

AI TINKERY PLAYBOOK

Tinkering with AI:
A Sandbox for Educators

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Welcome

The AI Tinkery at the Stanford Accelerator for Learning is a digital and physical place to play and tinker. By **understanding, shaping, and evaluating** generative AI, learners can better imagine the future.

We started the AI Tinkery to help educators learn in ways that are **collaborative, human-centered, applied, and thoughtful**. In this playbook, we introduce you to our guiding principles. You will then find ideas for activities you can use or modify, ways that you can create spaces for tinkering, and thoughts about the people who make this work.

We encourage you to try these ideas out in your school! Join the AI Tinkery Network to connect with others doing similar work. Network members connect to share emerging practices and **imagine what comes next**. Learn more about the AI Tinkery Network on [p.25](#).

“

*"The best way to imagine what is possible
is to start making it."*

• • •



Dan Schwartz
Professor and
I. James Quillen Dean
Graduate School of Education

Learn more at
ai-tinkery.stanford.edu and acceleratelearning.stanford.edu.



Why Learn About AI?

As we look to the future, we believe that our education systems will eventually need to adjust to the arrival of these new tools in every part of the curriculum. The question becomes how to help teachers and students thrive as connected, creative, and contributing members of society.

Educators need a place to imagine the ways AI could support teaching and learning. These tools are so new, and are evolving so rapidly, that few of us are experts. This presents us with challenges in staying informed, but also provides us with opportunities to question the status quo.

For some, learning about AI is about the joy of exploring something new. Others seek to work more productively, or minimize administration to make time for more important tasks. For still others, it is about becoming informed, empowered citizens who can shape the technologies influencing their lives, families, and communities.

While we started the AI Tinkery to support educators, it is also an approach that works for students. Students come to us with diverse experiences, aspirations, and strengths. The AI Tinkery is designed to prepare them for a rapidly evolving world, support deeper and more meaningful learning, and empower them to use these technologies thoughtfully, creatively, and responsibly.





VOCABULARY CHECK-IN

Throughout this toolkit, we use the term “AI” primarily to refer to **generative AI**, a category of artificial intelligence systems that can generate new content, including text, images, audio, video, data visualizations, and computer code, in response to human input or prompts.

Most current generative AI tools are powered by foundation models trained on extremely large datasets. One important category of these systems is **Large Language Models (LLMs)**, which are designed to understand, generate, summarize, and interact through human language. Examples include conversational tools, writing assistants, search copilots, and tutoring systems. Other generative AI systems can create or analyze images, music, speech, simulations, and multimodal content that combines several forms of media.

Artificial Intelligence as a field is much broader than generative AI and includes many other technologies, such as recommendation systems, predictive analytics, robotics, computer vision, speech recognition, and adaptive learning systems.

This playbook and our toolkit focus particularly on generative AI because of its rapidly expanding influence on teaching, learning, creativity, assessment, communication, and human interaction. However, an AI Tinkery can easily expand to explore other AI topics.

What Is Tinkering?

Tinker /'tiNGkər/ *n.* to make small changes to something, especially in an attempt to repair or improve it.
(Cambridge Dictionary)

Tinkering has many definitions, but in the context of education, it is used to describe hands-on activities in which learners are encouraged to try things out, take things apart, and put them together again. It's a safe place for exploration. Tinkerers develop the skills, habits, and mindset to figure out how things work, solve problems, and create new things.

“

*Tinkering is not a new idea.
From the time the earliest humans began making
and using tools, tinkering has been
a valuable strategy for making things.
But tinkering is more important today than ever
before. We live in a world that is characterized
by uncertainty and rapid change. ...
Tinkerers understand how to improvise, adapt,
and iterate, so they are never stuck on old plans
as new situations arise.”*

• • •

Resnick & Rosenbaum (2013)
Designing for Tinkerability





Isabelle Hau
Executive Director
Stanford's Accelerator for Learning



Dan Schwartz
Professor and
I. James Quillen Dean
Graduate School of Education

“

*Looking forward, we believe
the AI-infused future will place a premium on
learners' ability to create— not just to consume.
Creativity is a deep form of adaptability:
It means trying new approaches, generating ideas,
seeking feedback, and attending to constraints
on reasonable solutions.
Generative AI has already ushered in this shift.
People delight in composing poems, remixing
code, and designing digital art with AI's help.
We may be moving from the information age to the
age of creation.”*

• • •

Hau & Schwartz, (2026)
Avoiding Education's Turing Trap

Isabelle Hau, executive director of Stanford's Accelerator for Learning, and Dan Schwartz, dean of the Graduate School of Education, point toward a compelling vision of creativity as a possible future in our classrooms. How could we help people realize that creative future? Through tinkering, visitors to the AI Tinkery develop informed perspectives on AI's role in education.

COMMUNITY SPOTLIGHT



“AI in education is an integral part of our students' educational journey and is shaping our students' future right from our youngest learners. The Hausner AI Tinkery, inspired by Stanford GSE's AI Tinkery, allows students to engage with AI in a safe, mostly unplugged environment now— learning to formulate their own questions, testing their ideas, and learning to approach AI with curiosity, excitement and responsibility.”

• • •

Smita Kolhatkar

Assistant Head for Innovation
Responsible AI and Ed Tech
Gideon Hausner Jewish Day
School
California

COMMUNITY SPOTLIGHT

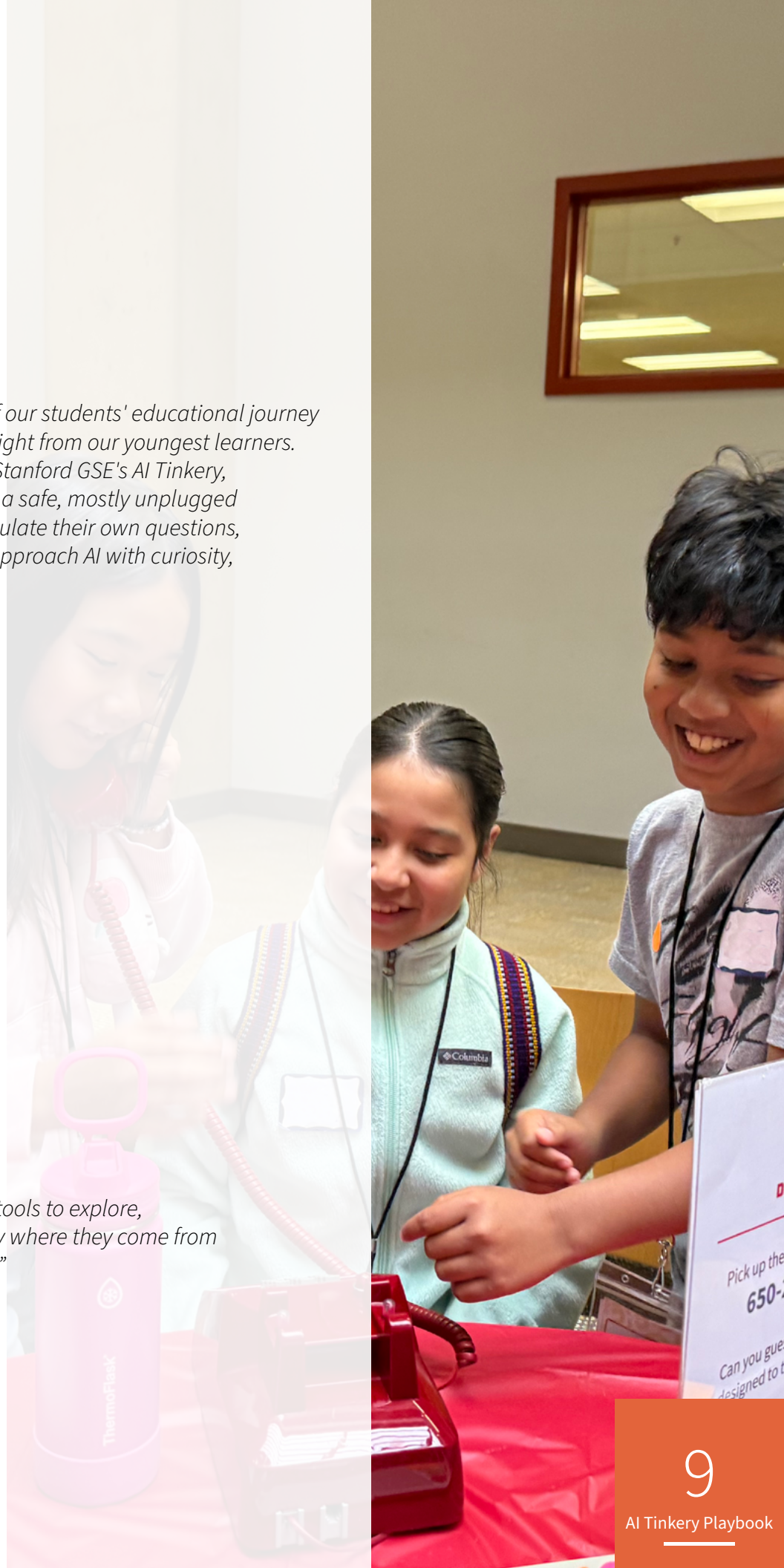


“When students are given the same tools to explore, their potential is no longer limited by where they come from but expanded by where they can go.”

• • •

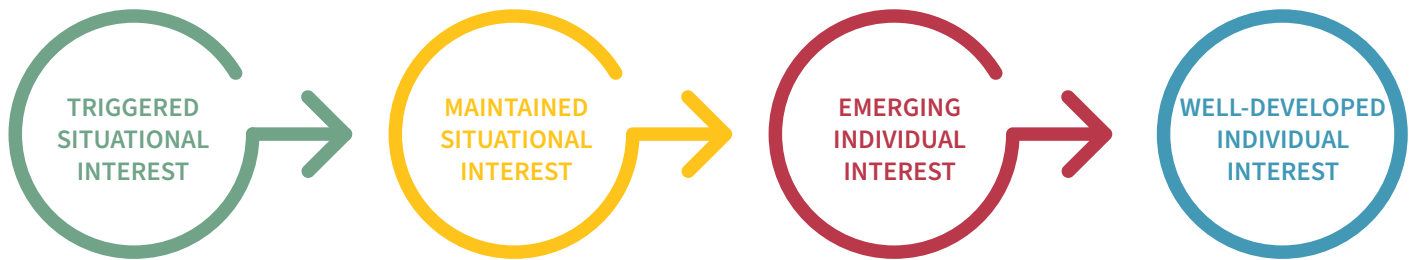
Marye Restrepo

Interventionist
Lakeside Elementary
Florida



To serve learners coming to the AI Tinkery with a wide range of experiences and knowledge, we find it helpful to think about the Four-Phase Model of Interest Development. The first two phases, triggered and maintained situational interest, are initiated by a situation. The last two, emerging and well-developed individual interest, are driven by the learner. They depend on different amounts of time, support, and initiative. This model helps us create a constellation of different learning experiences for everyone from people just passing by, individuals who are a little curious, and learners with a longstanding passion.

The Four-Phase Model of Interest Development



Hidi & Renninger (2026)

The four-phase model of interest development: Addressing individual differences



Trigger interest for people walking by.



Maintain situational interest with frequent, topical workshops.



Develop individual interest through working groups and opportunities to teach and learn in 1:1 consulting.

Guiding Principles: CHAT

In the AI Tinkery, we leverage insights from the learning sciences to create experiences that lead to contextualized, meaningful, and lasting understanding. We've developed the following principles—with the acronym CHAT—to guide our collection of activities.



Collaborative

With new tools constantly being developed, no one is an expert here. Instead, our approach invites everyone to bring their knowledge, and to learn from others. We aim to provide activities that bring people together to discuss, debate, and collaborate.



Human-centered

By focusing our exploration of AI on humans, we are making space for questions, valuing multiple perspectives, and paying attention to the impact of technology on both learners and their communities.



Applied

Tinkering means trying, testing, remixing, and learning by doing to promote agency, curiosity, and growth. Our activities make room for play, allowing safe exploration and unexpected insights.



Thoughtful

We approach AI as a system to be understood, questioned, and shaped. Skepticism and critique aren't barriers — they're essential to tinkering.





Kris Hagel
 Peninsula School District
 Washington

COMMUNITY SPOTLIGHT

"Our 'aha' moment during Tinker Time came when the teachers on our team realized AI could serve as a critical friend for improving their Universal Design for Learning practices.

Working together, teachers alongside staff from technology, teaching learning, and ML departments, we built a custom bot that provides feedback on lesson plan strengths and weaknesses.

The energy was electric as we tinkered, and the ripple effects have been profound: we now have many more teachers building AI assistants, and we've committed to developing our own AI tools so educators can create safe, secure support for their work."

• • •



Prof. Tokutaro Hiramoto
 Director of the Beyond SDGs
 Promotion Center
 Kanazawa Institute of Technology

COMMUNITY SPOTLIGHT

"Over-reliance on AI threatens to disrupt human cognitive development, meaning education must adapt immediately.

As we move toward closer collaboration with AI, we have to build a sharp sense through hands-on practice, ensuring we remain 'proactive architects of society' instead of letting AI take the lead.

This is why the 'AI Tinkery' is so essential.

It offers a space where playfulness and community meet, allowing us to tackle this new human-AI dynamic head-on.

In doing so, we are building a new, student-driven culture within our educational institutions.

We are currently bringing this environment to our university and high schools across Japan, equipping young people to critically evaluate new technologies and actively build a sustainable future."

• • •



Dr. Rika Ikeda
 Director of the AI Tinkery Program
 Beyond SDGs Promotion Center
 Kanazawa Institute of Technology

Activities

Learning Goals

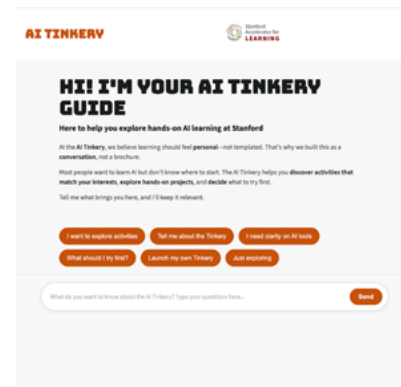
The AI Tinkery activities focus on three core learning outcomes.

- **Understand AI** — recognize where it is used in our lives, explain how it works, identify problems or tasks for which it is relevant.
- **Shape AI** — create new tools based on LLMs, solve meaningful problems, contribute to the betterment of our communities and society through new designs.
- **Evaluate AI** — evaluate impacts, surface risks, discuss ethics, imagine alternatives, and choose the right tool for the right task.

STUDENT SPOTLIGHT

"Through our university project exploring generative AI, I started seeing AI not as a mere automated task-runner, but as a powerful tool for augmenting human capabilities. Of course, it was tempting to treat AI like a cheat sheet, but this project showed me how meaningful it can be to learn and grow alongside it instead. Rather than replacing human creativity, AI made me even more curious, reflective, and excited about what people and technology can create together."

• • •
A Student Member
of the AI Tinkery Program at
Kanazawa Institute of Technology



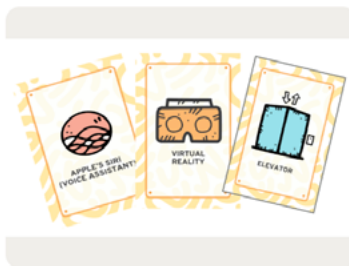
Toolkit

We have collected, modified, or created a range of activities to help educators understand, shape, and evaluate GenAI. We call these activities the Tinkery Toolkit.

You can find a starter toolkit at <https://ai-tinkery.stanford.edu/tinkery-toolkit>

UNDERSTAND AI

Activities like these help learners explore what AI is and can do, in ways that connect with their own prior knowledge and interests.



AI or Not? (Virtual)

⌚ 15 minutes 👤 Teacher + Student

🟠 Understand AI

by CRAFT

Sort cards into AI or Not and generalize a rule



Prompting Lab

⌚ 30 minutes 👤 Teacher + Student

🟠 Understand AI

by AI Tinkery

Experiment with structured, conversational, and meta prompting strategies

SHAPE AI

These activities help learners create with AI, setting them up to contribute their own perspectives and lived experiences to the development of future tools.



Teachable Machine: Pose Model

⌚ 30 minutes 👤 Student 🟠 Shape AI

by AI Tinkery

This hands-on experience with training your own AI model reveals how machine learning works: you provide examples, the model finds patterns, and then it makes predictions on new data.



Build-a-Bot

⌚ 45 minutes 👤 Teacher 🟠 Shape AI

by SAL Accelerator Studio

PLAY and TINKER Go to Build-a-Bot at bot101.app to create your own chatbot. Need some inspiration? Click on the Chatbot Gallery to explore examples. Click Try it Out to remix a copy of your own. REFLECT How does the process of building

EVALUATE AI

These activities help learners think more carefully about the tools that AI makes possible. When do they help, and when might they introduce risks?



Fact checking AI

© 1 hour 🧑 Student 🟡 Evaluate AI

by CRAFT

In this lesson, we'll introduce students to the skill of lateral reading (Wineburg & McGrew, 2017) as one approach to fact-checking the information they get from AI.

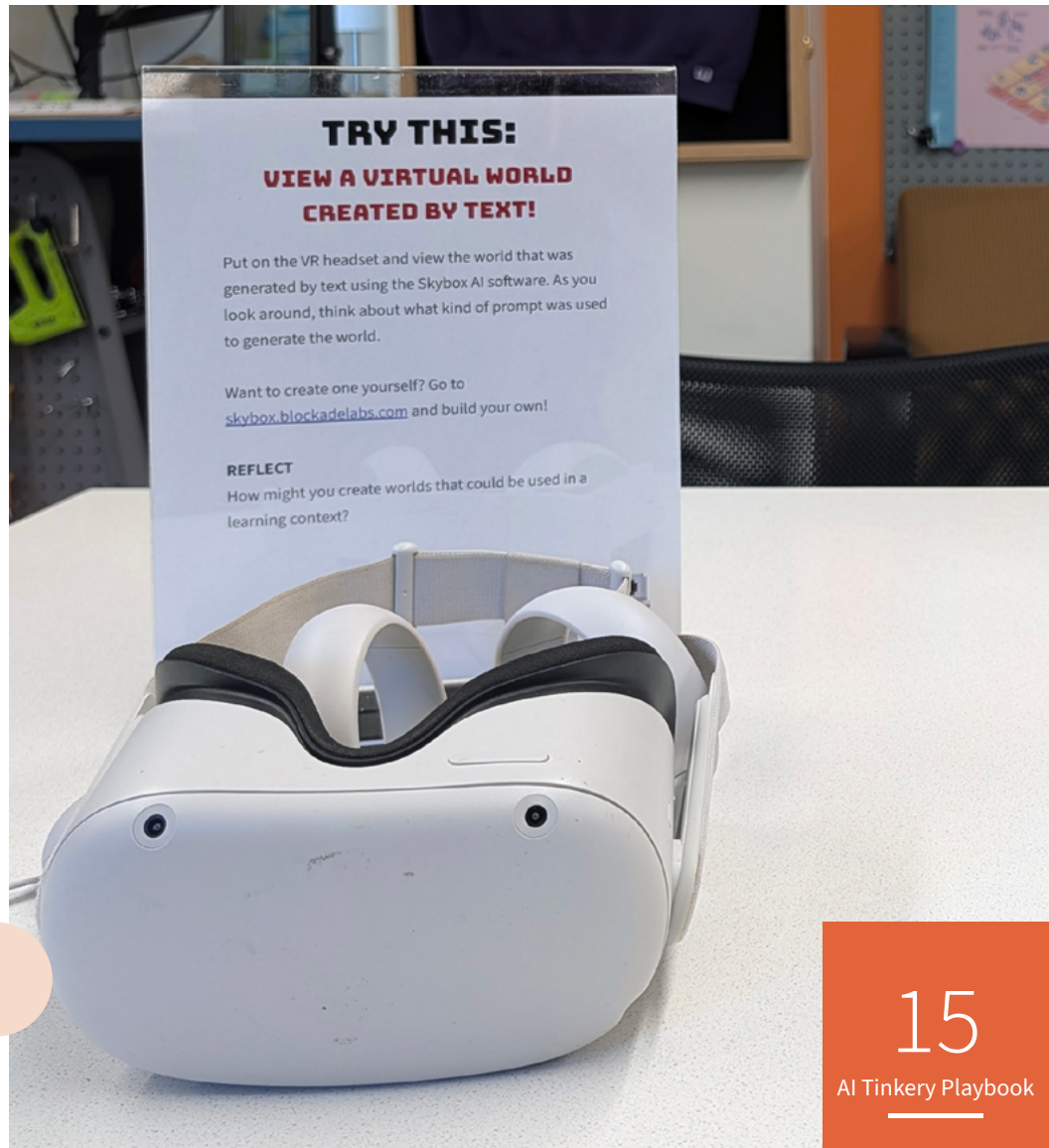


Evaluating GenAI Images

© 1 hour 🧑 Teacher + Student 🟡 Evaluate AI

by AI Tinkery

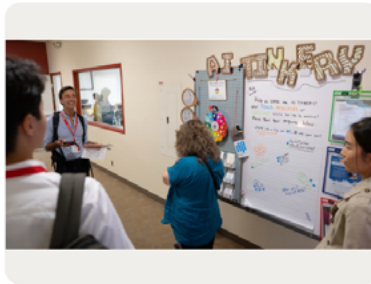
Create AI images and evaluate them for stereotypes and biases



VR installation

SPACE DESIGN

Here we have collected a starter kit for creating similar experiences in your own AI Tinkery.

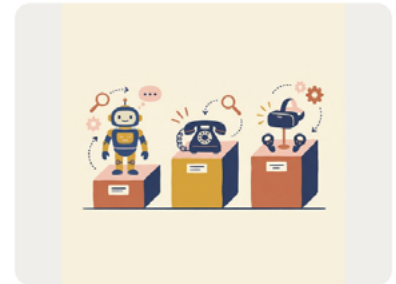


Curiosity Boards - Resource Guide

🕒 N/A 👤 Teacher 📁 Space Design

by AI Tinkery

Visual interactive installations for AI exploration



Installations

🕒 Variable 👤 Teacher 📁 Space Design

by AI Tinkery

Design museum-inspired interactive installations for AI exploration in your space. Examples include a robot companion to talk to, a VR headset showing a prompt-generated world, or a rotary phone playing opinions about AI from



Robot installation

Tinker Time

is a structured but playful way to introduce AI exploration.

The [Tinker Time facilitator guide](#) walks you through the goals, setup, and timing. The slides can be adapted for classroom or professional development contexts.

Working Groups

bring small cohorts together over multiple sessions to dive into a theme, tool, or question. Example themes include classroom practice, research workflows, creative coding, and responsible AI.

[View Working Groups facilitator guide.](#)

COMMUNITY SPOTLIGHT



"Navigating the constant shifts in education can be challenging, especially when it comes to emerging technology. Inspired by Stanford's AI Tinkery, I launched a similar initiative to help my colleagues explore AI. By fostering a playful, low-stakes environment, we were able to adopt a learner's mindset and collaboratively and thoughtfully integrate AI into our work and for our students."

• • •

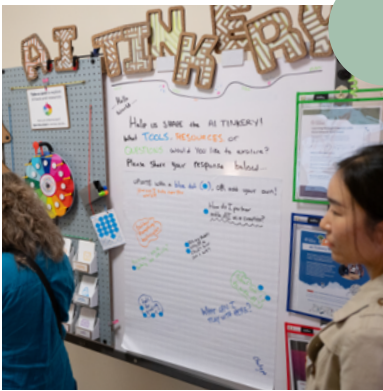
Jake Stein Greenberg,
Teaching, Learning,
and Innovation Specialist
The Agnes Irwin School
Pennsylvania

Spaces

Having a physical space to tinker with AI is key to facilitating the kinds of engagement we seek to foster.

A Wide Range of Options

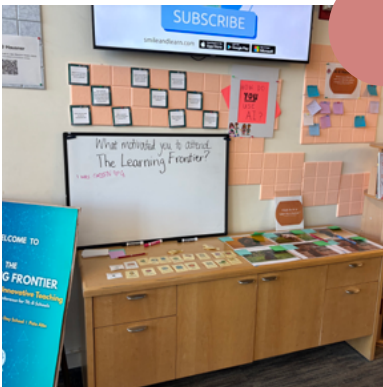
Many school and university leaders have shared with us how they have been inspired by our AI Tinkery to create their own versions to fit their spaces.



At Stanford, our first iteration of the AI Tinkery was a rolling white board. We have explored a variety of formats to bring provocative questions and curiosity — sparking activities to hallways and lobbies. Most recently, our AI Tinkery is in a conference room, which provides a place to host workshops and consultations.



At Lakeside Elementary in Florida, Tinkery station is located in the media center. Teachers used the spinner to give students subjects to explore.



At Gideon Hausner Day School, TK-8 students are invited to engage with books, questions, and activities in a lobby.

At Kanazawa Institute of Technology, students are presented with challenges to create games and apps combining learning, culture, and AI.



Installations

How can we invite learners to engage with explorations of AI in ways that spark curiosity and play?

We want to spark curiosity from passers by. We wanted to capture interest like an interactive exhibit in a museum or science center. The Stanford AI Tinkery Spinner was our first attempt. That idea has expanded to “Curiosity Boards” and other installations – interactive displays that make AI literacy visible in shared spaces. They invite drop-in participation at any pace, and turn individual reflections into a collective conversation the whole community can see.



Books

How can stories and critical perspectives on technology help us question assumptions and imagine alternative futures with AI?

The Stanford AI Tinkery Bookshelf started as a stack of dog-eared books we kept on hand for anyone curious about how technology shapes our lives. Over time, it has grown into a small library where teachers and students swap titles, circle passages, and spark conversations that connect personal curiosity with classroom practice.

A similar approach can be adapted for all age levels. At Gideon Hausner Day School, younger learners are invited to explore AI topics in age-appropriate books.

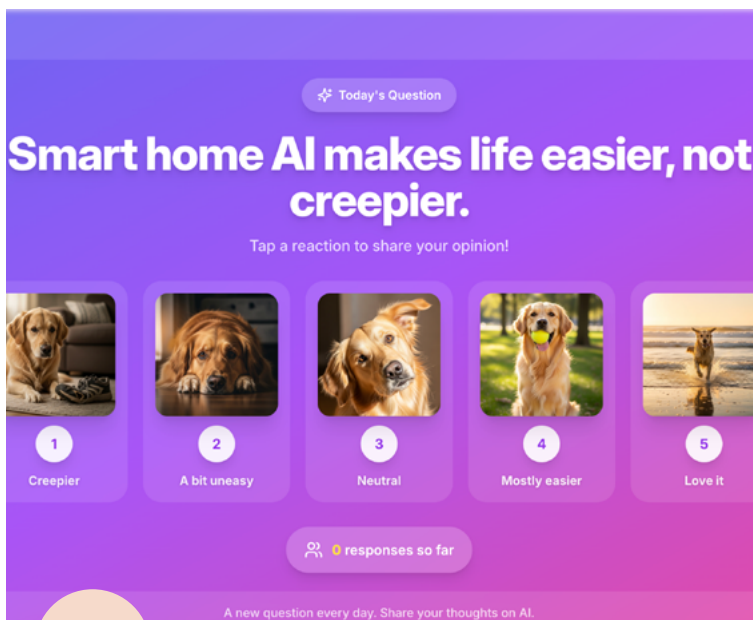


The Sandbox

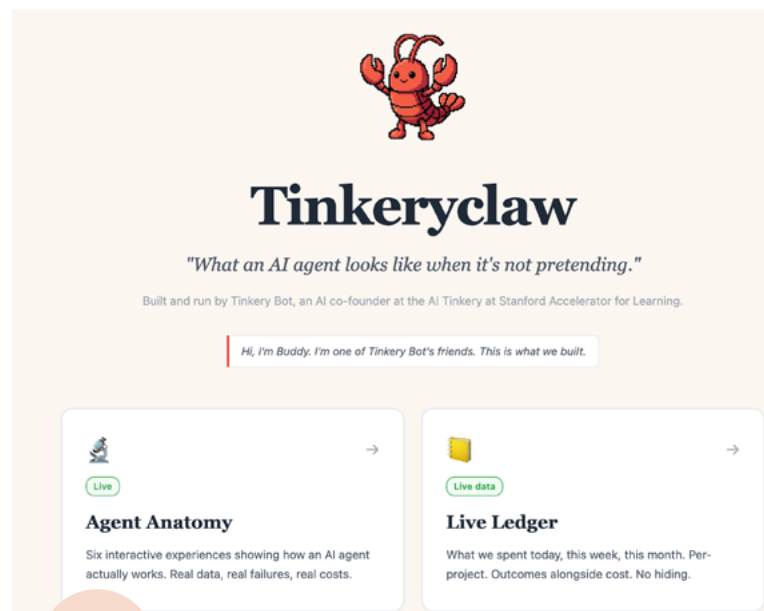
What do we learn about AI when we try to create with new AI tools?

One way the AI Tinkery supports low-risk learning is by facilitating a “sandbox”—workstations available during open hours where community members can explore AI tools with guided support. A highlight at Stanford is the AI Playground, a platform hosted by University IT that consolidates multiple approved models in one secure environment for safe exploration.

What tools you offer will depend on your school and district policies and support, and how they can be safely accessed. A “sandbox” serves as a safe space for visitors to explore AI’s affordances and grapple with its limitations. The purpose remains the same regardless of which tools are available—to foster play and tinkering so learners can understand, shape, and evaluate—as AI tools evolve.



AI question of the day



Tinkery Claw (the Tinkery Agent)





People in the Tinkery

Visitors

The AI Tinkery is a place for everyone. At Stanford, the Tinkery welcomes students, instructors, researchers, and staff from across the university and beyond. Those visitors represent learners who are skeptical, curious, experienced, and expert in a variety of AI topics.

Leadership

One person can lead the effort to start an AI Tinkery and spark momentum. The first leader sets up a physical presence, coordinates activities, invites mentors, and embeds the work in the school's culture. We encourage you to start small and grow into what makes sense for your community.

Mentors

At Stanford's AI Tinkery, we find that many people are eager to play a role in creating a vibrant, generative space and community. We invite them to join us as “mentors,” spending a couple hours in the space each week and taking on a special project.

Roles have evolved over time, as different mentors showed up and contributed their unique talents. For example:

- **Tinker Time Facilitator** — Runs workshops for learners (teachers, staff, students) to play and tinker with AI.
- **Working Group Leader** — Leads a small cohort or “club” to meet regularly to discuss and explore a topic or a tool.
- **1:1 Mentor** — Provides personalized or small-group coaching, models curiosity, and pilot tests new practices.
- **Community Connector** — Supports the community online; shares announcements, resources, and examples.
- **Builder** — Sets up new interactive displays and resources; creates new activities.

A SANDBOX FOR EDUCATORS: Play with us!

Join Our Network

If you're not already signed up, join us on our ai-tinkery.stanford.edu site or reach out to ai-tinkery@stanford.edu.

Members receive news updates, early access to new activities, opportunities to ask and answer questions in our online community of practice, and invitations to participate in educational research.

Start Your AI Tinkery

Pick one of the resources in the toolkit, set it up in your classroom, staff room, or hallway, and let learners engage. Share online using #AITinkery and #StanfordAcceleratorforLearning.

Try Tinkering

The Stanford AI Tinkery model is designed to be flexible and replicable — there are multiple ways to explore, depending on your context, time, and interest.

Go to ai-tinkery.stanford.edu/tinkery-toolkit for first steps and inspiration.

Community of Practice

We host online meetings for AI Tinkery Network members, where we share what we've tried, reflect on challenges, and imagine what comes next. Meetings are announced to members of the network.

Professional Learning Programs

Need more? The Stanford Graduate School of Education Professional Learning Extension (PLEX) offers non-degree learning experiences for educators, leaders, and education professionals.

Our programs, custom offerings, and professional certificates support deepening practice and addressing some of education's greatest challenges. Our team of teacher educators, researchers, and leadership experts offers research-based and practical professional learning experiences in a variety of formats.

Learn more at ed.stanford.edu/professional-learning.

Note: You are welcome to say “inspired by” but please do not claim an official relationship with Stanford University.



BUILD-A-BOT

Try This

- Go to the 'Build-a-Bot' web app at design.bot101.xyz to design, customize, and refine your own chatbot.

Explore & Tinker

- Click on the 'Chatbot Gallery' link in the menu to explore design inspiration. If you find one you like, click 'Remix' to customize a copy of your own.

Learn More...

Many people are doing work at the forefront of AI+Education. Below we offer some resources produced at Stanford University that we hope you will find useful.

| AI Literacy

The **Classroom Ready Activities for Teachers** project is creating activities specifically aimed to help teach high school students in all subject areas to understand and question Artificial Intelligence.



craft.stanford.edu

| Perspectives on AI and Education

Schools In Podcast, Stanford GSE

School's In brings you the latest research in teaching and learning, with practical insights for the present and future of education. Hosts Dean Dan Schwartz and Senior Lecturer Denise Pope invite you to join them and their expert guests as they dig into the complexities of learning across the life span.

AI for Educators Video Series — Stanford faculty on AI and learning.

In this series, Stanford faculty share their experiences and perspectives on artificial intelligence (AI) and learning as they respond to questions from educators. Each video comes with a set of discussion questions that you can use to self-reflect or engage in conversation with your colleagues.

ed.stanford.edu/professional-learning/resources



ed.stanford.edu/news-media/podcast



AI Research and Policy

The AI Hub for Education is the trusted source for superintendents and state/federal K-12 leaders on what works for leveraging generative AI to benefit students, schools, and learning. Schools need clear and actionable guidance to make the right decisions. We partner with school districts, policymakers, and ed tech innovators to leverage data, research effects, and bridge the gap between AI's potential and real-world impact. From practical tools for next semester to an aspirational vision of learning reimaged supported by genAI, we help education leaders with pragmatic answers to solve their most pressing problems.

User-Developer-Critic (UDC) Perspectives in AI Literacy Framework Documents

Abstract: AI literacy is increasingly discussed but does not have an agreed-upon definition or operationalization, specifically for curriculum and instructional design guidance. Different groups have tried to address this by producing framework documents that articulate key ideas and activities for AI literacy. In order to help characterize the broad set of AI literacy frameworks that are emerging, Lee and Long proposed the User-Developer-Critic (UDC) perspective space model as a meta-framework. UDC posits that AI literacy frameworks exist in a space with emphases on the perspectives of users, developers, and critics. To illustrate one use of this meta-framework, this paper presents a keyword analysis of five framework documents relative to the three perspectives of UDC. In doing this analysis, some differences appear between framework documents, such as more or less emphasis on developer perspectives and ideas about the mechanics of AI technology. Additionally, critic perspectives are present, but do not appear to be dominant in any of the framework documents.

Lee, V. (2025). "User-Developer-Critic (UDC) Perspectives in AI Literacy Framework Documents."
osf.io/download/xzvyr/

Acknowledgements

We thank the mentors, educators, and students who brought early versions of the AI Tinkery to life. Special thanks to Jessica Nguyen, Founding Manager, and our colleagues at the Stanford Accelerator for Learning, CRAFT, and PLEX.



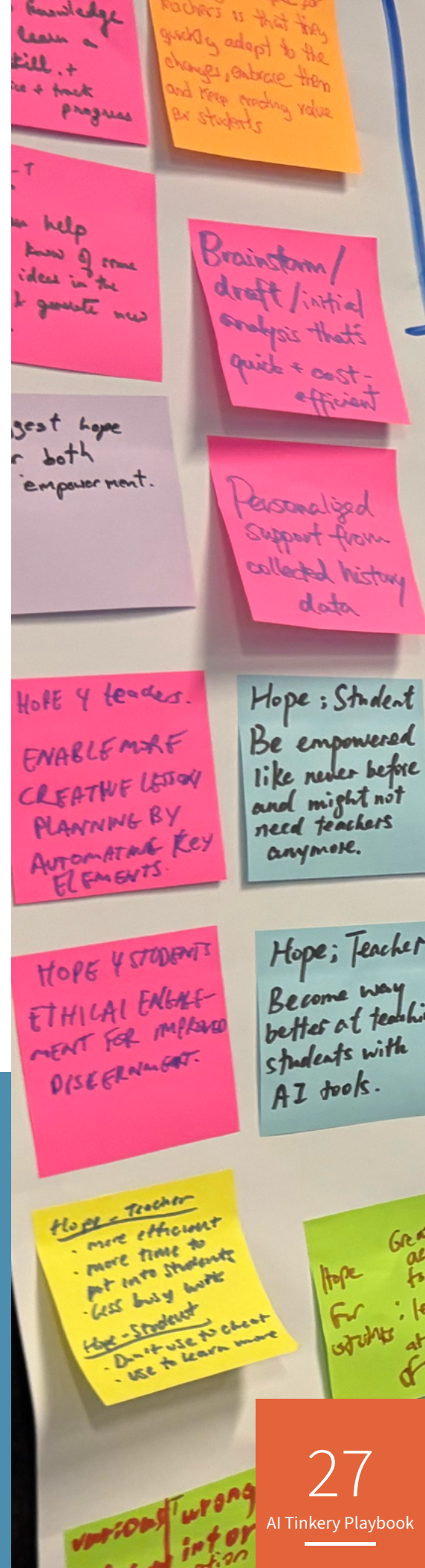
Gregory Wilson
AI Tinkery Manager



Karin Forssell
AI Tinkery Director

Your Feedback Matters

The AI Tinkery Playbook is a living resource. Your feedback helps us refine it, fill gaps, and make it more useful. Please email us with your comments: ai-tinkery@stanford.edu.



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more than a
hundred, and
which were all
affairs of the
hundred.

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