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**Abstract**

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Acknowledgements

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# Introduction <This is Heading 1>

Introduce the project.

## Aims and Objectives

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## Report Structure

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# Analysis and Requirements

## Background and Literature Review

Since its inaugural release on November 30, 2022, ChatGPT amassed over a million subscribers within its first week. This generative AI tool dazzled many with its sophisticated ability to undertake intricate tasks, especially in the realm of ESL (English as a Second Language) education. Such extraordinary abilities have evoked a spectrum of reactions from educators, as it transforms and redefines traditional pedagogical practices (Klyshbekova, 2023). Benefits attributed to ChatGPT in ESL encompass personalized and interactive learning, the generation of adaptive learning materials, provision of continuous and immediate feedback, fostering cultural understanding, and its 24/7 availability (Kohnke, Moorhouse and Zou, 2023). For instance, ChatGPT has demonstrated proficiency in generating dialogues tailored for students similar to the Common European Framework of Reference for Languages (CEFR) levels A and B1 (Young and Shishido, 2023). Adaptations of ChatGPT have effectively performed the role of an EFL teacher, assisting students with their writing tasks in regions like South Korea and Indonesia (Fitria, 2023; Han *et al.*, 2023). Moreover, EFL instructors in Vietnam acknowledged ChatGPT's potential in generating teaching materials and structuring ESL courses (Nguyen, 2023). It has been established that ChatGPT is adept at detecting grammatical errors, assisting Japanese ESL students in grammar acquisition (Schmidt-Fajlik, 2023). Remarkably, ChatGPT has been successfully deployed as a reading comprehension exercise generation system, offering qualified and individualized reading materials for middle-school English students in China (Xiao *et al.*, 2023). Consequently, such advantages have amplified the motivation among ESL learners to hone their reading and writing skills (Ali *et al.*, 2023). Yet, the technology is not devoid of limitations.

While ChatGPT's foundation is predominantly text-based, its inability to address speaking and listening skills emerges as a palpable drawback. Although ESL students generally exhibit a positive motivation towards reading and writing exercises facilitated by ChatGPT, their sentiments regarding its efficacy in nurturing listening and speaking proficiencies remain ambivalent(Ali *et al.*, 2023). It is recommended to conceive a comprehensive foreign language learning tool, which includes Augmented Reality, Voicebots, and ChatGPT technologies, thereby delivering a unique experience for ESL learners (Topsakal and Topsakal, 2022). Consequently, the assimilation of voice input and output mechanisms becomes imperative to fully harness the capabilities of ChatGPT in language learning.

Yet, other concerns still persist. Despite ChatGPT's aptitude in transforming auxiliary learning materials into interactive study resources, the quality and accuracy of such narratives remain under scrutiny (Diwan *et al.*, 2023). ChatGPT, on occasions, might produce misinformation or biased perspectives. Predominantly, the data it relies upon is procured from English sources and subsequently translated into various languages, such as Chinese or Japanese (Diwan *et al.*, 2023). Users also face the challenge of designing prompts to guide ChatGPT towards desired outputs—a process often daunting for non-technical individuals(Woo, Guo, and Hengky Susanto, 2023). Possible remedies involve furnishing structured learning materials to complement ChatGPT's capabilities or deploying a combination of hidden prompts to guide ChatGPT and open prompts for user initiation, ensuring a more refined feedback loop.

Furthermore, ChatGPT does not encompass features to record learners' progression or prompt them for periodic reviews. The technique of spaced repetition review, however, stands as a pivotal, economical, and effective learning strategy with immense potential to augment educational results (Kang, 2016). This method, aimed at reinforcing long-term retention, relies on strategically timed reviews premised on the forgetting curve—a principle that underpins numerous study systems (Yang, Oh and Youm, 2016). Empirical evidence reveals that EFL students who engaged in spaced repetition exercises for merely three minutes daily witnessed a threefold surge in long-term vocabulary retention (Chukharev-Hudilainen and Klepikova, 2016). Hence, the integration of a monitoring mechanism and a spaced repetition review system in educational software becomes indispensable.

In summary, while ChatGPT holds numerous advantages for ESL learners, its optimal utilization necessitates a combination of supplementary learning materials, efficient prompt management, voice integration, a robust learning tracking mechanism and spaced repetition strategy.

## Requirements Gathering

Basing on the previous literature review, this part will investigate and compare functionality of the existing applications related to ESL education. Furthermore, to obtain a deeper understanding of user perspectives regarding ESL software and the incorporation of ChatGPT, interviews were conducted with four ESL learners.

### Analysis of Existing Applications

According to the result of literature review, five salient features intrinsic to ESL software were identified: integration of AI technology, learning material, voice integration, learning tracking mechanism and spaced repetition review system. While these form the primary attributes, other desirable features will also be examined in this analysis. For a comprehensive understanding, three popular ESL websites have been chosen for a thorough evaluation of the merits and potential shortcomings of these applications.

**Duolingo** is one of the most popular language learning applications. As presented in its introduction, it embraces the prowess of AI with established language pedagogies to curate a tailored learning courses(Duolingo, 2023). The platform promises a comprehensive curriculum that covers crucial language domains, such as reading, writing, listening, and speaking. Although it also incorporates its voice function in courses and practices, the review system doesn’t follow spaced repetition rules. The website also emphasizes the gamified nature of learning. Earning points, unlocking levels, and interacting with their mascot, Duo the Owl, are elements that underscore Duolingo's commitment to making language acquisition both engaging and habit-forming.

**Glossika** positions itself as an innovative platform because of adaptive learning algorithms and an extensive database of handpicked sentences. With a strong emphasis on customization, the platform crafts content in alignment with users' competency levels and interests. By immersing learners in full-sentence contextual practice, Glossika ensures a combination of vocabulary, pronunciation, listening, reading and writing practices. Another intriguing aspect of Glossika's approach is its promised use of a spaced repetition algorithm, designed to obviate the often-daunting task of memorization. This ensures that learners receive timely prompts on phrases they're easily to forget, offering a seamless learning curve. Furthermore, authenticity is emphasized by the platform's incorporation of native speaker audio for every sentence. This allows learners to not just assimilate accurate pronunciation but also self-assess their progress by recording and comparing their accents over time.

**Langotalk**, an innovative startup, harnesses the potential of ChatGPT technology to redefine ESL education. One of its standout features is the diversity of chatbots it offers, each built with a distinct personality tailored to imitate varied settings and specialized topics. This range enables learners to immerse themselves in a conversational context. While it doesn't offer a structured curriculum, Langotalk allows users to create notes and log study items. The chatbots can offer real-time, individualized feedback, acting not just as conversational partners but also as tutors to guide on expression choices and grammatical structures. However, the incorporation of voice input and output can only base on the conversation content. In addition, a noticeable gap in Langotalk's offering is the absence of a robust learning tracking mechanism and a systematic review system, which might be essential for ESL learners looking to monitor their progress methodically.

Table 1: Comparison among Existing Applications

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Duolingo** | **Glossika** | **Langotalk** |
| **AI Technology** | AI-powered course recommendation and assessment. | AI-powered voice recognition and review algorithm basing on learning behavior and spaced repetition | ChatGPT |
| **Learning Material** | Well-structured and interactive courses martials for different level. | The sentences recommended by AI basing on user’s ability and preferences. | Not provided. Users can interact with chatbots directly and produce study content. |
| **Voice Integration** | Voice input and output for materials and review exercises. | Voice input and out for vocabulary and sentences practices. | Voice input and output for conversation texts. |
| **Learning Tracking Mechanism** | Record the courses which have accomplished. | Well recorded study progress and review schedule. | Not provided. But users can make study notes. |
| **Spaced Repetition Review System** | Review system but does not mention using spaced repetition strategy. | Individualized review schedule using spaced repetition algorithm. | No review system. |
| **Other** | Gamification and virtual rewards for achievements. | Weekly study report. | Various chatbots with different personality. |

The comparative analysis of the three ESL education software, as presented in the table above, highlights distinct strengths and areas of improvement for each. Traditional application, Duolingo and Glossika, prioritize high-quality learning materials, underscored by their robust learning and review mechanisms. However, their structured approach may somewhat scarify the flexibility and tailored experiences many modern learners seek. In contrast, Langotalk, capitalizing on its innovative approach, outstands in delivering rich, personalized learning experiences tailored to individual ESL learners. Meanwhile, its conspicuous absence of a learning progress monitoring system, week quality assurance for learning materials, and a systematic review mechanism somewhat diminish its overall user experience. Noteworthy across the board, though, is the seamless integration of voice features, enhancing the user's learning experience in all the platforms.窗体顶端

### Interviews

Compare softwares

## Application Requirments

# Design and Implementation

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Figure 1: Some important shapes.

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*# This is a little bit of Python*

**for** i in range( 10 ):

**for** j in range( 10 ):

**print** i\*j,

**print**

Figure 2: A crucial algorithm for the project.

# Testing and Evaluation

Show how you plan to organise your work, identifying intermediate deliverables and dates.

# Conclusion

[1] C. Baier and J.-P. Katoen. *Principles of Model Checking*. MIT Press, 2008.

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