Workshop 1:
Hands-On AI:
Building Custom Chatbots to Support Active Learning

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The AI mood board

In your opinion, what are some of AI's most significant strengths when it comes to enhancing student learning?

Choose one strength. What is a specific example of leveraging it to enrich your curriculum?

In your opinion, what is the greatest risk that AI poses to student learning?

Choose one risk. What’s one way that you can directly address it in your curriculum?

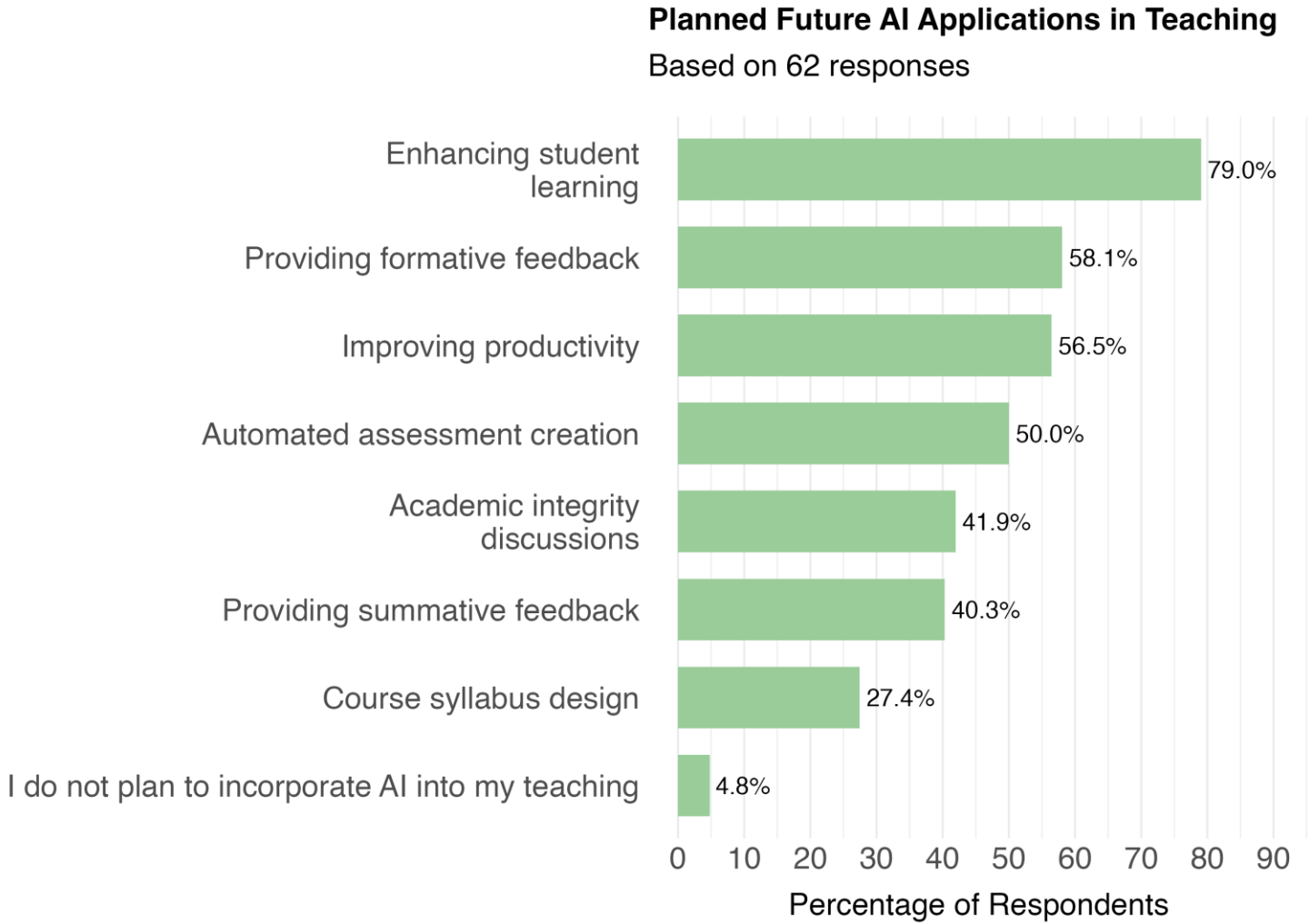
- American Association of Colleges and Universities
  - January 2025
  - 337 Higher Ed Administrators

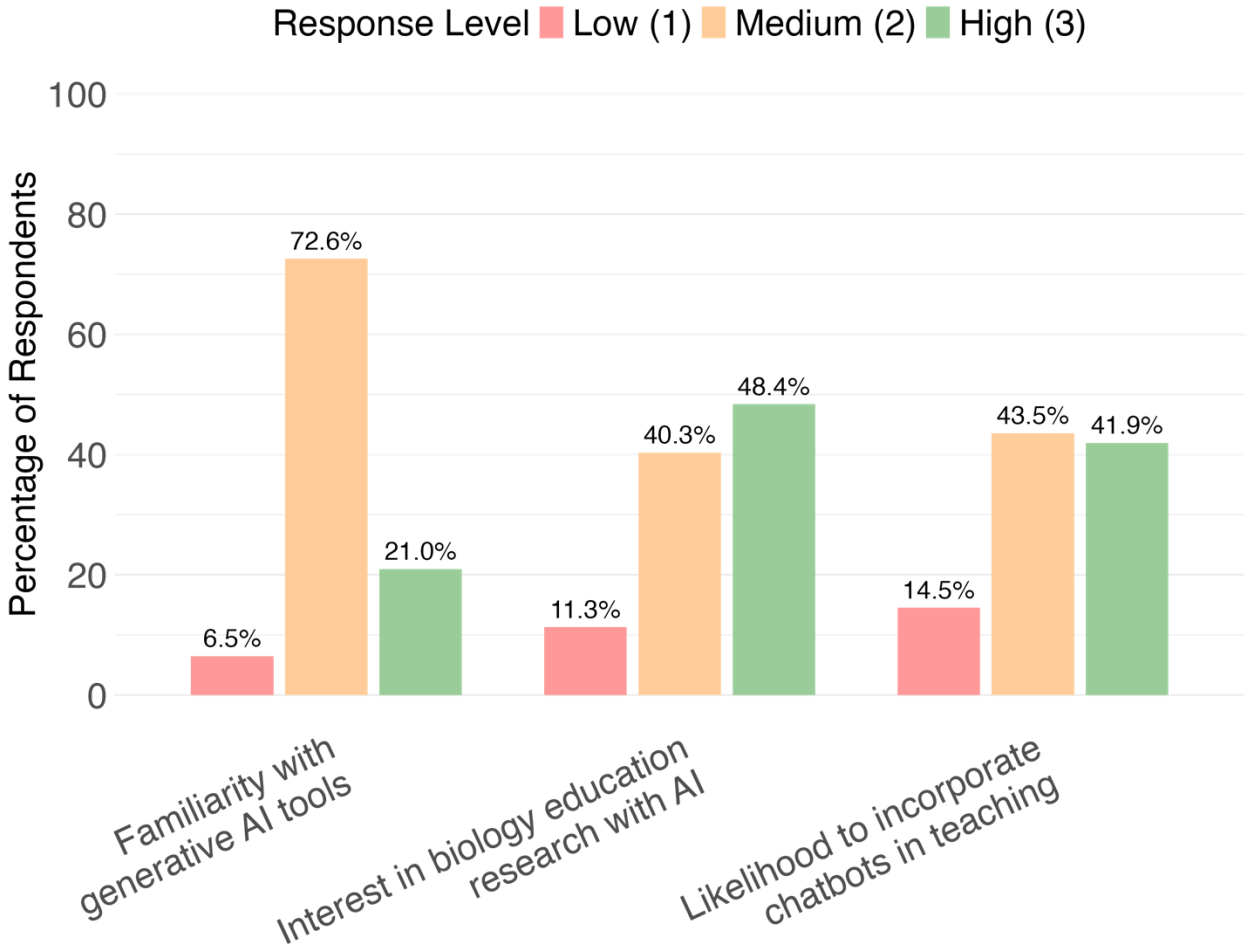
*Q23 To what extent do you believe Generative AI tools may **impact students in the future** when it comes to these aspects of their academic lives?*

	A lot	Some	Not much	Not at all	Don't know
Enhance and customize learning	47%	44%	6%	2%	2%
Improve research skills	29%	46%	13%	8%	4%
Increase creativity	21%	45%	18%	14%	2%
Increase ability to write clearly and persuasively	27%	42%	14%	16%	2%
Develop an overreliance on Generative AI tools	44%	48%	5%	*	3%
Increase concerns about academic integrity	56%	39%	4%	1%	1%
Decrease attention spans	24%	42%	22%	6%	6%
Widen digital inequities	36%	45%	13%	4%	3%

AI is a double-edged sword

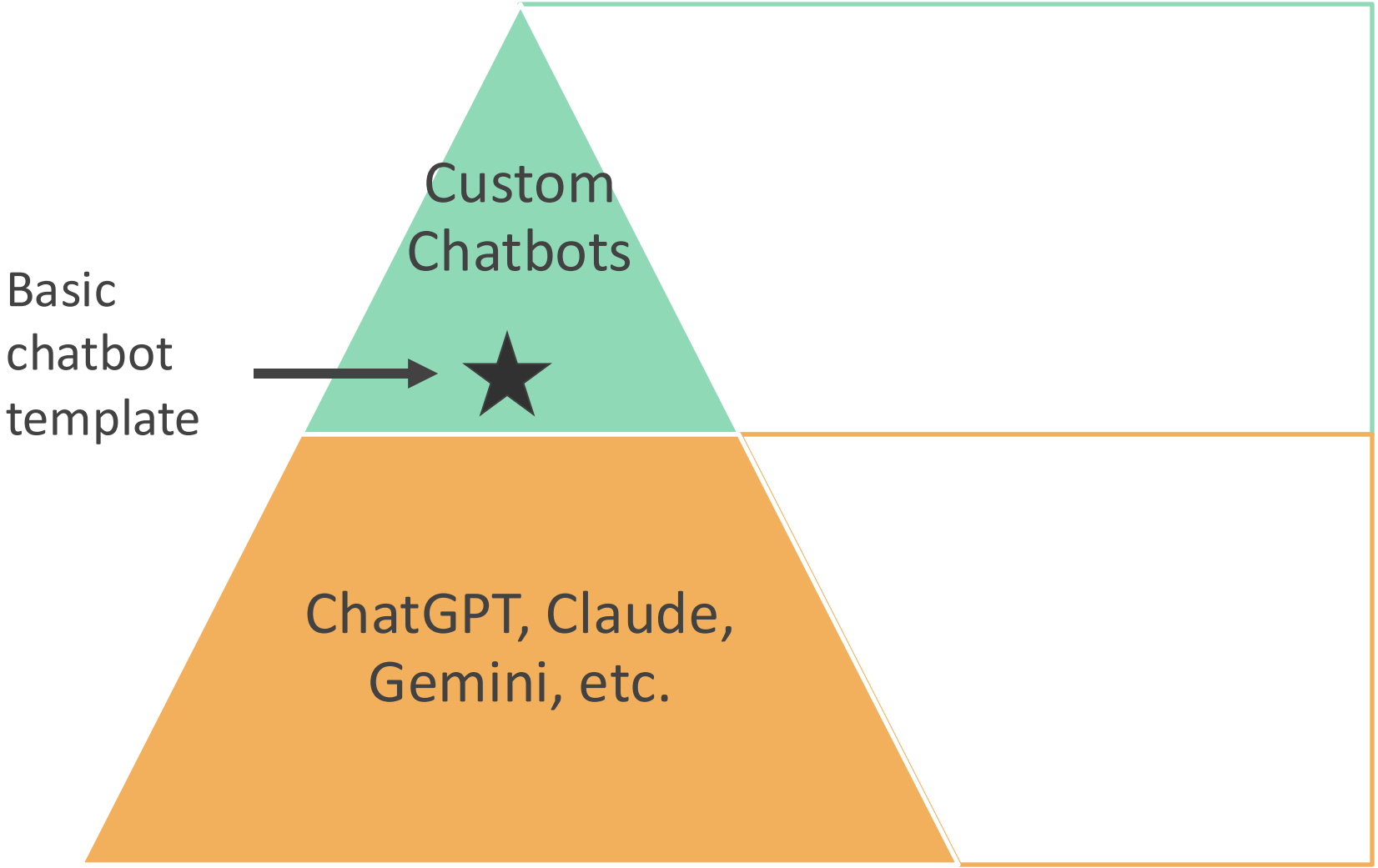
- Like any emerging technology, AI has the potential to:
  - extend the capabilities of experts
  - undermine the motivation to become one
- Its role should be to assist—not replace—the cognitive effort essential to achieving mastery.


Planned Future AI Applications in Teaching
Based on 62 responses
Enhancing student learning
79.0%
Providing formative feedback
58.1%
Improving productivity
56.5%
Automated assessment creation
50.0%
Academic integrity discussions
41.9%
Providing summative feedback
40.3%
Course syllabus design
27.4%
I do not plan to incorporate AI into my teaching
4.8%
0
10
20
30
40
50
60
70
80
90
Percentage of Respondents


Response Level
Low (1)
Medium (2)
High (3)
Percentage of Respondents
100
80
60
40
20
0
6.5%
72.6%
21.0%
11.3%
40.3%
48.4%
14.5%
43.5%
41.9%
Familiarity with generative AI tools
Interest in biology education research with AI
Likelihood to incorporate chatbots in teaching

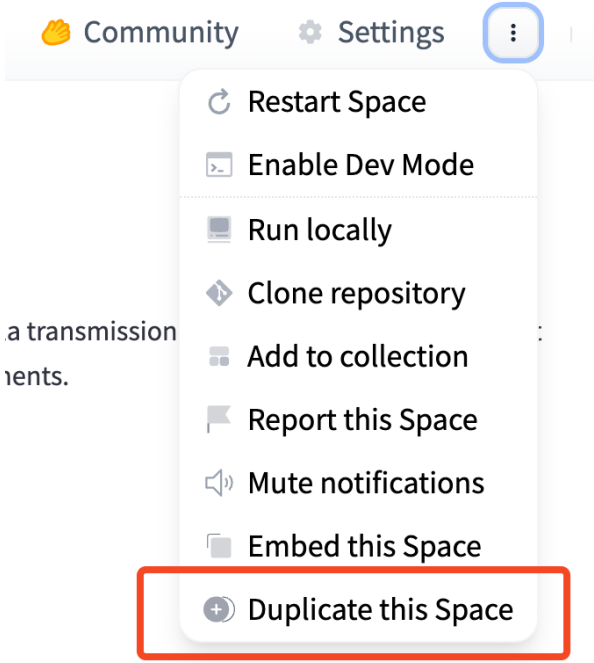
Create a Supportive AI Learning Ecology

- Academic integrity and syllabus policy
- In-person instructor demos or small-group activities
  - Instructor-led and small-group practice
  - Example: Writing a cold email
- Create curricula that explicitly showcase and address AI strengths and weaknesses
  - Strengths: basic knowledge, summarizing, organizing, creating
  - Weaknesses: information validation and limited/biased scope


Custom
Chatbots
Basic
chatbot
template
ChatGPT, Claude,
Gemini, etc.

Let’s Create a Chatbot!!!

- Starting Point:
  - OpenAI API Key (your own or you can borrow mine)
  - Log into your Hugging Face account
  - Search “keefereuther/st_basebot”



Duplicate this Space

Owner: keefereuther / Space name: ST_basebot / Visibility: Public

Space hardware Free

CPU basic · 2 vCPU · 16 GB · FREE

Your duplicated Space may not work if you switch to a different hardware than the suggested one.

This Space has 2 secrets and 0 variables that may be needed for it to work properly.

Space secrets Private

OPENAI_API_KEY — Add secret

password — Add secret

Duplicate Space | Cancel

How to edit and embed walkthrough

Let’s change and personalize the welcome message and the README

At your table, share your idea for your chatbot.

It’s ok if you don’t have an idea yet.

Choose any specific biology or learning related topic (e.g., metacognition)

Demo time!

Time to create and test!!!

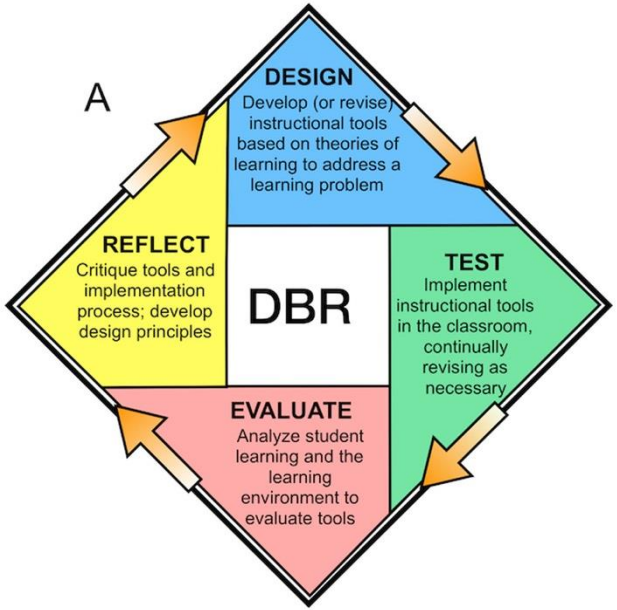
- Option to post your name, email, app URL, password, and a brief description.
- Test your own app and the apps of others.
- Be your inner undergrad!
  - Persona 1: Earnestly try and use as expected in a perfect world. (You've studied AND read the syllabus)
  - Persona 2: You're earnest and trying but never really went to class and don't know what's going on
  - Persona 3: Lie, cheat, and destroy!

Recommended Design Principles

1. Don’t create system instructions from scratch. Use AI or existing templates.
   - Format in Markdown
2. Clearly address:
   - Learning objectives
   - Student instructions
   - Chatbot behavior and knowledge base
   - Conversation constraints
3. Mess around with the model parameters too!
4. Regularly test and fine-tune the system; even small tweaks to instructions can lead to unexpected outcomes.

My Recommended Research Framework: Design Based Research (DBR)

- DBR is intentionally positioned between standard experimental approaches and action research.
- 4 tenets of DBR
  1. Grounded in theories of learning
  2. Aim to improve student learning
  3. Generate generalizable design principles
  4. Extended, iterative experiments



Scott, E. E., Wenderoth, M. P., & Doherty, J. H. (2020). Design-based research: A methodology to extend and enrich biology education research. *CBE—Life Sciences Education*, *19*(2), es11.