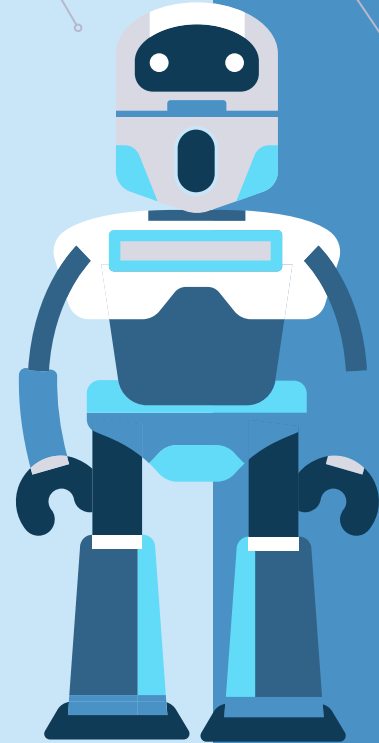
Julie Jacobi

jjacobi@luc.edu



Courtney Barcus

cbarcus1@luc.edu



CREDITS: This presentation template was created by [Slidesgo](#), and includes icons by [Flaticon](#), and infographics & images by [Freepik](#)