DebateSphere – Product Requirements Document

The AI-Powered Critical Thinking Incubator

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About

DebateSphere is an AI-powered interactive platform designed to cultivate critical thinking and argumentation skills. It provides real-time debates with peers or AI, an AI Coach that detects logical fallacies, and analytics that track user growth. This PRD outlines the product vision, features, requirements, technical design, and roadmap.

Users & Use Cases

Target Personas:

- **Ambitious Anika (High School Debater, 16):** Needs on-demand debate practice to sharpen rebuttal skills.
- **Curious Carlos (University Student, 20):** Needs structured reasoning tools to prepare essays and discussions.
- **Lifelong-Learner Linda (Professional, 45):** Needs a safe space to improve persuasive communication at work.

Use Cases:

- Debate with AI opponent for instant practice.
- Receive AI feedback on arguments to avoid logical fallacies.
- Track progress and communication skills via analytics.
- Map arguments visually to structure reasoning.

Scope

In Scope (MVP):

- 1v1 debate arena (user vs AI or user vs user)
- AI Coach for fallacy detection & feedback
- Argument-Mapping Tool
- Personalized analytics dashboard
- Secure user registration/login system

Out of Scope (Future Enhancements):

- Team debates (2v2, Lincoln-Douglas)
- Teacher/classroom dashboards
- Voice-to-text debates
- Automated source verification & fact-checking

Features & Requirements

Feature	Description	Acceptance Criteria
Debate Arena	Real-time 1v1 debates via chat-like interface.	Messages delivered in <300ms.
AI Coach	Detects logical fallacies, suggests improvements.	Detects 4+ fallacies with >80% accuracy.
Argument Mapper	Visual tree of pro/con arguments.	Users can create, link, and save maps.
Analytics Dashboard	Tracks fallacies, strength, win/loss ratio.	Displays at least 3 metrics.
User Management	Secure registration, login, profiles.	JWT authentication, bcrypt password hashing.

Non-Functional Requirements

- Performance: Real-time debate latency < 300ms
- Security: JWT authentication, bcrypt password hashing
- Scalability: Support 1,000 concurrent debates
- Reliability: Automatic WebSocket reconnection
- Accessibility: WCAG 2.1 compliance

Technical Architecture

Frontend: React SPA
Backend: Node.js with Express
Database: MongoDB Atlas
Real-time: Socket.IO
AI Integration: OpenAI API
Auth: JWT

Timeline & Roadmap

• Sprint 0 (Weeks 1–2): Backend setup, authentication system
• Sprint 1 (Weeks 3–5): Debate Arena
• Sprint 2 (Weeks 6–8): AI Coach integration
• Sprint 3 (Weeks 9–10): Argument Mapping + Analytics
• Sprint 4 (Weeks 11–12): Testing, bug fixing, deployment

Risks & Assumptions

Risks:
• Over-reliance on AI → Mitigation: feedback on-demand only
• LLM errors → Mitigation: restrict to predefined fallacies
• User disengagement → Mitigation: gamification, progress tracking

Assumptions:
• Users have internet access
• Users have basic debate knowledge