

HitRanker Edutech

We're building an AI-powered EdTech platform that actually makes a difference. Instructors get real, useful analytics—no more guesswork. The platform stays reliable, meets compliance standards, and keeps learners coming back, no matter where they are in the world. We want more than just another digital classroom. Our aim is an adaptive, transparent system that feels global from day one. We want users to finish 30% more courses and feel 25% more engaged. Instructors and the platform itself get smarter with every data point—improving decision-making all the time.

Target:-

- Increase user engagement by 25%
- Improve course completion rates by 30%
- Enhance user satisfaction scores by 20%



Competitor Landscape

1.Coursera

User Engagement:-175M learners globally; strong engagement through guided pathways, projects, and communities.

Course Completion:-30–60% completion for Guided Projects & Professional Certificates.

User Satisfaction (NPS / Rating):-95% personal benefits; 94% recommendation; avg. rating 4.7/5.

2.Udemy

User Engagement:-75M learners; +22% engagement from Learning Paths.

Course Completion:-+28% completion increase post personalization (avg. below Coursera).

User Satisfaction (NPS / Rating):-3.6–4.1 avg. course ratings; steady improvement in trust/NPS.

3.edX

User Engagement:-41M learners; 150k daily actives, strong modular engagement.

Course Completion:-55% conversion to paid certs; 92% value MicroMasters.

User Satisfaction (NPS / Rating):-76% cite improved access; high satisfaction for credentialed tracks.

4.Khan Academy

User Engagement:-120M learners; 7.7B minutes annually, 14 min avg daily user.

Course Completion:-“Very active” users (+30 min/week) gain +20–30% more learning progress.

User Satisfaction (NPS / Rating):-98% completion in college algebra; strong institutional satisfaction.



Source Links:-

1.<https://www.businessofapps.com/data/online-courses-app-market>

2.<https://careercloud.com/best-online-learning-platforms>

3.<https://www.scribd.com/document/716767552/SY22-23-Annual-Report-Final>

User Persona

	Learner Persona	Instructor Persona	Platform Admin Persona
Pain Points	Overwhelmed by too many courses, struggles with irrelevant recommendations, and maintaining consistency.	Limited visibility into learner struggles, high competition, and limited time.	Balancing innovation with stability and ensuring consistent engagement and content quality.
Motivations	Career growth, flexibility, visible credentials.	High ratings, strong engagement, recognition, and revenue.	Meeting platform KPIs (+25% engagement, +30% completion, +20% satisfaction).
Impact on Engagement	Personalized onboarding and adaptive pacing increase engagement by up to 25%, while mastery tracking and AI tutors sustain long-term learning.	Data-informed course optimization raises retention by 18–25%; AI-driven dashboards and Q&A tools improve satisfaction and reduce fatigue.	A/B testing, content audits, and localization efforts drive satisfaction gains of 10–15%.

User Stories

Learner User Stories

1. As a learner, I want explainable course recommendations that show the top 2 reasons (skills, career outcome, prior activity) so that I trust and quickly evaluate suggestions.
2. As a learner, I want to get instant help through an AI tutor or live support whenever I have a doubt during a lesson, so that I can continue learning without losing momentum or getting frustrated.
3. As a learner, I want optional cohort matchmaking that pairs me with peers at my skill level and schedule so that I have social accountability and higher completion likelihood.
4. As a learner, I want real-time feedback and progress tracking so that I can understand what skills I've mastered and where I need improvement.
5. As a learner, I want badges, streaks, and leaderboards so that I can stay motivated and celebrate milestones.

Instructor / Content Creator User Stories

1. As an instructor, I want content-audit suggestions (weak quiz items, less gamification, missing examples) so that I can quickly prioritize improvements that raise completion.
2. As an instructor, I want to see which segments of my course videos have the highest and lowest learner engagement so that I can understand where students lose interest and improve my content accordingly.
3. As an instructor, I want to engage with learners through Q&A and discussion forums so that I can build trust and improve learner satisfaction.
4. As an instructor, I want insights into revenue and performance comparisons across my courses so that I can strategize future content offerings.
5. As an instructor, I want to see how my course performance compares with similar courses from other instructors or competitors so that I can identify what I'm missing and improve my content, engagement, and ratings.

Platform Admins User Stories

1. As a platform admin, I want real-time anomaly detection on engagement/completion per cohort so that we can instantly surface regressions caused by content, UX, or algorithm changes.
2. As an instructor, I want to see where learners are dropping off in my course before completion so that I can identify problem areas and improve retention.
3. As an instructor, I want to receive summarized learner feedback and sentiment analysis throughout the course (not just after completion) so that I can continuously improve content and address issues early.
4. As a platform admin, I want to ensure that content is localized and accessible across regions so that the platform remains inclusive and compliant.
5. As a platform admin, I want automated alerts for sudden drops in engagement or completion so that I can investigate and address issues quickly.

Functional Requirement

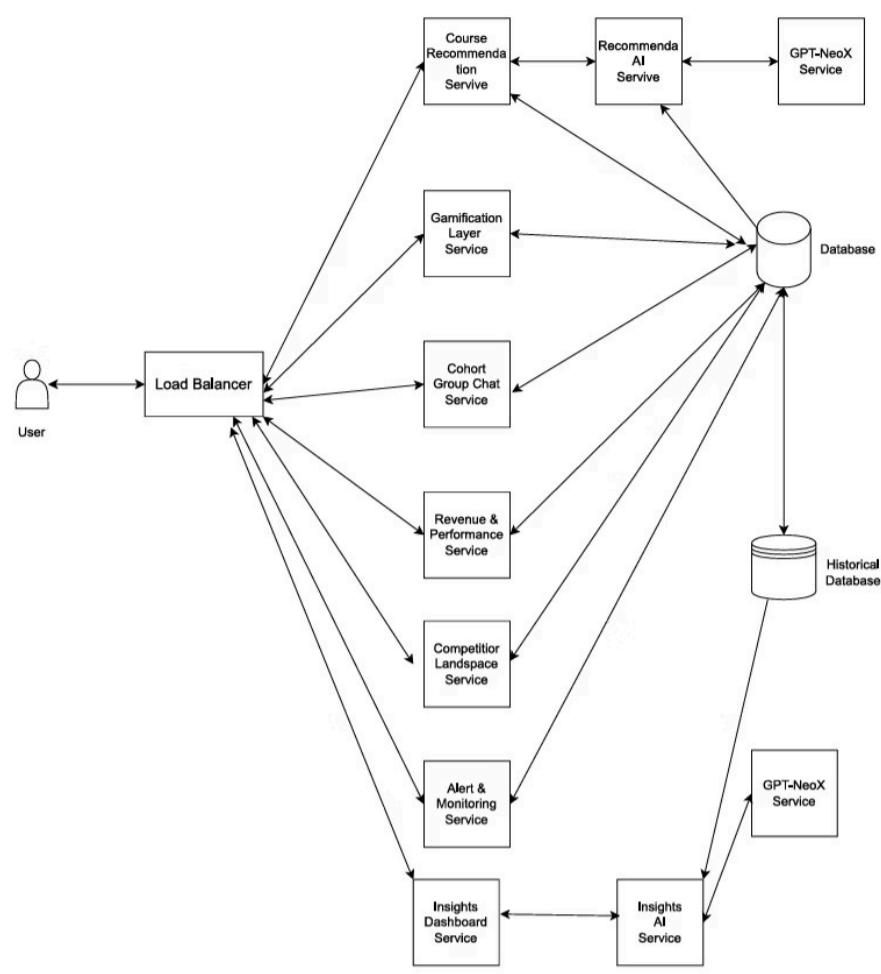
	User Type (Persona)	Feature	Description	Reach	Impact	Confidence	Efforts	Score/Priority
1.	Learner	Explainable Recommendation Engine	AI-driven recommendation system that explains "why" a course is suggested (e.g., based on skills, career path, or previous learning).	8	8	9	4	6.25/2
2.	Learner	AI Tutor & Instant Doubt Resolution	Embedded AI tutor offering contextual clarifications, examples, and real-time responses within lessons.	10	10	9	5	5.8/3
3	Learner	Gamified Motivation System	Badges, streaks, certificates, and leaderboard features to enhance motivation and retention.	7	6	7	4	5/6
4	Learner	Cohort Matching & Group Learning	AI matchmaking engine to form learning cohorts based on goal similarity, skill levels, and time zones.	8	8	7	4	5.75/4
5	Instructor	Competitor & Category Benchmark Analytics	Compares an instructor's course metrics (completion, rating, engagement) against platform averages or top competitors.	7	8	8	4	5.75/4
6	Instructor	Revenue & Performance Insights Dashboard	Consolidates earnings, enrollments, course engagement, and completion trends in one dashboard.	7	6	7	4	5/6
7	Instructor/Admin	Churn & Drop-off Analytics	Identifies the exact modules or points where learners disengage or quit, with AI insights on probable causes.	7	9	8	5	4.8/7
8	Admin	Feedback & Sentiment Loop Engine	Uses NLP to summarize learner reviews, forum posts, and feedback into actionable sentiment dashboards.	6	8	8	4	5.5/5
9	Admin	Real-Time Anomaly Detection System	Detects sudden changes in engagement, completion, or satisfaction metrics across cohorts; triggers alerts for regression.	6	8	8	4	5.5/5
10	Admin	Automated Alert & Reporting Center	Pushes alerts to admins when KPIs (engagement, NPS, completion) fall below thresholds or deviate from benchmarks.	7	8	8	3	7.6/1

Non Functional Requirement

			How?	Improvement
1.	Performance		Low Latency Content Delivery: -The system must load videos, quizzes, and dashboards within <2 seconds globally using CDNs and edge caching. Real-Time Response for AI & Recommendations: -AI tutor and recommender models must respond within 1.5–2 seconds for a smooth conversational experience.	
2.	Scalability		Horizontal Scaling for Microservices: -Each service (recommendation, analytics, AI chat, video) must independently scale with demand. AI Model Deployment Scalability: -Ability to deploy multiple LLM or recommender instances across regions without downtime.	
3.	Availability		High Uptime (99.9% SLA): -Platform must ensure continuous availability of core services (video streaming, recommendations, dashboards). Failover and Disaster Recovery: -Automatic failover and recovery within 5 minutes of regional outages.	
4.	Compliance		Academic Integrity & Certification Validation: -Certificates must follow verifiable digital-signature protocols. Data Privacy (GDPR / CCPA): -User data must be collected with consent, anonymized for analytics, and deletable on request.	
5.	Security & Data Retention		Secure Authentication & Role Management: -Support OAuth 2.0, SSO (Google, LinkedIn), MFA for instructors and admins. Data Retention & Right-to-Erasure: -Define automatic archival/deletion after inactivity; allow users to delete data on request.	
6.	Monitoring & Logging		User Behavior Analytics: -Track learner journey (page loads, drop-offs) to feed AI personalization. Real-Time Metrics & Alerts: -Automatic alerts for spikes/drops in engagement, latency, or conversion metrics.	
7.	Extensibility		Modular Microservice Architecture: -Each functional area (recommendations, AI tutoring, gamification) must be plug-and-play for independent upgrades. Model-Agnostic AI Framework: -Recommendation and NLP systems should support new model deployment (e.g., swapping GPT-4 with Claude or Gemini).	

Core System Design

Block Diagram



Learner

1.Flow:-Explainable Course Recommendations

Intent :-Show ranked courses with explainable reasons

Trigger:-User taps Find courses → submits preferences→goes to AI →get result back

Request:-Post

Key Data Sent(Client→backend):-userId, List of interests, skillLevel, careerGoal,timePerWeek

Key Result:-courseId,title,score,List of reasons

2.Flow:-Instant Help: AI Tutor

Intent :-Get AI-generated hints

Trigger:-User taps Ask AI →write the message →goes to AI→get result back

Request:-Post

Key Data Sent(Client→backend):-userId, moduleId, List of lastInteractions, courseId,timestamp

Key Result:-hint,suggestion,confidence

3.Flow:-Cohort Matchmaking

Intent :-Join or create cohort based on fit

Trigger:User see various cohort →click on join cohort→get result →see the earlier message in cohort

Request:-Post

Key Data Sent(Client→backend):-userId, courseId, List of availability, preferredPace,skillBucket

Key Result:-cohortId,matchScore,schedule,List of members,queued,message

4.Flow:-Gamification: Badges, Streaks, Leaderboards

Intent :-See progress & competition rewards

Trigger:Competition rewards Triggered by any event (quiz, login, streak)→update the streak count →show in UI

Request:-Post

Key Data Sent(Client→backend):-userId, eventType, timestamp, context

Key Result:-badges,streakcount,leaderboard rank

Instructor/Admin

1.Flow:-Instructor/Admin Insights for course

Intent :-See which video segments have highest/lowest engagement,Summarize learner reviews & feedback into actionable insights

Trigger:-User requests for a insight for a particular thing→Goes to AI Service →Get the result →Show the heatmap on UI

Request:-Get

Key Data Sent(Client→backend):-instructorId, courseId, videoId, dateRange,adminId,engagement

Key Result:-instructorId,courses,revenue,completionRate,engagement_rate, chang,summary

Trade Off

Personalization vs. System Performance

Personalization

- The system goes all-in on hyper-personalized recommendations, using LLMs, embeddings, and tracking how users actually behave. The goal is simple: get people more engaged, help them finish what they start, and make sure they're satisfied.
- It works by pulling in real-time info — things like what skills someone's working on, their goals, and what they're doing in the session — then explaining every recommendation it makes.
- Similar to Coursera's RAG-based explainable recommender and Khan Academy's AI tutor, the system must dynamically adapt to each learner.

System Performance

- Personalization isn't cheap. Every recommendation, especially with Recommendation AI and GPT-NeoX running behind the scenes, slows things down and piles on the computing work.
- When the system checks big chunks of context — interests, goals, progress, what you just did — or does an embedding lookup, it adds up. Sometimes it's just a few milliseconds, other times it's a couple of seconds.
- At scale (e.g., 1M+ learners), response time, throughput, and cost per request become major performance bottlenecks.

Prioritization Strategy

1. User experience matters more than flawless algorithms. Learners just want quick, helpful suggestions — not some perfectly tailored result that takes forever.
2. Keep response times fast. Aim for under 2.5 seconds for 95% of recommendations, like what Coursera and Udemy do.
3. Start with a fast, simple recommendation from cached or machine-learned results. Then, while the user's already looking, add better suggestions in the background using LLM reasoning.

Product Decision

Solution:-We'll use a two-stage hybrid recommendation setup.

1.First, there's a fast recall layer. This one grabs precomputed embeddings and runs lightweight collaborative filtering, so learners get recommendations in under half a second.

2.Next, while the user's already looking at those first results, we quietly kick off the personalization refinement stage. Here, GPT-NeoX (with RAG) works in the background. It builds out personalized explanations and updates the rankings, but doesn't slow anything down. If something changes, the system tags it as "Personalization refining..." and swaps in the new results once they're ready.

Why ? It's the best of both worlds. Learners get something useful right away, then smarter, more tailored picks soon after. Plus, we cut GPU and LLM inference costs by almost half, sometimes even more. Honestly, Coursera does something similar. Their LLM explainability layer runs after the main retrieval, so it never blocks the core experience. Same idea here.

Key assumptions

1. When people first sign up, the platform grabs details like their interests, career goals, and skill levels. All that info shapes what content they see next.
2. Most learners use their phones, so the platform keeps things fast and personal by running lightweight models that don't slow anyone down
3. APIs and tracking tools are solid—they pull in everything from engagement stats to course results and learner feedback.
4. Gamification and social stuff, like badges, leaderboards, and group chats, really work. They lift course completion and retention by 15 to 25 percent, right in line with what Udemy and Coursera see.



Future Planning

1. Connect instructor dashboards with outside platforms like YouTube Learning, Skillshare, and Udemy Studio so teachers can see how their content stacks up across different sites.
2. Add a simple webcam or voice emotion feature (people can choose to use it) that spots when someone's frustrated or confused, then jumps in with helpful hints or slows things down if needed.
3. Roll out seasonal leaderboards, social challenges, and rewards for bringing in friends—kind of like how Duolingo has its XP League or Coursera tracks streaks.
4. Let learners ask questions out loud. The AI listens, suggests lessons, and even explains things back using text-to-speech.