ELEVATE INTERACTION
ELEVATE LEARNING
ELEVATE AI

Sam Moses. Athul Rajagopal, Noel Thomas, Aidan Wong

Software Engineering, Schulich School of Engineering
Sponsor: SMART Technologies (Kelsey Hanson, Manat MacLeod)
Academic Advisor: Dr. Denis Onen, PhD, PEng
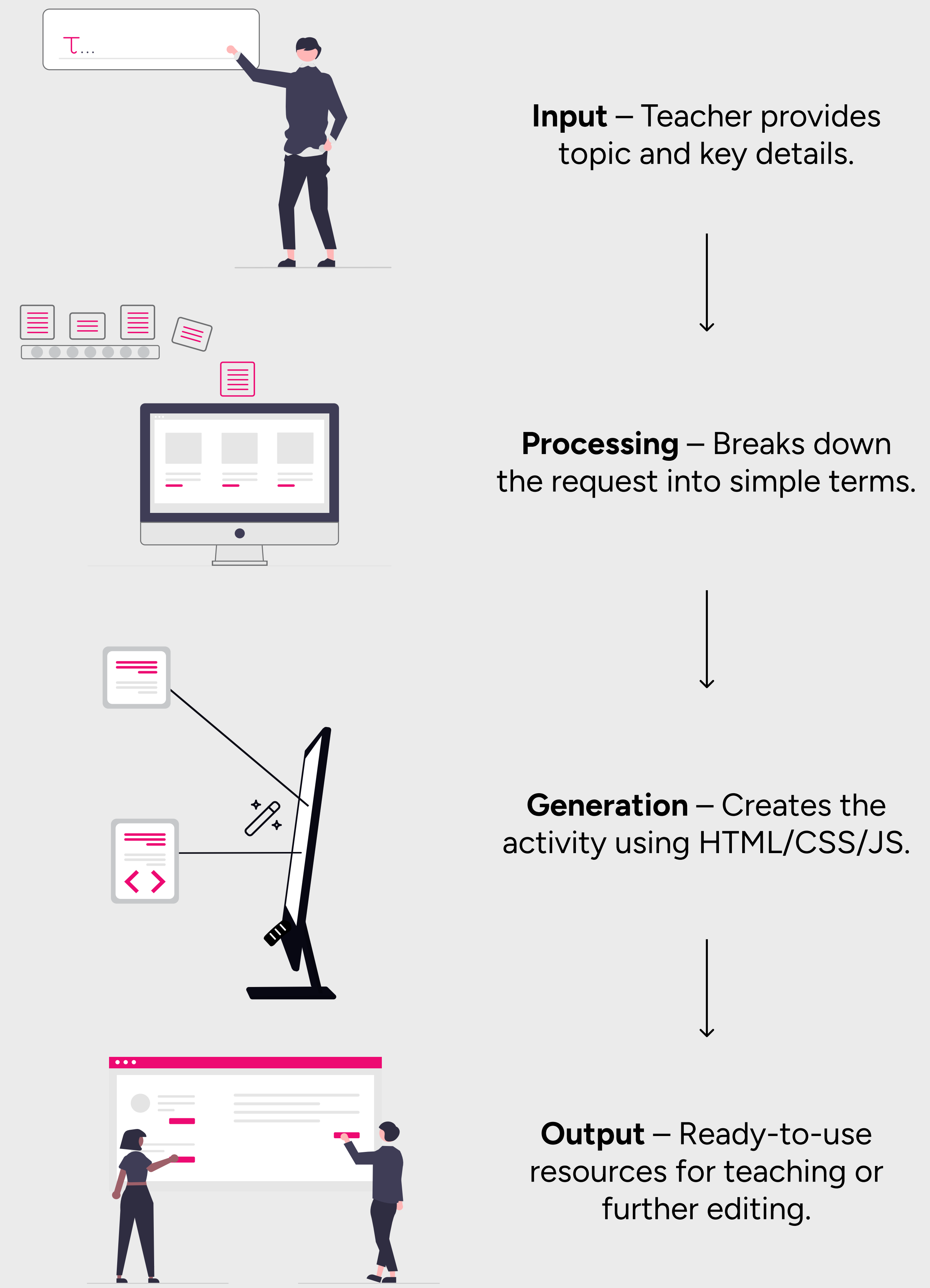Teaching Assistant: Ali Forootani, MSc

OVERVIEW

Teachers are always looking for ways to boost classroom engagement. Instead of PowerPoint slides or lectures, they see far more interest from students through interactive activities.

However, teachers often lack the tools to create these activities and must spend time searching for them online. What if there was a way to create them using plain English?
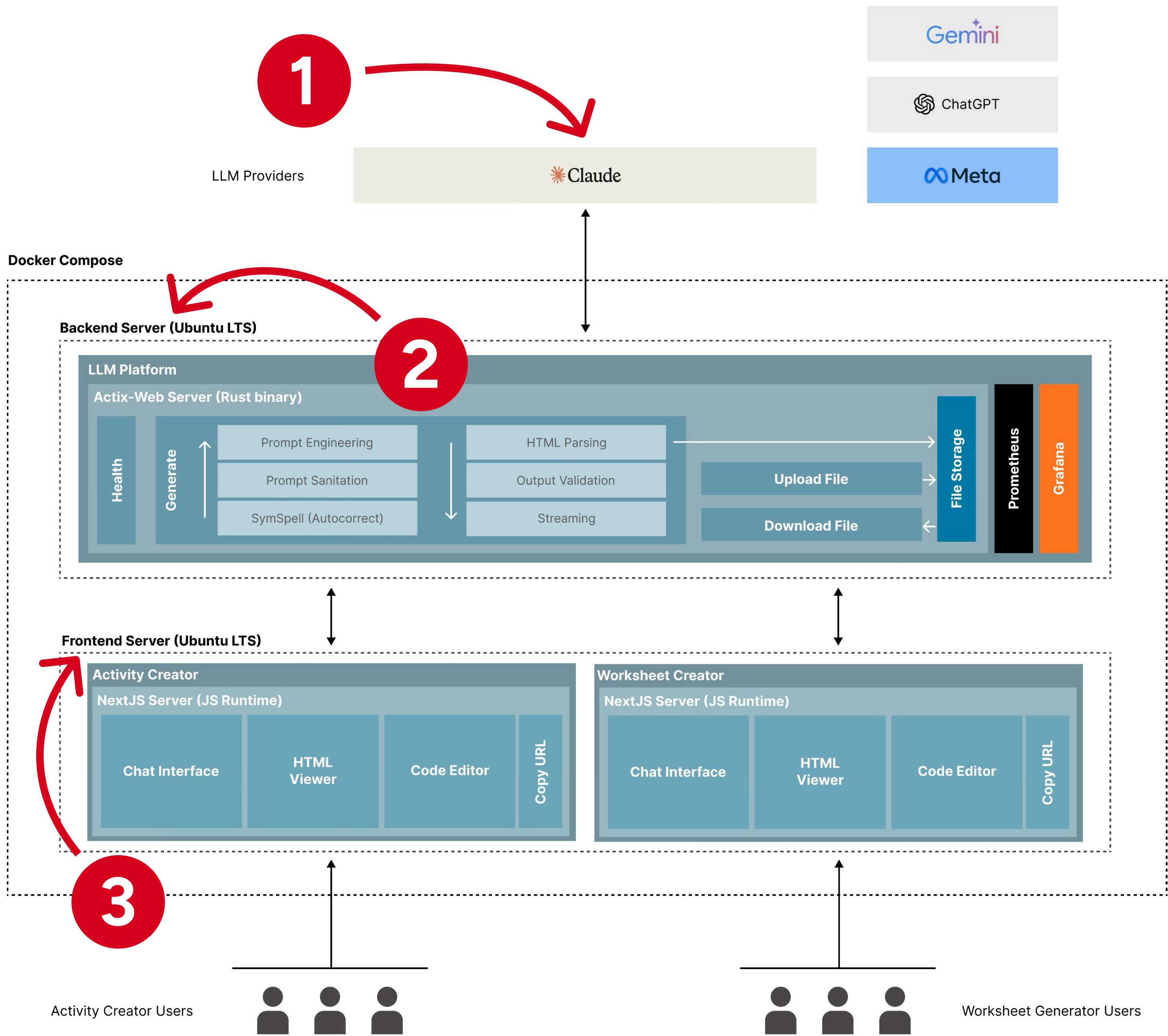
Meet Elevate, a web-based tool that leverages generative AI to create interactive teaching materials using natural language – no coding experience necessary!

Here's how it works:

Input – Teacher provides topic and key details.

Processing – Breaks down the request into simple terms.

Generation – Creates the activity using HTML/CSS/JS.

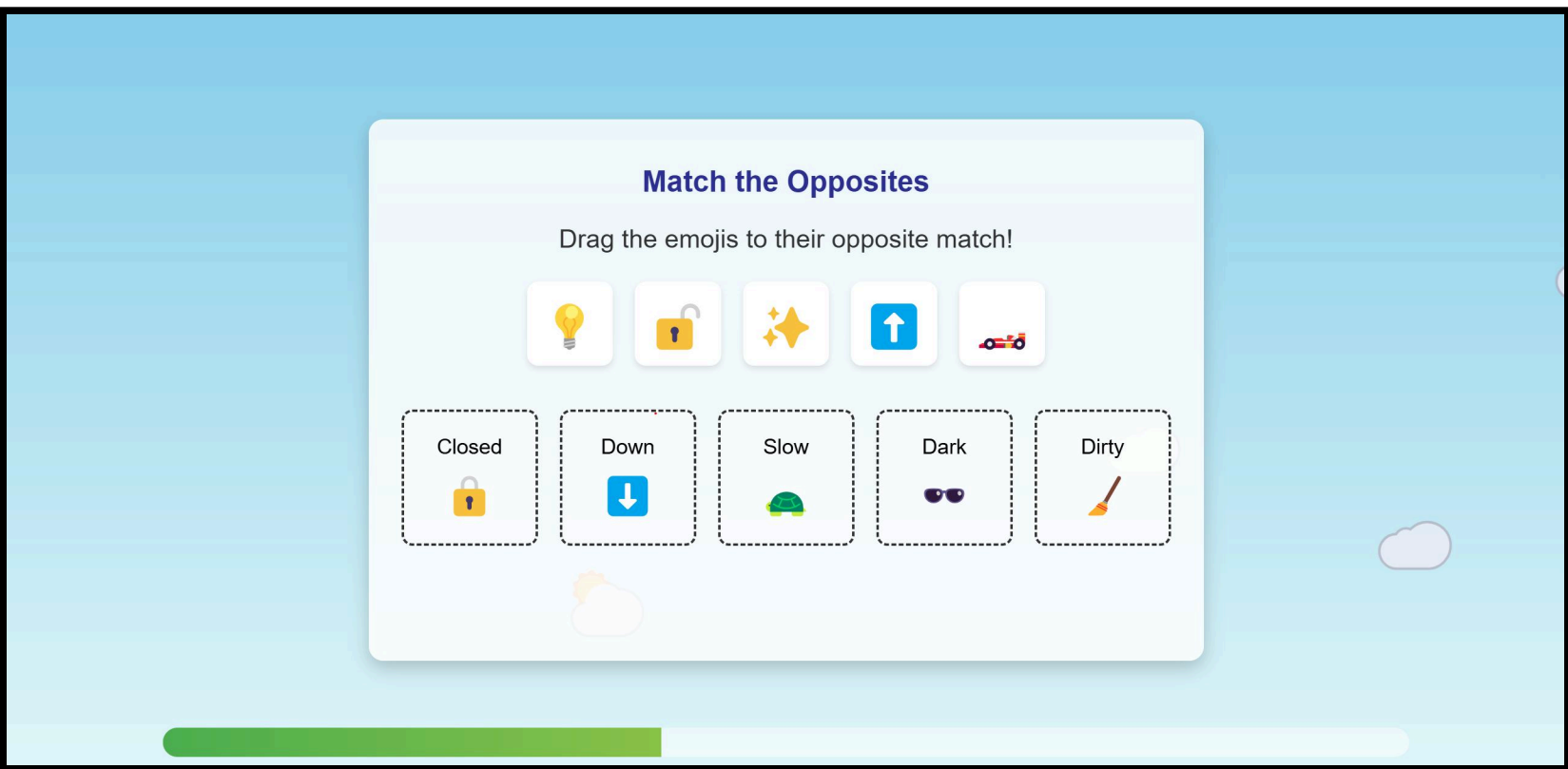**Output** – Ready-to-use resources for teaching or further editing.

DESIGN

1 LLM API
- Handles request processing and code generation
- Main provider is **Claude 3.7 Sonnet**

2 Backend
- Handles spellcheck, content moderation, and code cleanup
- Built with **Rust Actix-web** framework
- Can switch between multiple model providers, e.g. OpenAI, Meta, Anthropic, xAI, etc.

3 Frontend
- Handles page routing and state changes as the generated code is received from backend
- Built with **Next.js**, a **React** framework
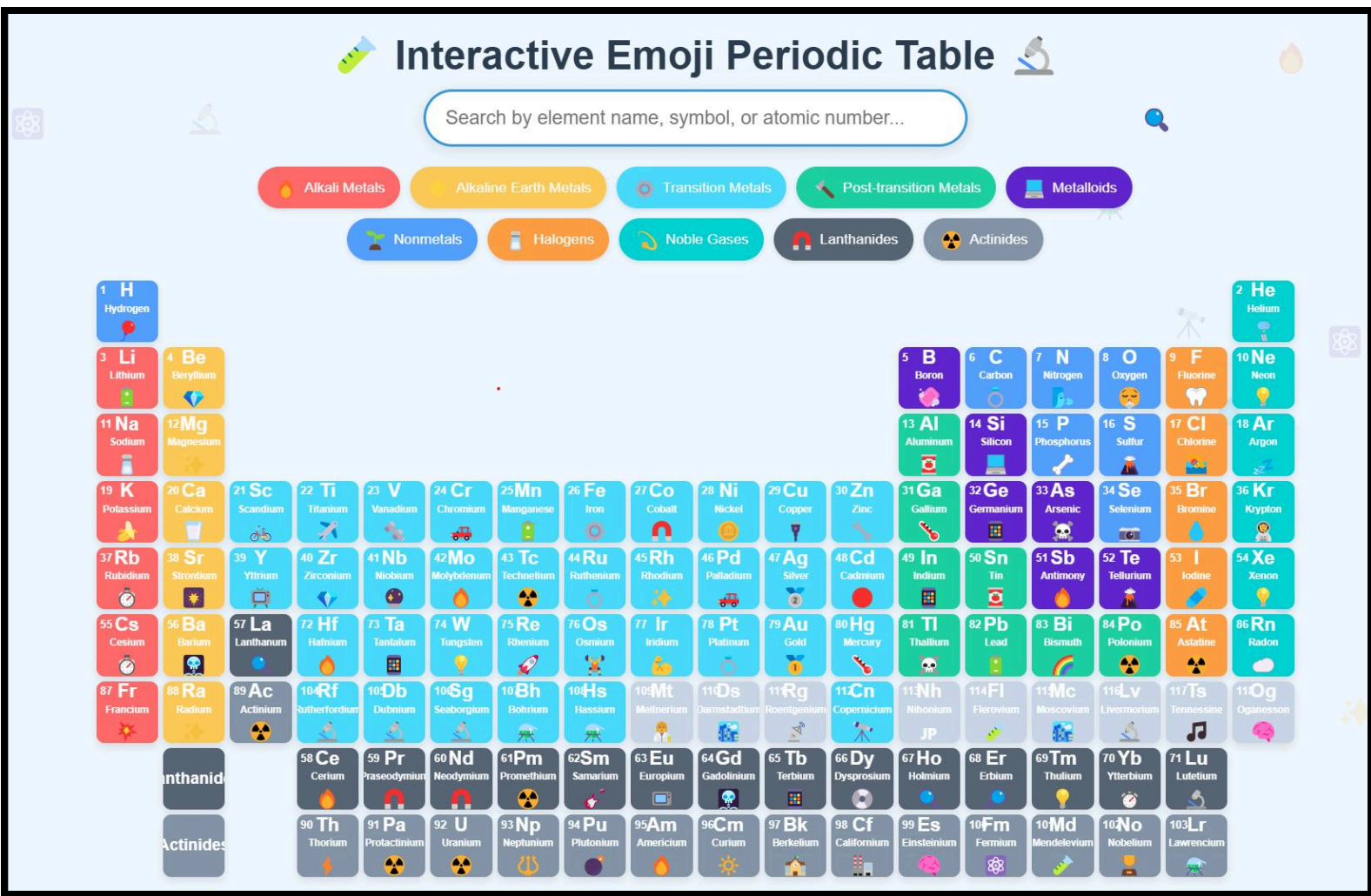- Only this part is visible to the teacher

Design Criteria

✓ **Smart Content Creation**
- Generates interactives and PDF worksheets
- Supports various subjects and grade levels

✓ **Responsive to User Feedback**
- Edit interface lets you change titles and colors without extra prompts
- System can still be re-prompted to refine output

✓ **Seamless Integration**
- Works with any platform that supports iframe embedding
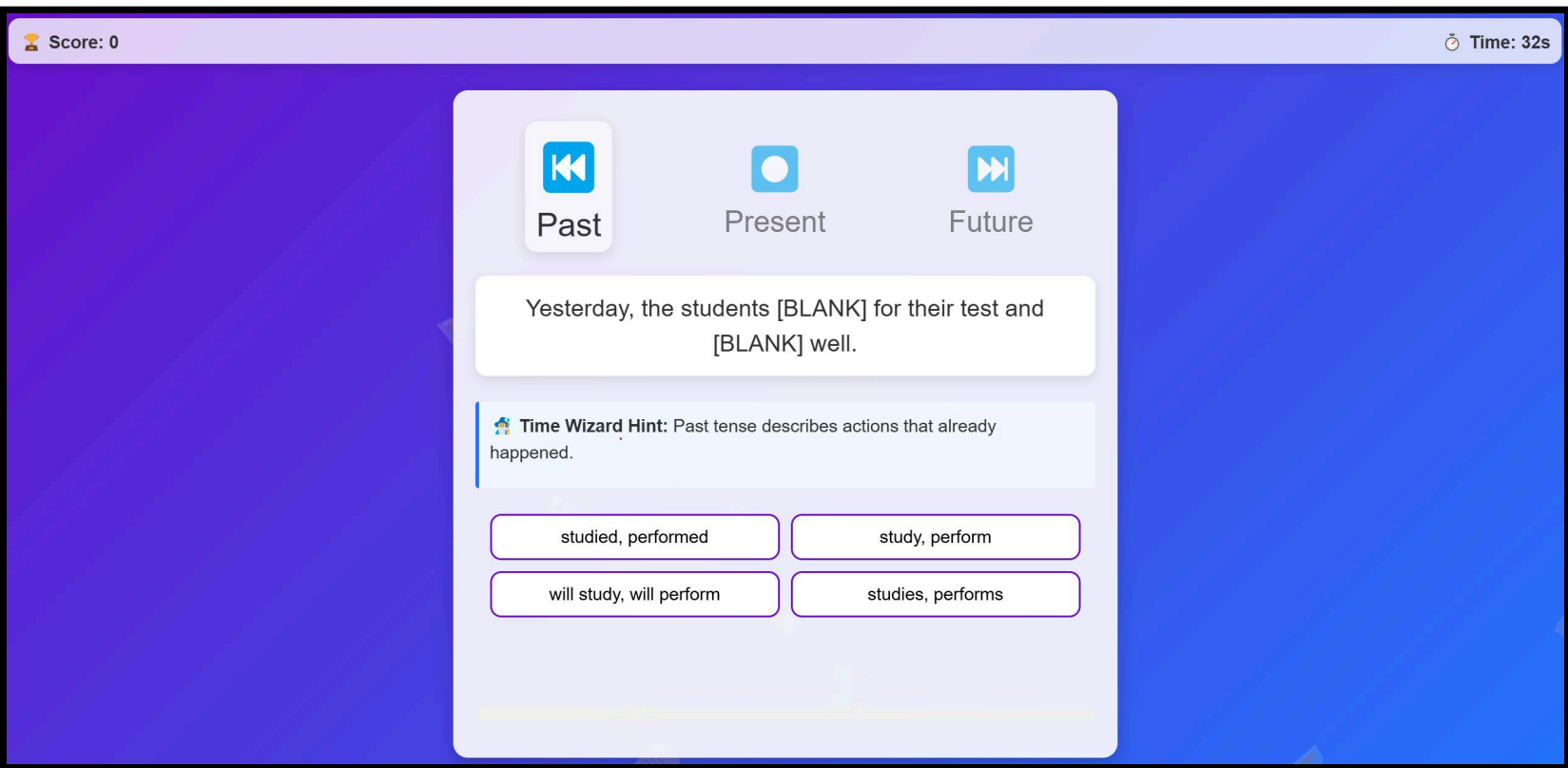- Easy to use and share, no extra setup required

RESULTS

SMART Board Friendly
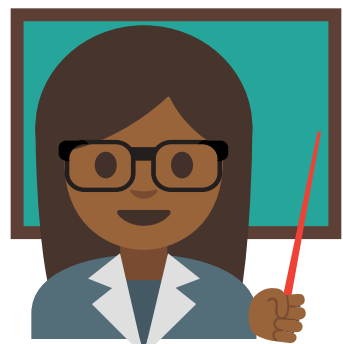Application is designed for use on large boards

Creative Context
Uses a combination of emojis, colours and visuals to increase engagement

Assess Knowledge
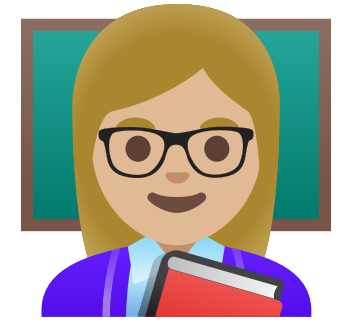Tests content to ensure students achieve learning outcomes

Findings

The system satisfies all design criteria.

Over 30 activities have been used in 5 schools across North America, engaging **more than 150 students** in active learning.

"Fantastic - we enjoyed exploring it today and my students did so well with the counting from 1-20 activity especially."

Rachel G, Diagnostic Kindergarten teacher, Toronto School Board

"This is by far the most AMAZING activity yet - so many assessment types, my students will understand and be able to access the material, this is exactly what they are working on right now, and all of the questions worked well."

Candace T, Lubbock Independent School District

CONCLUSIONS

Reduces workload – Frees up time for educators.
Enhances engagement – Creates dynamic, interactive content.
Supports all learners – Adjusts to different learning needs.