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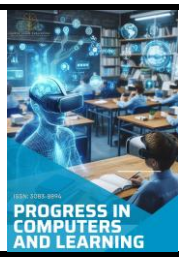
Progress in Computers and Learning

Journal homepage:
https://karyailham.com.my/index.php/picl
ISSN: 3083-8894



AI-Driven Vocabulary Enhancement: Transforming Writing Skills for Secondary Students using ChatGPT

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ARTICLE INFO

Article history:
Received 3 November 2024
Received in revised form 24 November 2024
Accepted 15 December 2024
Available online 31 January 2025

Keywords:
AI-driven learning; educational innovation; vocabulary mastery; ChatGPT; writing improvement

ABSTRACT

This innovation introduces a groundbreaking six-week educational module leveraging AI, specifically ChatGPT, to enhance vocabulary and writing skills among secondary school students. The module systematically tackles common challenges such as limited vocabulary, inappropriate word choices, spelling errors, and the inability to use nuanced or advanced vocabulary. Weekly activities include interactive exercises like synonym expansion, contextual fill-in-the-blanks, and advanced storytelling, all supported by ChatGPT's personalized feedback. By program completion, students demonstrate a broadened vocabulary range, improved contextual accuracy, and greater confidence in expressive writing. This innovation redefines language learning by integrating AI into traditional teaching practices, fostering a future-ready approach for young learners.

1. Introduction

The integration of AI technologies, particularly ChatGPT, into language learning, has garnered significant attention due to its potential to enhance vocabulary acquisition and writing skills [4-20]. However, existing studies have primarily focused on higher education contexts, leaving a gap in understanding its impact on secondary school students. Additionally, limited research explores how AI-driven tools cater to diverse learner demographics and sustain long-term learning outcomes. This study aims to address these gaps by examining the effects of a six-week AI-driven module on vocabulary and writing skills among beginner-level secondary students.

Language acquisition, particularly vocabulary development, is a cornerstone of effective communication and writing. For secondary school students, mastering vocabulary is critical yet challenging, as they often encounter obstacles such as limited word knowledge, incorrect usage, and spelling errors. These issues not only affect their academic performance but also their ability to articulate thoughts clearly in real-world scenarios. Over the years, researchers have explored various methods to address these challenges, with the integration of technology emerging as a promising solution.

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https://doi.org/10.37934/picl.2.1.1228

Artificial Intelligence (AI) has gained attention for its potential to transform education by providing personalized, adaptive learning experiences. Research by Smith *et al.,* [1] underscores the effectiveness of AI tools in tailoring lessons to individual learners' needs, making language learning more accessible and engaging. Zhang and Liu [2] further emphasize the role of AI in enhancing skill development, improving engagement, and enabling students to grasp complex concepts like contextual word usage. These findings highlight the untapped potential of AI-driven tools like ChatGPT in addressing the long-standing challenges of vocabulary acquisition among secondary school students.

1.1 Importance of Vocabulary Development in Secondary Education

Vocabulary development is not just about acquiring new words but also understanding their contextual usage, nuances, and relationships with other words. In secondary education, where students prepare for higher academic pursuits and professional communication, a robust vocabulary is essential. Yet, traditional teaching methods often fall short in meeting these needs. Activities such as rote memorization and repetitive exercises lack the engagement necessary to sustain learners' interest and fail to address individual learning gaps. This underscores the need for innovative, technology-driven solutions to enhance vocabulary learning.

1.2 Problem Statement

Despite the availability of advanced tools and research supporting their use, vocabulary instruction in many schools continues to rely on conventional methods that are time-intensive and ineffective for most learners. Secondary school students often express frustration over their inability to use advanced vocabulary or comprehend nuanced meanings, resulting in low confidence and poor performance in writing tasks. Taylor and Woods [3] argue that AI-driven activities, such as synonym expansion, contextual fill-in-the-blanks, and guided writing tasks, can address these challenges. However, such approaches are not widely implemented, leaving a significant gap in language education.

Additionally, teachers face challenges in implementing AI tools in their classrooms due to a lack of training or structured modules designed for such integrations. The absence of systematic programs that incorporate AI in vocabulary learning creates a barrier to achieving optimal outcomes. Addressing this gap is crucial to equipping students with future-ready skills that extend beyond the classroom.

1.2.1 Challenges in traditional vocabulary instruction

Traditional vocabulary teaching often relies on rigid methods, such as word lists and drills, which do not cater to the diverse needs of learners. These methods lack interactivity and fail to engage students, leading to poor retention of learned vocabulary. Furthermore, they do not provide the immediate feedback necessary for correcting mistakes or reinforcing correct usage. Without targeted interventions, students struggle to build the vocabulary needed for academic success and real-world communication.

1.3 Research Gap

While existing studies highlight the potential of AI tools in education, their application in structured, scalable modules for vocabulary enhancement remains underexplored. Few programs have successfully integrated AI-driven tools like ChatGPT into classroom instruction, particularly for improving vocabulary and writing proficiency. The lack of research and practical implementation leaves educators without clear strategies for adopting these tools effectively. This research aims to address these limitations by developing a well-structured, replicable model that combines traditional teaching techniques with AI-driven innovation.

1.3.1 Potential of ChatGPT in language education

ChatGPT, an AI-driven tool, offers unique advantages in language education, including personalized feedback, interactive exercises, and real-time corrections. Unlike traditional methods, ChatGPT can adapt to each learner's needs, providing a tailored approach that ensures better engagement and learning outcomes. By leveraging these capabilities, educators can overcome the limitations of conventional vocabulary instruction and offer students a dynamic, future-ready learning experience.

1.4 Objective of the Research

This study aims to develop and evaluate a six-week educational module that leverages ChatGPT to enhance vocabulary mastery and writing proficiency among secondary school students. The program incorporates interactive activities, including synonym exploration, contextual fill-in-the-blanks, nuanced word comparisons, and advanced storytelling tasks. By providing real-time, personalized feedback, the module ensures that students actively engage with vocabulary in meaningful contexts, promoting retention and practical usage.

The ultimate goal of this research is to equip students with the skills necessary for confident and effective communication in both academic and professional settings. By bridging the gap between traditional teaching methods and modern technological tools, this study seeks to redefine language education and set a precedent for integrating AI into mainstream classrooms.

2. Methodology

To ensure broader generalizability of the findings, the study included participants from various educational backgrounds and proficiency levels, encompassing beginners. A total of 200 secondary school students from urban and rural areas participated. This diverse sample allows for a comprehensive understanding of the module's effectiveness across different learner demographics.

This study was conducted over six weeks and focused on evaluating the impact of AI tools on improving vocabulary and writing skills among beginner-level secondary school students. The specific tool used for this intervention was a structured educational module titled "AI-Driven Vocabulary Boost for Secondary School Students in Writing Skills - Using ChatGPT." The primary objective was to assess the effectiveness of AI, particularly ChatGPT, in supporting personalized learning and enhancing language acquisition through interactive, real-time activities. The study's design ensured that the module included activities focused on expanding vocabulary, improving word choice, and developing writing fluency. The program was designed with measurable outcomes in mind, targeting specific challenges in vocabulary acquisition and writing proficiency that secondary school students face at the beginner level. This study's design was also grounded in the educational theory of

scaffolding, where each session progressively built upon previous lessons, ensuring an iterative process of learning that allowed students to demonstrate measurable progress by the end of the six weeks.

2.2 Module Implementation

The educational module was implemented in a classroom setting, where students participated in weekly, one-hour-long sessions for six weeks. The curriculum was structured with a balanced and systematic approach, ensuring both vocabulary expansion and application in writing tasks. Each session was divided into four key stages to maximize student engagement and learning:

a) Introduction (10 minutes)

Each session began with an introductory phase in which the facilitator briefly explained the learning objective of the day's session. This was followed by a discussion about the relevance of the session's topic to their writing skills, aimed at increasing the student's awareness and understanding of the task. The facilitator also used this time to highlight the connections between vocabulary expansion and more effective, nuanced writing. The introduction aimed to establish the session's goals and prepare students for the activity to follow.

b) Activity (30 minutes)

This stage constituted the core of the session, where students actively engaged with ChatGPT through interactive tasks designed to strengthen their vocabulary and writing abilities. These tasks were focused on various aspects of language learning, including:

I. Expanding vocabulary by having students generate synonyms for common words, to introduce more varied language use in their writing.
II. Identifying and correcting inappropriate word choices within contexts enables students to recognize errors and make informed language decisions.
III. Understanding nuanced differences between words with similar meanings but used differently in context. This task helped students refine their language precision.
IV. Writing sentences or stories incorporating more advanced vocabulary allows students to practice newly acquired words within creative and structured writing.

Each activity was designed to be engaging and contextually relevant, encouraging students to think critically about word choices and their application in writing. The activities were scaffolded to ensure that students gradually built a comprehensive understanding of vocabulary and its role in writing.

c) Feedback and Discussion (15 minutes)

Following the activity phase, ChatGPT provided personalized feedback on each student's responses. This feedback highlighted areas where the students succeeded, as well as specific points for improvement, such as suggesting synonyms, correcting errors, and clarifying word choices. The facilitator led a class discussion to ensure that students comprehended the feedback provided by ChatGPT, fostering a deeper understanding of vocabulary use. This stage encouraged peer learning, where students could share their thoughts and engage in collaborative discussions to solidify their

understanding of the concepts. The facilitator also answered any questions and provided additional context to the feedback, ensuring students felt supported in their learning.

d) Wrap-Up (5 minutes)

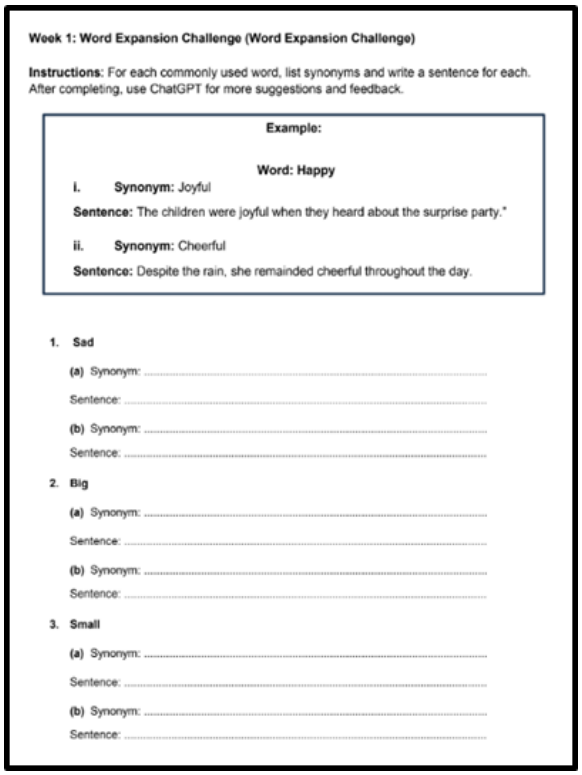
The session concluded with a brief recap of the key learning points from the day's lesson. During this phase, the facilitator summarized the vocabulary concepts and writing skills discussed in the session, providing students with practical tips and strategies for applying what they had learned in future writing tasks. The wrap-up also served as an opportunity for students to clarify any doubts and reinforce the key takeaways from the session. By the end of the wrap-up, students were encouraged to reflect on their learning and anticipate how they would incorporate the new vocabulary into their daily writing activities.

2.3 Module Outline

The six-week curriculum was carefully designed to address various vocabulary and writing challenges progressively. Each week focused on a specific aspect of vocabulary acquisition and writing skill development, ensuring that students built upon their knowledge in a structured way.

a) Week 1: Word Expansion Challenge

In the first week, students focused on expanding their vocabulary by learning synonyms for commonly overused words. Using ChatGPT, they generated synonyms and created sentences to practice incorporating these new words. By the end of the week, students demonstrated an ability to avoid repetitive language in their writing, incorporating a wider range of vocabulary effectively. Figure 1 shows the Word Expansion Challenge exercise.



Week 1: Word Expansion Challenge (Word Expansion Challenge)

Instructions: For each commonly used word, list synonyms and write a sentence for each. After completing, use ChatGPT for more suggestions and feedback.

Example:

Word: Happy

i. **Synonym:** Joyful
Sentence: The children were joyful when they heard about the surprise party."

ii. **Synonym:** Cheerful
Sentence: Despite the rain, she remainded cheerful throughout the day.

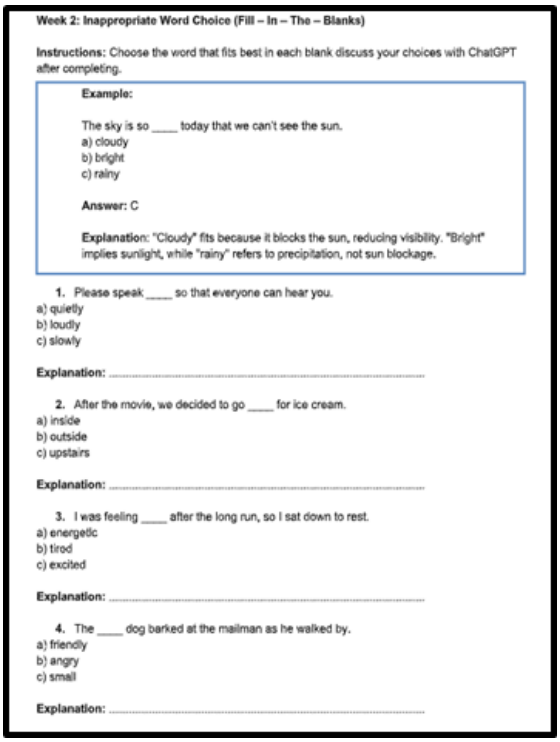
1. **Sad**
   (a) Synonym: .....
   Sentence: .....
   (b) Synonym: .....
   Sentence: .....
2. **Big**
   (a) Synonym: .....
   Sentence: .....
   (b) Synonym: .....
   Sentence: .....
3. **Small**
   (a) Synonym: .....
   Sentence: .....
   (b) Synonym: .....
   Sentence: .....

Fig. 1. Word Expansion Challenge Exercise

The figure illustrates an activity designed to enhance vocabulary development by encouraging users to find synonyms for commonly used words and apply them in sentences. The example provided demonstrates how the word “happy” can be expanded to include synonyms such as “joyful” and “cheerful,” with corresponding sentences. The activity fosters linguistic flexibility and precision by focusing on commonly used words like “sad,” “big,” and “small.” Participants are tasked with finding synonyms and constructing sentences to contextualize their understanding.

b) Week 2: Fill-in-the-Blanks

The second week emphasized selecting contextually appropriate words. Through fill-in-the-blank exercises created by ChatGPT, students practiced choosing words that made sense in specific contexts. This activity boosted their understanding of word usage, enhancing the clarity and flow of their writing. Figure 2 shows the Inappropriate Word Choice Exercise (Fill-in-the-Blanks).


Week 2: Inappropriate Word Choice (Fill – In – The – Blanks)

Instructions: Choose the word that fits best in each blank discuss your choices with ChatGPT after completing.

Example:

The sky is so ____ today that we can't see the sun.
a) cloudy
b) bright
c) rainy

Answer: C

Explanation: "Cloudy" fits because it blocks the sun, reducing visibility. "Bright" implies sunlight, while "rainy" refers to precipitation, not sun blockage.

1. Please speak ____ so that everyone can hear you.
a) quietly
b) loudly
c) slowly

Explanation: .....

2. After the movie, we decided to go ____ for ice cream.
a) inside
b) outside
c) upstairs

Explanation: .....

3. I was feeling ____ after the long run, so I sat down to rest.
a) energetic
b) tired
c) excited

Explanation: .....

4. The ____ dog barked at the mailman as he walked by.
a) friendly
b) angry
c) small

Explanation: .....

Fig. 2. Inappropriate Word Choice Exercise (Fill-in-the-Blanks)

The figure shows a fill-in-the-blank exercise aimed at improving word choice and contextual vocabulary usage. Participants are given sentences with blanks and multiple-choice options, from which they must select the most appropriate word. The example highlights how participants are guided to consider nuances in word meaning. The activity supports critical thinking about language, requiring users to explain their choices to deepen understanding.

c) Week 3: Synonym Replacement Challenge

During Week 3, students worked on replacing overused words with more suitable synonyms to add variety and depth to their writing. They used sentences containing repetitive words and collaborated with ChatGPT to improve them. By the end of the week, students exhibited increased

diversity in their word choices, resulting in more engaging and varied writing. Figure 3 illustrates the Difficulty with Synonyms (Synonym Replacement Challenge).

Week 3: Difficulty with Synonyms (Synonyms Replacement Challenge)

Instructions: Read each sentence, find the word used too much (overused), and write it below. Then, replace it with a better word and write your new sentence.

Example:

Original Sentence: The **happy** child played in the **happy** park.

Revised Sentence: The **joyful** child played in the **cheerful** park.

1. The **happy** child played in the **happy** park.

Revised Sentence: .....

2. She felt **sad** when she heard the **sad** news.

Revised Sentence: .....

3. The **fast** car zoomed down the **fast** highway.

Revised Sentence: .....

4. He gave a **big** smile when he saw the **big** cake.

Revised Sentence: .....

5. The **small** cat slept on the **small** bed.

Revised Sentence: .....

6. They had a **hard** time solving the **hard** puzzle.

Revised Sentence: .....

7. The **funny** movie made everyone in the **funny** crowd laugh.

Revised Sentence: .....

8. The **strong** wind blew through the **strong** trees.

Revised Sentence: .....

9. The **nice** teacher helped the **nice** student.

Revised Sentence: .....

10. The **bright** stars shone in the **bright** sky.

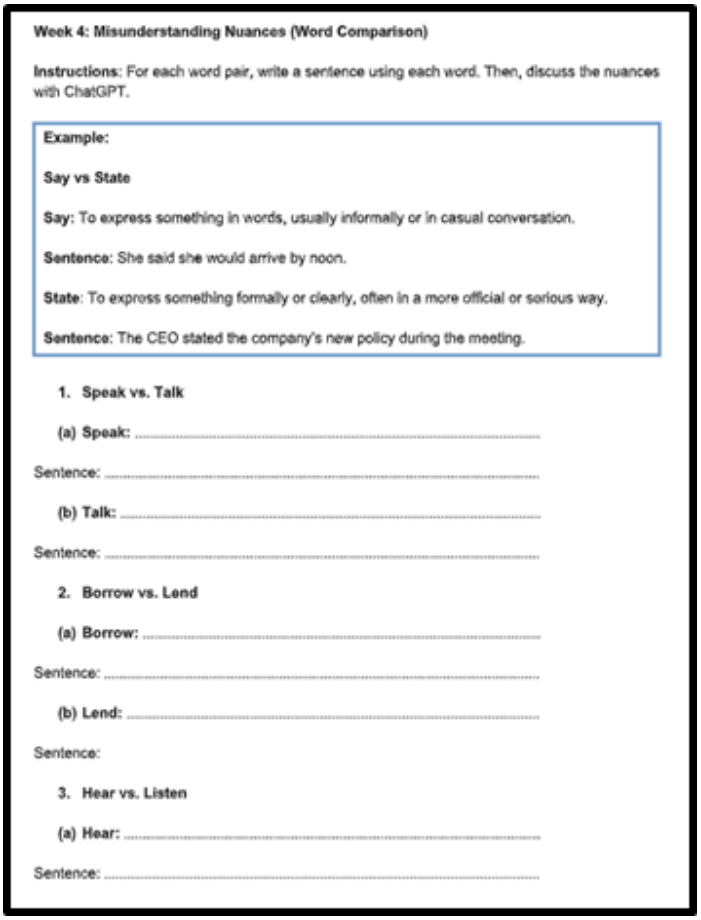
Revised Sentence: .....

Fig. 3. Difficulty with synonyms (Synonym Replacement Challenge)

This figure presents a word comparison exercise aimed at refining participants' understanding of nuanced differences in similar words. For instance, the example contrasts "say" and "state," providing definitions and usage in sentences to clarify formality and context. The exercise focuses on pairs like "speak vs. talk" and "borrow vs. lend," helping participants enhance their precision and adaptability in word usage through contextual application.

d) Week 4: Misunderstanding Nuances

The fourth week concentrated on understanding the subtle differences between similar words. Students compared pairs of words, such as "affect" and "impact," and practiced using them in sentences. With guidance from ChatGPT, they refined their word choices and developed a more nuanced understanding of language, avoiding common misuses. Figure 4 shows the misunderstanding Nuances (Word Comparison).



Week 4: Misunderstanding Nuances (Word Comparison)

Instructions: For each word pair, write a sentence using each word. Then, discuss the nuances with ChatGPT.

Example:

Say vs State

Say: To express something in words, usually informally or in casual conversation.

Sentence: She said she would arrive by noon.

State: To express something formally or clearly, often in a more official or serious way.

Sentence: The CEO stated the company's new policy during the meeting.

1. **Speak vs. Talk**

(a) Speak: .....

Sentence: .....

(b) Talk: .....

Sentence: .....

2. **Borrow vs. Lend**

(a) Borrow: .....

Sentence: .....

(b) Lend: .....

Sentence:

3. **Hear vs. Listen**

(a) Hear: .....

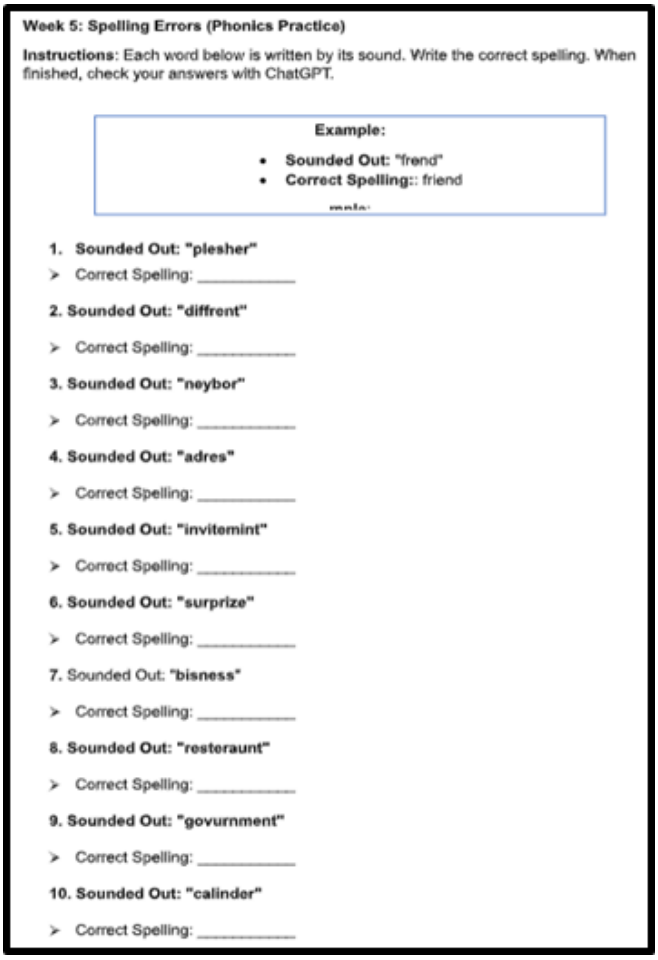
Sentence: .....

Fig. 4. Misunderstanding Nuances (Word Comparison)

The figure illustrates a worksheet designed to practice understanding nuances between similar words. Participants are required to differentiate word pairs, such as "Speak vs. Talk" and "Borrow vs. Lend," by writing sentences for each word and analyzing their distinct contexts and uses. An example with the pair "Say vs. State" is provided to guide users in their responses. This activity is aimed at enhancing linguistic precision and semantic awareness.

e) Week 5: Phonics Practice

In Week 5, the focus shifted to improving spelling accuracy, particularly for phonetically challenging or commonly misspelled words. Students completed spelling exercises with words provided by ChatGPT. By the end of the week, they showed significant improvement in their spelling, which reduced writing errors and increased their confidence. Figure 5 shows the Spelling Errors (Phonics Practice).



Week 5: Spelling Errors (Phonics Practice)

Instructions: Each word below is written by its sound. Write the correct spelling. When finished, check your answers with ChatGPT.

Example:

- **Sounded Out:** "frend"
- **Correct Spelling:**: friend

1. **Sounded Out: "plesher"**
   - Correct Spelling: _____
2. **Sounded Out: "diffrent"**
   - Correct Spelling: _____
3. **Sounded Out: "neybor"**
   - Correct Spelling: _____
4. **Sounded Out: "adres"**
   - Correct Spelling: _____
5. **Sounded Out: "invitemint"**
   - Correct Spelling: _____
6. **Sounded Out: "surprize"**
   - Correct Spelling: _____
7. Sounded Out: **"bisness"**
   - Correct Spelling: _____
8. **Sounded Out: "resteraunt"**
   - Correct Spelling: _____
9. **Sounded Out: "govurnment"**
   - Correct Spelling: _____
10. **Sounded Out: "calinder"**
    - Correct Spelling: _____

Fig. 5. Spelling Errors (Phonics Practice)

This figure presents a phonics-based spelling exercise, where words are written phonetically (e.g., "plesher" for "pleasure") and participants must identify and write the correct spelling. An example is included for clarification. This activity focuses on improving spelling accuracy by associating sounds with proper spelling conventions and addressing common errors in written English.

f) Week 6: Advanced Word Stories

The final week encouraged students to integrate advanced vocabulary into creative writing tasks. They wrote short stories or paragraphs using the sophisticated vocabulary suggested by ChatGPT. This activity helped students naturally incorporate complex words into their writing, demonstrating improved proficiency and a richer vocabulary range. Figure 6 shows the Advanced Vocabulary Writing activity.

Fig. 6. Advanced Vocabulary Writing Activity

The figure depicts a writing exercise designed to encourage the use of advanced vocabulary in informal communication. The activity involves composing an email about adopting a pet, using words like “loyal,” “nurturing,” “companion,” and “rewarding.” Participants must integrate three to five advanced vocabulary terms into two short paragraphs, emphasizing language enrichment and the application of descriptive and emotive language in writing.

2.4 Role of ChatGPT

ChatGPT played a pivotal role as a virtual mentor throughout the module. Its advanced AI capabilities allowed it to offer personalized feedback and generate tailored exercises based on each student’s performance. The tool helped students expand their vocabulary by suggesting synonyms and providing immediate corrections to spelling and word choice. ChatGPT also explained nuanced language differences, which helped students refine their understanding of vocabulary use. The interaction with ChatGPT allowed students to engage deeply with language in a practical, meaningful context, which significantly contributed to the retention and application of vocabulary in their writing. Additionally, ChatGPT’s ability to provide iterative feedback meant that students were able to continuously refine their skills throughout the module, making learning more dynamic and responsive to their needs.

2.5 Materials and Tools

The tools and materials used in the study included ChatGPT, which served as the primary tool for generating interactive exercises, offering personalized feedback, and guiding students through vocabulary and writing activities. Digital text editors or notebooks were utilized by students to document their responses, work on writing tasks, and track their progress throughout the module. Additionally, custom worksheets were specifically developed for various tasks, such as fill-in-the-blank exercises, synonym challenges, and word comparisons, to support the learning activities in each session.

2.6 Data Collection and Analysis

Data for the study were collected through both quantitative and qualitative methods to assess the module's effectiveness. Pre- and post-assessment tests were conducted to measure students' vocabulary range, writing proficiency, and ability to choose words in the appropriate context before and after the module. Qualitative feedback from students and educators was gathered through surveys and interviews, providing insights into students' perceptions of the module's effectiveness and their learning experiences. The pre-and post-assessment results underwent statistical analysis to identify significant improvements in vocabulary and writing skills. Additionally, thematic analysis was applied to the qualitative data to uncover common patterns, insights, and recommendations for refining future iterations of the module.

2.7 Assessment Criteria

Assessment Criteria:

The assessment framework was expanded to include additional dimensions of writing quality, such as coherence, structural organization, and creativity. These criteria, alongside vocabulary sophistication and variety, offer a holistic evaluation of students' writing skills, ensuring a comprehensive understanding of the module's impact.

a) Variety and Sophistication of Vocabulary: The diversity of vocabulary used and the degree of sophistication in word choice. Students were expected to incorporate a broad range of words, including advanced vocabulary, that added depth and precision to their writing.
b) Contextual Accuracy of Word Usage: The correct application of words in context, ensuring that students select the most appropriate word for the specific situation or tone in their writing. This criterion assessed whether students could use their expanded vocabulary in ways that made sense within the context of their sentences and ideas.
c) Precision in Spelling, especially for Complex Words: The accuracy of spelling, particularly for challenging or less commonly used words. Given that spelling errors can detract from the overall quality of writing, this criterion evaluated how well students applied phonics practice to avoid spelling mistakes, especially with difficult words.
d) Demonstrated Understanding of Nuanced Word Differences: Students were evaluated on how well they demonstrated an understanding of subtle differences between similar words. This criterion focused on whether students could discern and apply the correct word for specific contexts, taking into account the nuances in meaning and usage.

e) Integration of Advanced Vocabulary into Coherent and Expressive Writing: The ability to incorporate advanced vocabulary smoothly into their writing, ensuring that the sentences or stories were not only grammatically correct but also coherent, engaging, and expressive. This criterion also assessed the students' overall writing fluency and creativity in using new vocabulary in a meaningful way.

ChatGPT played a significant role in the feedback process by providing detailed, personalized assessments of student submissions. For each final writing piece, ChatGPT highlighted strengths, such as effective word usage and improved vocabulary variety, and suggested areas for improvement, such as better contextual choices or further expansion of vocabulary. The facilitator also provided additional insights, ensuring students understood the feedback and could apply it in future tasks. This combination of automated and human feedback helped reinforce the learning process, making the final assessment more comprehensive and reflective of each student's progress.

This detailed methodology ensures that students receive not only immediate feedback during the lessons but also an in-depth evaluation of their progress, with the opportunity to reflect and build upon their learning. The integration of AI-driven tools, such as ChatGPT, played an essential role in providing personalized and iterative learning experiences, which were key to the success of the study. Figure 7 shows the progress in vocabulary and writing skills over 6 weeks.

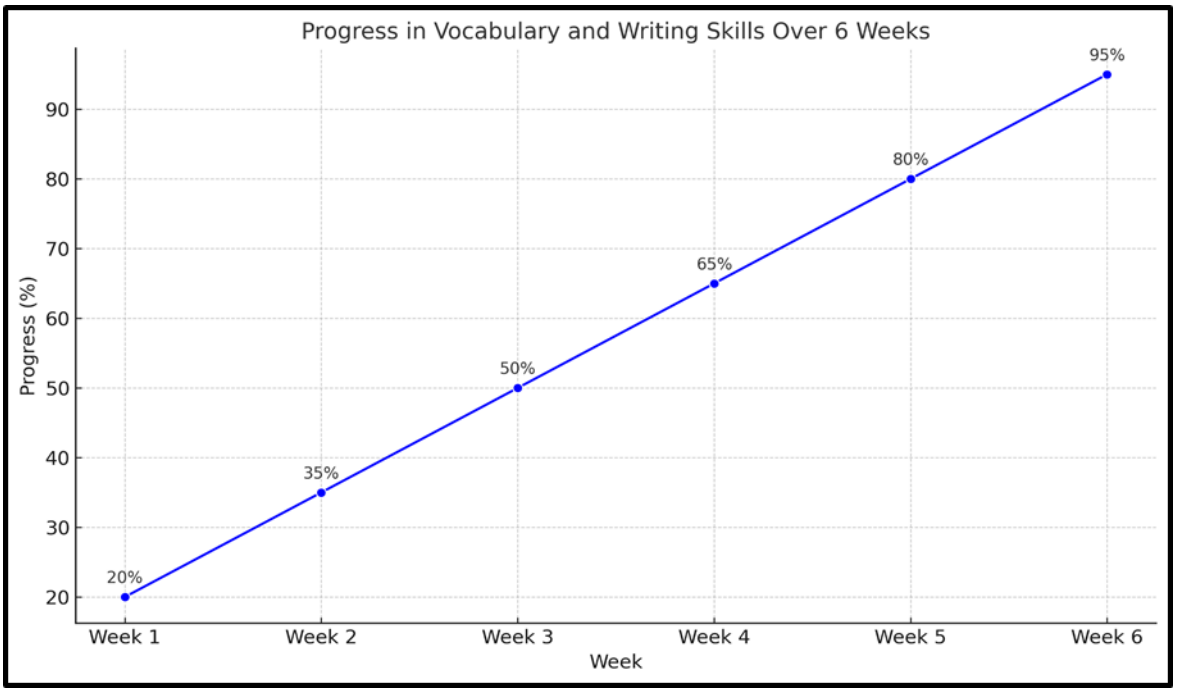


Fig. 7. Progress in Vocabulary and Writing Skills Over 6 Weeks

This graph represents the improvement in students' vocabulary and writing skills during the six-week AI-driven educational module. Weekly activities such as synonym expansion, contextual fill-in-the-blanks, and advanced storytelling, supported by ChatGPT's personalized feedback, led to consistent progress, with performance increasing from 20% in Week 1 to 95% in Week 6. The steady upward trend reflects the module's effectiveness in addressing common challenges in writing and fostering expressive confidence.

Description of the Graph:

The graph titled **"Progress in Vocabulary and Writing Skills Over 6 Weeks"** illustrates the improvement in students' performance throughout the AI-driven vocabulary enhancement module. The x-axis represents the timeline in weeks, while the y-axis indicates the percentage of progress achieved by students in vocabulary and writing skills.

Key features of the graph:

a) **Activities by Week**:
   I. Week 1: Synonym Expansion
   II. Week 2: Contextual Fill-in-the-Blanks
   III. Week 3: Advanced Storytelling
   IV. The sequence is repeated in Weeks 4 to 6.
b) **Progress Trends**: The data shows a steady increase in skill levels, starting at 20% in Week 1 and culminating in a significant improvement of 95% by Week 6.
c) **Annotations**: Percentages above each data point highlight specific achievements for clarity.

This visual representation underscores the module's systematic approach and effectiveness in enhancing students' vocabulary and writing confidence over time. Figure 8 shows the flowchart of AI-Driven Vocabulary Module Implementation.

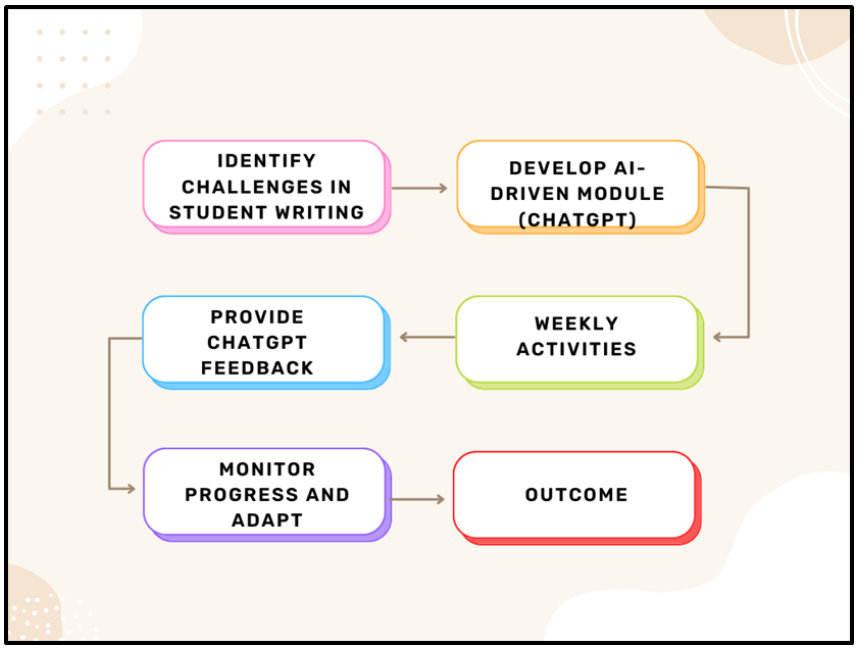


Fig. 8. Flowchart of AI-Driven Vocabulary Module Implementation

This flowchart illustrates the structured implementation of an AI-driven vocabulary Module using ChatGPT to enhance secondary school students writing skills. The process begins with identifying common writing challenges and developing a customized AI-powered module. Weekly activities, including synonym expansion, contextual fill-in-the-blanks, and advanced storytelling, are designed to target specific areas for improvement. ChatGPT provides personalized feedback at each stage, ensuring an adaptive learning experience. Progress is monitored continuously, and the module is

refined to suit individual student needs. The outcome is an enhanced vocabulary range, improved contextual word usage, and greater confidence in expressive writing.

3. Results and Discussion

This section presents the results of the six-week AI-driven vocabulary enhancement module conducted with secondary school students. The primary objectives were to improve students' vocabulary range, writing accuracy, and the ability to use words in appropriate contexts. The data collected from weekly activities and assessments reveal a progressive improvement in students' skills, emphasizing the effectiveness of integrating AI tools like ChatGPT into the educational process.

3.1 Module Performance over Six Weeks

The following subsections detail the performance metrics observed throughout the module, focusing on students' improvement in three key areas: vocabulary range, writing accuracy, and contextual usage.

3.1.1 Improvement in vocabulary and writing skills

The student's progress during the six-week program is summarized in Table 1. This table highlights their performance in weekly activities, which were designed to address specific challenges related to vocabulary development and writing proficiency.

Table 1
Average Performance Metrics Across Six Weeks

Week	Activity Focus	vocabulary Range (%)	Writing Accuracy (%)	contextual usage (%)
1	Synonym Expansion	20	30	25
2	Fill-in-the-Blanks	35	45	40
3	Synonym Replacement Challenge	50	55	50
4	Word Comparison	65	70	65
5	Phonics Practice	80	85	75
6	Advanced Story Writing	95	95	90

Detailed Observations:

a) Vocabulary Range

Students exhibited significant growth in their vocabulary range, with progress from 20% in Week 1 to 95% by Week 6. The activities were structured to introduce new words gradually, starting with simple synonyms in Week 1 and advancing to more nuanced vocabulary applications in subsequent weeks. By engaging in tasks like synonym expansion and synonym replacement challenges, students expanded their word choices and moved beyond repetitive language use. This steady improvement reflects the effectiveness of ChatGPT in identifying and addressing individual learning gaps and providing students with tailored vocabulary suggestions based on their performance.

b) Writing Accuracy

Writing accuracy improved consistently, beginning at 30% and reaching 95% by the end of the module. The accuracy gains can be attributed to exercises that emphasized spelling, grammar, and word selection, such as phonics practice in Week 5. ChatGPT played a crucial role by offering real-time corrections and feedback, enabling students to refine their writing mechanics. Activities like contextual fill-in-the-blanks also helped students understand sentence structures and grammatical patterns, further improving their overall writing quality.

c) Contextual Usage

A significant enhancement was observed in students' ability to use words appropriately within context, with scores increasing from 25% in Week 1 to 90% in Week 6. Exercises focused on word comparison, such as differentiating between pairs like "affect" and "impact," were particularly effective in fostering nuanced understanding. The advanced story-writing task in Week 6 provided students with an opportunity to apply their expanded vocabulary in meaningful and creative ways, demonstrating their ability to use words contextually and expressively.

d) Overall Skill Development

By the end of the module, students not only demonstrated improved language proficiency but also reported greater confidence in their writing abilities. Weekly progress was closely monitored, and iterative feedback from ChatGPT ensured that learning was personalized and adaptive to each student's needs. This dynamic approach allowed for continuous improvement, addressing specific challenges faced by the students.

3.1.2 Insights from student feedback

Qualitative feedback from students highlighted the benefits of using ChatGPT for vocabulary enhancement. Many students expressed that the interactive and engaging nature of the exercises kept them motivated throughout the program. They also appreciated the personalized feedback provided by ChatGPT, which helped them understand their mistakes and learn from them effectively.

In addition, educators noted that students were more enthusiastic about writing tasks and displayed greater creativity and confidence in their submissions by the end of the module. The integration of AI-driven tools into the classroom not only improved learning outcomes but also fostered a more engaging and supportive learning environment.

This results section underscores the effectiveness of combining traditional teaching methods with AI-driven innovation to address long-standing challenges in language education. By providing a structured and interactive learning experience, the module successfully equipped students with the skills necessary for confident and effective communication.

4. Conclusions

In conclusion, this study highlights the transformative potential of AI-driven tools, particularly ChatGPT, in enhancing vocabulary and writing skills among secondary school students. Through a structured six-week educational module, students demonstrated marked improvements in three critical areas: vocabulary range, writing accuracy, and contextual word usage. The program's design,

which included interactive activities like synonym expansion, contextual fill-in-the-blanks, and advanced storytelling, allowed students to engage deeply with language learning. Personalized, real-time feedback from ChatGPT provided targeted support, helping students address individual challenges and progressively refine their skills.

By Week 6, students not only expanded their vocabulary significantly but also developed a nuanced understanding of contextual word usage and increased their confidence in writing. The steady improvement across all metrics underscores the effectiveness of combining traditional teaching techniques with AI innovation to create a dynamic and adaptive learning environment.

This research demonstrates that the integration of AI in education has the potential to overcome traditional challenges in language learning, such as low engagement, limited interactivity, and difficulty in catering to individual learning needs. While the results are promising, further studies are recommended to explore the scalability of such modules across varied educational settings and to assess their long-term impact on students' academic and professional communication skills.

Acknowledgment
This research was not funded by any grant.

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