The Use of Artificial Intelligence in the Learning of Malay Proverbs among Secondary School Students in the District of Semporna

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ABSTRACT

This study aims to evaluate the effectiveness of Artificial Intelligence (AI) in the learning of Malay proverbs among secondary school students in Semporna District, Sabah. The use of AI in education is perceived to strengthen students' comprehension through immediate feedback, adaptive content, and self-directed learning. This study employed a quasi-experimental design involving two groups of Form Five students: the Experimental group (learning with AI applications) and the Control group (traditional teaching). A total of 60 students with moderate academic achievement were selected as the study sample. The research instruments consisted of pre- and post-tests designed to measure students' understanding and achievement in Malay proverbs. Data were analyzed using SPSS version 27 through independent and paired sample t-tests. The findings revealed significant differences in mean scores between the Experimental and Control groups, as well as notable improvements between pre-test and post-test scores within the Experimental group. These results indicate that AI-based learning has a positive impact on students' achievement in learning Malay proverbs. This study is expected to provide valuable implications for Malay language teachers in utilizing AI technology as an alternative, interactive, and effective approach to teaching proverbs.

Keywords: Artificial intelligence, Malay proverbs, learning, secondary school, quasi-experimental

INTRODUCTION

Proverbs represent a significant linguistic heritage that reflects the beauty, refinement of character, and moral values of the Malay community. In the context of Malay language education, mastery of proverbs is essential as it not only develops linguistic competence but also reflects students' understanding of the culture and worldview of the Malay society. However, numerous studies have shown that students often face difficulties in mastering proverbs due to their figurative and symbolic nature, which are sometimes not directly comprehensible. This has resulted in confusion or a lack of interest when proverbs are taught through conventional methods that are less interactive.

In line with the advancement of the Fourth Industrial Revolution (IR 4.0), the education sector has also undergone significant transformation through the integration of modern technologies, including Artificial Intelligence (AI). Within the context of Malay language learning, AI has the potential to assist teachers and students by providing a more dynamic, adaptive, and self-directed learning environment. This technology not only allows content to be delivered interactively but also provides feedback and adapts learning materials according to students' proficiency levels. The use of AI applications in teaching proverbs is expected to enhance students' comprehension of implied meanings through visualization, contextual examples, interactive quizzes, and realistic simulations.

This study was conducted to evaluate the effectiveness of AI in the learning of Malay proverbs among secondary school students through a quasi-experimental design. It focuses on the effectiveness of AI in improving students' achievement in terms of understanding and mastery of proverbs compared to traditional teaching methods. The findings of this study are expected to contribute significantly to the pedagogy of Malay language and serve as a guide for the Ministry of Education Malaysia, Malay language teachers, and researchers to integrate AI technology more effectively in the teaching and learning process.

Problem Statement

Digital learning refers to an approach that integrates advancements in digital technology into the implementation of the teaching and learning (T&L) process (Maimun Aqsha Lubis et al., 2021). In line with current technological developments, educators must ensure that this approach is effectively combined with pedagogical principles to create a more dynamic learning environment that meets the needs of 21st-century education (You Eng & Choo Keong, 2019). Consequently, a variety of advanced technological tools have been incorporated into different teaching approaches, among which is Artificial Intelligence (AI). Initially, AI technologies gained prominence mainly in industries such as commerce, film, and medicine. However, the field of education has also been significantly impacted by AI, which has transformed the educational landscape in Malaysia.

The empowerment of AI use in education aims to enrich students' learning experiences by providing instant feedback, adaptive content, and the strengthening of self-directed and inquiry-based learning. In the context of Malay language learning, technologies such as language chatbots, intelligent learning systems, and adaptive learning software have been introduced to increase student engagement and improve academic performance.

Although Malaysia's education system is becoming increasingly modern and technology-driven, traditional teacher-centered methods are still commonly practiced in Malay language classrooms. Many Malay language teachers continue to rely heavily on whiteboards and textbooks. As a result, students often become disengaged and perceive Malay language classes as uninteresting. AI can help create a more engaging and interactive learning environment, thereby enhancing students' confidence and openness in using the Malay language for communication.

One of the challenges faced by Malay language teachers when teaching topics that are perceived as less relevant to today's younger generation is the inclusion of classical Malay literature and proverbs in the curriculum. In teaching proverbs, many teachers still rely on rote memorization techniques, requiring students to memorize both the proverbs and their meanings simultaneously. Teachers often do not provide detailed explanations of the individual words within the proverbs or their relevance to real-life contexts. Consequently, students rely only on memorization, which has become a deeply ingrained teaching practice for proverbs. Teachers, therefore, play a crucial role in ensuring that students are not confined to outdated methods.

A study by Nor Hashimah Jalaluddin and Junaini Kasdan (2010) revealed that 894 respondents failed to master proverbs because they struggled to understand the meanings embedded within them. Mohd Ridzuan Md Nasir (2017) further supported this claim, finding that many individuals failed to understand proverbs due to their inability to grasp the implicit meanings. Similarly, Mary Fatimah Subet and Mohd Ridzuan Md Nasir (2019) highlighted that students' weak mastery of proverbs is largely due to ineffective teaching techniques. Collectively, these studies confirm that students in schools face difficulties in understanding the meanings of proverbs and in applying them effectively in both spoken and written communication.

Another factor contributing to students' limited understanding of proverbs is their level of motivation. When learning proverbs, students often feel pressured to comprehend the lexical meaning of phrases that are complex and not interpretable literally, leading to discouragement and loss of interest (Samburskiy, 2020). This phenomenon poses challenges to the effective internalization of curriculum content as outlined by the Ministry of Education Malaysia (MOE) through the Standard Curriculum and Assessment Document (DSKP) for Malay Language. In addition, teacher competency also influences students' learning of proverbs. Teachers with limited pedagogical expertise in teaching proverbs may hinder students' mastery and appreciation of their meanings.

Despite evidence of the potential benefits of advanced technologies, particularly AI, in Malay language education, several challenges remain. One such challenge is the lack of AI-based learning materials specifically designed for the cultural and linguistic context of the Malay language, which often forces students to rely on foreign-language resources that may be less relevant to the local context (Norazah Mohd Nordin et al., 2021). Moreover, many Malay language teachers are not fully prepared to integrate AI into their teaching due to limited training or exposure, which undermines the effectiveness of AI implementation in classrooms.

Therefore, to assist students in understanding the lexical meanings of Malay proverbs found in the Form Four and Form Five textbooks, there is a pressing need to implement and examine in depth the influence of AI in improving students' comprehension and achievement in learning Malay proverbs in Malaysia. At the same time, proverbs—especially aphorisms (kata-kata hikmat)—should be emphasized as an essential component of Malay cultural heritage that shapes students' personalities to become more dynamic and competitive. Aphorisms are not merely stylistic expressions but are rich with moral lessons and guidance for daily life (Zaitul Azma Zainon Hamzah & Ahmad Fuad Mat Hassan, 2011).

Research Objectives

The purpose of this study is to identify the effectiveness of using Artificial Intelligence (AI) technology in learning Malay proverbs among secondary school students in the district of Semporna, Sabah. More specifically, this study seeks to achieve the following objectives:

1. To identify the differences in pre-test performance between the Experimental group and the Control group in learning Malay proverbs.
2. To identify the differences in post-test performance between the Experimental group using AI applications and the Control group using traditional methods in learning Malay proverbs.
3. To identify the differences in pre-test and post-test performance within the Experimental group when using AI technology in learning Malay proverbs.

Research Hypotheses

Several hypotheses were formulated to address the research objectives of this study. They are as follows:

1. **Hypothesis for Objective 1**

2. H_{01}: There is no significant difference in pre-test mean scores between the Experimental group and the Control group in learning Malay proverbs before the use of AI applications.

3. H_{11}: There is a significant difference in pre-test mean scores between the Experimental group and the Control group in learning Malay proverbs before the use of AI applications.

4. **Hypothesis for Objective 2**

5. H_{02}: There is no significant difference in post-test mean scores between the Experimental group using AI applications and the Control group using traditional methods in learning Malay proverbs.

6. H_{12}: There is a significant difference in post-test mean scores between the Experimental group using AI applications and the Control group using traditional methods in learning Malay proverbs.

7. **Hypothesis for Objective 3**

8. H_{03}: There is no significant difference between the pre-test and post-test mean scores within the Experimental group using AI applications in learning Malay proverbs.

9. H_{13}: There is a significant difference between the pre-test and post-test mean scores within the Experimental group using AI applications in learning Malay proverbs.

RESEARCH METHODOLOGY

Research Design

This study employed a quasi-experimental design involving two sample groups: the Experimental group and the Control group. The purpose of this design was to evaluate the effects of using Artificial Intelligence (AI)

technology in learning Malay proverbs. The Experimental group received innovation by being taught with AI applications to understand the meaning of proverbs, while the Control group was taught using traditional methods, relying only on explanations and the whiteboard.

The quasi-experimental design used in this study followed the pre-test and post-test structure for both the Experimental and Control groups, as illustrated in Table 1.

Table 1: Pre-Test–Post-Test Design for Two Groups

Group	Pre-Test (P1)	Teaching Method	Post-Test (P2)
Experimental	P1	Q1 (AI-based learning for 9 weeks)	P2
Control	P1	Q2 (Traditional learning for 9 weeks)	P2

This design was chosen to examine the implications of two different teaching approaches for Malay proverbs among students with average achievement levels. The Control group received instruction through traditional methods, while the Experimental group received intervention through AI-based learning of Malay proverbs.

Population and Sample

The study involved Form Five students from a secondary day school in the Semporna district. This location was chosen to facilitate data collection, with the school administration providing full cooperation throughout the study. A total of 60 students participated, with 30 in the Experimental group and 30 in the Control group. The Control group was taught Malay proverbs using traditional methods, whereas the Experimental group used AI applications. Both groups completed two tests: a pre-test before the intervention and a post-test after the intervention. Students were not informed that they were part of an experimental study.

Two Form Five classes with low to moderate achievement levels were selected. Their results in Malay, particularly in proverb-related questions, were comparable, as determined by the 2024 Final Examination results. The sample was selected through purposive sampling, dividing participants into Experimental and Control groups. This approach was chosen to ensure accuracy and reliability of data, following Cohen's (1988) recommendation on statistical power analysis for adequate sample size. Additionally, purposive sampling helped save time, energy, and costs, as suggested by Majid (2005).

Research Instruments

The research instruments consisted of two sets of test papers: a pre-test and a post-test. The questions were adapted from the Form Four and Form Five Malay language textbooks and structured according to the study's objectives. Instrument validity was established using a Table of Specifications (TOS) aligned with Bloom's revised taxonomy. Expert validation was sought from senior Malay language teachers and excellent teachers with relevant experience.

Data Collection

Upon obtaining ethical approval, the tests were administered to 60 selected students with the assistance of Malay language teachers. Students completed the tests in a controlled environment within a specified time frame to ensure consistency. Malay proverb assessments were conducted simultaneously for both groups. Teachers involved in the study were briefed on the objectives and the importance of their participation. Students were given 20 to 30 minutes to complete the tests.

Data Analysis

Data collected were analyzed using the Statistical Package for the Social Sciences (SPSS) version 27. Descriptive statistics, including percentages, means, and standard deviations, were used to analyze the types of errors in grammar patterns. Independent sample t-tests were conducted to determine the effectiveness of AI

applications in learning Malay proverbs in Semporna. In addition, thematic analysis was applied to explore students' perceptions of AI adoption and the challenges of using AI in secondary schools in the district.

Reliability and Validity of Instruments

The reliability of the test instruments was measured using Cronbach's Alpha, which yielded a value of α = 0.841, indicating high reliability. Instrument validation was confirmed through expert review in the field of Malay language education.

RESEARCH FINDINGS

Hypothesis 1

H_{01}: There is no significant difference in pre-test mean scores between the Experimental group and the Control group in learning Malay proverbs before the use of AI applications.

H_{11}: There is a significant difference in pre-test mean scores between the Experimental group and the Control group in learning Malay proverbs before the use of AI applications.

To address Objective 1—identifying whether there is a difference in pre-test performance between the Experimental and Control groups before using AI applications—an independent sample t-test was conducted. **Table 2** presents the results.

Table 2: Independent Sample t-Test Results for Pre-Test Scores

Group	Mean	Mean Difference	Std. Deviation	t	p
Experimental	.2000	0.033	0.40684	-0.308	0.759
Control	.2333		0.43018		

Significance level: $p > 0.05$

The results show no significant difference in pre-test scores between the Experimental and Control groups. The Experimental group recorded a mean score of 0.2000 (SD = 0.40684), while the Control group recorded 0.2333 (SD = 0.43018). Levene's Test indicated homogeneous variances (p = 0.539, p > 0.05). The t-test value was -0.308 with 58 degrees of freedom, yielding p = 0.759 (p > 0.05).

This indicates that both groups had equivalent baseline performance levels before the intervention. Thus, the null hypothesis (H_{01}) is accepted, and the alternative hypothesis (H_{11}) is rejected.

Hypothesis 2

H_{02}: There is no significant difference in post-test mean scores between the Experimental group using AI applications and the Control group using traditional methods in learning Malay proverbs.

H_{12}: There is a significant difference in post-test mean scores between the Experimental group using AI applications and the Control group using traditional methods in learning Malay proverbs.

Independent sample t-test results revealed significant differences between post-test performances of the two groups. The Experimental group, which used AI applications, achieved a mean score of M = 5.40 (SD = 0.578), while the Control group recorded M = 2.37 (SD = 1.098).

Levene's Test indicated unequal variances (F = 6.776, p = 0.012). Therefore, results were interpreted using the "Equal variances not assumed" row. The analysis showed a statistically significant difference: t(43.94) = 13.387, p < 0.001. The mean difference was 3.03, with a 95% confidence interval [2.58, 3.49].

Table 3: Independent Sample t-Test Results for Post-Test Scores

Group	Mean	Mean Difference	Std. Deviation	t	p
Experimental	5.4	3.03	0.578	13.38	0.012
Control	2.37		1.098		

Significance level: p < 0.05

These results confirm that students in the Experimental group outperformed those in the Control group after the intervention. The null hypothesis (H_{02}) is rejected, and the alternative hypothesis (H_{12}) is accepted.

Hypothesis 3

H_{03}: There is no significant difference between the pre-test and post-test mean scores within the Experimental group using AI applications in learning Malay proverbs.

H_{13}: There is a significant difference between the pre-test and post-test mean scores within the Experimental group using AI applications in learning Malay proverbs.

To answer Objective 3, a paired sample t-test was conducted. Results are shown in **Table 4**.

Table 4: Paired Sample t-Test Results for the Experimental Group

Test	Mean	Mean Difference	Std. Deviation	t	p	Sig. (2-tailed)
Pre	2.43	-1.43	0.473	16.069	0.010	<0.001
Post	3.87		0.468			<0.001

Significance level: p < 0.05

The Experimental group's mean pre-test score was M = 2.43 (SD = 0.473), which increased to M = 3.87 (SD = 0.468) in the post-test. The paired sample test indicated a significant difference, t (29) = -16.069, p < 0.001, with a mean difference of -1.43. These findings confirm that students' achievement improved significantly after the use of AI applications. The null hypothesis (H_{03}) is rejected, and the alternative hypothesis (H_{13}) is accepted.

DISCUSSION

This study was conducted to examine the effectiveness of using Artificial Intelligence (AI) applications in learning Malay proverbs. The analysis of the data demonstrates that AI applications positively influenced students' test performance, particularly in Section B, Question 5 of the Malay Language Paper 2, which focuses on proverbs.

For Hypothesis 1 (H_{01}), the results of the independent sample t-test showed no significant difference in pre-test scores between the Experimental and Control groups (t = -0.308, p = 0.759, p > 0.05). This indicates that both groups began at an equivalent level of achievement before the intervention. This finding is critical, as it confirms that any differences observed in post-test scores are attributable to the intervention rather than pre-existing disparities in student ability. These results align with Emison et al. (2023), who found no significant pre-test differences between experimental and control groups in a study on early childhood mathematics, underscoring the importance of baseline equivalence in quasi-experimental research.

For Hypothesis 2 (H_{02}), the analysis revealed a significant difference in post-test scores between the Experimental and Control groups (t(43.94) = 13.387, p < 0.001). The Experimental group achieved a higher

mean score (M = 5.40) compared to the Control group (M = 2.37), with a mean difference of 3.03. This demonstrates that the Experimental group, which used AI applications, performed substantially better. The results confirm the positive and significant impact of AI applications on students' achievement in Malay proverb learning. This improvement can be attributed to AI's ability to provide interactive, structured, and personalized learning experiences that enhance comprehension and mastery. Similar findings were reported by Norazlin and Zamri (2021), who observed that integrating technology into Malay language teaching improved understanding of abstract concepts and encouraged greater student engagement.

Furthermore, the findings also indicate the relative ineffectiveness of traditional methods in fostering a deeper understanding of proverbs compared to AI-assisted approaches. This supports the view of Al-Mamun et al. (2020), who argued that smart technologies simplify complex learning processes by offering immediate feedback and engaging learning resources.

For Hypothesis 3 (H_{03}), paired sample t-test results revealed a significant improvement in the Experimental group's scores between pre-test (M = 2.43) and post-test (M = 3.87), with t(29) = -16.069, p < 0.001. The mean increase of 1.43 points clearly demonstrates the effectiveness of AI applications in enhancing students' performance. This improvement is not only statistically significant but also pedagogically meaningful, showing that AI fosters deeper understanding through interactive and structured guidance. Additionally, the moderate correlation (r = 0.461) between pre-test and post-test scores suggests that while prior knowledge played a role, the intervention had a significant independent impact on learning outcomes.

These results are consistent with Vygotsky's (1978) constructivist theory, which emphasizes the importance of scaffolding and guided support in knowledge construction. In this context, AI applications serve as digital scaffolds, guiding students to better comprehend the figurative meanings of proverbs and thereby enhancing mastery after the intervention.

Overall, the findings provide strong evidence that AI applications significantly improve students' achievement in learning Malay proverbs.

CONCLUSION

Based on the findings and data analysis, this study confirms that the use of Artificial Intelligence (AI) applications in learning Malay proverbs successfully enhanced the comprehension and mastery of proverbs among secondary school students in the district of Semporna, Sabah. As a result, students were able to answer questions satisfactorily, even at a moderate level, and with encouragement from teachers, they became more motivated to learn diligently, achieving better scores than before. This made learning proverbs more enjoyable through the assistance of AI applications such as ChatGPT, Claude AI, and chatbots.

The integration of AI applications in proverb learning also significantly improved students' understanding and mastery across different testing phases, proving its positive impact. Therefore, the use of AI in Malay language teaching and learning should be widely adopted by teachers, as it simplifies lesson delivery and ensures that daily learning objectives are achieved without unnecessary repetition. Moreover, AI creates a more interactive classroom environment, reducing boredom even when dealing with challenging topics. Students also benefit by being able to take notes more effectively when completing assignments, thereby strengthening their retention of knowledge. This fosters a more positive attitude toward learning new concepts.

With just a few keystrokes on their devices, students can instantly access both literal and figurative meanings of proverbs. Such efficiency not only boosts their learning but also contributes to improved performance in examinations. Consequently, schools must support Malay language teachers in embracing digital learning by encouraging collaboration through Professional Learning Communities (PLC). Implementing PLCs helps teachers share knowledge and skills with colleagues, thus strengthening their digital teaching competencies.

Additionally, numerous training programs and webinars on digital learning—such as Google Level Certificate (GLC), Apple Learning Training (ALT), and others available on the DELIMa platform—provide valuable

opportunities for educators to enhance their expertise. By leveraging these initiatives, teachers will be better equipped to maximize the potential of AI in transforming Malay language education.

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