

Sing & Spell with AI: Enhancing Vocabulary Acquisition through Song-Based Learning in ESL Classrooms

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ABSTRACT

Sing & Spell with AI is an innovation that combines Artificial Intelligence with music-based learning to support vocabulary instruction in ESL primary classrooms. The tool automatically generates customised lyrics by embedding target vocabulary into familiar tunes, reducing teacher preparation time while creating engaging learning experiences. Implemented with 15 Year 2 pupils over two weeks, the intervention showed clear improvements in spelling accuracy and vocabulary recall, especially among lower-proficiency pupils. From the teachers' perspective, the AI-assisted system simplified lesson planning and made vocabulary instruction more effective. The novelty of this approach lies in its integration of AI-generated lyrics with music-based strategies, offering potential for commercialisation through curriculum-based expansion and future development as a subscription-based mobile application.

Keywords: (vocabulary learning, AI-assisted vocabulary instruction, music-based learning)

INTRODUCTION

Vocabulary acquisition plays a central role in language learning, particularly at the primary school level where children are building foundational literacy. Without adequate vocabulary, learners often struggle with reading comprehension, writing and oral communication. Songs and rhymes have long been recognised as effective strategies for vocabulary learning as they provide rhythm, repetition and context that support memorisation and pronunciation (Karote Rajan & Saadat, 2024; Kholid, Rini, & Winasari, 2024).

Problem Statement

Despite the proven benefits of songs and rhymes, teachers often face time constraints in preparing such materials which limits their classroom use. Traditional approaches may not provide enough engaging or multisensory exposure to vocabulary, leading to difficulties in retention, especially for lower-proficiency learners. Teachers in Malaysian ESL classrooms have reported that curriculum demands restrict the time they can dedicate specifically to vocabulary instruction (Manap, Ramli, & Mohd Tahir, 2025).

In today's era, where Artificial Intelligence is increasingly integrated into education, it presents practical solutions for enhancing vocabulary instruction. One such application is the ability to generate customised lyrics that embed target vocabulary into familiar tunes thereby reducing lesson preparation time. With this in mind, Sing & Spell with AI was developed as an innovation aimed at supporting teachers and pupils in achieving effective and enjoyable vocabulary learning.

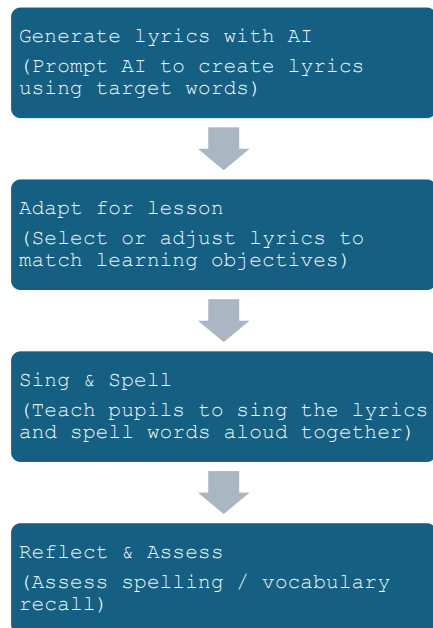
Objectives

1. To enhance Year 2 pupils' spelling accuracy and vocabulary recall through the use of Sing & Spell with AI.
2. To minimise teacher preparation time by utilising AI-generated lyrics for vocabulary instruction.
3. To promote learner motivation and active participation through music-based vocabulary learning.

PRODUCT DESCRIPTION & METHODOLOGY

Sing & Spell with AI is an innovation that combines artificial intelligence with music-based learning. Using an AI text generator, teachers input target vocabulary, and the system automatically creates lyrics that fit into the rhythm of familiar tunes such as London Bridge is Falling Down. This makes lessons easier to prepare, more engaging for pupils, and adaptable to different vocabulary themes. The framework of the product (as shown in Figure 1) outlines four main steps:

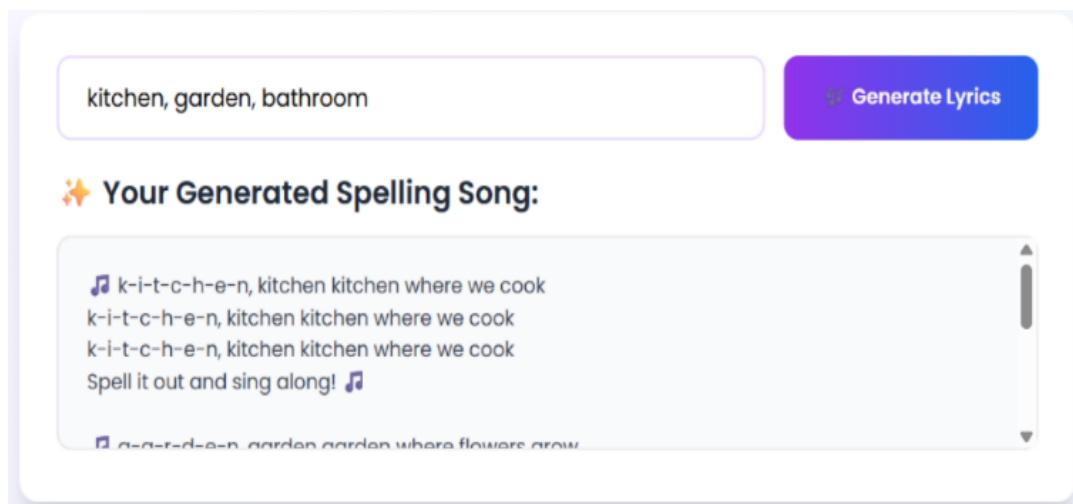
Figure 1 Sing & Spell with AI framework



The framework illustrates the four stages of the innovation: selecting target vocabulary, generating AI-assisted lyrics, classroom singing, and assessing spelling or vocabulary recall.

Sample AI-generated lyrics are illustrated in Figure 2 showing how target vocabulary is embedded naturally into song verses.

Figure 2 Sample AI-generated lyrics



Using Sing & Spell with AI, teachers only need to key in the target vocabulary and the platform automatically produces song lyrics that embed the words into familiar tunes. This reduces preparation time while ensuring engaging and meaningful vocabulary practice for pupils.

POTENTIAL FINDINGS AND COMMERCIALISATION

Early Results

During the two-week implementation of Sing & Spell with AI, incorporating lyrics and singing into lessons led to clear improvements in vocabulary retention and spelling accuracy particularly among lower-proficiency pupils (as shown in Table 1) who often face difficulties with traditional memorisation methods. Verbal assessments conducted after the intervention revealed that pupils not only remembered how to spell the words but were also able to accurately recall the word meaning embedded in the songs. This suggests that the combination of rhythm, repetition and AI-generated lyrics supported recognition and vocabulary understanding.

From the teachers' perspective, the integration of AI to generate lyrics significantly reduced preparation time making vocabulary instruction more efficient and purposeful. Furthermore, classroom observations revealed higher levels of learner motivation and active participation. This indicates that music-based AI tools can foster a more engaging and supportive learning environment.

Table 1 Pre-test and Post-test Scores

Pupil	Number of correct spelling (Pre-test)	Number of correct spelling (Post-test)
1	0	4
2	2	6
3	1	6
4	4	8
5	4	6
6	8	8
7	7	8
8	8	8
9	8	8
10	8	8
11	8	8
12	8	8
13	8	8
14	8	8
15	8	8

Commercialisation

In terms of commercialisation potential, Sing & Spell with AI can be further expanded to cover a wider range of topics and vocabulary sets across grade levels following the syllabus in the curriculum. As an online platform, it provides teachers with an easily accessible resource that requires minimal preparation.

The innovation can also be developed into a subscription-based mobile application where teachers simply select a tune and input target vocabulary and the system automatically generates customised lyrics.

This model offers scalability and sustainability which makes the product both practical for classroom use and marketable within the broader educational technology sector.

NOVELTY AND RECOMMENDATIONS

The novelty of Sing & Spell with AI lies in its unique integration of music-based vocabulary instruction with the use of Artificial Intelligence (AI). Unlike traditional method where teachers spend considerable amount searching for song and creating suitable lyrics and rhythm, this innovation automatically generates customised lyrics based on target vocabulary, allowing teaches to deliver meaningful vocabulary lessons with minimal

preparation time. The AI-driven component provides flexibility to adapt across different vocabulary sets and topics.

For future development, Sing & Spell with AI can be expanded to include a wider selection of tunes and thematic vocabulary banks to cater to various proficiency levels and curriculum needs. The platform can also be enhanced with other interactive features such as gamified quizzes and pronunciation guide to support both teachers and learners.

In addition, incorporating structured interviews or classroom observations can provide qualitative evidence of learner engagement and retention. These data would help to validate the observed improvements and offer richer insights into how pupils respond to AI-generated song-based learning. Longitudinal testing could also be conducted to examine the sustainability of learning gains over time particularly in maintaining vocabulary recall.

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