



Concordia University

Engineering and Computer Science

Department of Computer Science and Software engineering

Software Project Management

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LANGUAGE LEARNING CHATBOT

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PROBLEM IDENTIFICATION REPORT

Project Objective

Develop and launch an advanced language learning chatbot that incorporates conversational AI and a Custom Scenario Creator to boost language proficiency among young adults and university students. Concurrently, this project is designed to enhance our team's AI and software development skills through reverse engineering existing chatbot technologies, fostering innovation and fostering technical expertise.

Opportunity Statement

Language learning chatbots offer a variety of exciting features in the education domain for individuals seeking to learn foreign languages and for those investing their resources in developing applications to capitalize on this expanding market. All the chatbots in the current market are similar in nature offering convenient and accessible solutions for learners, but we need an application which is smart enough to communicate with the learners as a companion. This is why we see incorporating conversational AI agents into our language learning chatbot is a great opportunity.

While traditional learning methods remain valuable, the interactive conversations, quizzes, and real-time feedback provided by chatbot platforms significantly enhance user engagement and motivation. The integration of conversational AI agents marks a significant advancement in education technology, offering learners a more engaging and personalized experience. This is particularly beneficial for our target audience, as it ensures flexible access, a safe practice space, and real-time feedback tailored to their dynamic learning needs and lifestyles.

Moreover, the inclusion of a Custom Scenario Creator within our chatbot elevates the learning experience by allowing young adults and university students to design their learning scenarios. This feature not only caters to their specific interests and real-world application needs but also amplifies the chatbot's role as an interactive companion. It enables learners to directly apply language skills in scenarios they're likely to encounter,

such as studying abroad, engaging in international projects, or preparing for global job markets.

Educators realize the advantages of such technology, which include greater accessibility, automated tasks, data-driven insights, and personalized learning paths. These benefits are especially important to our target audience, since they enable a learning experience that is not only academically enriching but also linked with their personal and professional goals. The combination of AI-driven conversations and user-generated scenarios prepares learners for diverse real-world interactions and cultural contexts, positioning our chatbot as an innovative tool in the language learning landscape for young adults and university students.

Stakeholder Analysis

Product Owner:

- **Interests:**
 - Ensuring the language learning chatbot aligns with the organization's vision and goals.
 - Maximizing the value delivered by the chatbot to end-users.
 - Prioritizing features and functionalities based on user feedback and market demand.
- **Concerns:**
 - Always having clear communication of requirements and expectations with the development team.
 - Meeting stakeholder expectations by always be attentive during the process
 - Ensuring that the project schedule stays on track and within budget.

Beta Users Group:

- **Interests:**
 - Accessing a language learning tool that effectively meets their needs and preferences.
 - Providing feedback to improve the chatbot's usability, content, and features.
 - Early access to innovative language learning technology.
- **Concerns:**
 - The usability and effectiveness of the chatbot in aiding language learning.

- Data privacy and security while using the chatbot.
- Availability of support and resources during the beta testing phase.

Developers:

- **Interests:**
 - using state-of-the-art instruments and technologies to create novel characteristics.
 - working together with other team members to resolve technical issues and guarantee the completion of the project successfully.
- **Concerns:**
 - Unambiguous comprehension of project specifications and anticipations.
 - controlling technological debt and guaranteeing maintainability and quality of code.
 - fixing bugs and technical problems as soon as possible.

QA Team:

- **Interests:**
 - Ensuring the quality and reliability of the language learning chatbot.
 - Identifying and addressing defects and usability issues through testing.
 - Providing feedback to improve the overall user experience.
- **Concerns:**
 - Access to necessary resources and environments for testing.
 - Balancing thorough testing with project timelines and deadlines.
 - Communicating effectively with the development team to resolve issues.

UX Designer Team:

- **Interests:**
 - Designing an user-friendly interface for the product.
 - Conducting user research to better understand user's preferences and gain validation.
 - Collaborating with the developer's team to provide design solutions that improve the overall user experience.
- **Concerns:**
 - Balancing design aesthetics, usability, and functionality features throughout the development process.
 - Ensuring consistency across platforms and devices.
 - To improve the design by responding to user and stakeholder feedback and adapt in future iterations.

Marketing and Sales Team:

- **Interests:**
 - Promoting the language learning chatbot to attract users and drive adoption.
 - Understanding user preferences and market trends to tailor marketing strategies.
 - Generating revenue through subscriptions, partnerships, or other monetization models.
- **Concerns:**
 - Effectiveness of marketing campaigns in reaching the target audience.
 - Competition from other language learning products and services.
 - Ensuring a positive brand image and reputation through the chatbot's features and user experience.

Relevance to Software Solution

Addressing the problem or opportunity through software development:

Conversational engine:

- Develop a natural language processing (NLP) engine capable of understanding user input to simulate real-life conversations in the target language, allowing users to practice speaking and listening skills.
- Develop image and voice processing features to enhance the useability.
- Utilize voice recognition and synthesis for voice interaction.
- Develop an advanced dialogue system to generate fluent and grammatically correct responses.

Custom Scenario Creator with Language Integration:

- This feature allows users to create their own learning scenarios or stories using a simple, intuitive interface within the chatbot
- Users can craft dialogues or choose settings, characters, and plots, integrating language learning into the creation process.

Engaging dialogue:

- Design engaging conversation scenarios that simulate real-life situations.

- Incorporate different aspects such as cultural and historical stories to make learning more enjoyable.

Real-time feedback:

- Develop AI-powered feedback that identify grammar errors, pronunciation mistakes, and provide word choices.
- Offer sentences improvement and phrasings in real-time.
- Provide detailed reports and learning paths based on the performance on periodically quizzes and exercises.

System safety and privacy:

- Protect user credentials, personal information, and learning progress from unauthorized access from the third party.
- Only collect and keep data for providing the language learning services.
- Provide clear and transparent policies on how user data is collected, processed, handled, and applied in the chatbot system.
- Offer options for users to manage their privacy preferences.

Initial thoughts on the scope of the software solution may include the following components:

- **User Interface:** Develop a simple and visually appealing user interface for easy interaction with the chatbot. To improve the user experience, incorporating features such as speech recognition, chat history retrieval, and many other customizable settings will be beneficial.
- **Content Management:** Create a comprehensive database of language learning resources, including vocabulary lists, grammar lessons, cultural insights, and conversation examples. Initial development can focus on popular languages with conversational scenarios for basic interactions.
- **Algorithm Development:** Implement algorithms for NLP and user profiling to enhance the chatbot's personalization features. Improve the design based on user feedback and usage patterns to leverage accuracy and effectiveness. The end goal is to keep the content engaging and user satisfaction.
- **Integration with Learning Platforms:** Link the chatbot to current language learning platforms and resources, such as online courses, textbooks, and other materials.
- **Performance Optimization:** Improve the chatbot's performance so that it can manage several user interactions at once while minimizing response times. Prioritize user experience and accessibility to improve usability.

- **Data Security and Privacy:** Implement strong data security procedures to protect user information and ensure compliance with privacy laws. To avoid unwanted access or data breaches, encrypt sensitive data, enforce access limits, and perform frequent system security audits.

MARKET ANALYSIS - LANGUAGE LEARNING CHATBOT

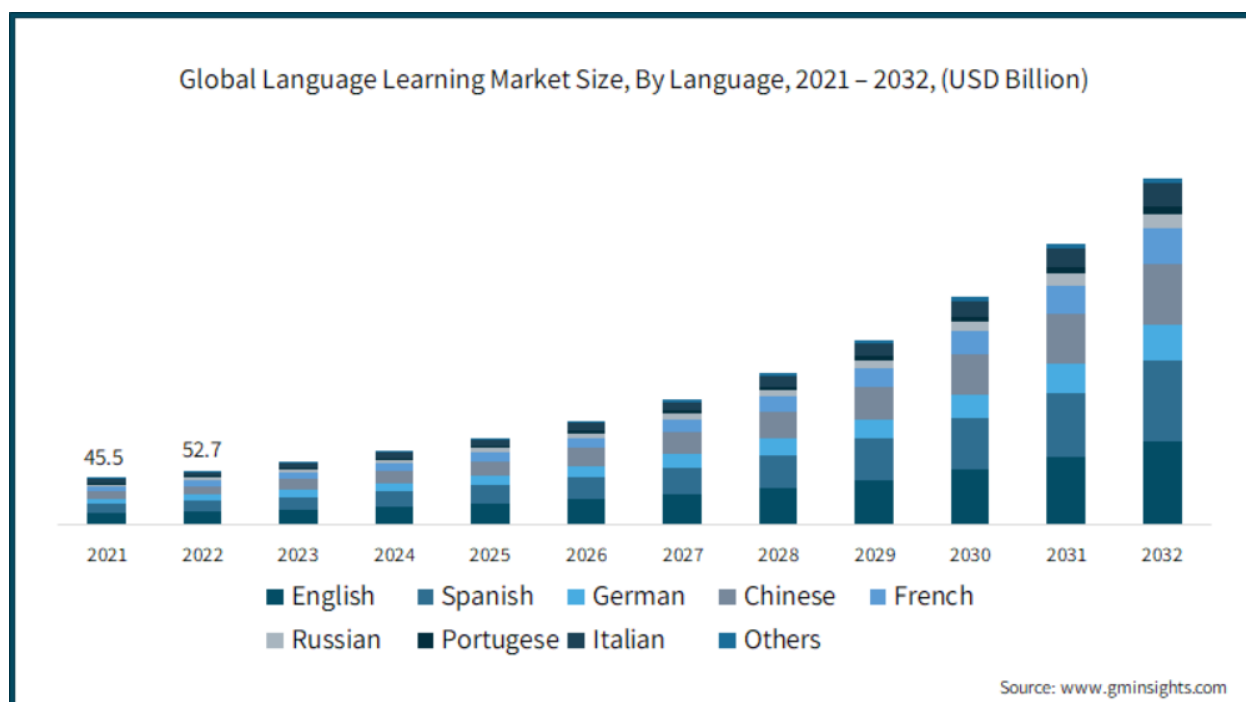
Language learning chatbots are designed as applications bridging the gap between technical advancement and the human urge to learn new languages. The spike in demand for these AI-powered companions reflects a huge shift in how people seek to learn languages, moving away from traditional classroom settings and toward more customized, flexible, and interactive online platforms. As we go deeper into the market data, it becomes clear that the language learning chatbot industry is more than just riding the tide of edtech innovations; it is at the vanguard of reimagining language teaching for a worldwide audience [1]. This analysis aims to unpack the dynamics of this market, exploring the forces driving growth, the challenges that lie ahead, and the opportunities that await those ready to innovate in the space of language learning technology.

Language Learning Market Statistics

Recent statistics illuminate this trend, revealing a substantial increase in the adoption and usage of language learning chatbots. Users are not just seeking convenience; they are drawn to the promise of a more engaging, efficient, and tailored learning experience. We performed market analysis by first gathering statistics around the market for language learning since our application fits in that space. Below statistics clearly show the increasing market demand.

Market Report Scope [\[2\]](#)

Language Learning Market Size in 2022:	USD 52.7 Billion
Forecast Period:	2023 - 2032
Forecast Period 2023 - 2032 CAGR:	20.8%
3 - 2032 Value Projection:	USD 337.2 Billion
Historical Data for:	2018 - 2022



The language learning market is experiencing robust growth, with its value projected to increase from USD 52.7 billion in 2022 to USD 337.2 billion by 2032, at a CAGR of 20.8%. This trajectory signals a thriving demand for language education, with English leading as the most sought-after language, followed by Spanish, German, Chinese, and French. The

trend indicates a fertile ground for innovative solutions like AI-driven language learning chatbots, especially those offering personalized and culturally immersive experiences. As the market grows, there's significant potential for such technology to capture market share, particularly if it can differentiate itself with unique features and adapt to the varying needs of language learners worldwide.

We can clearly see the following are the growth drivers.

- Rising globalization
- Increasing demand for multilingualism
- Rising trend of e-learning
- Integration of AR and VR technology for language learning platform
- Growing learning platform collaboration for educational institutions

Alongside these technological advances, research has provided empirical evidence for the positive effects of using speech-recognition technology-based chatbots on language learning [\[3\]](#)

Competitor Analysis

We did competitor analysis to understand if there are any existing platforms that are available for the opportunity area that are still available based on conversation agents. We present insights about top 5 chatbots available for market analysis in market [\[4\]](#)

DUOLINGO:

- **Features:** Exercises in writing, speaking, listening, and reading are included. use an in-app purchase and advertisement freemium business model
- **Unique Selling Points:** High user engagement through gamification. Offers a broad selection of languages.

MONDLY

- **Features:** Among the features are daily lessons, speech recognition for pronunciation practice, and AR (Augmented Reality) features for immersive learning.
- **Unique Selling Points:** Points of differentiation that set them apart: Learners who prioritize practical applications in their conversations.

MEMRISE

- **Features:** Uses videos of native speakers in real-life contexts. Courses are often community-created.
- **Unique Selling Points:** Real-world language usage through native speaker videos. Spaced repetition for effective memorization.

BABBEL

- **Features:** Lessons are designed by linguistic experts, incorporating review sessions to reinforce learning. Offers a speech recognition feature.
- **Unique Selling Points:** Course material designed by experts. Focus on conversational language from the start.

Rosettastone

- **Features:** Speech recognition technology, personalized learning paths, and live tutoring sessions (for an additional fee).
- **Unique Selling Points:** Fully immersive curriculum designed to mimic natural language acquisition. High-quality speech recognition.

Competitor SWOT ANALYSIS

Platform	Strengths	Weaknesses	Opportunities	Threats
Duolingo	<ul style="list-style-type: none"> • Wide range of languages • Engaging gamification • Strong brand recognition • Free with premium options 	<ul style="list-style-type: none"> • Depth of learning may be limited • Gamification may detract from learning • Limited conversational practice 	<ul style="list-style-type: none"> • Expand language offerings • Enhance conversational AI features • Partner with educational institutions 	<ul style="list-style-type: none"> • Rising competition • User gamification fatigue
Mondly	<ul style="list-style-type: none"> • Conversation-based learning • AR for immersive learning • Voice recognition for pronunciation 	<ul style="list-style-type: none"> • Content can feel repetitive. • AR not universally appealing • Premium access required for full features 	<ul style="list-style-type: none"> • Advance AI and AR technologies • Expand into new markets with localized content 	<ul style="list-style-type: none"> • Competitors adopting similar tech • Technological limitations in voice recognition

Memrise	<ul style="list-style-type: none"> • Real-life videos for learning • Spaced repetition for vocabulary • User-generated content for diversity 	<ul style="list-style-type: none"> • Inconsistent content quality • Focuses on vocabulary over conversation 	<ul style="list-style-type: none"> • Increase range and quality of content • Develop interactive conversational practice 	<ul style="list-style-type: none"> • Competition from structured content apps • Diminishing user engagement if content quality does not improve
Babbel	<ul style="list-style-type: none"> • Lessons by linguistic experts • Focus on conversational skills • Structured curriculum 	<ul style="list-style-type: none"> • Limited language selection • Subscription model may deter users • Less gamification 	<ul style="list-style-type: none"> • Language expansion • Advanced speech recognition tech • Corporate and educational partnerships 	<ul style="list-style-type: none"> • Free or cheaper alternatives • Preference for more gamified experiences
Rosetta Stone	<ul style="list-style-type: none"> • Immersive learning method • Strong brand recognition • Advanced speech recognition 	<ul style="list-style-type: none"> • High cost • Immersion method are challenging without supplementary explanations 	<ul style="list-style-type: none"> • AI personalization • Business and educational sector expansion 	<ul style="list-style-type: none"> • Affordable platform competition • Shift towards shorter, more interactive sessions

Business Value

Unique Selling Point (USP)

Enhanced Real-World Practice and Personalization

1. **Dynamic Conversational Practice:** Beyond scripted interactions, conversational AI enables learners to engage in free-flowing, natural conversations, mimicking real-life interactions for effective real-world practice.

2. **Custom Scenario-Based Learning:** The Custom Scenario Creator complements conversational AI by allowing learners to design their own learning environments and dialogues, reflecting personal interests or real-world situations they wish to navigate, further personalizing the learning experience.
3. **Adaptive Learning Experience:** Combining AI's adaptability with user-generated content, the platform offers personalized dialogue challenges and scenarios that evolve with the learner's progress, interests, and pace, ensuring a tailored learning journey.
4. **Immediate, Contextual Feedback:** Instant feedback from the conversational AI on grammar, pronunciation, and vocabulary within custom scenarios offers learners a comprehensive understanding of their strengths and areas for improvement.
5. **Cultural and Contextual Immersion:** Both conversational AI and scenario creation introduce learners to cultural contexts, idioms, and slang, providing a holistic approach to language learning that encompasses cultural nuances and real-world applicability.
6. **Enhanced Accessibility and Scalability:** This approach makes advanced conversational practice and personalized scenario-based learning accessible to a broader audience, overcoming traditional barriers such as scheduling, cost, and the limitations of content scope.

Challenges to Overcome

Integrating these advanced features requires addressing several technical and content challenges:

- **Advanced NLU and NLG:** Developing AI that can accurately understand and generate natural, culturally nuanced responses in multiple languages.
- **Sophisticated Contextual and Cultural Awareness:** Ensuring the AI can maintain context over conversations within custom scenarios and across diverse cultural situations, adapting to the user's learning needs in real-time.
- **User-Generated Content Moderation:** Implementing mechanisms to review and moderate custom scenarios to ensure they are appropriate, beneficial for learning, and culturally sensitive.
- **Integration of AI with User Creativity:** Seamlessly combining AI-driven conversations with user-created scenarios in a way that feels natural and enhances the learning experience.
- **Personalization at Scale:** Balancing the personalization capabilities of the platform with the need to scale and cater to a wide range of users, languages, and learning objectives.

Value Proposition

With the integration of advanced conversational AI and a profound comprehension of cultural subtleties, our chatbot provides a very engaging and customized educational experience. This chatbot, which was created for college students and young people, is more than just an app.

Why select this chatbot?

- **Conversational agent:** Having a chatbot with conversation feature would immensely assist users in engaging in in-person conversation and improve their speaking skills. Moreover it would provide users with scenarios that are plausible, and grow with you as you progress.
- **Customized Learning Opportunities:** We understand that no single strategy works for everyone. With the usage of this chatbot, users could have a personalized learning path made according to their objectives, interests, and chosen learning style. Thus ensuring that each session is effective, engaging, and relevant.
- **Immersion in Culture:** Transcend syntax and lexicon. Discover the intricacies that make learning genuinely enriching, as well as the language's cultural context and idiomatic idioms.
- **Comments That Are Important:** You can make immediate corrections to your grammar and pronunciation with the help of immediate, thorough feedback. With the help of our voice analysis technology, you can confidently develop your abilities with individualized suggestions.

Target Audience

The target audience for a language learning app featuring a conversational AI/agent can encompass a diverse group of learners with varying needs, motivations, and backgrounds such as

- **Professionals and Business people** whose focus is on business language, cultural nuances in professional settings, and the ability to practice conversations relevant to their industry.
- **Travel Enthusiasts and Expatriates** who emphasize practical language use, cultural suggestions, and survival words that can help them navigate new situations.
- **Polyglots and language hobbyists** who require extensive conversational practice, exposure to a range of dialects and accents, and fluency in multiple languages.

However, our app's primary target demographic is Young Adults and University Students due to following reasons:

- ***Tech-Savvy and Open to Innovation:*** Because they are generally more eager to adopt new technologies and creative learning methodologies, users in this demographic are ideal for an app that incorporates cutting-edge conversational AI.
- ***Acquiring Language Skills for Future Prospects:*** Young people and college students often enroll in language courses to enhance their academic and career options, including studying abroad, participating in international programs, or increasing their employability in the global job market.
- ***High Engagement Potential:*** Because of their active online presence and social media usage, this group may help with organic marketing and word-of-mouth promotion, which will increase the app's visibility and user base.
- ***Flexible Learning Requirements:*** They have busy schedules and need flexible learning solutions, thus on-the-go conversational AI learning apps are especially intriguing.

Demographic Characteristics

- **Age:** Usually 18 to 25 years old, however this can also apply to those in their late 20s or early 30s, particularly if they are graduate students or adult learners who are going back to school.
- **Education:** Recent grads or enrolled in colleges and universities for higher education. This covers students pursuing undergraduate, graduate, and vocational degrees.
- **Location:** Geographically varied, with students studying both domestically and overseas
- **Income Level:** Generally lower personal income, often reliant on parental support, scholarships, part-time jobs, or student loans.
- **Language Proficiency:** varies greatly; some people may be trying to pick up a language from the start, while others may be trying to get better at it.

Psychographic Characteristics

- **Goals and Aspirations:** Driven by the desire to travel or relocate overseas, as well as by the desire to grow personally, succeed professionally, and attain academic success. Learning a language is frequently considered as a means of achieving these objectives.
- **Preferences for Learning:** Choose self-paced, adaptable learning options that you can fit into your hectic schedule of social, professional, and study obligations. Give more weight to hands-on, interactive, and interesting learning opportunities than to standard classroom education.
- **Technology Usage:** Proficient in social networking, digital technology, and mobile apps. They choose solutions that are compatible with multiple platforms and gadgets, such as tablets, smartphones, and laptops.
- **Attitudes and Values:** Give cultural diversity, global connectedness, and personal growth a top priority. Be open to novel experiences and educational approaches. socially and environmentally aware.
- **Lifestyle:** Engaging social life combined with a healthy balance between academic obligations and extracurricular activities. Interest in travel, culture, entertainment, and maintaining an active presence on social media.

References

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