SUTD Leap

[RE]IMAGINE EDUCATION

A weekly Design.AI newsletter

PERSONALIZED DIGITAL PROF: CUSTOM GPTS TO SUPERCHARGE LEARNING

Anieyrudh R, First Year Student
In Conversation with Dr. Nachamma Sockalingam, OSP

Welcome to another edition of [Re]Imagine Education, where we spotlight the bold, the curious, and transformative practices at SUTD.

This week, we bring you a story that captures what makes our community so unique: the fearless willingness to experiment, remix, and reimagine what education can be in the age of AI. ***Have you ever wished you could access your professor's wisdom anytime, anywhere? What if every student had their own digital mentor, personalized to their learning style and needs?***

In the following feature, Anieyrudh, an SUTD undergraduate student, takes us on a personal journey: from late-night study frustrations to building a "Prof in a Pocket" with Custom GPTs. It is a story about using AI not as a replacement, but as a creative partner. It's about making learning radically more personal, flexible, and fun. Anieyrudh also has ambitious ideas on creating ***Building 0****.*

As always, we invite you to join the conversation. Try out new tools. Share your breakthroughs. Push boundaries. Because here at SUTD, we don't just imagine the future of education, we build it, together.

Let's get inspired!

Editor of Newsletter:
Dr. Nachamma Sockalingam, Office of Strategic Planning

How It All Started: The Day GPTBernie Was Born

It was the night before my math finals, and panic was setting in. My inbox was a flurry of messages, most of them mine, sent to Prof. Bernie, hoping for one last clarification, one more example, anything that might help make sense of the elusive epsilon–delta proofs. Usually, Prof. Bernie replied in minutes. But that evening, his inbox was silent. Perhaps other students were also sending him questions at the last minute. I decided to do something instead of waiting anxiously.

That's when I remembered Poon King Wang's workshop on building Custom GPTs. With nothing to lose, I decided to try something radical and create my digital professor through customization of ChatGPT.

- I uploaded my lecture notes, past papers, and Bernie's slides into a GPT.
- I added Bernie's bio, just to set the tone.
- Then I typed the magic prompt:

"Teach me like Prof. Bernie—start with an intuitive example, then guide me through the proof. If I get stuck, just give me a hint."

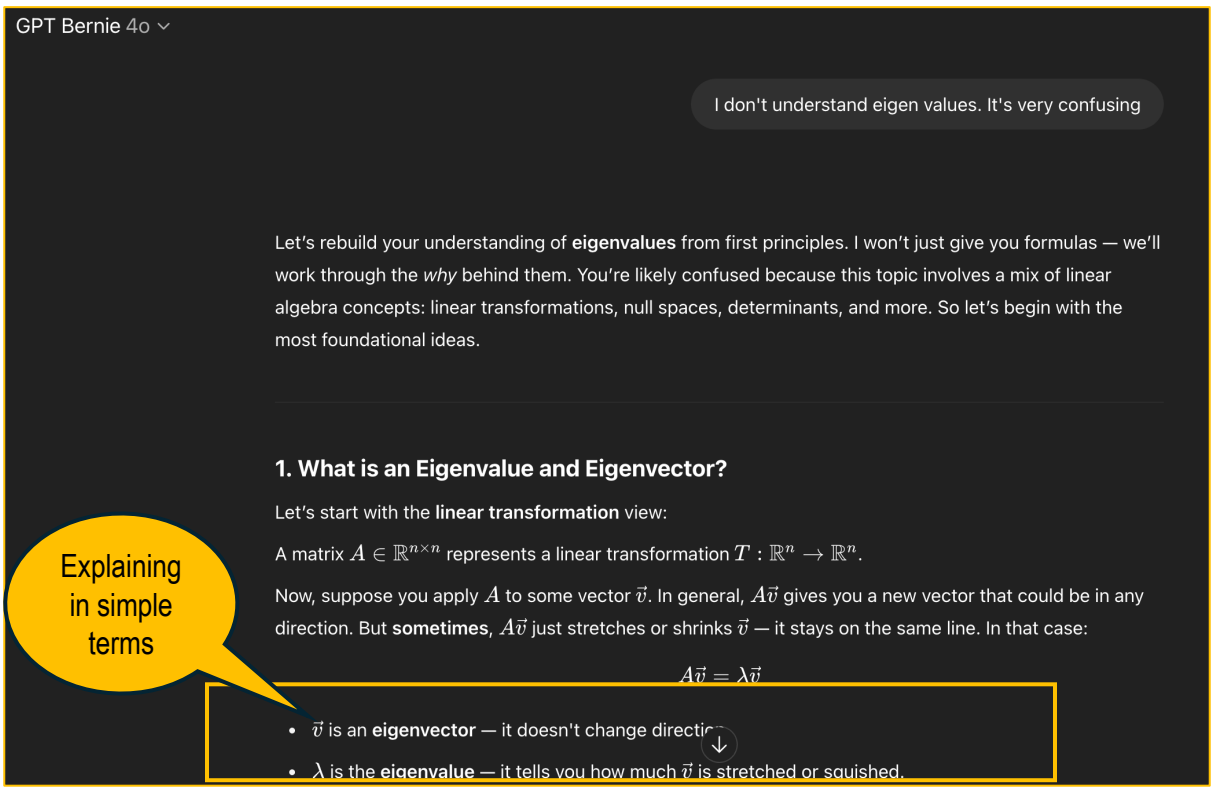
Within minutes, it felt like I was in Bernie's office, only faster. My digital "GPTBernie" explained tough concepts in everyday language, generated custom practice questions, and most importantly, gave me just enough of a hint when I got stuck, so I still had to think for myself. Suddenly, I wasn't just studying. I was learning on steroids.

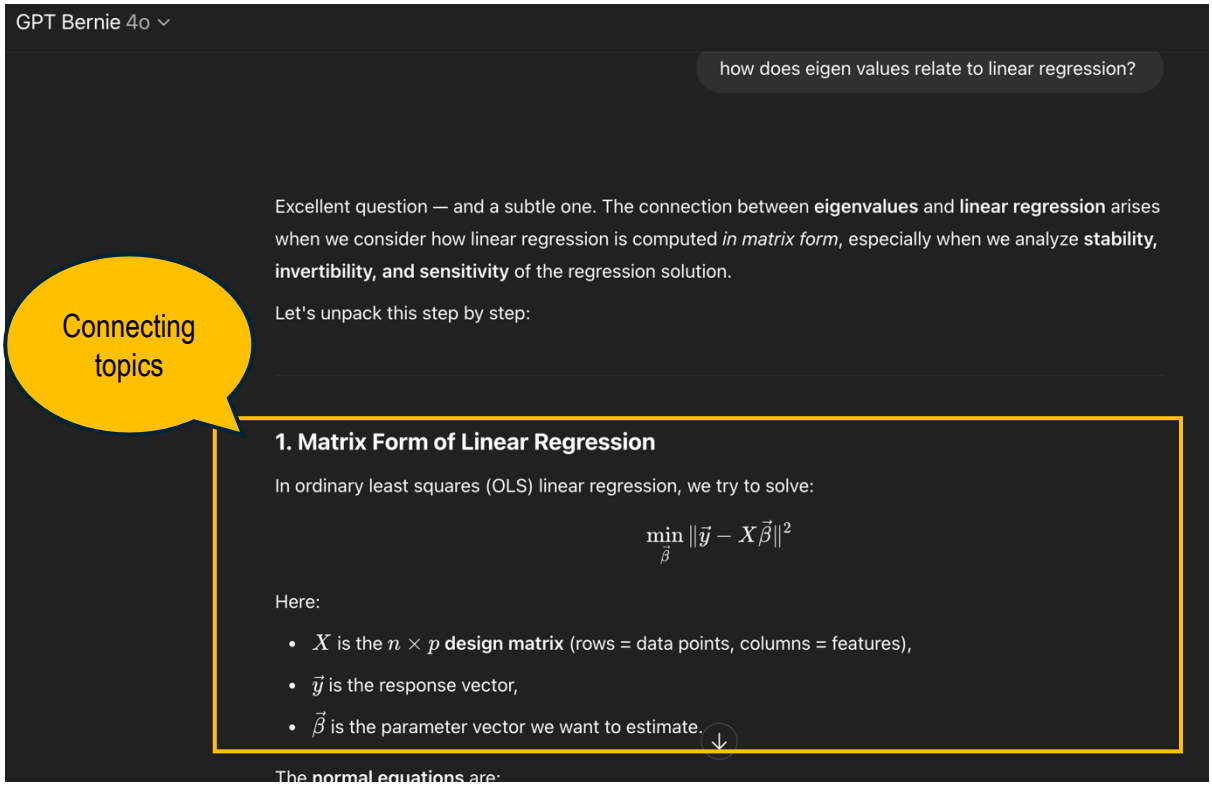
From Panic to Possibility: The GPTBernie Effect

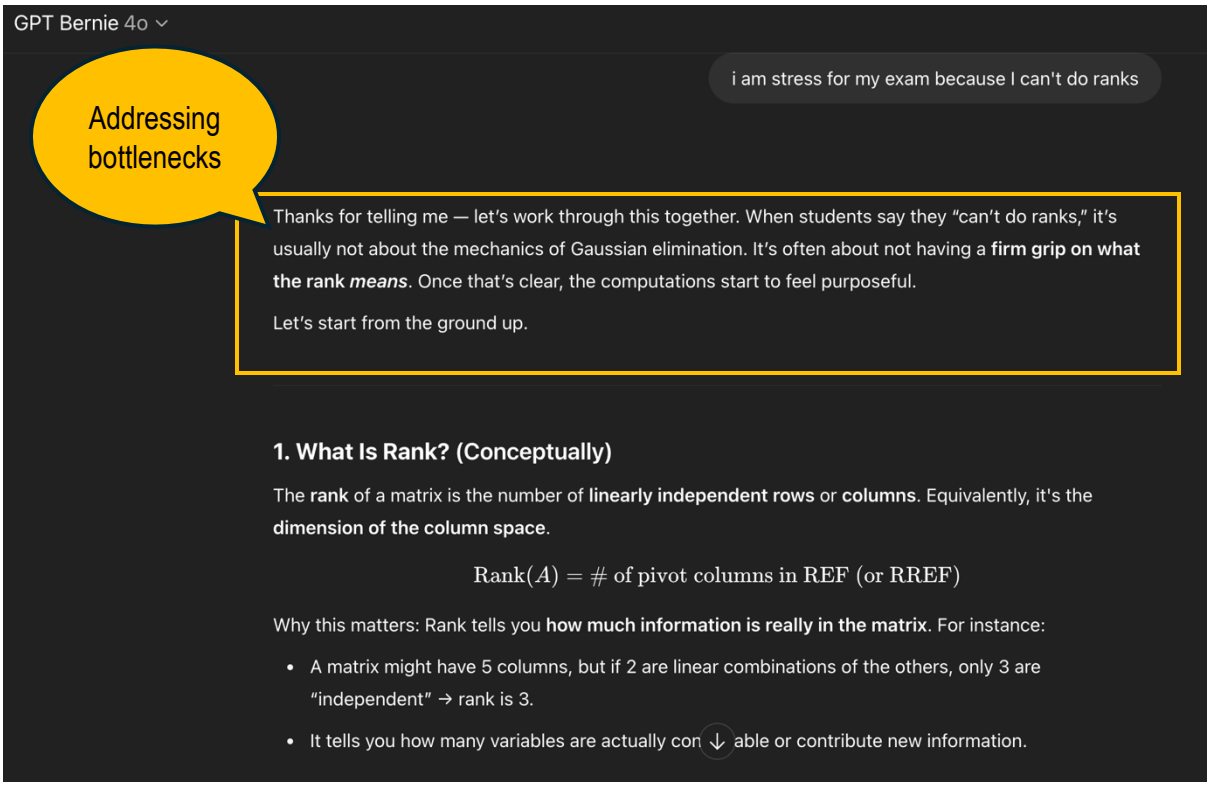
My digital Prof. Bernie was a great support. It generated practice questions at my difficulty level and dropped hints (never spoilers!) exactly the way Bernie would. GPT was available 24/7, anytime and anywhere. I could then use my meeting time with the real Prof. Bernie more purposefully.

Here's GPTBernie to try it out and some snippets of my conversation with GPTBernie.

https://chatgpt.com/g/g-6808912dc25c819185ed46a03d356492-gpt-bernie




GPT Bernie 4o
how does eigen values relate to linear regression?
Excellent question — and a subtle one. The connection between **eigenvalues** and **linear regression** arises when we consider how linear regression is computed *in matrix form*, especially when we analyze **stability, invertibility, and sensitivity** of the regression solution.
Let's unpack this step by step:
Connecting topics
1. Matrix Form of Linear Regression
In ordinary least squares (OLS) linear regression, we try to solve:
$$\min_{\vec{\beta}} \|\vec{y} - X\vec{\beta}\|^2$$
Here:
X is the $n \times p$ **design matrix** (rows = data points, columns = features),
$\vec{y}$ is the response vector,
$\vec{\beta}$ is the parameter vector we want to estimate.
The **normal equations** are:


GPT Bernie 4o
i am stress for my exam because I can't do ranks
Addressing bottlenecks
Thanks for telling me — let's work through this together. When students say they "can't do ranks," it's usually not about the mechanics of Gaussian elimination. It's often about not having a **firm grip on what the rank *means***. Once that's clear, the computations start to feel purposeful.
Let's start from the ground up.
1. What Is Rank? (Conceptually)
The **rank** of a matrix is the number of **linearly independent rows** or **columns**. Equivalently, it's the **dimension of the column space**.
$$\text{Rank}(A) = \#\text{ of pivot columns in REF (or RREF)}$$
Why this matters: Rank tells you **how much information is really in the matrix**. For instance:
A matrix might have 5 columns, but if 2 are linear combinations of the others, only 3 are "independent" → rank is 3.
It tells you how many variables are actually con able or contribute new information.

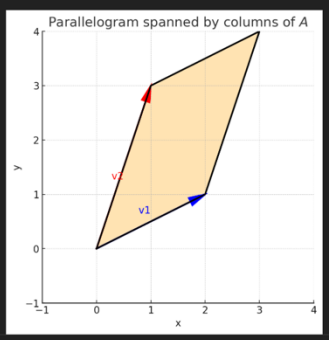
GPT Bernie 4.1

```
ax.annotate('v2', v2/2, color='red', fontsize=12, xytext=(-15,-15), textcoords='offset po

plt.show()
```

Presenting visually and explaining

Parallelogram Spanned By Columns Of A



Here's a geometric visualization:

- The blue and red arrows are the columns of your matrix A.
- The **orange parallelogram** is the region spanned by those two vectors.
- The **area** of this parallelogram is exactly $|\det(A)|$.

Try to imagine what would happen if those two vectors were collinear:

- The orange area would collapse to zero.
- Algebraically: the determinant would be zero (i.e., no unique "volume" is created).

GPT Bernie 4.1

Having some mathematical fun

tell me a joke prof

Of course! Here's one with a mathematical flavor:

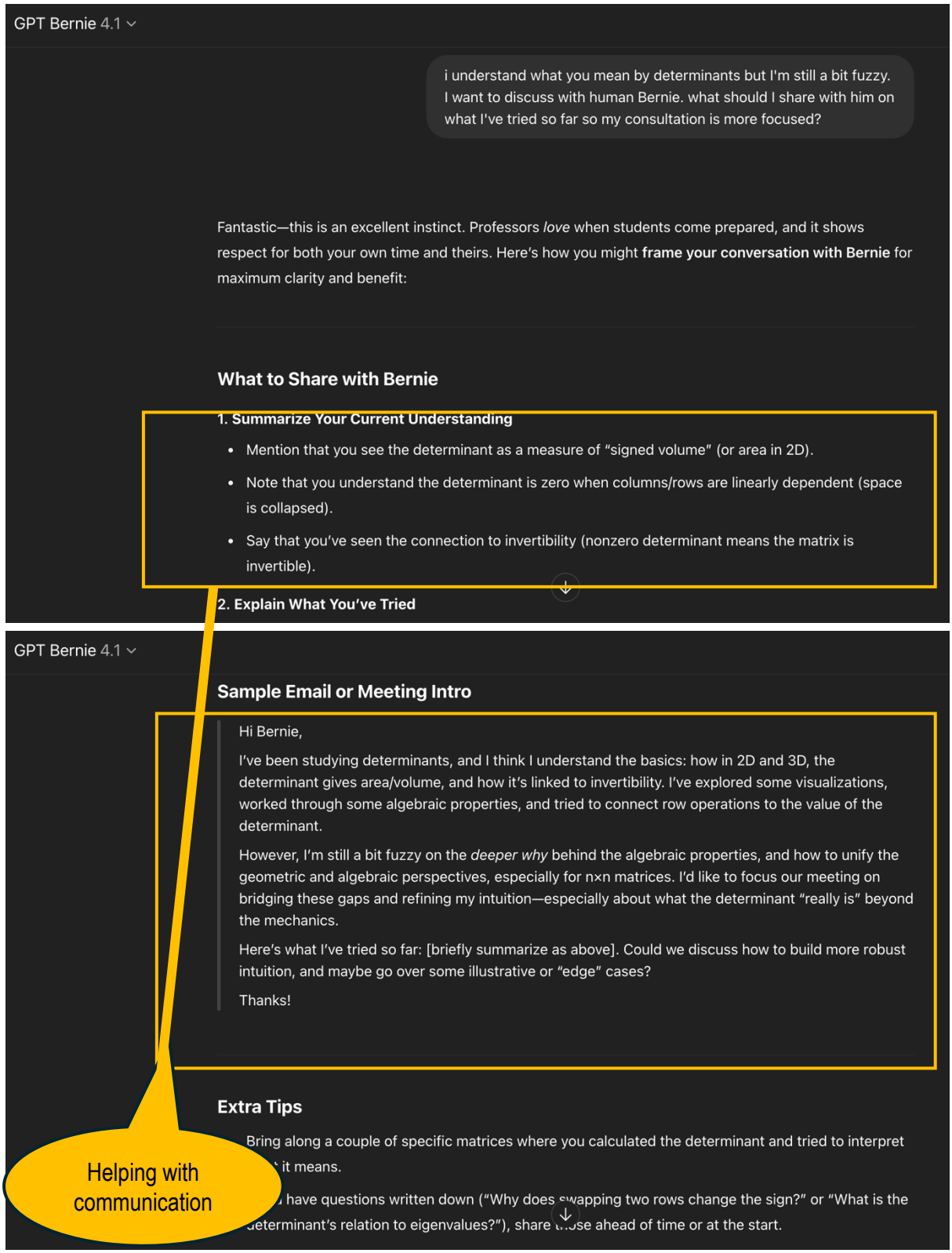
Why did the determinant get invited to all the parties?

Because it really knew how to *change the space*!

Or, if you prefer your jokes with a touch of linear algebra subtlety:

Why did the matrix break up with the vector?
Because it just wasn't *working out*—every time they tried to combine, the vector kept losing its direction.

(And if you'd like one with more proof, I can show you why these are funny... but perhaps that would ruin the "element" of surprise!)



My emails to Prof. Bernie dropped by 70%. When we did meet, we zeroed in on the edge cases which are the true trouble spots, making every consultation sharper and more rewarding.

I started to wonder: "If one digital 'Prof' could supercharge my learning, what would happen if every student had access to their own? What if we could scale this across subjects, styles, and levels?"

From GPTBernie to GPTProfs: Scaling the Magic

This creation of GPTBernie gave me new ideas and possibilities. Why not build a whole library of "GPTProfs"? GPT Profs, which were

- **Subject-specific experts:** Each tuned to lecture notes, research papers, and the profiles of our professors.
- **Adaptive to students:** The system remembers how each student learns, and can personalise learning to that student.
- **Resource-light:** No fancy hardware needed. Just smart prompts, a well-built knowledge base, and a little curiosity.

This was not just about reducing workload for faculty or convenience for students. It was about making learning **personal, scalable, and limitless.**

Want to Build Your Own GPTProf? Here's How

Here is a simple playbook. Try it, remix it, share it:

1. Gather: Pull together all the essentials—syllabuses, slides, problem sets, and your instructor's bio.

2. Curate: Identify 3–5 teaching "vibes"—Socratic, visual, step-by-step, whatever fits.

3. Upload & Tag: Build your own CustomGPT knowledge base, tagging by topic and style.

4. Prompt & Iterate: Seed your GPTProf with an instruction, then refine it through feedback and results.

> Role: You are [CourseName]GPTProf, a virtual tutor for [Topic/Subject] students at [School/Dept].
>
> Knowledge Base: You draw from [syllabus name], [slides], [problem sets], and [instructor name]'s teaching style.
>
> Teaching Vibe: Use a [Socratic | visual | step-by-step | intuitive-first] approach. Ask clarifying questions if needed.
>
> Depth: Provide [conceptual | computational | real-world] depth as appropriate. Connect ideas to first principles when possible.
>
> Example Task: "When a student asks: [insert typical student question], respond with [preferred response style — e.g., a 3-step breakdown, analogy + derivation, or diagram description]."
>
> Tone: Be [encouraging | precise | patient | rigorous].

5. Track Success: Watch for drops in help emails, boosts in self-study quiz results, and more focused office hours.

Why It Matters: Building 0 and the Future of Learning

Building more GPT Professors is Building 0.

What is Building 0?

It is not a physical space or a fancy new app. It is a mindset. Building 0 stands for zero barriers, zero limits, and zero wasted opportunities in education. It is about reimagining learning for a world of abundance, where expertise is unlimited but available to anyone, anywhere, anytime.

Building 0 is for everyone ready to break the old mold:

- **Students** who want to move beyond the syllabus and design their learning paths—empowered with AI tools that adapt to their strengths and curiosity.
- **Educators** who want to multiply their impact, scale their mentorship, and focus on the deep questions and creative challenges that matter most.
- **Partners and collaborators** who believe in open access—sharing bite-sized modules, expertise, and creative resources so learning has no boundaries.

By embracing the Building 0 mindset, we shift from scarcity to abundance, from one-size-fits-all to truly personalise education. It's more than using new tools. It's about creating a community where everyone can experiment, share, and grow together.

For a start, it is about building more GPT Professors at SUTD.

Ready to Join Building 0?

Whether you are a student eager to customize your learning, an educator looking to amplify your impact, or a partner who believes in open access. Building 0 is yours to shape.

Try creating your own GPTProf. Share your story. Collaborate with others. Break down barriers and help us build a future where everyone can learn, teach, and create together.

Are you ready to go beyond the limits? **Step into Building 0. Start reimagining education today.**