Unraveling the Potential of ChatGPT: Investigating the Efficacy of Reading Text Adaptation

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ABSTRACT

The purpose of this study is to investigate the effectiveness of ChatGPT in reading text adaptation. Its primary focus is on examining ChatGPT's ability to adapt texts with particular attention to its contextual understanding and limitations. Employing a mixed-methods approach, the research combines quantitative analysis and qualitative evaluation. Quantitative measures assess the consistency of ChatGPT's responses across various text adaptation scenarios, whereas qualitative evaluations involve the assessment of language teachers' attitudes and perceptions towards the use of ChatGPT for text adaptation in their teaching practices. Ethical considerations pertaining to potential biases and misinformation in the model's output are also discussed. The outcomes of this investigation contribute to understanding ChatGPT's strengths and limitations in reading text adaptation. The research has practical implications for domains such as language education, content creation, and information retrieval, where accurate and adaptable text comprehension is crucial.

Keywords: ChatGPT, reading, text adaptation

Introduction

In an era marked by the rapid advancement of artificial intelligence (AI) and natural language processing, the integration of AI models into various aspects of our lives has become increasingly prevalent. One such AI marvel is ChatGPT, a remarkable model that has been meticulously trained on a vast corpus of internet texts, boasting the ability to generate human-like responses. Its applications span a multitude of domains, including conversational interfaces, content generation, and text adaptation.

In light of this, this study focuses on exploring the effectiveness of ChatGPT in reading text adaptation, which is a vital area within natural language processing, including modifying, transforming, or adjusting text to suit particular contexts, audiences, or linguistic requirements. With the employment of a comprehensive mixed-methods approach, this study provides a

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holistic assessment of ChatGPT's performance. The quantitative measures take on the task of gauging the consistency of ChatGPT's responses when faced with diverse text adaptation scenarios. Concurrently, qualitative evaluations introduce an intriguing facet to the study as they encompass the insights and perceptions of language teachers regarding the use of ChatGPT in text adaptation within their teaching practice.

By the culmination of this investigation, the study aims to unlock a deeper understanding of ChatGPT's strengths and limitations, offering language teachers novel possibilities for integrating AI in their lesson preparations.

Literature review

Text adaption

Text adaptation plays a crucial role in language teaching by tailoring learning materials to the needs and abilities of learners. When working with students with significant reading challenges, teachers need to evaluate the essential concepts within the text that should remain and will often adapt the text to meet their students' needs (Lauren, 2021). Text adaptation addresses students' diverse linguistic and cognitive levels, making educational content more accessible, engaging, and effective. Teachers must skillfully align instructional materials with their students' capabilities to facilitate effective teaching and learning. This task can be particularly demanding when students' reading proficiency falls below grade-level expectations, yet the available texts are designed for either their current level or more advanced readers. Conversely, when students exhibit reading abilities that surpass grade-level norms, but instruction materials are tailored for those below their competence, learners may struggle to engage with the content, potentially leading to a lack of interest in the lessons. Balancing this dynamic is essential for cultivating an environment conducive to meaningful education. Therefore, teachers are increasingly expected to adapt their teaching to students' needs and grade-level standards (Van Geel et al., 2023).

Text adaptation can enhance comprehension and engagement, ultimately aiding students in mastering the language. There are studies involving the simplification of learning materials in English by reducing the complexity level of the original, authentic texts to increase their linguistic accessibility and make them a better match to the learners' English proficiency level (Crossley et al., 2012; Rets & Rogaten, 2021; Rets et al., 2022). These studies have indicated that simplified texts lead to better text comprehension in comparison with authentic texts. However, current teacher training programs lack courses designed to provide teachers with effective linguistic accessibility strategies. Additionally, there is limited support for the text adaptation process, and research on reading comprehension instruction for English academic texts remains insufficient (Crossley et al., 2012; Atai & Fatahi-Majd, 2014; Jin & Lu, 2018; Irina et al., 2022). As a result, without adequate support, teachers primarily rely on intuition, drawing from their teaching experience, writing proficiency, and personal beliefs about enhancing text comprehension for their target learners (Crossley et al., 2012; Young, 1999) or resort to a structural simplification approach, utilizing word lists and conventional readability formulas to evaluate the complexity of simplified texts afterward (Jin & Lu, 2018). This highlights the need for comprehensive training and innovative solutions like ChatGPT to address text adaptation challenges.

ChatGPT and Text Adaptation

ChatGPT, standing for Chat Generative Pre-trained Transformer, is a large language model-based chatbot developed by OpenAI and launched on November 30, 2022, and is considered a "state-of-the-art chatbot" (Hong, 2023). According to Reuters, the world's largest multimedia news provider, ChatGPT reached an incredible 100 million monthly active users in January 2023, making it the fastest-growing application ever seen, and by June 2023, the number had increased to 1.6 billion visits. ChatGPT has become increasingly popular in teaching and learning practices, and participants are quite open to this trend (Nguyen, 2023). ChatGPT's popularity is grounded in its exceptional conversational ability, remarkable adaptability, and wide-reaching accessibility. These qualities collectively render it an invaluable asset across diverse domains, with language education as a prime example, offering benefits to educators and students alike.

One of ChatGPT's most prominent applications is its role as a virtual tutor and knowledge resource. ChatGPT can provide instant responses to student's questions, explain complex topics, and offer assistance with homework and assignments, which helps alleviate the pressure on educators to be available at all times. Among many aspects, adapting reading materials for teaching is one of the truly shining capacities of ChatGPT. It addresses a deep-rooted challenge in education: how to accommodate students with varying reading abilities within a single class. ChatGPT can dynamically adjust the complexity of a text, making it more accessible to struggling readers while offering more advanced content to those who are more proficient. This personalization of reading materials is invaluable, demonstrating ChatGPT's potential to revolutionize teaching and learning. Its adaptability, accessibility, and efficiency make it a powerful tool for teachers striving to provide suitable materials for all students, regardless of their reading abilities.

Despite its strengths, concerns regarding the use of ChatGPT have been raised. Nguyen (2023) suggests that more research should be conducted, especially regarding the adverse effects of AI applications and stakeholders' perceptions. Teachers and policymakers should be aware of the negative impacts of AI tools. Nguyen's study also delves into the application of ChatGPT in language test design, exploring the potential and challenges faced by language teachers in various schools and institutions.

Identifying research gaps, it becomes apparent that despite ChatGPT's widespread application in language education, there is a scarcity of comprehensive studies evaluating the efficiency of ChatGPT in general, the attitude of teachers towards the usefulness of ChatGPT in text adaptation, and the reliability of the texts adapted by ChatGPT in particular. By addressing these research gaps, educators, policymakers, and researchers can gain valuable insights into the potential of ChatGPT in enhancing educational materials, ultimately advancing the quality of education in an increasingly digital era.

Research Questions

The study aims to seek answers to the following research questions:

1. To what extent do reading texts adapted by ChatGPT meet the level requirements set for learners in educational contexts?
2. What are teachers' attitudes and perceptions regarding the use of ChatGPT for text adaptation in their teaching practices?

Methods

This study employs a dual-pronged approach, combining quantitative and qualitative methods. In addressing the first research question, the Flesh Reading Ease index is used to evaluate the readability levels of the texts adapted by ChatGPT. Two distinct texts were selected from a practice test book tailored for VSTEP.3-5, a Vietnamese Standardized Test of English Proficiency. These texts cover diverse themes, encompassing Christmas and children's education, thereby catering to learners of varying ages. The Flesch Reading Ease is a readability formula that measures the difficulty of English text. It analyzes both sentence length and word complexity to determine the readability of a text. It considers longer sentences and words with more syllables to indicate a higher difficulty level. The Flesch Reading Ease gives a text a score between 1 and 100, with 100 being the highest readability score. The higher the reading score is, the easier a piece of text is to read. The formula is as follows:

Figure 1.
Flesch Reading Ease Formula

$$206.835 - (1.015 \times ASL) - (84.6 \times \frac{n_{sy}}{n_w})$$

where ASL = Average Sentence Length | NSY = Number of Syllables | NW = Number of Words

According to Wikipedia, an open-access encyclopedia and Flesch (1948), the Flesh reading-ease scores can be interpreted as shown in the table below.

Table 1.
The interpretation of Fresh Reading Ease scores

Score	Grade level (US)	Difficulty level
100.00–90.00	5th Grade	Very easy
80.0–89.0	6th Grade	Easy
70.0–79.0	7th Grade	Fairly easy
60.0–69.0	8th & 9th grade	Standard
50.0–59.0	10th to 12th grade	Fairly difficult
30.0–49.0	College	Difficult
20.0–29.0	College Graduate	Very difficult
00.0–19.0	Professional	Extremely difficult

Within this research endeavor, the readability scores of two distinct original texts are compared with those of the adapted texts crafted by ChatGPT. Then, the percentage of texts that meet, exceed, or fall below the level requirements set for specific students are calculated. For the evaluation of readability scores, an online software tool – Readability Scoring System, accessible at https://readabilityformulas.com/readability-scoring-system.php#formulaResults, is employed. This invaluable resource empowers the researcher to comprehensively examine the texts, facilitating a precise assessment of their suitability for the intended readership.

To answer the second research question, interviews were conducted with 10 English teachers working for a university in Hanoi, Vietnam and known to have employed ChatGPT for text adaptation in the classroom. This tool aims to inquire about teachers' attitudes and perceptions regarding the use of ChatGPT for text adaptation in their teaching practices, including its benefits and challenges in teaching and learning. The interview's content analysis of open-ended responses is transcripted to identify common themes, challenges, and benefits associated with ChatGPT-adapted texts.

This mixed methods approach allows for a holistic assessment, offering both quantitative data-driven insights and qualitative perspectives on the effectiveness of the text adaptations.

Findings and discussion

To what extent do reading texts adapted by ChatGPT meet the level requirements set for learners in educational contexts?

In the context of this study's findings and discussion for the first research inquiry, the investigation aims to assess the alignment between reading texts adapted by ChatGPT and the prescribed proficiency levels for learners in educational settings.

With the utilization of ChatGPT, each of these selected texts underwent eight adaptations, corresponding to the 8 Flesh Reading ease score levels (as illustrated in Table 1). Additionally, each adaptation was regenerated twice to ascertain the consistency of the outcomes. These are the data analysis findings pertaining to Text 1.

Table 2.
Flesch reading ease score of the original text 1

Original Text	***Adapted at the same level (1)***	***Adapted at the same level (1)***
Score: 73 [= reading scale] Reading Difficulty: Fairly Easy Grade Level: 7th Grade Age Range: 12-13 years old	Score: 69 [= reading scale] Reading Difficulty: Standard Grade Level: 8th & 9th Grade Age Range: 13-15 years old	Score: 70 [= reading scale] Reading Difficulty: Fairly Easy Grade Level: 7th Grade Age Range: 12-13 years old

Table 2 shows the analysis of Text 1 when adapted at the same level. The original text exhibits a readability score of 73 on the reading scale, signifying a fairly easy reading difficulty level and suitable for a 7th-grade learner within the age range of 12-13 years old. However, after adaptations by ChatGPT at this level, the resulting text obtains a readability score of 69, indicating a standard reading difficulty level akin to an 8th or 9th-grade audience aged between 12-15 years old, whereas the score of the second adapted text at this level stays nearly the same.

While the adapted texts' readability scores remain in the vicinity of the original, there is a slight shift towards a higher grade level audience, suggesting a minor adjustment in reading complexity while retaining overall accessibility.

Table 3.
Flesch reading ease score of the adapted original text 1
(adapted texts for 5th grade; 6th grade, 8&9th grade; 10-12th grade)

Text 1	***Adapted 1***		***Adapted 2***		***Adapted 3***		***Adapted 4***	
	Version 1	Version 2	Version 1	Version 2	Version 1	Version 2	Version 1	Version 2
Aimed grade level	5th Grade		6th Grade		8th & 9th grade		10-12th Grade	
Score	77	71	71	74	59	57	39	51
Reading Difficulty	Fairly easy	Fairly easy	Fairly easy	Fairly easy	Fairly difficult	Fairly difficult	Difficult	Fairly difficult
Grade Level	7th	7th	7th	7th	10-12th	10-12th	College	10-12th
Age Range	12-13	12-13	12-13	12-13	15-18	15-18	18 & above	15-18

Table 3 presents the Flesh Reading Ease scores for the adapted versions of Text 1 across various grade levels, providing insights into the readability and intended audience for each adaptation. For adapted texts (Adapted 1 & Adapted 2), aimed at 5th and 6th levels, respectively, the readability scores are between 71 and 77. Both versions are classified as "fairly easy" to read, aligning well with a 7th-grade reading level and age 12-13 years. Similarly, the readability scores for Adapted 4, intended for eighth and ninth- are 59 and 57, which are considered "fairly difficult", more complex than the intended learners, and suitable for 10-12th grade learners, whereas those for 10-12th Grade are not consistent with each other between two adaptations with version 1 exhibits a slight increase in complexity compared to the intended level.

Table 4.
Flesch reading ease score of the adapted original text 1
(adapted texts college; college graduate; professional)

Text 1	***Adapted 5***		***Adapted 6***		***Adapted 7***	
	Version 1	Version 2	Version 1	Version 2	Version 1	Version 2
Aimed grade level	College		College Graduate		Professional	
Score	37	49	36	39	27	39
Reading Difficulty	Difficult	Difficult	Difficult	Difficult	Very difficult	Difficult
Grade Level	College	College	College	College	College Graduate	College
Age Range	18 & above	18 & above	18 & above	18 & above	18 & above	18 & above

Moving to more advanced levels, Adapted 5, Adapted 6, and Adapted 7 are tailored for college students, college graduates, and ad professional audiences, respectively. These adaptations yield relatively good matches with the intended levels, though there is a slight mismatch in the readability levels of some texts. They correspond very well to a college-grade reading level and still need a minor change in order to fit totally with the more advanced levels.

A similar analysis is made for Text 2, and the findings pertaining to Text 1 are presented in Tables 5-7.

Table 5.
Flesch reading ease score of the original text 2

Original Text	***Adapted at the same level (1)***	***Adapted at the same level (1)***
Score: 40 [= reading scale] Reading Difficulty: Difficult Grade Level: College Age Range: 18 years old and above	Score: 43 [= reading scale] Reading Difficulty: Difficult Grade Level: College Age Range: 18 years old and above	Score: 49 [= reading scale] Reading Difficulty: Difficult Grade Level: College Age Range: 18 years old and above

As can be seen from Table 5, the data for the original text 2 is suitable for college students with a readability score of 40. The adapted versions of the text were assessed for their reading difficulty scores to evaluate the effectiveness of the adaptations in maintaining the text's level of complexity. The results of the adaptations indicate that the overall reading difficulty level is either maintained or slightly increased within the difficult range.

Table 6.
Flesch reading ease score of the adapted original text 2
(adapted texts for 5th grade; 6th grade, 7th grade, 8&9th grade)

Text 1	***Adapted 1***		***Adapted 2***		***Adapted 3***		***Adapted 4***	
	Version 1	Version 2	Version 1	Version 2	Version 1	Version 2	Version 1	Version 2
Aimed grade level	5th Grade		6th Grade		7th Grade		8th & 9th grade	
Score	78	78	76	67	37	57	22	46
Reading Difficulty	Fairly easy	Fairly easy	Fairly easy	Standard	Difficult	Fairly difficult	Very difficult	Difficult
Grade Level	7th	7th	7th	8-9th	College	10-12th	College Graduate	College
Age Range	12-13	12-13	12-13	12-13	18 & above	15-18	18 & above	18 & above

Table 7.
Flesch reading ease score of the adapted original text 2
(adapted texts for 10-12th grade; college graduate; professional)

Text 1	***Adapted 5***		***Adapted 6***		***Adapted 7***	
	Version 1	Version 2	Version 1	Version 2	Version 1	Version 2
Aimed grade level	10-12th Grade		College Graduate		Professional	
Score	23	24	24	26	19	17
Reading Difficulty	Very difficult	Very difficult	Very difficult	Very difficult	Extremely difficult	Extremely difficult
Grade Level	College Graduate	College Graduate	College Graduate	College Graduate	Professional	Professional
Age Range	18 & above	18 & above	18 & above	18 & above	18 & above	18 & above

Tables 6 and 7 show the evidence for text adaptations for a wide range of audiences. The texts adapted from the original one by ChatGPT tend to be more difficult than the targeted levels. For middle school and early high school audiences, reading texts targeting 5th and 6th graders score a readability range of 68-78, indicating that they are fairly easy or standard to read despite two levels more difficult, whereas those for Grade 8th and 9th seem to be much harder for the targeted audience and the readability scores are not consistent with two adaptation times. Similarly, the texts adapted for high school students score consistently 23 and 24, indicating very difficult readability. When progressing to college and professional levels, the adaptations totally fit with the intended audience.

What are teachers' attitudes and perceptions regarding the use of ChatGPT for text adaptation in their teaching practices?

To gain insights into teachers' attitudes and perceptions regarding using ChatGPT for text adaptation, interviews were conducted with 10 teachers known to have employed ChatGPT for text adaptation in the classroom. The key areas to explore in this study are the teachers' attitudes toward the benefits of ChatGPT and their perceptions of challenges in their teaching practices.

Regarding the benefits of ChatGPT in terms of text adaptation, all of the teachers agreed that this tool has a "powerful ability to generate human-like texts and adapt contents to various reading levels and styles." This versatility allows them to adapt existing materials or "create new ones tailored to students' specific needs and reading levels, reducing the times and effort required to adapt materials manually". The materials adapted by ChatGPT are engaging and relatable for students, thus enhancing students' experience.

Understanding teacher's concerns is equally important in this study. When asked about potential challenges related to ChatGPT, most of the teachers said that while there are several advantages of using AI for text adaptation, there are also valid concerns and challenges associated with this technology. One of the primary concerns is the accuracy of AI-generated adaptations. ChatGPT may sometimes "produce content that contains factual errors or inaccuracies, which can mislead readers or learners."

Another concern is related to ethical issues. AI models like ChatGPT can inherently perpetuate biases present in the data they were trained on. This can lead to biased or discriminatory content. Besides, the use of AI for text adaption often involves "processing large amounts of data, which can raise concerns about data privacy, especially in educational settings".

5 out of 10 teachers raised fear about a loss of human touch resulting from too heavily relying on AI-driven adaptations, which leads to the fact that AI may replace human roles, although they all agreed that "AI-generated content may lack the creativity and innovation that humans bring to content creation." 3 interviewed teachers mentioned the problems of plagiarism because ChatGPT can produce texts resembling the original work. They stated that "because ChatGPT has the capability to produce texts that closely resemble original works, it is important to be vigilant".

In short, interviews with teachers regarding the use of ChatGPT for text adaptation show that they unanimously recognized its powerful ability to generate human-like texts, adapting content to varied reading levels. They praised its versatility for efficiently adapting or creating materials tailored to students' needs, reducing manual effort. Adapted materials were deemed engaging, enhancing students' experiences. However, concerns surfaced – teachers worried about inaccuracies in AI-generated content, ethical issues related to biases, and data privacy concerns. Fear of a loss of human touch and plagiarism risks were also acknowledged. Despite benefits, a consensus emerged: ChatGPT should complement, not replace, human oversight for optimal use in education.

Conclusion

The analysis of text adaptations performed by ChatGPT reveals interesting insights into its capabilities and limitations. The data presented in the study showcases ChatGPT's potential in the field of text adaptation. It is undeniable that ChatGPT is a valuable tool for teachers, publishers, and content creators looking to tailor materials to specific reading levels. ChatGPT's ability to adjust text complexity while retaining overall accessibility is promising. However, the analysis reveals some inconsistencies in ChatGPT's adaptations. While ChatGPT provides valuable adaptations, further fine-tuning may be needed to precisely match intended grade levels. This is particularly important for educational materials where accuracy is crucial.

The use of ChatGPT for text adaptation in teaching practice holds immense promise. However, understanding teachers' attitudes and perceptions regarding the use of this tool is vital for successful implementation. By exploring the perceived benefits, challenges, and opportunities, teachers can harness the potential of ChatGPT to create a more inclusive and personalized learning environment. With careful consideration and collaboration, AI-powerful text adaptation can be a valuable asset in the ever-evolving landscape of education. Educators may require training and professional development opportunities to use AI tools in their teaching practice effectively. Besides, addressing ethical concerns related to ChatGPT in education, such as data privacy and bias, should be a priority. Developing clear guidelines and ethical standards can build trust in ChatGPT's adaptations. In addition, promoting collaboration between ChatGPT and human educators can lead to more effective teaching practices.

These studies have indicated that simplified texts lead to better text comprehension in comparison with authentic texts. However, current teacher training programs lack courses designed to provide teachers with effective linguistic accessibility strategies. Additionally, there is limited support for the text adaptation process, and research on reading comprehension instruction for English academic texts remains insufficient (Crossley et al., 2012; Atai & Fatahi-Majd, 2014; Jin & Lu, 2018; Irina et al., 2022). As a result, without adequate support, teachers primarily rely on intuition, drawing from their teaching experience, writing proficiency, and personal beliefs about enhancing text comprehension for their target learners (Crossley et al., 2012; Young, 1999) or resort to a structural simplification approach, utilizing word lists and conventional readability formulas to evaluate the complexity of simplified texts afterward (Jin & Lu, 2018). These studies have indicated that simplified texts lead to better text comprehension in comparison with authentic texts. However, current teacher training programs lack courses designed to provide teachers with effective linguistic accessibility strategies. Additionally, there is limited support for the text adaptation process, and research on reading comprehension instruction for English academic texts remains insufficient (Crossley et al., 2012; Atai & Fatahi-Majd, 2014; Jin & Lu, 2018; Irina et al., 2022). As a result, without adequate support, teachers primarily rely on intuition, drawing from their teaching experience, writing proficiency, and personal beliefs about enhancing text comprehension for their target learners (Crossley et al., 2012; Young, 1999) or resort to a structural simplification approach, utilizing word lists and conventional readability formulas to evaluate the complexity of simplified texts afterward (Jin & Lu, 2018).

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