



## **"Statement: Peer Learning Exchange Platform Description: A peer-to-peer learning platform that connects users who want to teach or learn specific skills."**

Users create profiles listing what they can teach and what they want to learn, and the system matches compatible users. The platform supports scheduling sessions, integrated chat or video links, and post-session ratings and feedback. The platform encourages knowledge sharing, mentorship, and skill development in a collaborative and community-driven environment."

this is my problem statement and its description, please do research on this project and suggest me how can i make it unique, make PRD and SRS for this project

Based on comprehensive research, I'll help you create a unique positioning for your Peer Learning Exchange Platform, along with complete PRD and SRS documents.

### **Unique Differentiation Strategies for Your Platform**

#### **Key Market Gaps & Opportunities (2025 Context)**

##### **1. AI-Driven Hyper-Personalization**

- Current platforms use basic matching algorithms
- **Your Edge:** Multi-dimensional AI matching considering learning styles, time zones, personality compatibility, past success rates, and adaptive learning paths<sup>[1] [2]</sup>

##### **2. Gamification with Real Impact**

- Standard platforms have basic badges/leaderboards
- **Your Edge:** Progressive skill trees, community challenges, skill certification pathways, and achievement-based unlocks<sup>[3] [4]</sup>

##### **3. Hybrid Skill Credit System**

- Most platforms are either fully free or fully paid
- **Your Edge:** Skill credit economy where users earn credits by teaching, spend on premium features, with dispute resolution and milestone-based releases<sup>[5] [6]</sup>

##### **4. Immersive Learning Experiences**

- 2025 trend toward VR/AR integration

- **Your Edge:** Optional VR/AR rooms for specific skills (design reviews, language practice, physical demonstrations) <sup>[4]</sup> <sup>[7]</sup>

## 5. Micro-Learning Integration

- Time-constrained users need bite-sized sessions
- **Your Edge:** 15-min quick sessions, skill sprints, and progressive mastery tracking <sup>[8]</sup> <sup>[9]</sup>

## 6. Trust & Safety Innovation

- Major concern in peer platforms
- **Your Edge:** Verified skill badges through peer assessments, video verification, progressive trust levels, and AI-powered moderation <sup>[6]</sup> <sup>[10]</sup>

## 7. Community-Driven Learning Paths

- Users need structured guidance
- **Your Edge:** Collaborative learning circles (3-5 people learning together), cohort-based programs, and mentor matching <sup>[11]</sup> <sup>[12]</sup>

# PRODUCT REQUIREMENTS DOCUMENT (PRD)

## 1. Executive Summary

**Product Name:** SkillSync Exchange Platform

**Version:** 1.0

**Date:** October 25, 2025

**Owner:** [Your Name/Team]

### Vision Statement:

Create the world's most trusted and engaging peer-to-peer learning ecosystem that democratizes skill acquisition through AI-powered matching, community-driven validation, and immersive learning experiences.

### Product Objectives:

- Achieve 10,000 active users within first 6 months
- Maintain 85%+ successful session completion rate
- Establish 4.5+ average rating across all exchanges
- Generate 50,000+ skill exchange hours in year one

## 2. Problem Statement

### Current Pain Points:

1. Traditional education is expensive and time-consuming
2. Existing peer learning platforms lack sophisticated matching

3. Trust and quality verification remain significant barriers
4. Learning experiences are often passive and unengaging
5. No flexible credit-based exchange systems exist
6. Limited accountability in peer-to-peer commitments

### **Target User Personas:**

#### **Persona 1: Sarah - The Career Switcher**

- Age: 28, Marketing professional transitioning to UX Design
- Needs: Affordable learning, real-world mentorship, flexible scheduling
- Pain: Can't afford bootcamps, needs practical portfolio projects

#### **Persona 2: Alex - The Skilled Hobbyist**

- Age: 35, Software developer who plays guitar
- Needs: Share coding skills, learn advanced music theory
- Pain: No platform connects skill trades effectively

#### **Persona 3: Maya - The College Student**

- Age: 21, Computer Science major
- Needs: Supplemental learning, peer networking, resume building
- Pain: Textbook learning insufficient, wants practical experience

## **3. Product Features & Requirements**

### **3.1 Core Features (MVP - Priority 1)**

#### **Feature 1: Intelligent User Profiles**

##### *User Stories:*

- As a user, I want to create a comprehensive profile showcasing my teachable skills, so potential learners can discover me
- As a user, I want to list skills I want to learn with proficiency targets, so the system can match me appropriately

##### *Acceptance Criteria:*

- Profile includes: name, photo, bio (200 chars), location, timezone
- Minimum 3 teachable skills with proficiency level (Beginner/Intermediate/Advanced/Expert)
- Minimum 3 learning interests with target proficiency
- Skills categorized across 12+ categories (Tech, Business, Creative, Language, etc.)
- Profile completeness indicator (0-100%)

- Verification badges (email, phone, LinkedIn, skill assessments)

## **Feature 2: AI-Powered Matching Algorithm**

### *User Stories:*

- As a user, I want to receive personalized match recommendations based on complementary skills
- As a user, I want to filter matches by availability, location, teaching style, and ratings

### *Acceptance Criteria:*

- Multi-factor matching score (0-100) considering:
  - Skill complementarity (40%)
  - Availability overlap (20%)
  - Learning style compatibility (15%)
  - Rating history (15%)
  - Response rate (10%)
- Real-time match suggestions updated daily
- Ability to "favorite" and "pass" on matches
- Explanation of why each match was suggested

## **Feature 3: Session Management System**

### *User Stories:*

- As a user, I want to propose session times and receive confirmations
- As a user, I want integrated calendar sync with Google/Outlook
- As a user, I want automatic reminders before sessions

### *Acceptance Criteria:*

- Propose up to 5 time slots per session request
- Accept/decline/counter-propose functionality
- Auto-generate video meeting links (integrated with Zoom/Google Meet)
- Email + push notifications 24hrs, 1hr, and 15min before session
- Session types: One-time, recurring, multi-session programs
- Duration options: 30min, 1hr, 2hr, custom

## **Feature 4: Integrated Communication Hub**

### *User Stories:*

- As a user, I want to chat with matched users before committing to sessions
- As a user, I want to share resources (documents, links, videos) within the platform

### *Acceptance Criteria:*

- Real-time text messaging with typing indicators
- File sharing (max 10MB per file, common formats)
- Resource library per matched pair
- Message search and archival
- Report/block functionality
- Chat encryption for privacy

### **Feature 5: Rating & Feedback System**

#### *User Stories:*

- As a user, I want to rate my experience after each session (quality, punctuality, communication)
- As a user, I want to view aggregate ratings before matching

#### *Acceptance Criteria:*

- Mandatory post-session feedback within 48 hours
- 5-star rating across 3 dimensions:
  - Knowledge/Skill (how much you learned/taught)
  - Communication (clarity, responsiveness)
  - Professionalism (punctuality, respect)
- Written review (optional, 500 char max)
- Public ratings visible to all users
- Private feedback sent to participants only
- Aggregate rating displayed on profiles (weighted by recency)

### **Feature 6: Skill Credit Economy**

#### *User Stories:*

- As a user, I want to earn credits by teaching sessions
- As a user, I want to spend credits to book premium teachers or features

#### *Acceptance Criteria:*

- New users receive 50 starter credits
- Earn 10 credits per completed 1-hour teaching session
- Spend 10 credits to book standard sessions (1:1)
- Premium users can charge 15-20 credits (verified experts)
- Credits expire after 12 months of inactivity
- Purchase credit bundles: 100 (\$10), 500 (\$45), 1000 (\$80)
- Referral bonus: 25 credits per successful referral

## **3.2 Advanced Features (Post-MVP - Priority 2)**

### **Feature 7: Learning Circles & Cohorts**

*Description:*

Group learning sessions (3-8 participants) focused on collaborative skill development

*Requirements:*

- Create/join topic-based learning circles
- Scheduled cohort programs (4-8 week duration)
- Peer accountability check-ins
- Shared progress dashboards
- Group video conferencing support

### **Feature 8: Skill Verification & Badges**

*Description:*

Community-validated skill certifications through peer assessments

*Requirements:*

- Request skill verification from 3+ peers who've learned from you
- Standardized assessment rubrics per skill category
- Digital badges displayed on profiles
- Integration with LinkedIn for credential sharing
- Tiered badges: Verified → Proficient → Expert → Master

### **Feature 9: Progress Tracking & Analytics**

*Description:*

Personalized learning dashboards showing skill development over time

*Requirements:*

- Skills learned counter with proficiency progress bars
- Total hours taught/learned statistics
- Learning streak tracking (consecutive weeks active)
- Milestone celebrations (10 sessions, 50 hours, etc.)
- Exportable learning portfolio

### **Feature 10: Micro-Learning Modules**

*Description:*

Quick 15-minute skill exchanges for time-constrained users

*Requirements:*

- "Quick Help" request system for immediate assistance
- 15-min session template library
- Skill sprint challenges (learn 1 new thing daily)
- Integration with mobile app for on-the-go learning

### **3.3 Future Enhancements (Priority 3)**

- VR/AR immersive learning rooms
- AI-generated personalized learning paths
- Corporate/Educational institution partnerships
- Mobile apps (iOS & Android)
- Offline session support with manual logging
- Multi-language support (10+ languages)
- Accessibility features (screen reader, closed captions)

## **4. Technical Requirements**

### **4.1 Technology Stack Recommendations**

#### **Frontend:**

- Framework: React.js 18+ with TypeScript
- State Management: Redux Toolkit or Zustand
- UI Library: Material-UI or Tailwind CSS + Headless UI
- Real-time: [Socket.io](https://socket.io/) client
- Video Integration: Zoom SDK or [Daily.co](https://daily.co/) API

#### **Backend:**

- Runtime: Node.js 20+ with Express.js
- Database: PostgreSQL (relational data) + Redis (caching)
- File Storage: AWS S3 or Cloudflare R2
- Authentication: JWT + OAuth 2.0 (Google, LinkedIn)
- Real-time: [Socket.io](https://socket.io/) server

#### **AI/ML Services:**

- Matching Algorithm: Python (scikit-learn) or TensorFlow
- Recommendation Engine: Collaborative filtering + Content-based
- NLP for skill extraction: OpenAI API or Hugging Face

#### **Infrastructure:**

- Hosting: AWS (EC2, ECS) or Vercel + Railway
- CDN: CloudFlare
- Monitoring: Datadog or New Relic
- Analytics: Mixpanel or Amplitude

#### **Third-Party Integrations:**

- Video: Zoom API, Google Meet, [Daily.co](https://daily.co)
- Calendar: Google Calendar API, Microsoft Graph
- Payments: Stripe
- Email: SendGrid or AWS SES
- Push Notifications: Firebase Cloud Messaging

### **4.2 Performance Requirements**

- Page load time: < 2 seconds (initial), < 500ms (subsequent)
- API response time: < 200ms (p95)
- Matching algorithm execution: < 3 seconds
- Support concurrent users: 10,000+
- Database query optimization: indexed searches < 100ms
- 99.9% uptime SLA

### **4.3 Security Requirements**

- HTTPS/TLS 1.3 encryption for all traffic
- OWASP Top 10 vulnerability mitigation
- GDPR & CCPA compliance
- Data encryption at rest (AES-256)
- Regular security audits (quarterly)
- Rate limiting on all public APIs
- Two-factor authentication (optional)
- Regular automated backups (daily)

## **5. User Experience Requirements**



## 5.1 Design Principles

1. **Simplicity:** Onboarding completed in < 5 minutes
2. **Trust:** Prominently display ratings, verifications, reviews
3. **Engagement:** Gamification elements throughout
4. **Accessibility:** WCAG 2.1 AA compliance minimum
5. **Responsiveness:** Mobile-first design, works on all devices

## 5.2 Key User Flows

### Onboarding Flow:

1. Sign up (email/social OAuth) → 2. Create profile → 3. Add 3 skills to teach → 4. Add 3 skills to learn → 5. Set availability → 6. View first 5 matches → 7. Send first connection request

### Session Booking Flow:

1. Browse/receive matches → 2. View profile details → 3. Send message/connection → 4. Propose session times → 5. Receive confirmation → 6. Get calendar invite → 7. Join session → 8. Submit feedback

### Credit Management Flow:

1. View credit balance → 2. Earn credits (complete teaching session) → 3. Spend credits (book session) → 4. Purchase credits (if needed) → 5. Track history

## 6. Success Metrics & KPIs

### User Acquisition:

- Monthly active users (MAU) growth: 20% MoM
- New registrations: 500/month by Month 6
- Referral rate: 25% of new users from referrals

### Engagement:

- Average sessions per user: 4/month
- Session completion rate: 85%+
- Return user rate: 60% (within 30 days)
- Average session rating: 4.5+/5

### Retention:

- Week 1 retention: 40%
- Month 1 retention: 25%
- Month 3 retention: 15%

### Revenue (if applicable):

- Credit purchase conversion: 15% of users
- Average revenue per user (ARPU): \$5/month

## 7. Launch Strategy

### Phase 1: Closed Beta (Months 1-2)

- Invite-only 100 users
- Focus on local community (1 city)
- Gather intensive feedback
- Iterate on core features

### Phase 2: Open Beta (Months 3-4)

- Public launch to 1,000 users
- Geographic expansion (5 cities)
- Influencer partnerships
- Content marketing campaign

### Phase 3: Public Release (Month 5+)

- Full feature set launch
- Multi-channel marketing
- Partnership outreach (universities, bootcamps)
- Press releases and media coverage

## 8. Risks & Mitigation

Risk	Impact	Probability	Mitigation
Low user adoption	High	Medium	Aggressive marketing, referral program, free credits
Poor match quality	High	Medium	Continuous algorithm improvement, manual curation initially
Trust/safety issues	High	Low	Robust verification, reporting system, moderation team
Technical scalability	Medium	Low	Cloud infrastructure, performance monitoring
Competitor emergence	Medium	High	Rapid feature development, community building

# SOFTWARE REQUIREMENTS SPECIFICATION (SRS)

## 1. Introduction

### 1.1 Purpose

This SRS document specifies the software requirements for the SkillSync Peer Learning Exchange Platform. It details functional and non-functional requirements for developers, testers, and stakeholders.

### 1.2 Scope

The system enables peer-to-peer skill exchange through:

- User profile creation and management
- AI-powered skill matching
- Session scheduling and management
- Integrated communication (chat, video)
- Rating and feedback system
- Skill credit economy
- Progress tracking and analytics

### 1.3 Definitions, Acronyms, and Abbreviations

- **P2P:** Peer-to-Peer
- **MAU:** Monthly Active Users
- **MVP:** Minimum Viable Product
- **API:** Application Programming Interface
- **JWT:** JSON Web Token
- **CRUD:** Create, Read, Update, Delete
- **Session:** A scheduled learning exchange between two or more users
- **Skill Credit:** Virtual currency earned by teaching, spent on learning

### 1.4 References

- OWASP Security Guidelines
- WCAG 2.1 Accessibility Standards
- GDPR Compliance Documentation
- REST API Best Practices

## **2. Overall Description**

### **2.1 Product Perspective**

The platform is a standalone web application with future mobile app support. It integrates with third-party services (video conferencing, calendar, payment processing) but maintains independent user data and core functionality.

### **2.2 Product Functions**

1. User Authentication & Authorization
2. Profile Management
3. Skill Catalog & Taxonomy
4. Matching Algorithm Execution
5. Session Scheduling & Calendar Integration
6. Real-Time Communication
7. Video Conferencing Integration
8. Rating & Review System
9. Credit Economy Management
10. Notification System
11. Search & Discovery
12. Analytics & Reporting

### **2.3 User Classes and Characteristics**

#### **Learner:**

- Primary goal: Acquire new skills
- Technical proficiency: Basic to intermediate
- Usage frequency: 2-4 times/week

#### **Teacher:**

- Primary goal: Share expertise, earn credits
- Technical proficiency: Intermediate to advanced
- Usage frequency: 3-5 times/week

#### **Admin:**

- Primary goal: Platform management, moderation
- Technical proficiency: Advanced
- Usage frequency: Daily

#### **Super Admin:**

- Primary goal: System configuration, analytics
- Technical proficiency: Expert
- Usage frequency: Daily

## 2.4 Operating Environment

- **Web Browsers:** Chrome 100+, Firefox 100+, Safari 15+, Edge 100+
- **Mobile Browsers:** iOS Safari 15+, Android Chrome 100+
- **Screen Resolutions:** 320px (mobile) to 2560px (desktop)
- **Network:** Minimum 1 Mbps for video calls

## 2.5 Design and Implementation Constraints

- Must comply with GDPR, CCPA data protection regulations
- Video calls rely on third-party APIs (Zoom, Google Meet)
- Payment processing through Stripe (subject to their terms)
- Must support internationalization (i18n) from architecture
- Real-time features require WebSocket support

## 2.6 Assumptions and Dependencies

- Users have stable internet connectivity
- Users have email addresses for authentication
- Third-party API uptime and availability
- Users consent to video/audio recording during sessions (optional)

## 3. Specific Requirements

### 3.1 Functional Requirements

#### 3.1.1 User Management Module

##### FR-UM-001: User Registration

- **Description:** Users shall register using email or social OAuth (Google, LinkedIn)
- **Inputs:** Email, password (8+ chars, 1 uppercase, 1 number, 1 special) OR OAuth token
- **Processing:** Validate inputs, check for duplicate emails, hash password (bcrypt), send verification email
- **Outputs:** User account created, verification email sent, JWT token issued
- **Priority:** High

##### FR-UM-002: Email Verification

- **Description:** Users must verify email within 7 days of registration
- **Inputs:** Verification token from email link
- **Processing:** Validate token, mark email as verified, enable full account access
- **Outputs:** Account activated, redirect to profile setup
- **Priority:** High

#### **FR-UM-003: User Login**

- **Description:** Registered users shall login with credentials
- **Inputs:** Email and password OR OAuth
- **Processing:** Validate credentials, generate session JWT, log access
- **Outputs:** JWT token, redirect to dashboard
- **Priority:** High

#### **FR-UM-004: Password Reset**

- **Description:** Users can reset forgotten passwords
- **Inputs:** Email address
- **Processing:** Send password reset link (valid 1 hour), validate new password
- **Outputs:** Password updated, confirmation email sent
- **Priority:** Medium

#### **FR-UM-005: Profile Creation**

- **Description:** New users complete profile with skills and preferences
- **Inputs:**
  - Name (2-50 chars)
  - Profile photo (max 5MB, JPG/PNG)
  - Bio (max 500 chars)
  - Location (city, country)
  - Timezone (auto-detect with manual override)
  - 3+ teachable skills with proficiency
  - 3+ learning interests with target proficiency
  - Availability schedule (weekly calendar)
- **Processing:** Validate inputs, upload photo to CDN, store in database, calculate profile completeness
- **Outputs:** Profile saved, redirect to matching page
- **Priority:** High

#### **FR-UM-006: Profile Editing**

- **Description:** Users can update their profiles anytime

- **Inputs:** Any editable profile field
- **Processing:** Validate changes, update database, recalculate matches if skills changed
- **Outputs:** Profile updated, success message
- **Priority:** Medium

#### **FR-UM-007: Account Deletion**

- **Description:** Users can permanently delete accounts
- **Inputs:** Password confirmation
- **Processing:** Anonymize user data (GDPR compliance), cancel active sessions, refund credits
- **Outputs:** Account deleted, confirmation email
- **Priority:** Low

### **3.1.2 Skill Management Module**

#### **FR-SM-001: Skill Taxonomy**

- **Description:** System maintains hierarchical skill categories
- **Data Structure:**
  - 12 top-level categories (Technology, Business, Creative, Language, etc.)
  - 50+ mid-level subcategories
  - 500+ specific skills
- **Processing:** Admin-managed taxonomy, searchable, filterable
- **Priority:** High

#### **FR-SM-002: Skill Search**

- **Description:** Users can search and add skills to profiles
- **Inputs:** Search query (min 2 chars)
- **Processing:** Fuzzy search across skill taxonomy, return ranked results
- **Outputs:** List of matching skills
- **Priority:** High

#### **FR-SM-003: Custom Skill Addition**

- **Description:** Users can request new skills not in taxonomy
- **Inputs:** Skill name, category suggestion, description
- **Processing:** Admin review queue, approve/reject, add to taxonomy if approved
- **Outputs:** Skill added to user profile (pending or approved)
- **Priority:** Medium

#### **FR-SM-004: Skill Proficiency Levels**

- **Description:** Each skill has 4 proficiency levels
- **Levels:** Beginner (0-25%), Intermediate (26-60%), Advanced (61-85%), Expert (86-100%)
- **Processing:** User self-assessment + peer validation
- **Priority:** Medium

### 3.1.3 Matching Algorithm Module

#### FR-MA-001: Match Generation

- **Description:** System generates personalized matches daily
- **Inputs:** User profile (skills, preferences, availability, ratings, activity)
- **Processing:**
  - Calculate complementary skill scores
  - Factor in timezone compatibility
  - Consider rating thresholds (minimum 3.5/5)
  - Apply content-based + collaborative filtering
  - Rank by composite match score (0-100)
- **Outputs:** Top 20 match suggestions per user
- **Priority:** High
- **Algorithm Weights:**
  - Skill complementarity: 40%
  - Availability overlap: 20%
  - Past success rate: 15%
  - Rating compatibility: 15%
  - Response rate: 10%

#### FR-MA-002: Match Explanation

- **Description:** Each match includes reasoning
- **Outputs:** "90% match because: You both want to exchange Design ↔ Coding, 15+ overlapping hours, both highly rated (4.8+)"
- **Priority:** Medium

#### FR-MA-003: Match Filtering

- **Description:** Users filter matches by criteria
- **Filters:** Skill category, proficiency level, location, availability, rating (min threshold)
- **Processing:** Client-side filtering on initial 20 matches, server-side if expanded
- **Priority:** Medium

#### FR-MA-004: Match Actions



- **Description:** Users can favorite, pass, or block matches
- **Inputs:** Match ID, action type
- **Processing:** Update user preferences, exclude blocked users from future matches
- **Outputs:** Match list updated, algorithm learns preferences
- **Priority:** Medium

### 3.1.4 Communication Module

#### FR-CM-001: Real-Time Chat

- **Description:** Matched users communicate via text chat
- **Inputs:** Message text (max 1000 chars)
- **Processing:** WebSocket transmission, encryption in transit, spam filtering, store in database
- **Outputs:** Message delivered, read receipts, typing indicators
- **Priority:** High
- **Technical:** Socket.io with Redis pub/sub for scaling

#### FR-CM-002: File Sharing

- **Description:** Users share resources within chat
- **Inputs:** File upload (max 10MB, allowed: PDF, DOC, JPG, PNG, MP4, ZIP)
- **Processing:** Virus scan, upload to S3, generate secure CDN URL, store metadata
- **Outputs:** File available for download
- **Priority:** Medium

#### FR-CM-003: Message Search

- **Description:** Users search chat history
- **Inputs:** Search query
- **Processing:** Full-text search across messages with that user
- **Outputs:** List of matching messages with context
- **Priority:** Low

#### FR-CM-004: Report/Block Users

- **Description:** Users report inappropriate behavior or block users
- **Inputs:** User ID, report reason, optional description
- **Processing:** Create moderation ticket, immediately block if selected, notify admin team
- **Outputs:** User blocked from contacting reporter, admin review initiated
- **Priority:** High

### 3.1.5 Session Management Module

#### FR-SSM-001: Session Proposal

- **Description:** Users propose session dates/times
- **Inputs:**
  - Recipient user ID
  - Session type (one-time, recurring)
  - Duration (30min, 1hr, 2hr, custom)
  - Skill to exchange
  - Up to 5 proposed time slots
  - Optional agenda/notes
- **Processing:** Check recipient availability, send notification, create pending session
- **Outputs:** Session proposal sent, awaiting confirmation
- **Priority:** High

#### FR-SSM-002: Session Response

- **Description:** Recipient can accept, decline, or counter-propose
- **Inputs:** Session ID, action (accept/decline/counter)
- **Processing:** If accepted, create confirmed session, generate video link, send calendar invites; if counter-proposed, create new proposal
- **Outputs:** Session confirmed/declined, both parties notified
- **Priority:** High

#### FR-SSM-003: Calendar Integration

- **Description:** Confirmed sessions sync with Google/Outlook calendars
- **Inputs:** User OAuth tokens for calendar access
- **Processing:** Create calendar event with video link, set reminders (24hr, 1hr, 15min before)
- **Outputs:** Calendar event created, confirmation shown
- **Priority:** Medium

#### FR-SSM-004: Video Link Generation

- **Description:** Each session gets a unique video meeting link
- **Processing:** Call Zoom API / [Daily.co](https://daily.co) API to create room, embed link in session details
- **Outputs:** Meeting link available 15 minutes before session
- **Priority:** High

#### FR-SSM-005: Session Reminders

- **Description:** Automated reminders sent via email and push

- **Schedule:** 24 hours, 1 hour, 15 minutes before session
- **Processing:** Scheduled jobs check upcoming sessions, trigger notifications
- **Priority:** Medium

#### **FR-SSM-006: Session Rescheduling**

- **Description:** Either party can request reschedule
- **Inputs:** New proposed times
- **Processing:** Send reschedule request, await confirmation, update calendar if accepted
- **Outputs:** Session rescheduled or original time retained
- **Priority:** Medium

#### **FR-SSM-007: Session Cancellation**

- **Description:** Either party can cancel with reason
- **Inputs:** Session ID, cancellation reason
- **Processing:** Refund credits if within policy (24hr+ notice), notify both parties, remove from calendars
- **Outputs:** Session cancelled, credits handled
- **Priority:** Medium

### **3.1.6 Rating & Feedback Module**

#### **FR-RF-001: Post-Session Rating**

- **Description:** Both parties rate session within 48 hours
- **Inputs:**
  - Overall rating (1-5 stars)
  - Dimension ratings:
    - Knowledge/Skill Transfer (1-5)
    - Communication Quality (1-5)
    - Professionalism (1-5)
  - Written review (optional, max 500 chars)
  - Tags (punctual, patient, knowledgeable, etc.)
- **Processing:** Store ratings, calculate weighted averages, update user profiles, send to recipient
- **Outputs:** Rating submitted, impacts user's aggregate score
- **Priority:** High

#### **FR-RF-002: Rating Enforcement**

- **Description:** Users must rate before booking next session

- **Processing:** Check for pending ratings on profile/booking pages
- **Outputs:** Block new bookings if ratings overdue (48hrs+)
- **Priority:** Medium

#### **FR-RF-003: Rating Display**

- **Description:** Aggregate ratings shown on profiles
- **Display:**
  - Overall average (weighted by recency: last 3 months 60%, 3-12 months 40%)
  - Total sessions completed
  - Individual dimension averages
  - Recent reviews (last 5)
- **Priority:** High

#### **FR-RF-004: Rating Disputes**

- **Description:** Users can dispute unfair ratings
- **Inputs:** Rating ID, dispute reason
- **Processing:** Admin review, may remove rating if violates policy
- **Outputs:** Rating removed or dispute rejected
- **Priority:** Low

### **3.1.7 Credit Economy Module**

#### **FR-CE-001: Credit Allocation**

- **Description:** New users receive starter credits
- **Amount:** 50 credits upon profile completion
- **Priority:** High

#### **FR-CE-002: Earning Credits**

- **Description:** Users earn credits by teaching
- **Rules:**
  - 10 credits per completed 1-hour teaching session
  - Prorated for other durations (5 credits for 30min, 20 for 2hr)
  - Credits awarded after both parties submit ratings
- **Processing:** Calculate credits, add to balance, notify user
- **Priority:** High

#### **FR-CE-003: Spending Credits**

- **Description:** Users spend credits to book sessions

- **Rules:**
  - Standard sessions: 10 credits per hour
  - Premium teachers (4.8+ rating, 50+ sessions): 15-20 credits per hour
  - Group sessions: 5 credits per hour per person
- **Processing:** Deduct credits on session confirmation, hold in escrow until completion
- **Priority:** High

#### **FR-CE-004: Credit Purchase**

- **Description:** Users can buy credits with real money
- **Packages:**
  - 100 credits: \$10 (10¢/credit)
  - 500 credits: \$45 (9¢/credit, 10% bonus)
  - 1000 credits: \$80 (8¢/credit, 20% bonus)
- **Processing:** Stripe payment integration, add credits on successful payment
- **Priority:** Medium

#### **FR-CE-005: Credit Refunds**

- **Description:** Credits refunded for cancelled sessions (conditions apply)
- **Rules:**
  - Full refund: cancelled 24+ hours before
  - 50% refund: cancelled 2-24 hours before
  - No refund: cancelled <2 hours before (unless teacher cancels)
- **Processing:** Return credits to spender, notify both parties
- **Priority:** Medium

#### **FR-CE-006: Credit Expiration**

- **Description:** Credits expire after 12 months of account inactivity
- **Processing:** Scheduled job checks last login, expires old credits, sends warning emails at 11 months
- **Priority:** Low

#### **FR-CE-007: Credit History**

- **Description:** Users view transaction history
- **Display:** Date, type (earned/spent/purchased/refunded), amount, balance, related session
- **Priority:** Low

### 3.1.8 Notification Module

#### FR-NM-001: Notification Types

- **Categories:**
  - Session-related (proposals, confirmations, reminders, cancellations)
  - Matching (new match suggestions)
  - Messaging (new chat messages)
  - Credits (earned, spent, low balance warnings)
  - System (profile verification, policy updates)
- **Priority:** High

#### FR-NM-002: Notification Channels

- **Channels:**
  - In-app notifications (bell icon with badge count)
  - Email notifications (customizable per category)
  - Push notifications (mobile web/future apps)
- **Priority:** High

#### FR-NM-003: Notification Preferences

- **Description:** Users customize notification settings
- **Options:** Enable/disable per category per channel
- **Processing:** Store preferences, respect settings when sending notifications
- **Priority:** Medium

#### FR-NM-004: Notification History

- **Description:** Users view past notifications
- **Display:** Last 30 days, mark as read/unread, delete
- **Priority:** Low

### 3.1.9 Search & Discovery Module

#### FR-SD-001: User Search

- **Description:** Search for users by name, skills, location
- **Inputs:** Search query, filters (skill, location, rating, availability)
- **Processing:** Full-text search with ranking, filter results
- **Outputs:** Paginated user results (20 per page)
- **Priority:** Medium

#### FR-SD-002: Skill-Based Browse

- **Description:** Browse users by specific skills
- **Inputs:** Skill category or specific skill
- **Processing:** Query users with that skill, sort by rating/recency
- **Outputs:** List of users teaching that skill
- **Priority:** Medium

#### **FR-SD-003: Featured Teachers**

- **Description:** Highlight top-rated, active teachers
- **Criteria:** 4.5+ rating, 20+ sessions, active within 7 days
- **Display:** Rotating carousel on homepage/dashboard
- **Priority:** Low

### **3.1.10 Admin Module**

#### **FR-AM-001: User Management**

- **Description:** Admins view/edit/suspend/delete user accounts
- **Actions:** View full profile, edit details, suspend (temp), ban (permanent), delete
- **Priority:** Medium

#### **FR-AM-002: Content Moderation**

- **Description:** Review reported users/messages
- **Workflow:** Review queue, view evidence, take action (warn, suspend, ban), notify reporter
- **Priority:** High

#### **FR-AM-003: Skill Taxonomy Management**

- **Description:** Add/edit/remove skills from catalog
- **Actions:** CRUD operations on skills, approve user-submitted skills
- **Priority:** Medium

#### **FR-AM-004: Analytics Dashboard**

- **Description:** View platform metrics
- **Metrics:**
  - Total users, MAU, new registrations (daily/weekly/monthly)
  - Total sessions, completion rate, average ratings
  - Credit economy (earned, spent, purchased)
  - Top skills, top teachers, user retention
- **Priority:** Medium

#### **FR-AM-005: System Configuration**

- **Description:** Super admins configure platform settings
- **Settings:** Credit pricing, session durations, refund policies, matching algorithm weights
- **Priority:** Low

## **3.2 Non-Functional Requirements**

### **3.2.1 Performance Requirements**

#### **NFR-P-001: Response Time**

- Web pages shall load in < 2 seconds on 4G connection
- API responses shall complete in < 200ms (p95)
- Search queries shall return results in < 500ms
- Matching algorithm shall complete in < 3 seconds

#### **NFR-P-002: Throughput**

- System shall support 10,000 concurrent users
- Chat system shall handle 1,000 messages/second
- Video integration shall support 500 concurrent sessions

#### **NFR-P-003: Scalability**

- Horizontal scaling via load balancers
- Database sharding for user data
- CDN for static assets and media
- Microservices architecture for independent scaling

### **3.2.2 Security Requirements**

#### **NFR-S-001: Authentication**

- Multi-factor authentication (optional, recommended)
- JWT tokens with 7-day expiration
- Refresh tokens with 30-day expiration
- OAuth 2.0 for social login

#### **NFR-S-002: Authorization**

- Role-based access control (User, Teacher, Admin, Super Admin)
- API endpoints protected with middleware
- Users can only access their own data (except public profiles)

#### **NFR-S-003: Data Protection**



- All traffic over HTTPS/TLS 1.3
- Passwords hashed with bcrypt (cost factor 12)
- Sensitive data encrypted at rest (AES-256)
- PII anonymized in analytics

#### **NFR-S-004: Compliance**

- GDPR: right to access, rectify, delete data
- CCPA: opt-out of data sales (not applicable, but supported)
- Data retention: user data deleted 30 days after account deletion

#### **NFR-S-005: Vulnerability Management**

- Regular penetration testing (quarterly)
- Dependency vulnerability scanning (automated)
- OWASP Top 10 mitigation
- Rate limiting on authentication endpoints (5 attempts per minute)

### **3.2.3 Usability Requirements**

#### **NFR-U-001: Accessibility**

- WCAG 2.1 Level AA compliance
- Screen reader support (ARIA labels)
- Keyboard navigation for all features
- Minimum color contrast ratio 4.5:1

#### **NFR-U-002: Responsiveness**

- Mobile-first design
- Support screen widths 320px - 2560px
- Touch-optimized UI elements (44×44px minimum)
- Responsive images and lazy loading

#### **NFR-U-003: Internationalization**

- Support UTF-8 character encoding
- Date/time formatting per user locale
- Prepared for multi-language support (English initially)

#### **NFR-U-004: Browser Compatibility**

- Chrome 100+ (priority 1)
- Firefox 100+ (priority 1)
- Safari 15+ (priority 2)

- Edge 100+ (priority 2)
- IE 11 (not supported)

### **3.2.4 Reliability Requirements**

#### **NFR-R-001: Availability**

- 99.9% uptime (< 8.76 hours downtime/year)
- Planned maintenance during low-traffic hours (2-4 AM UTC)
- Maximum 4 hours planned downtime per month

#### **NFR-R-002: Fault Tolerance**

- Graceful degradation if third-party services fail
- Circuit breakers for external API calls
- Fallback messaging if video fails
- Retry logic for failed transactions

#### **NFR-R-003: Backup & Recovery**

- Automated daily backups (retained 30 days)
- Point-in-time recovery capability
- RTO (Recovery Time Objective): 4 hours
- RPO (Recovery Point Objective): 1 hour

### **3.2.5 Maintainability Requirements**

#### **NFR-M-001: Code Quality**

- 80%+ unit test coverage
- Automated CI/CD pipeline
- Code review required for all merges
- Linting and formatting enforced (ESLint, Prettier)

#### **NFR-M-002: Documentation**

- API documentation (OpenAPI/Swagger)
- System architecture diagrams
- Database schema documentation
- Deployment runbooks

#### **NFR-M-003: Monitoring**

- Application performance monitoring (APM)

- Error tracking and alerting
- Logging (centralized via ELK stack or similar)
- Uptime monitoring (external service)

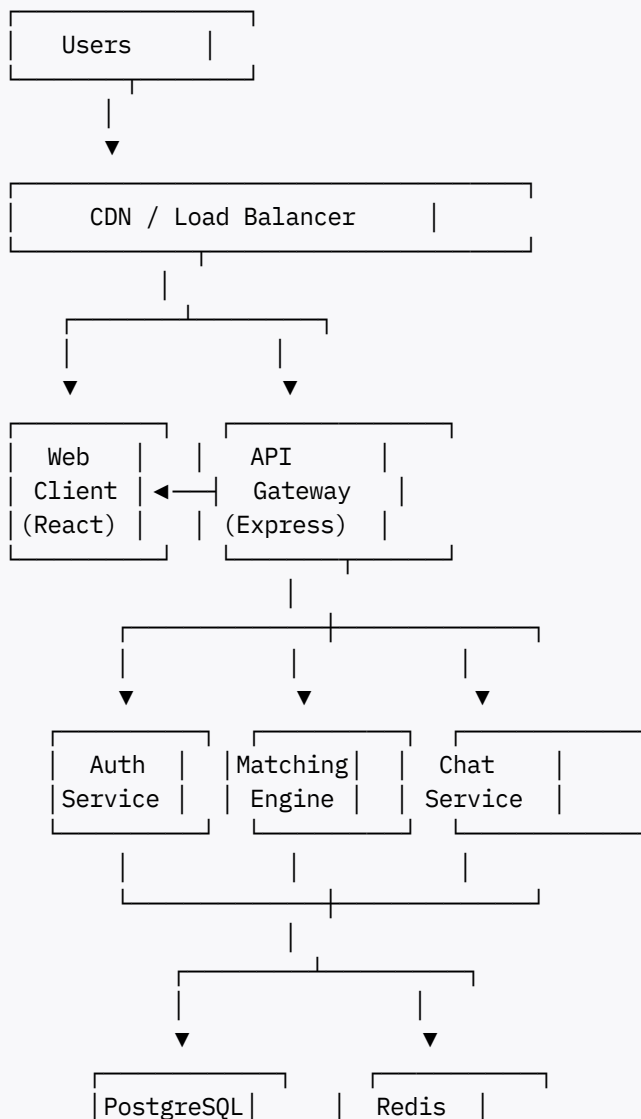
### 3.2.6 Portability Requirements

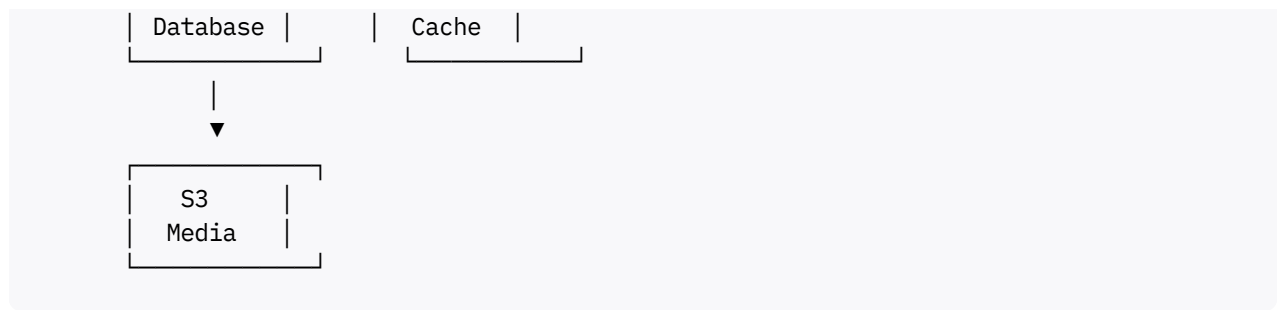
#### NFR-PO-001: Platform Independence

- Containerized deployment (Docker)
- Cloud-agnostic architecture (AWS initially, but portable)
- Database migrations managed (e.g., Prisma, TypeORM)

## 4. System Architecture

### 4.1 High-Level Architecture





## 4.2 Database Schema (Key Tables)

### users

- id (PK), email, password\_hash, name, profile\_photo\_url, bio, location, timezone, verification\_status, created\_at, updated\_at

### skills

- id (PK), name, category, subcategory, description

### user\_skills

- id (PK), user\_id (FK), skill\_id (FK), skill\_type (teach/learn), proficiency\_level, verified

### matches

- id (PK), user1\_id (FK), user2\_id (FK), match\_score, status (suggested/favorited/passed/blocked), created\_at

### sessions

- id (PK), requester\_id (FK), recipient\_id (FK), skill\_id (FK), scheduled\_at, duration\_minutes, status (proposed/confirmed/completed/cancelled), video\_link, credits\_cost, created\_at, updated\_at

### messages

- id (PK), sender\_id (FK), recipient\_id (FK), message\_text, file\_url, read\_at, created\_at

### ratings

- id (PK), session\_id (FK), rater\_id (FK), ratee\_id (FK), overall\_rating, knowledge\_rating, communication\_rating, professionalism\_rating, review\_text, created\_at

### credits

- id (PK), user\_id (FK), amount, balance, transaction\_type (earned/spent/purchased/refunded), related\_session\_id, created\_at

### notifications

- id (PK), user\_id (FK), type, title, message, link, read\_at, created\_at

## **5. External Interface Requirements**

### **5.1 User Interface**

#### **UI-001: Login/Signup Page**

- Clean, minimal design
- Email/password fields with validation
- Social login buttons (Google, LinkedIn)
- "Forgot Password" link

#### **UI-002: Dashboard**

- Welcome message with profile completeness
- Quick stats (credits, sessions completed, current rating)
- Top 5 match suggestions cards
- Upcoming sessions list
- Recent notifications

#### **UI-003: Match Discovery Page**

- Filter sidebar (skills, location, availability, rating)
- Match cards with photo, name, skills, match score, "Connect" button
- Infinite scroll or pagination

#### **UI-004: Profile Page**

- Editable sections: photo, bio, skills, availability
- Display: rating, sessions completed, reviews
- Verification badges

#### **UI-005: Session Management Page**

- Tabs: Upcoming, Past, Proposals
- Session cards with details, video link, actions (reschedule, cancel, rate)

#### **UI-006: Chat Interface**

- List of conversations (left sidebar)
- Message thread (right panel)
- File attachment button
- User info panel

## 5.2 Hardware Interfaces

- No direct hardware interfaces
- Client devices: Desktops, laptops, tablets, smartphones
- Server hardware: Cloud-based (AWS EC2, RDS, etc.)

## 5.3 Software Interfaces

### SI-001: Video Conferencing API

- Provider: Zoom or [Daily.co](#)
- Purpose: Generate meeting links, embed video
- Interface: REST API, webhooks for recording/events

### SI-002: Calendar API

- Provider: Google Calendar API, Microsoft Graph
- Purpose: Sync sessions to user calendars
- Interface: OAuth 2.0, REST API

### SI-003: Payment Gateway

- Provider: Stripe
- Purpose: Process credit purchases
- Interface: Stripe.js SDK, webhooks

### SI-004: Email Service

- Provider: SendGrid or AWS SES
- Purpose: Transactional emails (verification, notifications)
- Interface: REST API

### SI-005: Cloud Storage

- Provider: AWS S3 or Cloudflare R2
- Purpose: Store profile photos, shared files
- Interface: SDK (boto3, AWS SDK)

### SI-006: Push Notification Service

- Provider: Firebase Cloud Messaging
- Purpose: Browser/mobile push notifications
- Interface: FCM SDK

## 5.4 Communication Interfaces

### CI-001: HTTP/HTTPS

- All web traffic over HTTPS
- REST API follows JSON format
- Status codes: 200 (success), 400 (client error), 401 (unauthorized), 404 (not found), 500 (server error)

### CI-002: WebSocket

- Real-time chat and notifications
- Protocol: Socket.io over WebSocket
- Fallback to long-polling if WebSocket unavailable

### CI-003: Webhooks

- Receive events from Stripe (payments), video platforms (recordings)
- Authenticated via signature verification

## 6. Testing Requirements

### 6.1 Unit Testing

- All business logic functions
- Target: 80%+ code coverage
- Framework: Jest (JavaScript)

### 6.2 Integration Testing

- API endpoint testing
- Database operations
- Third-party service integrations
- Framework: Supertest, Postman

### 6.3 End-to-End Testing

- Critical user flows:
  - Complete signup to first session
  - Session booking and completion
  - Credit purchase and usage
- Framework: Cypress or Playwright

## 6.4 Performance Testing

- Load testing: 10,000 concurrent users
- Stress testing: find breaking point
- Tools: Apache JMeter, K6

## 6.5 Security Testing

- Penetration testing (manual + automated)
- Vulnerability scanning: OWASP ZAP
- SQL injection, XSS, CSRF prevention validation

## 6.6 Usability Testing

- User testing with 10-20 beta users
- Task completion rate > 90%
- System Usability Scale (SUS) score > 75

## 6.7 Acceptance Testing

- Validate all functional requirements
- Business stakeholder sign-off
- Acceptance criteria from PRD verified

## 7. Appendices

### Appendix A: Glossary

- **Session:** A scheduled skill exchange meeting
- **Credit:** Platform currency for bookings
- **Match Score:** Algorithm-generated compatibility rating (0-100)
- **Skill Proficiency:** User's expertise level in a skill

### Appendix B: Revision History

Version	Date	Author	Changes
1.0	Oct 25, 2025	[Your Name]	Initial SRS creation



## Next Steps & Recommendations

### Immediate Actions:

1. **Validate with Users:** Conduct 10-15 user interviews with target personas to validate problem assumptions and feature priorities
2. **Competitive Analysis:** Deep dive into existing platforms (SkillSwap, Trinsic mentioned earlier) to identify their weaknesses
3. **Technical Feasibility:** Prototype the AI matching algorithm with sample data to validate approach
4. **Design Mockups:** Create high-fidelity UI mockups for core flows (onboarding, matching, booking)
5. **Development Planning:** Break down into 2-week sprints, starting with authentication and profile creation

### Differentiation Summary:

Your platform's **unique competitive advantages:**

1. **Multi-dimensional AI matching** (beyond simple skill complementarity)
2. **Skill credit economy with gamification** (not just free or fully paid)
3. **Trust layer** (skill verification, progressive trust levels)
4. **Micro-learning integration** (15-min quick sessions for busy users)
5. **Community learning circles** (group cohorts, not just 1:1)
6. **Future-ready** (VR/AR roadmap for immersive learning)

This positions you between traditional learning platforms (Coursera, Udemy) and informal skill swaps, offering structured peer learning with built-in quality assurance.

Would you like me to create the UI wireframes, develop the matching algorithm prototype, or dive deeper into any specific section of the PRD/SRS?



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