SUTD Leap

[RE]IMAGINE EDUCATION

A weekly Design.AI newsletter

FROM LEARNING MANAGEMENT SYSTEMS TO LEARNING LOOPS WITH AI

Abhishek Vulla,Freshmore Student
In Conversation with Dr. Nachamma Sockalingam, Assistant Director, OSP

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Learning Management Systems (LMS) are the backbone of modern universities. Platforms like Canvas, Blackboard, Moodle, and at SUTD, eDimension organizes courses, materials, and assignments. Yet most LMS platforms function mainly as **content repositories rather than learning engines.** Most students and faculty tend to use the existing LMS in largely passive ways.

As generative AI (GenAI) tools become common, students increasingly turn to chatbots for quick answers, sometimes bypassing the reasoning process that structured learning aims to develop.

In this issue, we feature **Abhishek Vulla**, a freshmore student at SUTD and member of **Building0**, who is experimenting with and building **LearnLoop**, an AI-native learning platform designed to support a more structured learning loop.

The project offers an early glimpse of what **AI-powered learning environments in universities might be in the future.**

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

Hi. Abhishek!, Tell us about yourself. How did you get started with AI projects and Building0?

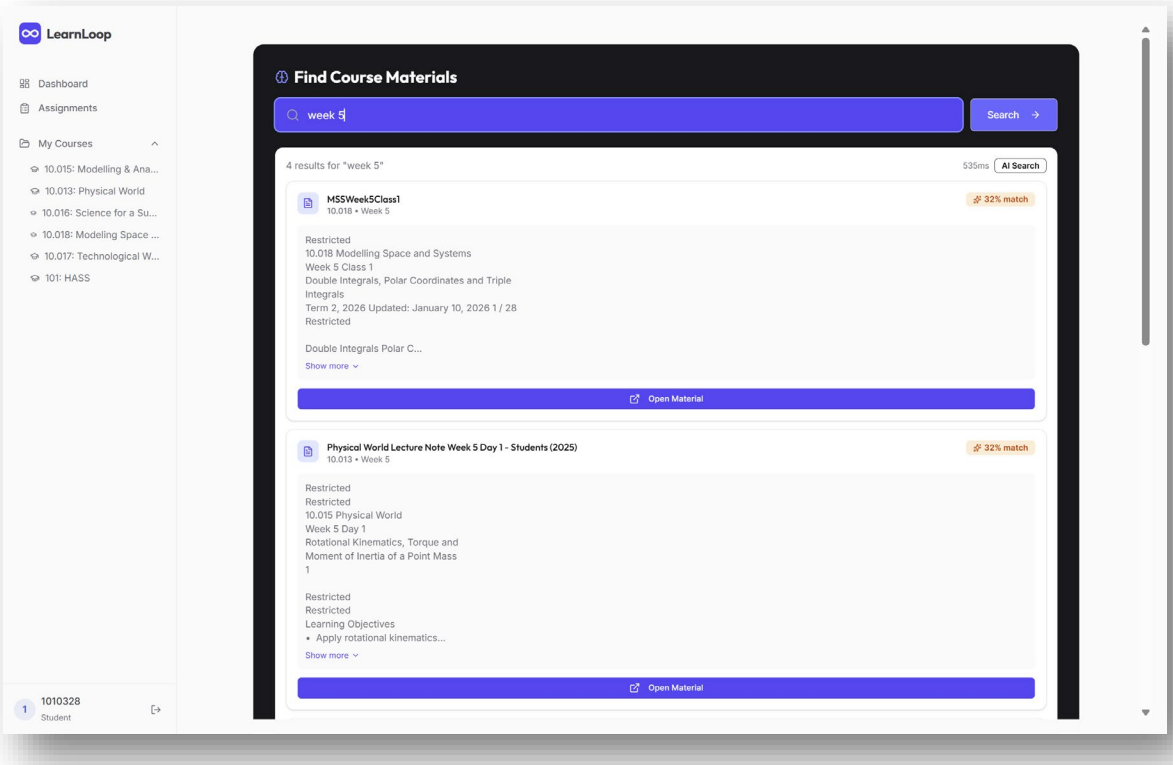
I am a freshmore student at SUTD. I joined Building0, a student-led think tank focused on AI integration, in November 2025 during my first term. I wanted to be around people who were actually building things, not just talking about ideas.

LearnLoop is not my first project. It was a Chrome extension called *SUTD Deadline Centre*. Deadlines at SUTD are scattered between eDimension and Gradescope, and students were constantly missing them because there was no single view.

So, I built an extension that scrapes both platforms, groups everything by week and course, and lets you export to your calendar. I shipped it to the Chrome Web store and it got picked up by about 30 students.

After that, a senior from Building0 challenged me to think bigger. The extension was useful, but it was a “patch” on a deeper problem. The real issue was not just deadlines. It was the entire way students interact with course materials.

That feedback pushed me to stop building small fixes and start building the actual system I wished existed. That became **LearnLoop**.



Searchable content in LearnLoop

https://www.youtube.com/watch?v=5xTbykJpGWI

Let's talk about LearnLoop. What problem does it address?

Every SUTD student knows the frustration with eDimension. While eDimension is easy to use, it is too structured in some ways and not intuitive.

Finding the right lecture slides means clicking through layers of folders. Students end up passively rereading PDFs before exams instead of actually engaging with the materials.

And when they get stuck, most of them paste the question into ChatGPT, get a full answer, and move on without ever reasoning through it themselves.

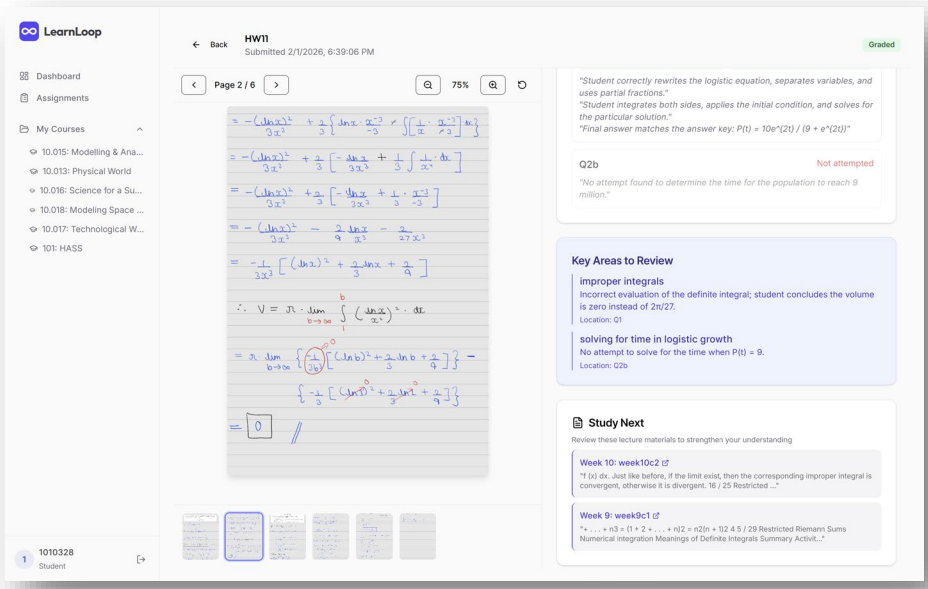
LearnLoop is my attempt to fix that.

It is an AI-native learning system, not a PDF storage box. It allows for one integrated learning loop and comes with several features. I list three here.

First, **Retrieval**: Students can search for any concept across all their course materials instantly using semantic search, not keyword matching. eDimension does not have this simple search function right now.

Second, **AI Tutor**: There is an in-built AI tutor that is grounded in the lecture slides and learning materials uploaded by the professor. It does not give direct answers. Instead, it asks guiding questions and hints so students must think through the problem.

Third, **AI grader**: Learnloop can read photos of handwritten homework, identify the exact step where understanding broke down, and point back to the specific lecture where that concept was taught. It gives immediate feedback.

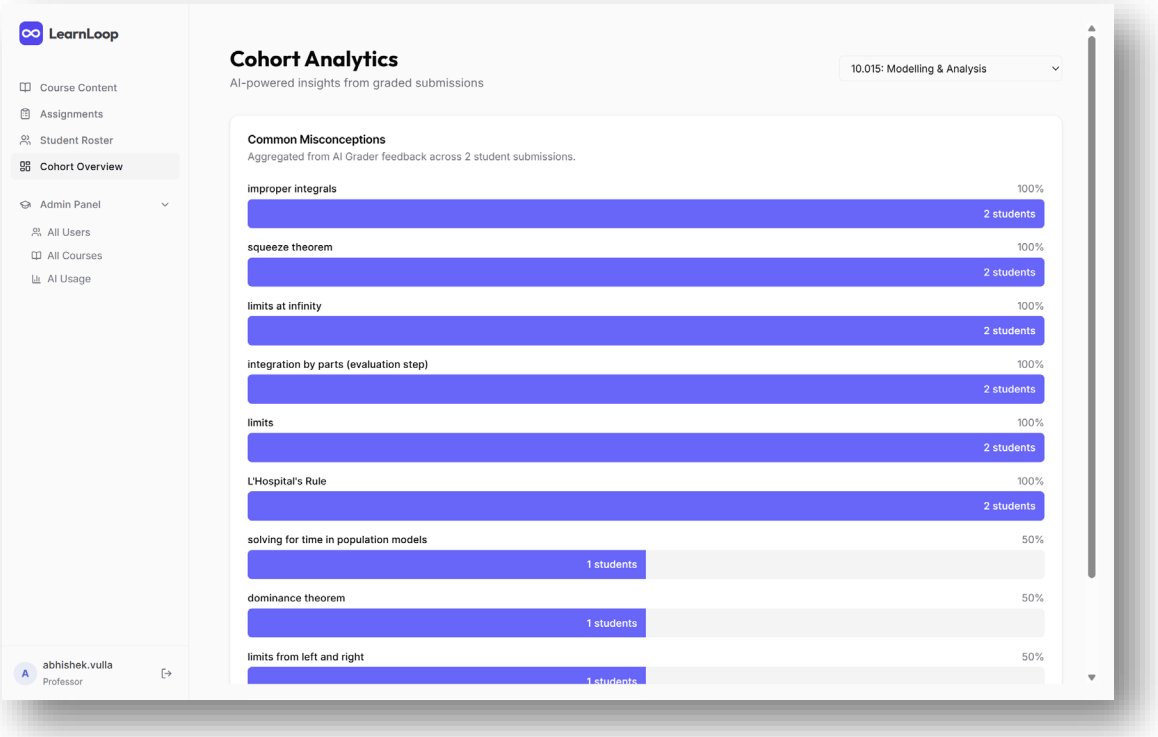


AI grader in LearnLoop giving immediate feedback on students' handwritten work

Does LearnLoop also provide insights for professors?

Yes. On the professor side, LearnLoop gives educators visibility they do not usually get from the LMS.

Professors can **bulk upload course materials**, and the system surfaces **cohort-level analytics** based on AI grader, showing which concepts students are struggling with most. This allows instructors to adapt their teaching in real time instead of discovering problems only after the final exam.



LearnLoop giving cohort-level analysis for instructors

How did you go about building LearnLoop?

When a professor uploads lecture slides, the system extracts the text and splits it into overlapping chunks of about 250 words each.

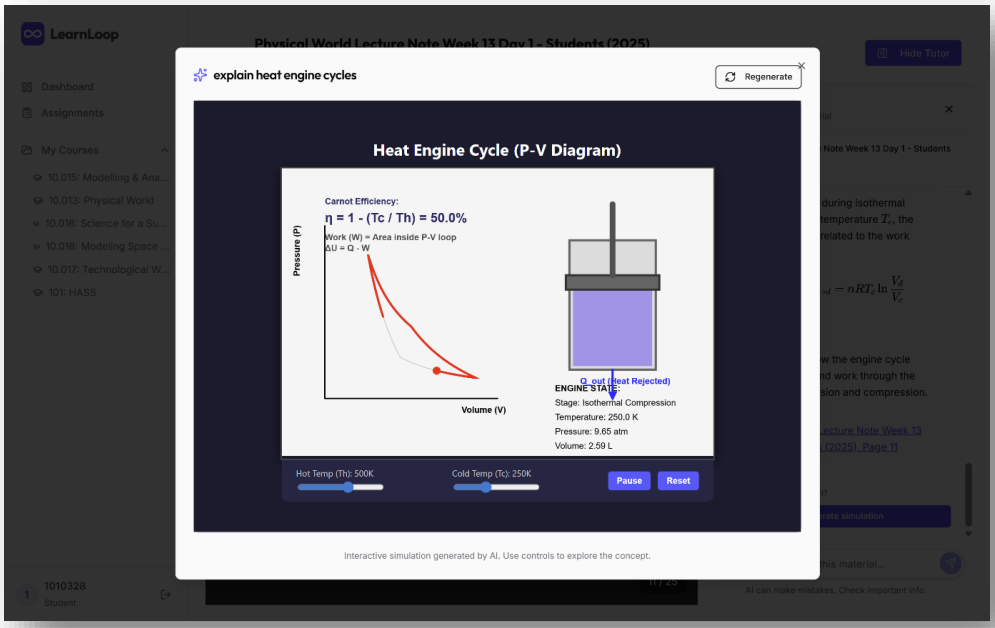
Each chunk is converted into a vector embedding and stored in a database that supports semantic search. When a student asks a question, the query is also embedded and the system retrieves the most relevant chunks using similarity search.

Those chunks are then injected into the AI's context so that the tutor and grader respond based only on the actual course material, not the open internet. This approach is known as Retrieval-Augmented Generation (RAG).

For simulations, I use **Google Gemini**. When a student wants to explore a concept like projectile motion or wave interference, the system generates a self-contained interactive simulation that runs directly in the browser. This is a feature that is not available in eDimension.

The AI tutor runs on GPT-4.1-mini for fast conversations grounded in the uploaded slides, while the grader uses GPT-4.1's vision capability to read and evaluate photos of handwritten work.

The rest of the system is built with **React, TypeScript, Express.js, PostgreSQL, Supabase for authentication, and Google Cloud Storage**, with deployment from **GitHub to Railway**.



LearnLoop created simulations for teaching and learning

You used AI tools heavily to help you build the platform?

Yes. I want to be upfront about this. I built this with **significant help from AI coding tools**.

When I started, I had basic coding knowledge and had never built a production web application. AI coding tools helped bridge the gap between what I knew and what I needed to build.

There is something meta about using AI to build an AI learning platform, but I think that is also the point. The AI did not make the design decisions or figure out the architecture. But it helped accelerate the building process.

What challenges did you encounter in developing the LearnLoop?

One of the first challenges was **infrastructure**. I initially built LearnLoop on Replit.

It was great for getting started, but it caused problems in production. The platform had several cold starts. For instance, the AI tutor took a relatively longer time (i.e., 30 seconds) to respond, memory limits that crashed the grading pipeline, and processes that sometimes stopped unexpectedly.

I eventually migrated the entire system to Railway. That required moving more than 1,500 files to Google Cloud Storage, switching to direct API keys, and rebuilding the deployment setup. It worked, and every file transferred successfully, but it taught me that infrastructure decisions matter from the beginning.

I think such mistakes or failures are sometimes unavoidable, and I take it with the flow. Eventually we know what tools to use when.

Looking back, what surprised you most about this journey?

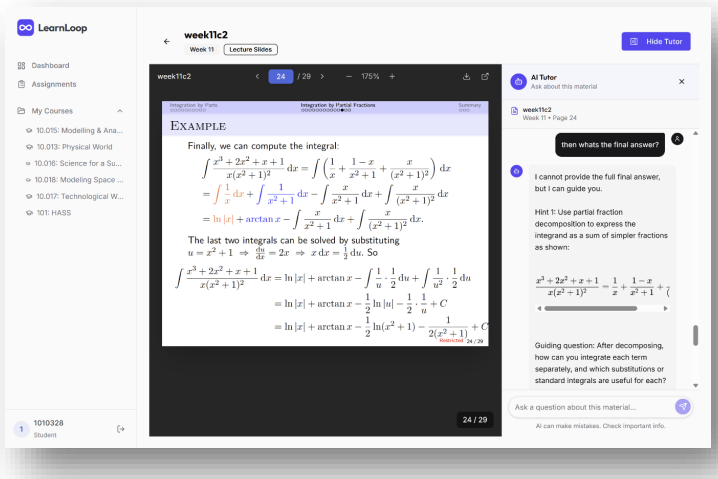
The thing that surprises me most is the **speed at which I could get this done**.

A few months ago, I had basic coding knowledge and had never built a web application. Now, I have a working AI learning platform that people can use.

Building under real constraints, with real feedback, taught me more than I expected.

The iteration and extent of work ensures that I don't just get away with copy pasting codes. I have to refine the codes and learn coding in that process. It is really about how we use AI.

AI does save time. But it is also take a lot of time to build something. It is not easy to get things working. But the difference is what we are spending the time on and what we are able to achieve in the larger scale of things for the time spent.



Using LearnLoop is about deep learning and not taking short cuts

Looking Ahead: What do you say as the next steps for LearnLoop?

LearnLoop is still evolving.

Discussions are underway with SUTD's Office of Strategic Planning, EduTech team and Office of Education and Innovation to explore whether the platform could eventually **be tested in real courses at SUTD and even beyond.**

More broadly, the project raises a larger question for universities experimenting with AI:
If GenAI is already transforming how students study and learn, should learning systems themselves also evolve?

Rather than acting purely as repositories for course materials, future learning environments might integrate search, reasoning support, feedback, and analytics into a continuous learning loop.

Student-led experiments like LearnLoop offer an early glimpse of what such systems might look like.

At the same time, they **invite collaboration**.

Educators, researchers, and students interested in exploring AI-native learning environments are welcome to connect, share ideas, and test new approaches together. **You can contact me at abhishek_vulla@mymail.sutd.edu.sg to try out LearnLoop in your class. Try out Learnloop here: https://learnloop.up.railway.app/signin.**

LearnLoop may still be an early experiment, but it raises a profound question for universities everywhere: **should learning management systems simply manage content, or should they actively cultivate thinking through more interactivity that allows for self-directed personalized learning?**

If GenAI is already reshaping how students search, study, and solve problems, then the systems that structure learning must evolve as well. Projects like LearnLoop suggest a future where learning platforms are not passive repositories, but **intelligent partners in inquiry, reflection, and discovery**.

Perhaps the real question is not whether AI should be used in LMS. The real question is **who and how we will design the LMS systems and processes to redesign teaching and learning.**