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READIFY: AI-ENABLED INTELLIGENT ASSISTANT TO IMPROVE READING AND COMPREHENSION SKILLS IN ENGLISH LANGUAGE

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DECLARATION

I declare that this is my own work, and this proposal does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or Institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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ABSTRACT

This research explores the application of Artificial Intelligence (AI) in enhancing reading and comprehension skills in the English language, focusing on the development of AI-enabled platforms capable of dynamically generating adaptable content and providing automated assessments and feedback for essay-type questions. By integrating Large Language Models (LLMs) and prompt engineering techniques, this platform aims to replicate human-like evaluations, offering personalized learning experiences tailored to individual learners' needs. The study investigates the effectiveness of LLM in understanding and grading student answers and the utility of LLMs in creating adaptive content. Through a comprehensive review of recent research, this paper highlights the current state and future directions of AI applications in education, underscoring the transformative potential of AI in improving English language proficiency and fostering a more equitable educational landscape.

Keywords: Artificial Intelligence (AI), Large Language Models (LLMs), Prompt Engineering

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- Gen AI - Generative AI
- LLM - Large Language Model
- RAG - Retrieval-Augmented Generation

1. INTRODUCTION

1.1 Background

Advanced comprehension skills are crucial for mastering the English language. These skills include the ability to understand the implied meaning of a text, evaluate and analyze the content, and make inferences and deductions based on the information provided. Essential components of these skills involve connecting different parts of the text, applying background knowledge, identifying the main idea, finding important facts and supporting details, summarizing content, and generating as well as asking relevant questions.

The importance of reading comprehension skills in English language learning cannot be overstated, especially in an era where information is readily available yet requires critical evaluation. English, as a global language, is a gateway to vast amounts of information, and proficiency in comprehension is key to accessing, processing, and applying this information effectively. However, despite its importance, many learners struggle with advanced comprehension tasks due to factors such as limited vocabulary, lack of engagement, and insufficient practice in higher-order thinking skills.

This challenge has sparked significant interest in leveraging Artificial Intelligence (AI) to improve reading and comprehension skills. AI-enabled platforms offer personalized learning experiences, adapting to individual learner needs and providing real-time feedback. These platforms can analyze learner behavior, identify weaknesses, and offer targeted exercises to strengthen comprehension skills. The effectiveness of AI in educational contexts has been widely studied, but its application to enhance reading comprehension in English, particularly in non-native speakers, remains an area ripe for exploration.

1.2 Literature Review

The integration of AI in education, particularly for enhancing reading and comprehension skills in English, has gained considerable traction in recent years. This review explores the current state of research in this area, focusing on AI-enabled platforms designed to dynamically generate adaptable content, automatically assess essay-type responses, and provide feedback. By analyzing key studies in this domain, we aim to contextualize the advancements and challenges in utilizing AI for educational purposes, with a specific emphasis on improving English language proficiency.

Lack of Dynamically Adaptable Content

Lack of Tools for Automated Essay-Type Question Evaluation

The second major challenge is the absence of reliable tools for the automated assessment of essay-type questions, which traditionally require human evaluation due to the complexity and subjectivity involved in grading. This area has seen considerable research, yet existing solutions remain inadequate for high-stakes educational environments.

Moholkar et al. (2024) [1] provide a comprehensive survey of machine learning techniques for evaluating descriptive answers. Their survey covers various approaches, including supervised learning models and ensemble methods, highlighting their effectiveness in grading to some extent. However, the authors acknowledge the limitations in these models' ability to handle the nuances of human language, such as context, tone, and rhetorical devices, which are crucial for evaluating essay-type questions. The models surveyed often struggle with maintaining consistency and fairness in grading, especially in cases requiring deep contextual understanding.

Similarly, Xia et al. (2024) [4] conduct an empirical study on large language models (LLMs) as automated essay scoring tools, using the TOEFL Independent Writing Task

as a case study. Their findings suggest that while LLMs can perform reasonably well in scoring essays, there are significant drawbacks, including the models' susceptibility to being misled by superficial features like essay length or vocabulary sophistication. Furthermore, the lack of transparency in LLM decision-making processes raises concerns about their reliability and fairness in educational assessments.

Hussein et al. (2019) [5] review automated language essay scoring systems, identifying a range of methodologies from traditional rule-based systems to more contemporary machine learning approaches. While this review highlights progress in the field, it also points out the persistent challenges in achieving human-like grading accuracy, especially in handling creative or argumentative essays that require nuanced judgment.

The proposed research intends to overcome these limitations by developing a novel assessment tool that combines the strengths of machine learning with advanced linguistic analysis to better emulate human evaluators. This tool will focus on understanding the content and structure of essays more deeply, including context, argumentation, and rhetorical devices, thereby improving grading accuracy and fairness. Moreover, by integrating this tool with the dynamically adaptable content system, the platform would not only assess but also provide immediate, actionable feedback, thereby enhancing the learning process in real-time.

Conclusion

The research landscape for AI-enabled platforms aimed at improving reading and comprehension skills in English is marked by significant advancements but also by critical gaps, particularly in the areas of dynamically adaptable content and automated essay-type question evaluation. Existing studies have laid important groundwork but have not fully addressed these challenges. The proposed research seeks to fill these gaps by developing a more responsive and nuanced AI-enabled platform that provides both dynamic content adaptation and robust assessment tools for essay-type questions. By doing so, it aims to offer a more personalized and effective learning experience, bridging the current shortcomings in educational technology.

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