ADA University
School of Information Technologies and Engineering
INFT 2303: Systems Analysis and Design
Spring Semester, 2025

TalkMate

System Request and Feasibility Study / Planning Phase
(Homework No.1B)

Project team: TalkMate
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Submitted in partial fulfillment of the requirements of the
INFT 2303: Systems Analysis and Design course project

Version date	Version information
22.03.2025	Initial draft - Basic framework
31.03.2025	Final version - Completed all sections with detailed analysis

Team member	Contribution to this homework (NOT the project)	Estimated %
Aysel Panahova	Prepared document structure, Table of Contents, and full Introduction sections. Ensured template compliance and formatting consistency.	25%
Nilufar Babayeva	Developed Product Perspective and Product Functions sections, including competitive analysis and feature specifications.	25%
Zakir Aghakishiyev	Authored User Characteristics, Constraints, and Assumptions & Dependencies sections with detailed user profiles.	25%
Javid Ibadov	Conducted Feasibility Analysis (technical/economic/organizational) with cost-benefit calculations.	25%

Table of Contents

1. Introduction

This document presents the System Proposal for **TalkMate**, a social language-learning platform designed to facilitate real-time language practice between learners. The platform addresses the critical gap in current language education solutions by combining interactive communication tools with AI-powered feedback and gamification elements.

The team evaluated four competing proposals before selecting TalkMate as the focus project. The selection process involved rigorous analysis using a weighted decision matrix with the following criteria:

1. **Market Need (30% weight)**
   - TalkMate addressed the critical gap in conversational practice (72% of learners cite this as a primary challenge).
   - Competing proposals focused on vocabulary or grammar tools.

2. **Technical Feasibility (25% weight)**
   - Utilized existing AWS AI services (Transcribe, Comprehend).
   - Required only moderate custom development.
   - Other proposals required more experimental technologies.

3. **Economic Value (20% weight)**
   - Clear revenue model with three streams.
   - Projected 62% ROI in Year 1.
   - Competitors averaged 35% projected ROI.

4. **Educational Impact (15% weight)**
   - Directly targets speaking skills (most neglected area).
   - Aligns with CEFR (Common European Framework of Reference for Languages) proficiency standards.

5. **Risk Profile (10% weight)**
   - Moderate technical risk (mitigated by AWS services).
   - Low market risk (validated by user surveys).

Submitted Proposals:

1. **Athletech AI (Aysel Panahova)**
   - **Purpose:** AI-driven personalized fitness and nutrition platform integrating wearable data and human coaching.
   - **Key Features:**
     - Real time workout adjustments
     - Integration with smartwatches
     - Hybrid AI/human coaching
   - **Value:** Targets health-conscious users and gyms, with projected revenue of $500K/year.

2. **TalkMate (Nilufar Babayeva)**
    - **Purpose:** Social language learning app for real-time speaking practice with AI feedback.
    - **Key Features:**
        - Live video/voice calls with learners
        - Gamification
        - Subscription tiers
    - **Value:** Solves the #1 language-learning gap (speaking practice), with $1M-$5M projected Year 1 revenue.

3. **Baktelecom (Zakir Aghakishiyev)**
    - **Purpose:** Mobile app for managing internet/TV subscriptions in Azerbaijan.
    - **Key Features:**
        - Plan upgrades, auto-payments, outage alerts
        - Multilingual support (Azerbaijani/English/Russian)
    - **Value:** Reduces call center costs by approximately $40K/year and boosts customer satisfaction.

4. **YourJersey (Javid Ibadov)**
    - **Purpose:** Verified marketplace for authentic football merchandise.
    - **Key Features:**
        - Team-authorized sellers only
        - IMulti-currency payments
        - Seller ratings
    - **Value:** Combats counterfeit products and builds fan-team trust. First-year value ranges from $300K-$500K.

Document Preparation:

The team conducted the following work to prepare the document:

1. **Research and Data Collection**
    - Academic Sources: Reviewed articles on language-learning platforms.
    - Market Analysis: Compared existing apps (Duolingo, Tandem) to identify gaps.
    - User Needs: Conducted brief interviews to define requirements.

2. **Structured Writing**
    - Followed the template format provided by the instructor.
    - Divided sections among team members.
    - Ensured consistency in terminology and style.

3. **Technical and Financial Assumptions**

Costs, revenue, and technical specs were estimated based on:

- Online research

Hypothetical user growth projections (e.g., “If 1% of Duolingo’s users switched to Talkmate,...”).

4. **Peer Review and Revisions**
    - Clarity (avoiding jargon without explanation)
    - Logical flow (for example, “Business Need’ must align with “Solutions’).
    - Grammar/formatting consistency.

Definitions

Term	Definition
AWS AI	Amazon Web Services' artificial intelligence and machine learning services that enable developers to add smart capabilities to applications without building models from scratch.
API	A set of functions and procedures allowing the creation of applications that access the features or data of an operating system, application, or other service.
Gamification	The application of game design elements (points, badges, leaderboards) in non-game contexts to enhance user engagement and retention.
Cloud-Based Architecture	A system design where all software components, data storage, and processing power are hosted on remote servers ("the cloud") provided by third-party services like AWS, Azure, or Google Cloud, rather than on local machines.
AWC Transcribe	A fully managed AI service that automatically converts spoken language into accurate written text.
DynamoDB	A fully managed NoSQL database service that provides single-digit millisecond response times at any scale.
Amazon S3 (Simple Storage Service)	An object storage solution offering industry-leading durability and security.
Amazon Chime SDK	Provides embedded voice, video, and messaging capabilities.
Cloud Optimization	Using cloud resources efficiently to get the best performance for the lowest possible price.
Freemium Model	Offering a free basic version of a product or service while charging for premium features, upgrades, or additional services. This allows users to experience the core functionality for free, increasing adoption and engagement.
Viral Referrals	Encouraging users to refer friends, often by offering incentives (e.g., free upgrades, extra features, or discounts) for both the referrer and the new user.
AI/ML	Short for artificial intelligence (AI) and machine learning (ML)—represents an important evolution in computer science and data processing that is quickly transforming a vast array of industries.
WebRTC	An open source project that enables real-time voice, text and video communications capabilities between web browsers and devices.

2. Overall Description

The system to be developed, **TalkMate**, is a social language-learning platform designed to facilitate real-time conversational practice through AI-enhanced interactions.

What TalkMate Will Do:

- Connect language learners worldwide for voice/video conversations.
- Provide real-time AI feedback on pronunciation, grammar, and fluency.
- Incorporate gamification elements (streaks, challenges) to sustain engagement.
- Offer flexible subscription plans (free and premium tiers).

What TalkMate Will NOT Do:

- Replace formal language certification programs.
- Offer structured curriculum-based courses (like Duolingo).
- Support offline functionality (requires internet connectivity).

Application and Value Proposition

TalkMate addresses the critical gap in spoken language practice, which surveys identify as the #1 challenge for 72% of learners (Duolingo 2024 Report). The system delivers:

Key Benefits:

1. **For Learners:**
   - Practice with real people in a structured environment.
   - Receive instant AI-powered corrections.
   - Track progress through measurable fluency scores.

2. **For Educational Institutions:**
   - Supplemental speaking practice tool.
   - API integration for classroom use.

3. **For Investors:**
   - Multiple revenue streams 9 subscriptions, ads, partnerships).
   - Scalable cloud-based architecture (AWC Transcribe, DynamoDB, S3, Chime SDK).

Business Need

Existing language apps focus on:

✔️ Vocabulary (flashcards).
✔️ Grammar (puzzles).
❌ Authentic conversation practice (real, unscripted speaking with humans, which TalkMate solves through live video calls and AI feedback to bridge the gap between textbook learning and real-world communication).

Business Requirement

Must-Have Features:

- Secure user authentication (encrypted logins)
- CEFR-aligned proficiency tracking
- Scalability for 50,000+ users

Future-Proofing:

- Modular design for adding new languages/AI features

Business Value

Metric	Target	Source of Revenue
Revenue	$1,000,000	Premium subs (70%), ads (10%), partnerships (20%)
Active Users	50,000 MAU	Freemium model + viral referrals
Partnership	5+ institutions	Language schools, certification bodies

Special Constraints

1. **Technical:**
    - Support 100+ concurrent voice calls
    - AI feedback latency <1 second
    - AWS cloud dependency (cost optimization needed)

2. **Regulatory:**
    - GDPR (The general data protection regulation) compliance
    - Content moderation (AI + human review)

Key Market Influences

1. **Trends:**
    - Growth in language exchange platforms.
    - Gen Z demands gamification (streaks, rewards)

2. **Tech Advances:**
    - 5G enables smoother voice/video calls
    - AWS AI cuts development time by 50% vs. building from scratch

Why This Matters

☑ **Fixes the Biggest Problem in Language Learning**
- Most apps help with memorizing words and rules but don't give enough practice in actual speaking.
- TalkMate solves this by connecting learners for real conversations with instant feedback.

☑ **Built on Trusted Technology**
- Uses Amazon's cloud (AWS), which is reliable, secure, and scales easily as more users join.
- Avoids reinventing the wheel—saves time and reduces technical risks.

☑ **Designed for How People Learn Today**
- Quick setup (under 5 minutes) so users can start practicing immediately.
- Includes game-like rewards and social features to keep learners motivated long-term.

Product Perspective

Talkmate is a language-learning application that allows users to communicate with others around the world based on language preferences and shared interests. In comparison to existing products such as HelloTalk, Tandem, Talkmate offers a structured connection system, integrating both free and premium subscriptions with a focus on engagement features such as streaks, daily challenges, and small rewards to keep the users active.

Similarities to Existing Systems:

- Like HelloTalk and Tandem, Talkmate provides language exchange opportunities through chat, voice, and video communication.
- Users can choose their language preferences and find partners to practice with.
- The system supports a freemium model, where users can access basic features for free and upgrade for additional benefits.

Differences and Unique Features:

- **Structured Matching System:** Unlike random pairing, TalkMate matches users based on language preferences, their interests, and availability.
- **Gamification & Engagement Activities:** To make sure that users are active and they learn daily, Talkmate offers daily streaks between users, daily challenges in their preferred languages, and small rewards (such as badges).
- **Session-based Interaction:** Talkmate offers each and every user a limited number of sessions with limited time per week. If the users upgrade to premium, they get more extended and flexible access to sessions.
- **Community-based Interaction:** Talkmate provides forums, discussion groups, and group sessions to foster collaboration beyond one-on-one conversations.

Relationship to a Larger System - TalkMate can work as a part of a larger educational platform. It can provide authentication for login, a payment system for subscriptions, and external APIs for chat and video calls.

Product Functions

TalkMate provides different features that help users learn languages and connect with others. These features are designed to make language learning simple and fun but also effective.

1. **User Registration and Profiles**
    - Users can sign up using email or Google.
    - They create profiles where they list languages they know and want to learn along with side works (such as profile pictures, date of birth, name, surname, etc.)
    - Users set their language proficiency level and interests (this one will mainly be used for the matching speaking partners.)

2. **Smart Matching System**
    - The app itself suggests language partners based on language preferences, skill levels, and common interests.
    - Users can search profiles and select partners manually.

3. **Chat and Call Features**
    - Users can communicate through chat, voice, and video calls.
    - In chat, there are options to send voice messages and share images.
    - AI-based translation tool in chats to make communication smooth and understandable for partners.

4. **Gamification and Engagement**
    - Users earn small rewards for completing the daily tasks and small challenges.
    - Daily tasks and small challenges keep users active in the system and learning the language consistently.

5. **Free and Premium Subscriptions**
    - Free users have limited access to conversation sessions per week.
    - Premium users select their premium plan and get more flexible access to chats and calls.

6. **Community and Social Features**
    - Users can join discussion groups and forums to chat and, therefore, practice with multiple people.
    - Users can attend cultural exchange activities to represent their country and learn from other countries.
    - Topic-based groups allow users to talk with multiple users about a specific topic/interest to improve vocabulary and writing skills.
    - Users can post language-related questions, asking for advice from others and get answers.

7. **Safety and Moderation**
    - Users can report inappropriate messages or behavior.
    - Users have options to block or mute others if necessary.
    - AI moderation helps warn users if necessary and detect and block harmful content.

8. **Payments and Subscription Management**
    - Users can subscribe to premium plans through secure payment methods.
    - Subscription plans include monthly and yearly.
    - They can cancel the premium plan any time or manage it easily.

These functions make sure that TalkMate provides a simple, secure, but effective experience for users to support them through their language learning period.

User Characteristics

The intended population of TalkMate is individuals who want to improve their language proficiency through conversational practice. The system will take the following general user population characteristics into account during design:

- **Level of Education:** The audience will range from high school students to professionals who work and lifelong learners. The site will accommodate different levels of language ability based on the Common European Framework of Reference for Languages (CEFR) (Council of Europe, 2024).

- **Language Learning Experience:** The users may have had some background in using language-learning apps before this one, or they may be complete beginners. The system will need to provide a smooth onboarding process and adaptive learning routes.

- **Technical Competence:** The users are assumed to possess basic digital literacy, having a history of working on the internet, smartphones, and computers. The users should be well-versed in filling out online forms and dealing with web or mobile applications. However, the site should remain accessible to less technology-fluent users by applying straightforward navigation, simple-to-follow instructions, and interactive tutorials.

- **Device and Internet Access:** The majority of users will access TalkMate through smartphones, tablets, and personal computers. Since the platform is cloud-based, an adequate internet connection will be necessary to ensure real-time communication.

User Behavior and Expectations:

- Users are likely to access the platform for short, recurrent sessions and not prolonged study sessions.

- The majority will look for features such as voice recognition, AI-driven feedback, and interactive conversation simulation for enhanced learning.

- Others will require privacy controls to oversee personal data, especially while handling other users or AI-driven chat systems.

Constraints

TalkMate development is subject to several constraints that will impact system design, implementation, and deployment. The constraints include:

- **Platform Compatibility:** The application should be accessible via web browsers (desktop and mobile) and mobile applications (iOS and Android) to gain a large user base. This limits the choice of development frameworks and requires cross-platform compatibility.

- **Real-Time Communication:** Since the system will be offering interactive language practice, it must support real-time text and voice communication with minimal latency. This imposes constraints on network infrastructure, backend performance, and server scalability.

- **Data Privacy and Security:** The system would be handling user-generated speech and text data and would need strict data protection measures. GDPR (for users in Europe) and other data privacy regulations' compliance needs to be ensured.

- **AI Integration:** TalkMate will utilize AI-driven conversational practice and speech recognition technology to provide feedback and improve learning outcomes. This requires integration with existing AI models or developing proprietary language processing systems.

- **Scalability:** The system must be capable of serving a growing number of users with no significant loss of performance. This will affect the choice of cloud providers, database management, and system architecture overall.

- **User Accessibility:** The system must be usable for a wide user base, including those who are not technologically advanced. Multilingual UI, assistive tools, and voice-based interactive features will need to be included.

- **Monetization & Business Model:** If a subscription-based or freemium model is chosen, the system must be connected to payment systems smoothly without making it harder for users to navigate.

- **Development Timeline:** The project must follow a strict development timeline, so initial features should be kept simple, with improvements made gradually through iterative development process. .

Assumptions and Dependencies

Assumptions

Users Have Internet Access

- The system requires users to maintain a constant network connection for their access to all online communication tools such as video and audio feeds with text messaging features.

Availability of AI and Speech Recognition Services

- The system operates under the condition that users have available third-party Artificial Intelligence services (OpenAI, Google Speech-to-Text and custom NLP models) to perform language processing and speech recognition tasks. Any modifications to pricing and availability policies or API constraints will affect project development.

Multi-Device Compatibility

- The platform assumes users can access it through contemporary web browsing platforms together with iOS and Android mobile operating systems. The system fails to support the combination of outdated devices with old browser versions.

Legal Compliance and Data Privacy Laws

- The program relies on legal structures, including GDPR and CCPA alongside COPPA for younger users to be unchanging factors. System modifications would become necessary when regulatory changes occur.

User Willingness to Share Data

- The platform depends on users sharing all available styles such as voice and text data as well as personal learning preferences to enhance AI-based feedback generation. When privacy conditions arise the system will need substitute methods to handle data.
- Users in the market show a continuous interest for e-Learning and language learning education.
- Platform developers expect e-learning and language learning demand to rise so they can make the platform viable.

Dependencies

Third-Party APIs and Services

- SpeechMate depends on third-party APIs to provide its functionalities.
- Speech recognition (Google Cloud Speech-to-Text, Deepgram, etc.)
- The system depends on AI-controlled conversational support through OpenAI or Anthropic or proprietary NLP solutions.
- Payment handling (Stripe, PayPal)The platform employs cloud storage and database solutions among suitable platforms such as AWS or Firebase or alternative cloud providers.
- System operations will be affected by any changes that occur with API performance and meta or cost structures and availability.

Hosting and Infrastructure

- The platform utilizes cloud hosting companies (AWS, Google Cloud, Azure) for its scalability and stability maintenance. System stability might be adversely affected by policy changes or service downtimes that occur to the infrastructure.

Development Tools and Frameworks

- Modern web technologies such as React along with Node.js and Spring Boot need implementation to develop the system. A migration will be needed if framework elements used in the base infrastructure get marked end-of-life or deprecated.

User Adoption and Feedback

- The model expects initial adopters to share their feedback which will enhance the learning procedure. The model of interaction needs modification because adoption rates remain low.

Integration with Learning Standards (CEFR)

- The system works under the premise that users follow the Common European Framework of Reference for Languages (CEFR) guidelines for establishing learning targets with international standards.

3. Feasibility Analysis

Technical Feasibility: Can We Build It?

Familiarity with Application(s) or Technology:

- Project's level of risk can be influenced by the experience of the team on social networking and language related applications
- Expertise in AI/ML and WebRTC or similar technologies are required to integrate AI based functions and live voice and video interaction features.
- Backend and cybersecurity knowledge is required for moderation and security.

Project Size:

- Multiple components such as user registration, AI-powered language learning, matching algorithms, gamification, and subscription management are involved.
- Scalability requirements make this project more complex compared to simple web apps.

Compatibility:

- Compatibility testing is necessary for integration with platforms like Google Sign-In and third-party AI tools such as Gemini or ChatGPT
- Cross-platform development should be supported and needs to be both mobile and web friendly.

Economic Feasibility: Should We Build It?

Development Costs:

- Estimated development team (developers, designers, AI specialists, testers): $400,000
- Infrastructure (server costs, cloud services, AI licensing, WebRTC integration): $150,000
- Marketing and initial user acquisition: $100,000
- Total Estimated Development Cost: $650,000

Annual Operating Costs:

- Cloud hosting, maintenance, customer support, and moderation team: $200,000
- Subscription management fees and transaction costs: $50,000
- Updates and feature enhancements: $100,000
- Total Estimated Annual Operating Cost: $350,000

Annual Benefits:

- Projected revenue from premium subscriptions: $750,000
- Ad revenue from free users: $200,000
- Partnerships with language institutions: $100,000
- Total Estimated Annual Revenue: $1,050,000

Intangible Benefits and Costs:

- Increased motivation and engagement through gamification features.
- Risk of low user adoption if not marketed well.
- Potential for high user satisfaction and long-term retention.

Necessary Calculations:

- Break-even Analysis:
    - Investment: $650,000
    - Annual Profit: $1,050,000 - $350,000 = $700,000
    - Break-even point: $650,000 / $700,000 = 0.93 years (approximately 11 months)

Organizational Feasibility: If We Build It, Will They Come?

Strategic Alignment:

- Flexible language learning solutions associated with global demand and trends.
- Smooth transition between real-world practice and academic language

Project Champion(s):

- A team with a clear understanding of the project and its impact.
- Potential collaboration with language educators and AI specialists.

Senior Management:

- Requires backing from investors or university funding for initial launch.
- Monetization strategy should appeal to stakeholders.

Users and Other Stakeholders:

- **Target audience:** Language learners worldwide, students, professionals, people want to practice their language skills.
- **Potential institutional partners:** Language schools, universities, and certification programs.
- **Risk:** User acquisition and retention depend on marketing, UI/UX quality, and engagement features, lack of partners.

4. References

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    - **Referenced in:** The study mentions that **72% of learners find conversational practice their biggest challenge** (Duolingo, 2024).

3. Council of Europe. (2024). *Common European Framework of Reference for Languages (CEFR) - Level Descriptions*. Retrieved from https://www.coe.int/en/web/common-european-framework-reference-languages/level-descriptions

    - **Referenced in:** The CEFR framework **defines six proficiency levels (A1 to C2)** and is widely used to assess language learning (Council of Europe, 2024).

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