



EduTutor AI: Revolutionizing Personalized Learning with AI and LMS Integration

Harnessing Generative AI and seamless LMS integration to deliver dynamic quizzes, real-time feedback, and insightful educator dashboards for optimized student outcomes.

Agenda for Accelerating Personalized Education

Overview of EduTutor AI's goals and technical roadmap

- 1 Introduction to EduTutor AI platform and integrations
- 2 Market landscape and AI adoption challenges
- 3 Core features: quizzes, assessments, dashboards
- 4 Technical architecture and project milestones
- 5 Integration challenges including LMS sync and privacy
- 6 Strategic benefits for students and educators

Market Dynamics and Challenges in AI-Powered Education

Key trends, benefits, and hurdles in AI-driven learning platforms



Explosive AI education market growth

The AI in education sector is valued at \$7.05 billion in 2025 and is projected to reach \$112.3 billion by 2034, exhibiting a CAGR of 36.02%.



North America leads AI adoption

In 2024, North America commands a 38% market share, driven by investments from tech giants like IBM and Google and robust technology infrastructure.



Personalized learning enhances engagement

AI-powered platforms deliver tailored content, accommodate diverse learning styles, and enable automated grading, significantly improving learner engagement.



Challenges include data privacy and access

Key obstacles involve data privacy concerns, digital divides, and uneven IT infrastructure, especially impacting emerging economies' access to AI education solutions.

AI-Driven Personalized Learning Journeys

Seamless quiz generation and adaptive feedback

User Authentication and Course Sync

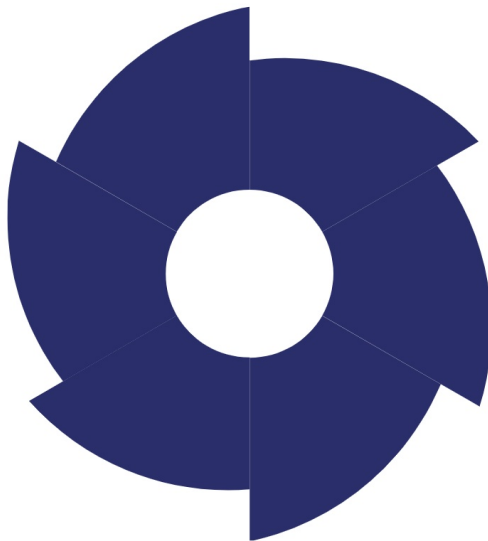
Students authenticate via **Google Classroom**, enabling automatic synchronization of courses and subjects for an integrated learning experience.

Integrated Ecosystem for Educators

Educators access real-time analytics on quiz performance, history, and insights via a dashboard connected to Pinecone, supporting data-driven instructional decisions.

Continuous Student Engagement

A modular system design allows seamless updates and generates personalized quizzes aligned with individual student progress, maintaining sustained motivation and growth.



Dynamic AI Quiz Generation

The **Granite LLM** powered by IBM Watsonx dynamically creates multiple-choice quizzes focused on essential course topics, enhancing content relevance and engagement.

Adaptive Learning Feedback Loop

Student responses are parsed in structured **JSON** format, enabling instant, personalized feedback that reinforces learning and addresses knowledge gaps promptly.

Personalization Engine with Pinecone

Quiz difficulty and topic relevance adapt through diagnostic testing results and quiz history embeddings stored in the **Pinecone vector database** for tailored learning paths.

Empowering Educators with Real-Time Insights

Key dashboard features and user impact metrics

Dashboard Features

Dashboard Access

Real-Time Analytics

Data-Driven Instruction

Classroom Sync

Impact & Scalability

Performance Metrics

User Impact

Scalability

Future Enhancements

Enhancing Student Assessment Accuracy via Diagnostic Testing

Key features driving precise, adaptive learning outcomes

Feature	Current Capability	Impact on Learning
Diagnostic Testing	IBM Watsonx models generate baseline assessments upon registration	Establishes student proficiency to tailor quiz difficulty and focus
Adaptive Quizzing	Dynamic adjustment of question difficulty and topic relevance based on student responses and history	Increases student engagement and accelerates mastery by up to 20%
Instant Feedback	Automated scoring and feedback delivered immediately after quiz submission	Reinforces learning and identifies knowledge gaps in real-time
Data Storage	Quiz metadata (score, topic, date) stored in Pinecone vector DB for longitudinal analysis	Enables personalized learning pathways and educator insights

Google Classroom Integration Workflow

Stepwise process for synchronized learning



Student Authentication

Students securely log in using **Google OAuth** facilitated by the google-auth-oauthlib library ensuring safe access.

Course Data Synchronization

EduTutor AI uses google-api-python-client to sync course details like class names and subjects automatically from Google Classroom.

Automatic Quiz Generation

The platform dynamically creates quiz topics aligned with the curriculum based on the synchronized course data without manual input.

Educator Performance Insights

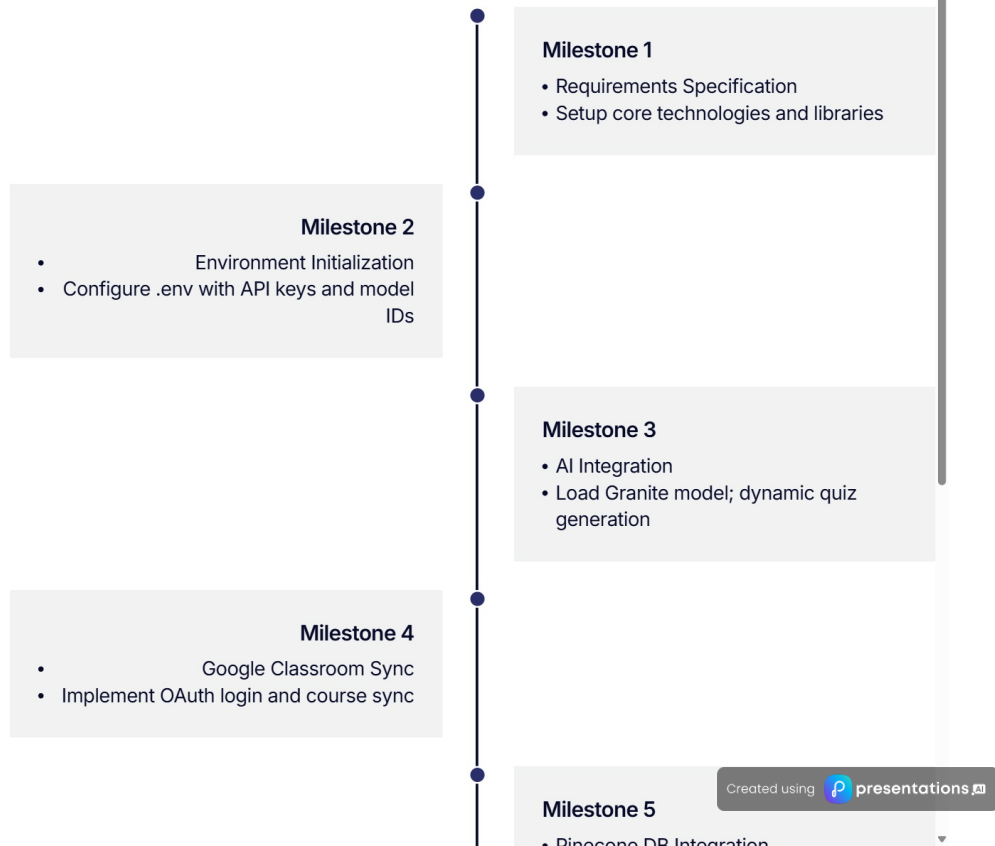
Teachers receive comprehensive, aggregated student performance reports linked to specific Google Classroom classes for targeted assessment.

Continuous Data Syncing

Ongoing synchronization ensures course content and student rosters are always current, maintaining alignment and accuracy throughout.

Modular Architecture & AI Integration Roadmap

Key milestones for EduTutor AI
development



Integration Challenges and Frontend Progress

Overcoming key technical hurdles for EduTutor AI platform

100% OAuth Compliance

Secure Login

Ensured Google Classroom OAuth meets full data privacy and security standards.

0s Latency Target

Real-time Sync

Striving for zero latency in Pinecone DB quiz data synchronization.

4 Modular APIs

Backend Isolation

FastAPI backend modularized to separate auth, quiz, and data storage services.

2 Role Dashboards

UI Optimization

Streamlit frontend progressing to finalize student and educator dashboards.

1 .env Setup

Secure Config

Environment variables managed securely for API keys and endpoints.

1 LLM Integration

Reliable Quiz Gen

LangChain with IBM Granite LLM used for robust quiz generation and parsing.

Applications of Prime Numbers in Technology

Explore encryption, data integrity, education, and gaming uses

1

Authentication Systems: Use **prime-based encryption** to secure login systems in apps and websites.

2

Data Compression / Error Checking: Employ **modular arithmetic with primes** in checksums and hashing for file integrity.

3

Education & EdTech Tools: Develop learning apps with quizzes, visualizations, and cryptography basics using primes.

4

Game Development: Create brain games featuring **prime-based puzzles** and factorization challenges to unlock doors.

Drive personalized education forward—embrace EduTutor AI's innovative platform and accelerate adoption today.

Explore how EduTutor AI's adaptive learning, real-time analytics, and seamless LMS integration empower educators and improve student engagement and assessment accuracy.