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Needs Analysis of AI-based Smart English Conversation Application for EFL and Students with Disabilities

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ABSTRAK

Penelitian ini bertujuan untuk menganalisis kebutuhan mahasiswa EFL dan mahasiswa disabilitas terhadap pengembangan aplikasi Smart English Conversation berbasis AI. Dengan menggunakan pendekatan metode diskriptif qualitatif, data dikumpulkan melalui wawancara dengan tiga dosen bahasa Inggris yang mengajar di kelas inklusif serta mahasiswa EFL 60 mahasiwa dan 20 mahasiswa disabilitas. Hasil penelitian menunjukkan bahwa dosen mengakui potensi media berbasis AI dalam meningkatkan keterampilan berbicara, namun mereka memiliki pengalaman yang terbatas dalam mengintegrasikannya karena adanya keterbatasan akses dan masih bergantung pada bahan ajar konvensional seperti buku teks dan slide. Mahasiswa melaporkan beberapa kendala dalam pembelajaran konvensional, termasuk kurangnya rasa percaya diri, terbatasnya kesempatan praktik, minimnya media pembelajaran yang ramah disabilitas, serta keterbatasan waktu dosen untuk memberikan umpan balik individual. Analisis kebutuhan menunjukkan adanya permintaan yang sangat tinggi terhadap aplikasi berbasis AI yang mendukung keterampilan berbicara. Fitur utama yang diidentifikasi meliputi *adaptive speech recognition*, umpan balik otomatis secara real-time, fitur aksesibilitas inklusif, simulasi percakapan nyata, serta materi pembelajaran yang dipersonalisasi. Temuan ini menegaskan urgensi pengembangan aplikasi Smart English Conversation berbasis AI yang mengutamakan inklusivitas, interaktivitas, adaptabilitas, dan umpan balik real-time, serta dilengkapi dengan gamifikasi dan kompatibilitas dengan platform pembelajaran daring yang sudah ada.

ABSTRACT

This study aimed to analyze the needs of EFL students and students with disabilities for the development of a Smart English Conversation application based on AI. Using a descriptive qualitative approach, data were collected through interviews with three English lecturers teaching inclusive classes and 60 of EFL students and 20 students of disabilities. he results revealed that lecturers acknowledged the potential of AI-based media to enhance speaking skills but had limited experience integrating them due to access restrictions and reliance on conventional materials such as textbooks and slides. Students reported several challenges in conventional learning, including lack of confidence, limited practice opportunities, insufficient disability-friendly media, and restricted lecturer time for individual feedback. Needs analysis indicated a very high demand for AI-based applications supporting speaking skills. Key features identified included adaptive speech recognition, real-time automatic feedback, inclusive accessibility features, real-life conversational simulations, and personalized learning materials. The findings highlight the urgency of developing an AI-based Smart English Conversation application that prioritizes inclusivity, interactivity, adaptability, and real-time feedback, while also integrating gamification and compatibility with existing online learning platforms.

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Background of Study

In the era of globalization, the ability to communicate in a foreign language, particularly English, has become one of the essential competencies required in various fields of life. English not only serves as a tool for cross-cultural communication but also functions as the primary medium of instruction in academia, business, technology, and diplomacy. Therefore, English proficiency is no longer considered merely an additional skill; rather, it has become an integral part of developing competent human resources who are ready to compete at the global level.

The teaching of English as a Foreign Language (EFL) in higher education is required to focus not only on theoretical aspects but also on the mastery of practical skills, particularly speaking. Speaking is considered one of the most complex aspects of language learning as it involves the integration of linguistic knowledge, communication strategies, as well as courage and confidence in expressing ideas orally. Nevertheless, in practice, speaking instruction still encounters various challenges, ranging from limited practice time, the lack of supportive environments, to the inadequacy of learning media that are responsive to students' needs.

In the context of inclusive education, these challenges become even more complex. Students with disabilities often face double barriers, both in terms of accessibility to learning materials and teaching approaches that are not fully disability-friendly. In fact, the principle of equality in education demands the provision of support and facilities that enable all students, without exception, to develop optimally. Therefore, the integration of technology into language learning has become a promising strategy to bridge this gap.

English proficiency, as one of the international languages, has become an essential skill for students learning English as a Foreign Language (EFL). Mastery of this language not only opens wider career opportunities but also facilitates engagement in global communication. Students with strong English skills possess higher competitiveness in the job market, which increasingly demands foreign language proficiency.

Despite its importance, many EFL students still face various challenges in developing their speaking skills, such as the lack of exposure to real-life English use and the limited opportunities to interact with native speakers or fellow learners. On the other hand, students with special needs also have the right to access higher education that is inclusive, equitable, and supportive of their maximum potential (Marda et al., 2024). However, the number of learning platforms specifically accommodating inclusive needs remains very limited, leaving students with disabilities often experiencing disparities in the learning process (Widyastuti et al., 2025). For both EFL students and students with disabilities, mastering English language skills presents distinct challenges. Therefore, innovations in English language learning methods are required to create learning experiences that are more interactive, adaptive, and

accessible to all, including students with special needs (Abdi Syahputra & Irwan Padli Nasution, 2024).

The advancement of Artificial Intelligence (AI) has revolutionized the way language learning is conducted (Sari & Kurniawan, 2025). This technology enables the development of more innovative and interactive approaches while being able to respond to learners' needs in a personalized manner (Fajriati et al., 2024). AI-based learning applications can be designed to provide more responsive and flexible speaking experiences for users (Rahis Pasaribu et al., 2024). With the ability to simulate real-time conversations, deliver automatic feedback, and adjust difficulty levels according to individual proficiency, AI opens new opportunities for developing language skills that are more effective and adaptive (Salsabilla Putri Wijaya et al., 2025).

The Smart English Conversation application based on AI holds significant potential as an innovative solution to overcome various challenges in speaking skill development, particularly for EFL students and students with disabilities (Astuti & Putri, 2024). The use of AI in this application allows for the provision of automated feedback on crucial aspects of speaking, such as pronunciation, grammatical structure, and fluency, tailored to individual needs (Utami, 2024). The development of such an application needs to be grounded in a comprehensive needs analysis, covering the identification of essential features, inclusive interaction models, and factors that support the effectiveness of speaking skill development in disability-friendly higher education contexts (Lestari et al., 2025).

Based on the aforementioned background, the urgency of this research is to identify the specific needs of students in AI-based English learning, particularly for EFL students and those with disabilities. The findings of this study are expected to contribute to the development of applications that are more effective, inclusive, and aligned with the needs of EFL students and students with disabilities.

EFL students and students with disabilities often face obstacles in mastering English speaking skills, primarily due to the lack of exposure to authentic language use. In addition, the available teaching methods remain limited in terms of adaptability and inclusivity. This condition creates a significant gap and highlights the need for innovative application-based learning media that can enhance both accessibility and effectiveness of learning for all students, including those with special needs.

In this regard, the use of Artificial Intelligence (AI) technology serves as a promising alternative solution, as it enables the development of English learning applications that are responsive to individual needs. This technology allows for the adjustment of difficulty levels, the provision of automatic feedback, and real-time conversation simulations (Yelliza et al., 2025). The Smart English Conversation application based on AI is designed with an inclusive approach, integrating features such as text-to-speech and speech-to-text to support students with communication barriers, such as hearing impairments or speech difficulties (Halim.M & Satria, 2020).

This research approach begins with a needs analysis of students in order to identify the most relevant and necessary features to support speaking skill learning. The application implementation stage is carried out through experiments involving EFL students and students with disabilities, aiming to evaluate the effectiveness of the application as well as to

identify potential challenges that may arise during its use. The findings from this evaluation process then serve as the basis for refining and developing the application's features to make them more adaptive and responsive to users' needs.

Through the development of the AI-based Smart English Conversation application, it is expected that the speaking skills of EFL students and students with disabilities can improve significantly. Furthermore, this application is also expected to contribute to creating a more inclusive, flexible, and needs-oriented learning ecosystem (Martiningsih, 2023).

The literature review highlights the potential of Artificial Intelligence (AI) implementation in enhancing inclusivity within English Language Teaching (ELT), as well as the impact of integrating AI tools in ELT courses to foster inclusion and accommodate student diversity. Research findings indicate that AI holds significant potential in promoting personalized learning, accessibility, and diverse learning environments. Moreover, AI integration contributes to the development of more inclusive ELT pedagogy (Kannadhasan, 2024). Other studies on the use of AI in English learning explain that elements such as gamification, chatbots, virtual language instructors, and immersive simulations play an interactive and engaging role. AI creates equal opportunities for learners from diverse linguistic and ability backgrounds to access high-quality language learning (Moybeka et al., 2023).

Other studies have discussed the use of Artificial Intelligence (AI) technology as an innovative solution to support language learning in the era of the Fourth Industrial Revolution. Advanced AI features enable students to learn English independently through automatic translation tools, speech recognition, and interactive applications that provide real-time feedback (Hidayatullah, 2024). Another study highlights the potential for improving the quality of language learning through the integration of Augmented Reality (AR) into the curriculum. The findings suggest that such integration can drive the development and implementation of technology, encouraging educators to adopt more innovative and creative teaching methods by utilizing AR (Kurniawan et al., 2024).

Research related to the development of Outcome-Based Education (OBE) strategies using AI Bard as a learning medium indicates that AI Bard can be personalized to meet the specific learning needs of each student. Students with disabilities or particular learning difficulties can benefit from AI Bard to receive the assistance and support they require (Saepudin et al., 2024).

Based on the literature review, this study offers novelty and advantages in conducting a preliminary needs analysis for the development of an AI-based English learning application. The application is expected to serve as a technological breakthrough in English speaking instruction by providing a more innovative, interactive, flexible, and inclusive learning experience. Ultimately, this research aims to contribute to the creation of a language learning application that offers more dynamic and adaptive conversational experiences.

Methodology

This study adopts a Research and Development (R&D) approach referring to the model proposed by Sugiono, 2019, which consist of research, product design and development. However, in this study, the process was limited to level 1 of the R&D model. Focusing only on the research stages. Therefore, this study aims to identify the needs of the Smart English Conversation Application to be further developed in the next stages of R&D.

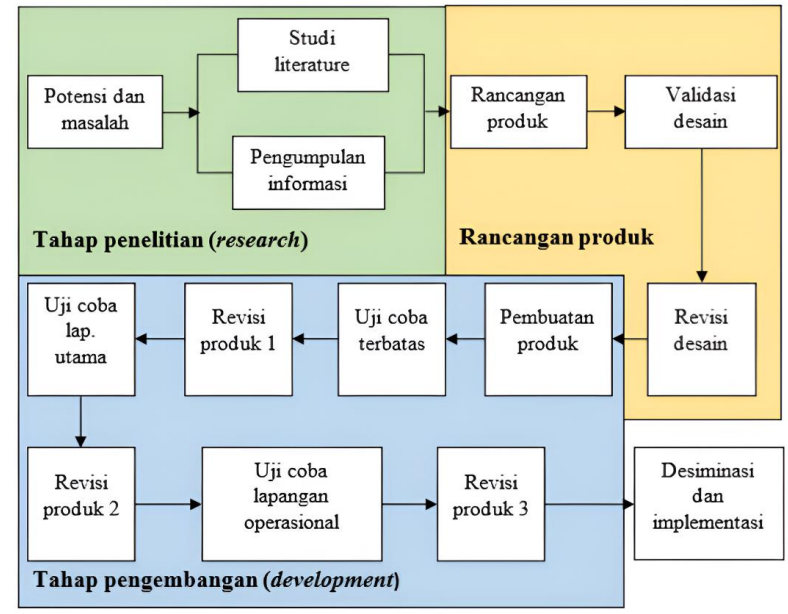

Figure 1. R & D steps proposed by Sugiyono

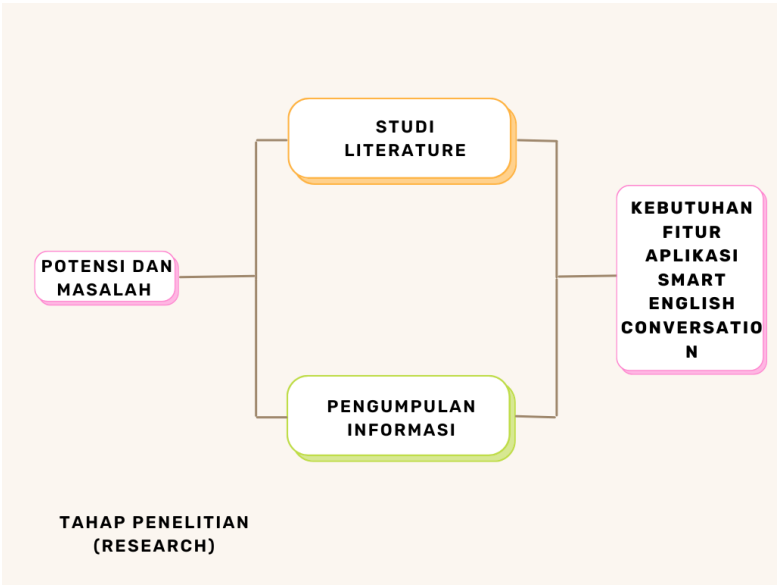

Figure 2. R & D level 1

The subjects involved in this study include: (1) English lecturers teaching in inclusive classes; (2) EFL students; and (3) EFL students with special needs who are enrolled in inclusive classes. These participants were drawn from several universities, including

Universitas Muhadi Setiabudi consist of 10 students, Universitas Negeri Yogyakarta 10 students, Universitas Tidar 20 students, Universitas Sebelas Maret 15 students, UIN Sunan Kalijaga Yogyakarta 15 students, and Universitas Pembangunan Nasional 10 students.

The research data were collected through interviews and questionnaires administered to both lecturers and students. This study employed two data analysis techniques. The first was quantitative descriptive analysis, which was used to process data obtained from the distributed questionnaire scores. The second technique was qualitative descriptive analysis, which aimed to analyze data collected from reviews provided by inclusive education experts, lecturers, and students. This technique involved categorizing qualitative information, including suggestions and feedback obtained from the questionnaires.

To verify the reliability and validity of the questionnaire, a pilot test was first conducted with a small group of respondents. The results of the SPSS analysis revealed a Cronbach's Alpha coefficient of 0.89, indicating that all items in the questionnaire are consistent and reliable for further data collection.

Tabel 1. Reliability of Questionnaire Items

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.89	0.87	9

Tabel 2. Validity of Questionnaire Items

Question Number	r count	r table	Description
1	0.914	0.361	Valid
2	0.887	0.361	Valid
3	0.883	0.361	Valid
4	0.941	0.361	Valid
5	0.853	0.361	Valid
6	0.922	0.361	Valid
7	0.879	0.361	Valid
8	0.910	0.361	Valid
9	0.865	0.361	Valid

Based on validity testing on questionnaires sent using SPSS, the result showed that r value > r table based on a significance test of 0.05, meaning the questionnaire items are valid.

The research data were obtained from students' responses to a needs analysis questionnaire regarding the AI-based Smart English Conversation application, administered to the research subjects, namely EFL students and students with disabilities. The research instrument, in the form of a student needs questionnaire, generated both qualitative and quantitative data. These data were then analyzed descriptively through systematic organization and categorized according to the required aspects. Furthermore, the researcher conducted synthesis to arrange the findings into specific patterns consistent with the type of research being conducted, and finally drew conclusions from the collected data.

Finding and Discussion

The initial stage in developing the AI-based Smart English Conversation application begins with a needs analysis. This stage represents the first step in the product development process. The purpose of this stage is to identify the extent to which the product is needed in the field. Needs analysis in product development aims to ensure that the product to be created and developed is relevant and aligned with the expectations and needs of its users, namely lecturers, EFL and students with disabilities.

Below are the results of interviews conducted by the researcher with three English lecturers who teach in inclusive classes:

Tabel 3. The result of lecturer interview

No	Problem Identification	Response	Conclusion
1	What learning media are usually used by lecturers in English courses, particularly speaking skills?	**Lecture A said that** "Lecturers have used several forms of learning media such as modules, presentation slides, and free Android- or web-based applications."	Lecturers tend to rely on conventional learning media and freely available applications, but their use has not been maximized.
2	Have lecturers ever used AI in English learning, particularly speaking skills?	**Lecture A said that** "AI-based media have been used, but only temporarily; sustainable use is limited due to access restrictions."	Some lecturers have tried AI-based applications available on certain platforms, but only for a limited time during trial access, as they did not subscribe to premium membership.
3	What are lecturers' opinions about AI-based learning media?	**Lecture C said that** "AI-based media can motivate and increase students' enthusiasm in the learning process."	Lecturers gave positive feedback, expressing excitement if an AI-based application specifically designed for speaking skills is available.
4	What are the strengths and weaknesses of the learning resources	**Lecture B said that** "The strength lies in	AI-based media could complement

	used so far?	accuracy since resources are mostly from books, which are reliable. However, they are less practical because information must be read first and takes time."	books by providing faster access to information while maintaining high accuracy.
5	How do lecturers assess the effectiveness of English learning media in improving speaking skills?	**Lecture B said that** "Effectiveness can be assessed through indicators such as speaking performance, understanding of speaking concepts, learning motivation, and outcomes. Other aspects include curriculum relevance, content quality, interactivity, accessibility, ease of use, and overall impact. "	The effectiveness of AI-based media should be evaluated through multiple criteria to ensure proper integration into the learning process.
6	What content should be included in AI-based learning media?	**Lecture C said that** "Required content includes authentic speaking materials, conversational chatbots, speech recognition and pronunciation scoring, real-time automatic feedback, and progress evaluation."	Content should cover basic materials, interactive AI features, contextual learning, personalized feedback, and accessibility that supports inclusivity.
7	What are the lecturers' recommendations for developing AI-based learning media, especially for speaking?	**Lecture C said that** "Recommendations include integrating the latest learning technologies, mobile	AI-based learning media should be mobile-friendly, technologically integrated,

	applications, real-life case studies, simulations, and other interactive features to support speaking skill development."	interactive, innovative, and inclusive.

Based on the interviews with English lecturers teaching EFL and students with disabilities, the researcher concluded that the lecturers already possess an understanding of AI-based learning media; however, they have not yet been able to fully utilize and implement it in the teaching process. In practice, lecturers still rely on books, e-modules, or presentation slides as learning media, although these are often considered less effective and not entirely suitable for students who require more innovative, interactive, and inclusive English learning media, particularly in speaking skills.

The purpose of these interviews was to gather deeper insights into lecturers' needs and preferences regarding AI-based English learning media. The lecturers' perspectives indicate that the Smart English Conversation application has the potential to become a new learning medium that can enhance students' enthusiasm and motivation to learn English, especially in developing speaking skills for both EFL students and students with disabilities.

This study involved 80 respondents consisting of EFL students and students with various types of disabilities, including visual impairments, hearing impairments, physical disabilities, intellectual disabilities, communication disorders, and specific learning difficulties. The majority of respondents were regular EFL students (75%), while the remaining 25% were students with disabilities. In general, the respondents were within the age range of 18–24 years and were pursuing undergraduate studies in non-language majors.

The following presents the results of data collection regarding students' needs for the Smart English Conversation application, both for EFL students and students with disabilities:

Tabel 4. The result of students needs of Smart English Conversation Application

No	Statement	N	Score	mean	SD	Indicator
1	The application should provide speaking practice based on speech recognition.	73	92%	4.60	0.49	Agree
2	The application should offer immediate feedback on users' pronunciation.	71	89%	4.45	0.53	Agree
3	The application should be accessible with features tailored to different types of disabilities.	67	84%	4.20	0.65	Agree
4	The learning materials should include real-life dialogue examples relevant to daily life.	65	81%	4.05	0.70	Agree

5	The materials should be organized by specific themes/topics (e.g., self-introduction, ordering food, etc.) and structured from the simplest to the most complex.	62	78%	3.90	0.72	Agree

Linkert Scale : 1: Strongly disagree, 2 : Neutral, 3: Strongly Agree

The analysis revealed that the majority of students (87%) expressed a very high need for technology-based learning media, particularly applications that can support English-speaking skills. They perceived that the use of Artificial Intelligence (AI)-based applications provides a more interactive, personalized, and flexible learning experience compared to conventional learning methods.

Several key features were identified as highly important to be developed in this application, including adaptive speech recognition (92%) capable of recognizing local accent variations and users' articulation difficulties, automatic feedback (89%) that provides instant responses regarding grammar, pronunciation, and vocabulary, as well as an inclusive mode (84%) that ensures accessibility through screen readers for visually impaired users, automatic captions for hearing-impaired users, and simplified interfaces for students with cognitive difficulties. In addition, respondents emphasized the importance of real-life conversation simulations (81%) based on daily conversation and academic contexts, along with personalized learning materials (78%) tailored to each user's proficiency level and learning style.

The following presents the results of data collection regarding the challenges faced by students in speaking learning, as delivered by lecturers in the classroom:

Tabel 5. The result of student challenges

NO	Point	Score	Indicator
1	Lack of confidence	73%	High
2	Limited opportunities for intensive practice.	68%	Medium
3	Learning media that are not disability-friendly	65%	Medium
4	The limited time of instructors to provide individual feedback.	59%	Medium

Noted: 0 – 50 %: Low, 51 – 69%: Medium, 70 – 100%: High

In conventional English learning settings, students reported several recurring challenges. The main issues identified include a lack of confidence to speak in front of the class (73%), limited opportunities for intensive practice (68%), insufficient learning media that are disability-friendly (65%), and the limited time lecturers have to provide individual feedback (59%). These findings are consistent with previous studies by Jin (2023), which revealed that affective factors, limited opportunities for oral practice, and lack of interactive learning media remain major obstacles in improving speaking competence among EFL learners. Similarly, Hosseini & Mehdizadeh (2024) (2021) emphasized that accessibility

issues persist, as conventional digital platforms often neglect inclusive design principles for students with special needs.

These conditions reaffirm the need to develop an AI-based *Smart English Conversation* application as a supportive medium to enhance students' speaking skills. However, the design process must consider a balance between functional priorities (what features are most needed) and technical feasibility (what can be realistically implemented).

In practice, these design priorities must be evaluated against the technical feasibility of implementation. For instance, the use of Google Speech-to-Text API, OpenAI Whisper ASR can be considered, as these models have demonstrated high performance and flexibility in language learning contexts. Nevertheless, language and dialect adaptation is essential to accommodate Indonesian-accented English, ensuring that recognition accuracy and feedback are contextually fair and reliable. Moreover, optimizing the application for low-bandwidth environments and devices with limited hardware capabilities can promote broader accessibility.

Integration with existing Learning Management Systems (LMS)—such as Moodle or Canvas—would enhance institutional adoption and streamline user experience by connecting the application with existing course structures and assessment systems. Meanwhile, gamification elements (e.g., points, badges, or progress levels) can be included to foster user engagement and motivation, provided that they remain pedagogically meaningful rather than purely recreational.

The findings of this study highlight that the development of the AI-based *Smart English Conversation* application should not focus solely on technological sophistication but also ensure pedagogical alignment, inclusivity, and usability. Balancing feature innovation with technical practicality will be key to creating a sustainable and impactful learning tool for both regular EFL students and those with disabilities.

Conclusion

The findings of this study indicate a growing need for English learning media that are more innovative, interactive, and inclusive, particularly those that address speaking skills. Both lecturers and students identified several limitations in conventional resources, such as textbooks and presentation slides, and showed a positive response toward the idea of AI-based learning tools. Students expressed interest in features such as adaptive speech recognition, real-time feedback, inclusive accessibility options, authentic conversational practice, and personalized materials. Meanwhile, lecturers highlighted the importance of aligning technology use with curriculum relevance, interactivity, and accessibility.

Challenges in conventional learning—such as students' lack of confidence, limited opportunities for speaking practice, the absence of inclusive media, and the lack of individualized feedback—suggest the need for developing an AI-based *Smart English Conversation* application. For the application to be effective, it should emphasize inclusivity, interactivity, adaptability, and real-time feedback, while also considering integration with Learning Management Systems and the use of gamification elements to support learner motivation.

In conclusion, the AI-based *Smart English Conversation* application is expected to contribute as a potentially effective, flexible, and inclusive medium for supporting the improvement of speaking skills among EFL students, including those with disabilities.

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