

# AI-Driven Personalized Learning Platform

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# 01

Problem Being Addressed

# Problem

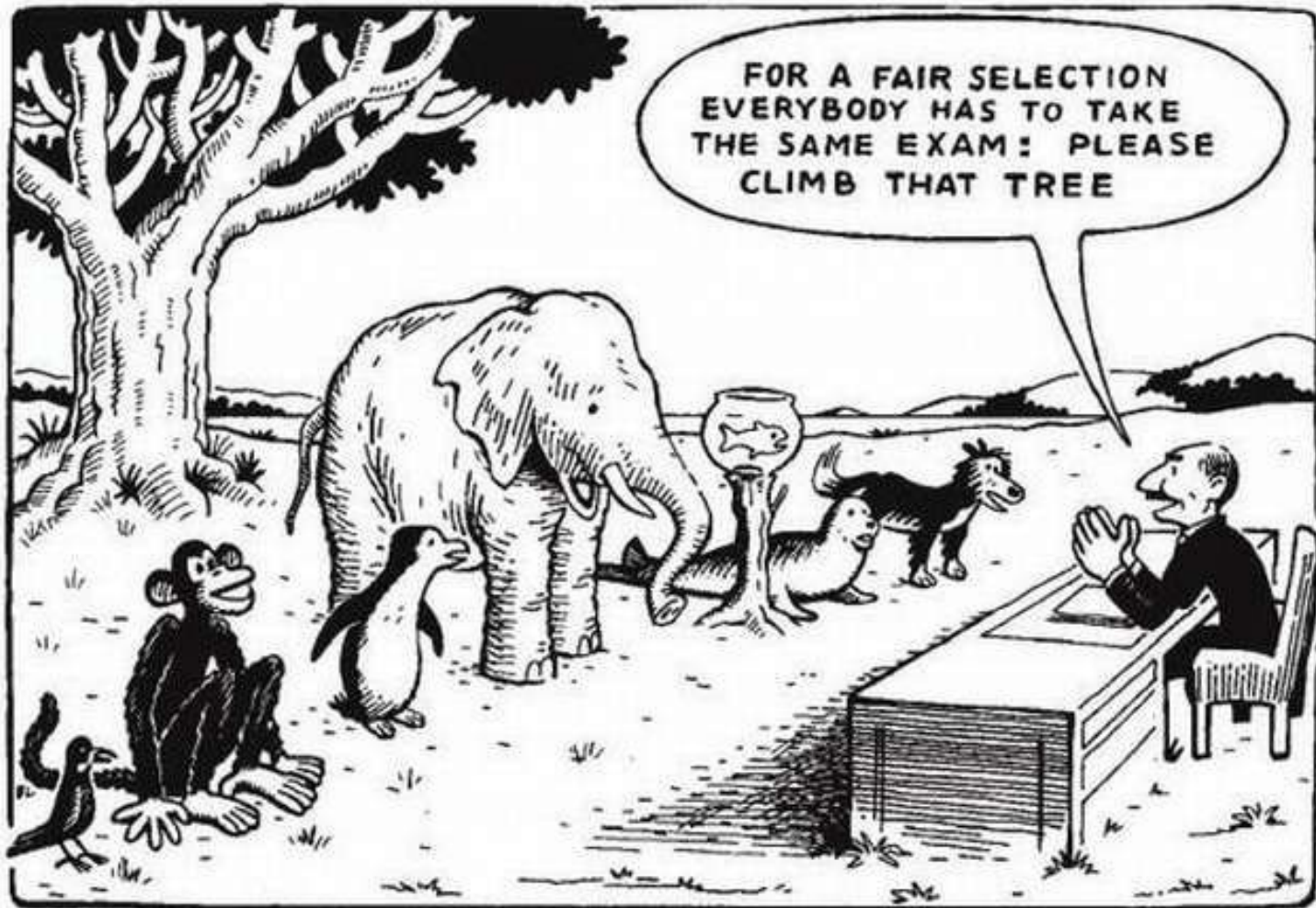
- Traditional and online learning use a **one-size-fits-all approach** that ignores different learning styles.
- **Lack of personalization** leads to disengagement, poor retention, and frustration.
- Students need a **learning system that adapts** to their unique preferences and challenges.



## 3 TYPES OF LEARNER

Effective Learning for Everyone





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Issues

# Issue 1 - Personalized Content Generation

## Issue:

- Traditional learning materials (PDFs, videos, lectures) do not dynamically adjust to individual needs.
- Manually personalizing content for each learner is time-consuming and unrealistic at scale.

## Solution:

- Use **AI that adapts content** (prompt engineering + RAG) to transform learning materials:
  - Convert text-based materials (ebooks, PDFs) into customized learning modules.
  - Generate interactive learning modules (quizzes, flashcards, video explanations).
  - Personalize examples and quiz questions based on the user's interests

# Issue 2 -

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## AI Accuracy & Reliability

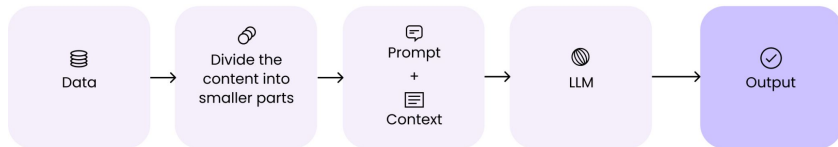
### Issue:

- AI-generated content must be accurate, relevant, and aligned with the subject matter

### Solution:

- **RAG (Retrieval-Augmented Generation) AI approach:**
  - AI retrieves verified sources before generating responses
  - Real-time validation using educational databases and reference textbooks.
  - Continuous human feedback and user reporting to improve AI accuracy.

The RAG process



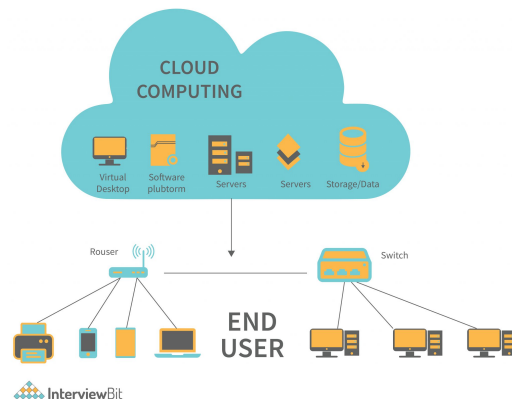
# Issue 3 - Scalability & Performance

## Issue:

- Processing large amounts of data (ebooks, user inputs, learning history) requires efficient computing power.

## Solution:

- **Cloud-based architecture** to handle data and scale efficiently.
  - As our program gets larger with more educational dashboards the cloud can store that data on demand
  - Allows for secure storage and traffic management to improve performance





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Tools and Practices

# Tools

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Frontend Development:

**NEXT.js**

PostgreSQL Database:



Hosting and Deployment:



Containerization:



# Practices

Practices	Description
Agile Development	We follow an iterative and flexible development process (sprint plan), making adjustments based on feedback and testing.
CI/CD	Automated deployment and testing using Vercel & Docker, ensuring stable and frequent updates.
Learning Persona	Understanding how each user learns best; based on performance and feedback.
Prompt Engineering	Used to refine AI-generated quizzes, explanations, and personalized content formats.
RAG	Used to process ebooks and generate personalized content with accurate, structured learning paths (same Info-different styles).

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## Current Progress and Challenges

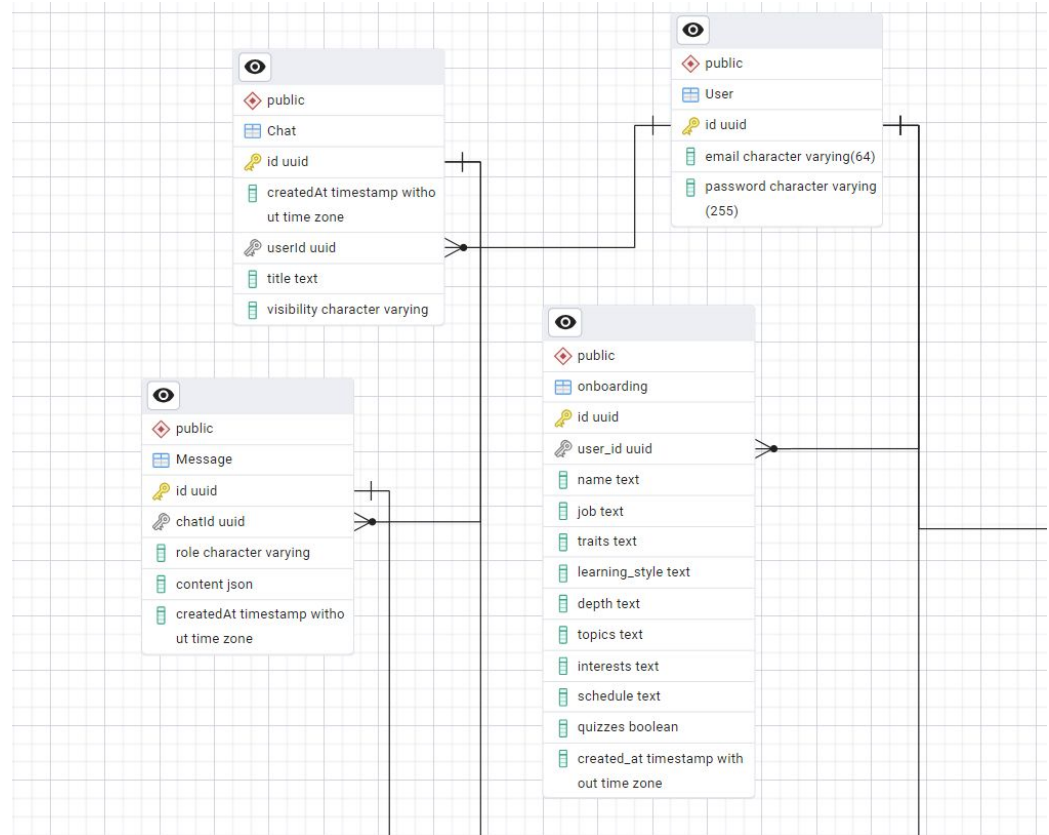
# Current Progress (Database)

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- **Operational Tables:**

- User
- Chat
- Message
- Onboarding

- API is set up to successfully handle data posting and retrieval, ensuring seamless communication between the frontend and backend.  
(Authentication, chats, persona)



# Current Progress (UI)

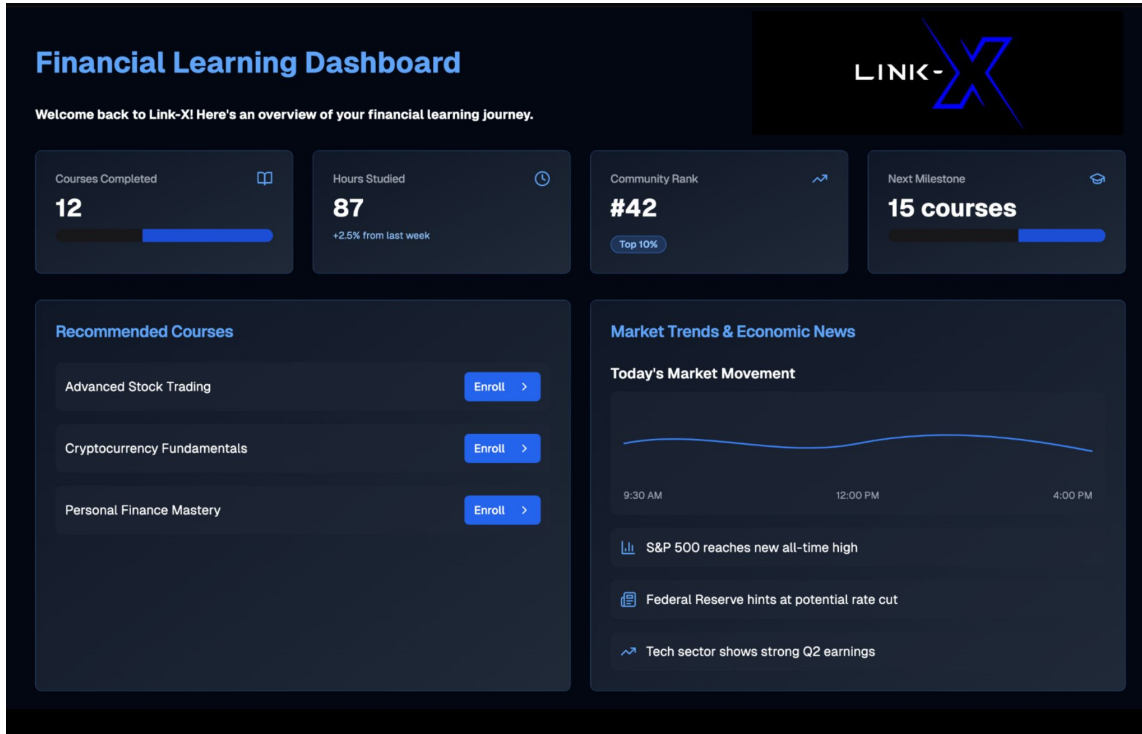
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- **Major Pages Implemented:** We have successfully developed four of our key pages.
- **Standardized Design:** Our goal is to align these pages with industry best practices for usability and aesthetics.
- **Client Collaboration:** We are actively working with the client to refine the design based on their vision and feedback.
- **Design Tools:** We are leveraging V0 by Vercel to streamline the design process and ensure consistency.



# UI Components

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User Dashboard

The Personalized Learning Setup form is a dark-themed interface for customizing the user's learning experience. It includes the following sections:

- Personalized Learning Setup:** The main title for the setup section.
- What should Link-X call you?:** A text input field.
- What do you do?:** A text input field with the example 'e.g., Student, Engineer'.
- What traits should Link-X have?:** A text input field with the example 'e.g., witty, encouraging'.
- Preferred Learning Style:** A dropdown menu with the option 'Select a learning style'.
- Depth of Explanation:** A dropdown menu with the option 'Select depth'.
- Topics of Interest:** A text input field with the example 'e.g., Investing, Finance'.
- Interests, Values, or Preferences for Personalization:** A text input field with the example 'e.g., Basketball, Video Games'.
- Preferred Study Schedule:** A dropdown menu with the option 'Select schedule'.
- Include quizzes for progress tracking:** A checkbox.

User Onboarding

# UI Components

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Log in



Sign out

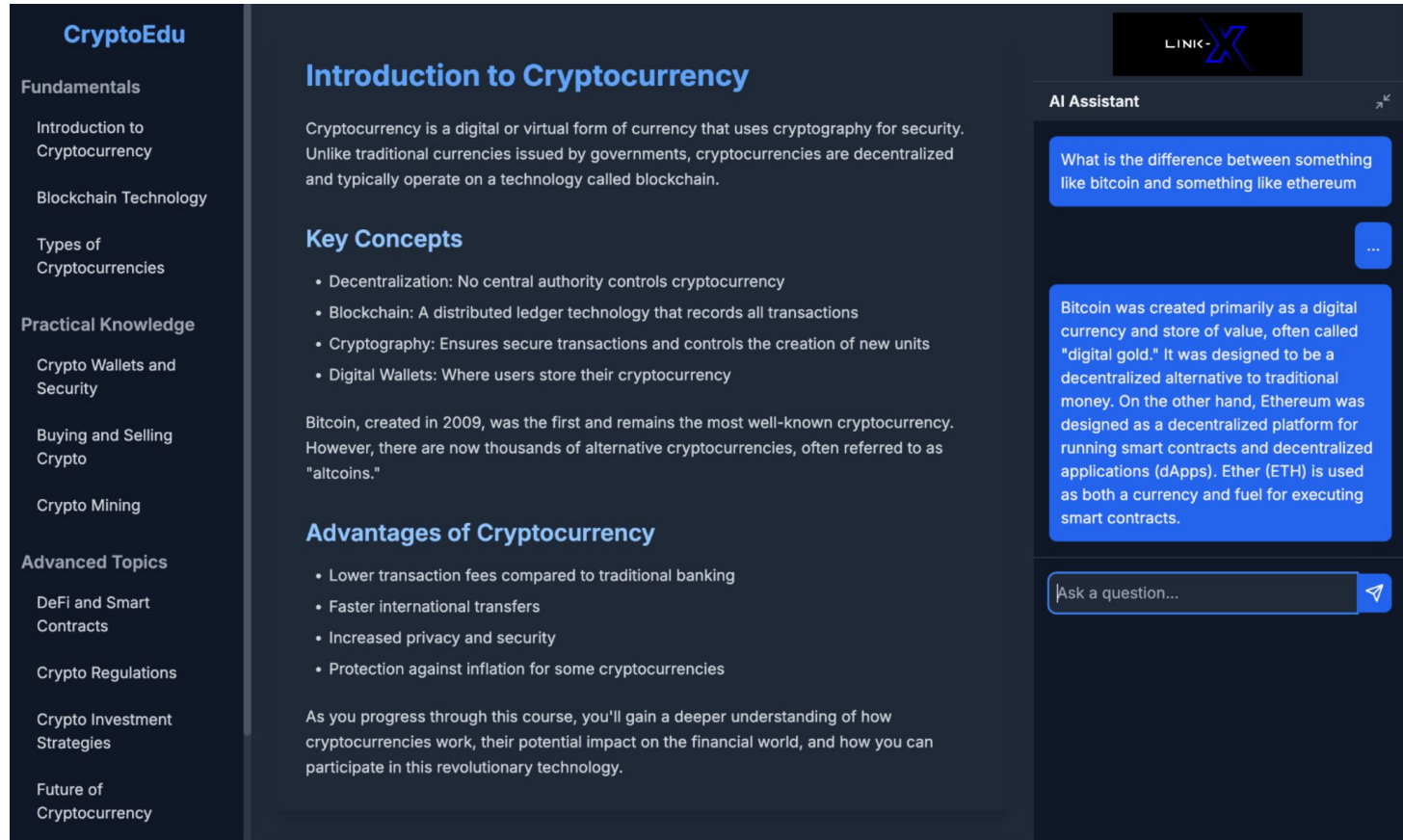


Modular Navbar Component



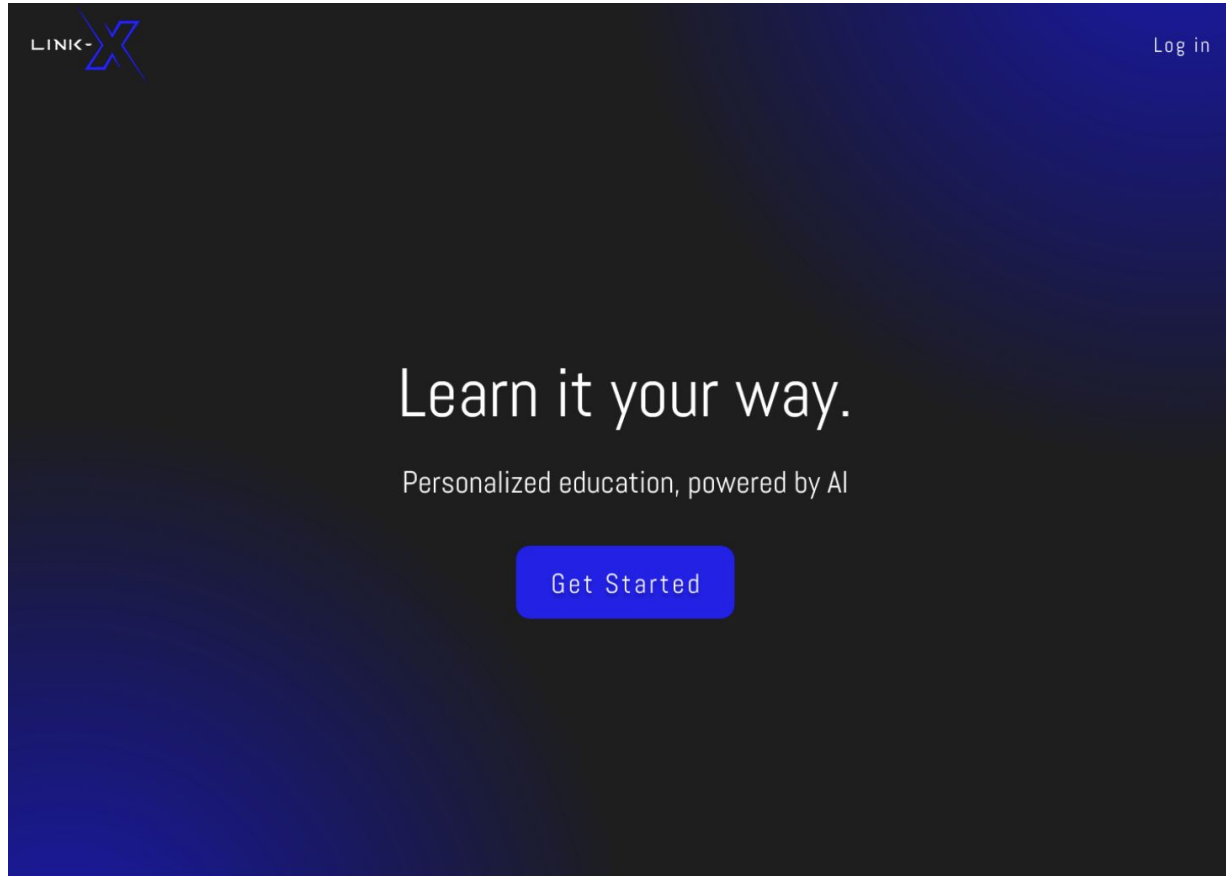
# Course Screen Sketch

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# Landing Page Screen Sketch

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# Challenges (Codebase & Backend)

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- **Adapting to the Existing Codebase:** Understanding the structure, dependencies, and best practices for working within it.
- **Running the Backend Properly:** Initial setup issues, API key integration for OpenAI, and backend filing confusions
- **Refactoring & Optimization:** Cleaning up and restructuring code to improve maintainability and efficiency.



# Challenges (AI & Prompt Engineering)<sup>20</sup>

- **Limited Experience in ML & Prompt Engineering:** Learning how to optimize prompts and integrate AI effectively.
- **Configuration Hurdles:** Understanding how to fine-tune responses and manage OpenAI's API parameters.
- **Ongoing Research & Experimentation:** Finding the best strategies to implement prompt engineering within our system



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Remaining Work Timeline

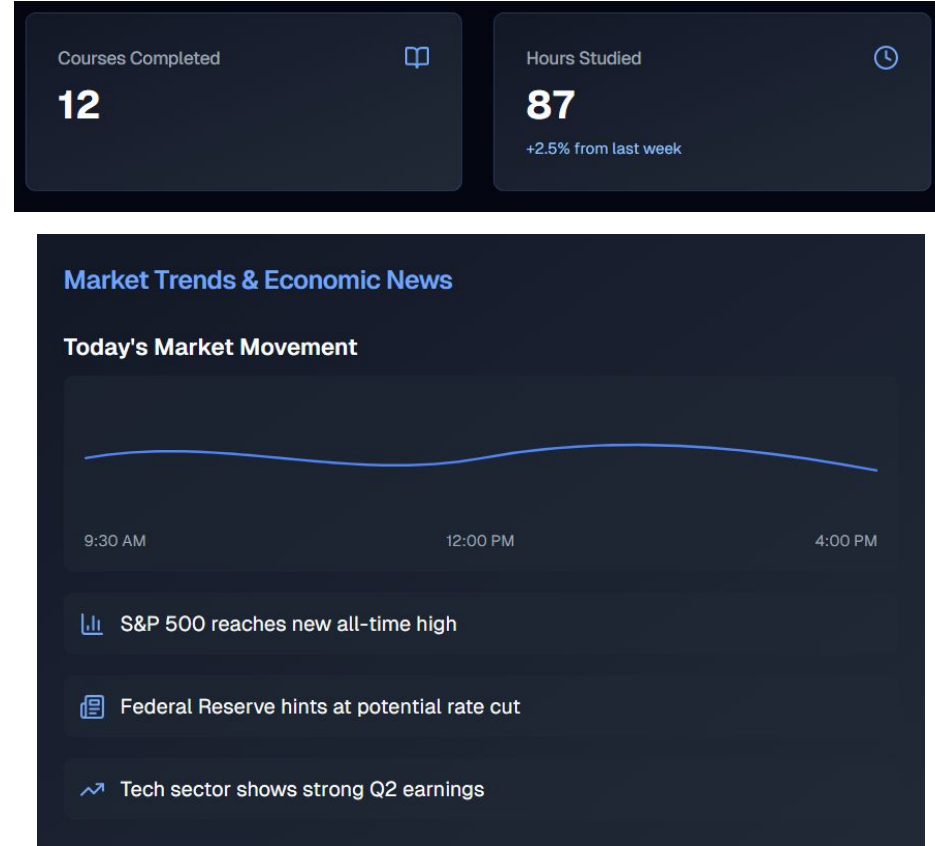
# Sprint Plan

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Week Starting	Sprint Plan	
2/2/2025	Onboarding and understanding code base	UI & Onboarding Complete
2/9/2025	Onboarding and understanding code base	
2/16/2025	Account creation and Authentication	
2/23/2025	Persona Creation and Database	
3/2/2025	Landing Page and Dashboard	
3/9/2025	Topics Page and Study Page	
3/16/2025	Spring Break	
3/23/2025	Testing Personalization & Backend	Have Working Personalization for any topic
3/30/2025	Testing Personalization & Backend	
4/6/2025	Make Database Backend to save personalization progress	
4/13/2025	Testing RAG for Uploading pdfs	
4/20/2025	Certificate Report for completion	
4/27/2025	Deployment	
5/4/2025	Extra ~ Analytics for Dashboard (user progress)	
5/11/2025	Finals Week	

# Future Plans: Dashboard & Study Page<sup>23</sup>

- **Enhancing Dashboard**  
**Functionality:** Improve user experience by adding interactive elements, progress bars, and dynamic data displays.
- **Expanding Study Page Features:** Implement better organization, filtering options, and personalized study recommendations.
- **Seamless Integration:** Ensure all pages work cohesively with existing components for a smooth workflow.



# Future Plans: Universal Styling

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- **Consistent UI/UX:** Apply a uniform design system across all pages for a professional and cohesive look.
- **Theme & Responsiveness:** Ensure accessibility across different devices and screen sizes.
- **Efficiency & Maintainability:** Use reusable styling components to simplify future development.





# Future Plans: Prompt Engineering for Personas<sup>25</sup>

- **Persona-Specific Responses:** Fine-tune AI behavior to align with different user needs and expectations.
- **Adaptive Learning:** Improve model accuracy based on user interactions and feedback.
- **Optimized API Usage:** Experiment with various prompt techniques to enhance response quality and efficiency.



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Demo

THANK YOU

