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The role of interactive gamification through Wordwall Apps to improve students' engagement and literary comprehension

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A B S T R A C T

Background: This study explores the efficacy of interactive gamification through Wordwall Apps in enhancing literary comprehension and student engagement in educational settings. **Objective:** The aim is to determine whether gamification techniques with Wordwall Apps can significantly improve literary learning outcomes compared to traditional teaching methods. **Method:** Utilizing a quasi-experimental design, the research involved control and experimental groups from a sample of high school students, where the latter engaged in gamified learning activitie with Wordwalls. **Results:** The findings reveal that Wordwall gamification markedly increases student engagement and deepens literary comprehension, as evidenced by higher post-test scores in the experimental group compared to the control. **Implication:** These results suggest that interactive gamification not only makes learning more enjoyable but also more effective, encouraging a deeper interaction with literary content. **Novelty:** This not only renews the pedagogical perspective but also broadens the educational discourse by introducing dynamic variables and methods that address the cognitive needs of the modern learner.

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INTRODUCTION

In contemporary education, maintaining student engagement remains a formidable challenge, especially in subjects requiring deep cognitive investment like literary comprehension. The digital era has ushered in myriad distractions that compete for students' attention, diminishing their engagement and consequently, their learning outcomes. However, the integration of technology in educational settings presents a viable solution to recapture student interest and enhance their educational experience. The utilization of interactive gamification through applications like Wordwall represents a critical innovation in this regard. This research is crucial as it explores the efficacy of gamification in education, a strategy that has shown promise but remains underutilized in literature-focused academic curricula.

Previous studies have extensively documented the positive effects of gamification on student engagement (Cahyani, 2016; Chung & Pan, 2023; Hamza et al., 2023; Yang & Kang, 2021; Zeng et al., 2024) and learning outcomes (Buckley & Doyle, 2016; Jivani et al., 2024; Ruelas-Mejía et al., 2024; Yang & Kang, 2021; Zeng et al., 2024) across various disciplines (Mellado et al., 2024; Sawarkar et al., 2024). Specifically, interactive tools like Kahoot, Quizizz, and Google Form have been analyzed for their motivational impacts (Alawadhi & Abu-Ayyash, 2021; Chaiyo & Nokham, 2017; Janković et al., 2024; Lashari et al., 2024; Maraza-Quispe et al., 2024; Rayan & Watted, 2024; Rojabi et al., 2022; Wang et al., 2024). However, unlike these applications, Wordwall offers diverse game formats, including word matching, crosswords, and wheel spins, which cater to various learning styles. Its user-friendly interface allows teachers to create, modify, and adapt content seamlessly, encouraging personalized and active learning experiences in literary comprehension process. Unfortunately, the studies specifically probing the impact of Wordwall apps in enhancing literary comprehension remains scant. While some studies have hinted at the potential benefits of gamification in EFL classes (Matyakhan et al., 2024; Qiao et al., 2023), they did not employ Wordwall as a central tool nor focus exclusively on literary comprehension. This gap underscores the necessity for this study, which aims to directly investigate how Wordwall can specifically improve engagement and comprehension in literature education.

This study aims to address the critical question: How does interactive gamification through Wordwall apps enhance student engagement and comprehension in the process of learning literature? By focusing on this inquiry, the research intends to scrutinize the specific functionalities of Wordwall that could be pivotal in fostering a deeper understanding of literary texts. The objective is to empirically establish the link between gamification elements provided by Wordwall and the improvement of literary comprehension skills, thereby offering a structured analysis of gamification's role in educational psychology within the realm of literature education.

The hypothesis of this study suggests that Wordwall's interactive quizzes and game-based learning activities significantly boost students' interest and participation in literature classes. The hypothesis tested posits that interactive elements such as immediate feedback, competitive scoring, and visually engaging content can lead to higher retention rates and a deeper understanding of literary concepts. These outcomes not only advocate for the integration of Wordwall in literature curricula but also imply a broader application of gamification in education. This research anticipates that successful implementation of gamification through Wordwall could serve as a model for revitalizing traditional teaching methods and enhancing literary education on a global scale.

METHOD

This research, spanning three months, employed a quasi-experimental design (Cigdem et al., 2024; Prados Sánchez et al., 2023; Qiao et al., 2023) to investigate the effects of interactive gamification on student engagement and literary comprehension. Conducted among twelfth-grade language arts students at a private high school in Probolinggo, this study meticulously compared a gamified learning approach against conventional teaching methods. Both experimental and control groups, each consisting of randomly selected clusters from an initial pool of 80 students, engaged with six literary topics: cultural values in short story excerpts, messages from short stories, character traits within these stories, symbolic meanings in poetry excerpts, metaphors in poetry, and main ideas in essays. Classes met weekly for 150 minutes, where the experimental group participated in stages of gamified activities including orientation, game-based learning,

feedback and rewards, and reflection and integration, aiming to enhance literary understanding and engagement.

In contrast, the control group adhered to traditional teaching methods which have been in place for the past five years. This method involved direct instruction on objectives, foundational theories, printed literary works, examples of literary analysis, and student presentations. The research instruments included a 30-item validated student engagement questionnaire and a literary comprehension essay test, with reliability scores of Cronbach's Alpha 0.847 and 0.914 respectively (Barbera et al., 2021). Validity was established through Pearson Correlation (Taber, 2018). Data analysis was conducted using SPSS version 23.0, applying ANOVA to assess differences between groups with a significance level of 5% (Mercado Rueda, 2023). The hypothesis testing aimed to discern the impact of gamification on enhancing student literary engagement and comprehension, setting a foundation for innovative educational practices.

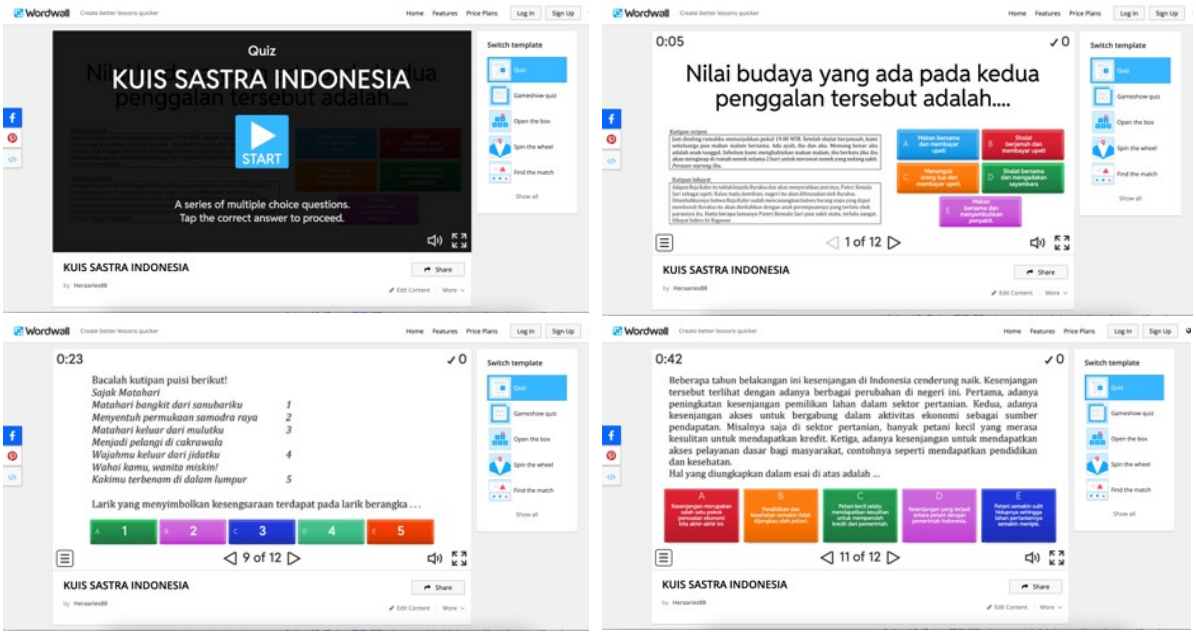


Figure 1. Wordwall features of Indonesian literature
(Source: https://wordwall.net/resource/60038142/kuis-sastra-indonesia)

RESULTS

Implementation of interactive gamification in literary learning

The integration of interactive gamification into the educational process has shown promising results, though it requires continuous guidance and reinforcement to enhance student skills effectively. The gamification activities implemented in the classroom encouraged students to engage in collaborative and enjoyable learning experiences (Forrest et al., 2020; Pacheco et al., 2020; Yang & Kang, 2021), leading them to produce outcomes that align closely with educational objectives. These activities were designed to foster a dynamic learning environment where students could explore literary concepts through interactive games that stimulated analytical thinking and deep comprehension (Najjar & Salhab, 2022; Wang et al., 2024; Zeng et al., 2024). The repetitive nature of the guidance ensures that students are not just participating in these activities for fun, but are also absorbing and applying the literary concepts they learn. The process of integrating gamification within the learning curriculum was observed to increase student motivation and participation significantly, indicating a successful adaptation of traditional teaching methods to more modern, engaging approaches. Table 1 shows the results of analysis of the six learning activities of interactive gamification for twelfth-grade language arts students at a private high school in Probolinggo.

Table 1. Results of analysis of interactive gamification learning

Gamification Syntax	Activity 1 (%)	Activity 2 (%)	Activity 3 (%)	Activity 4 (%)	Activity 5 (%)	Activity 6 (%)
Orientation	85	88	90	92	91	93
Game-Based Learning	75	78	80	82	85	87
Feedback and Rewards	65	68	70	73	75	78
Reflection and Integration	60	62	65	67	70	72

Table 1 outlines the effectiveness of different gamification stages in enhancing student engagement and comprehension through interactive learning. While the percentages indicate a generally positive trend across the six activities, they also reveal areas needing improvement. The incremental increases in each phase —Orientation, Game-Based Learning, Feedback and Rewards, and Reflection and Integration—suggest that while gamification is beneficial, there is significant room for enhancement. For instance, even though the Orientation phase scores are relatively high, other stages show a need for more substantial impacts to ensure deep learning. This data underscores the ongoing need to refine and optimize each aspect of the gamification process to achieve more robust educational outcomes and fully harness the potential of interactive learning environments.

The role of gamification in improving students' engagement in literary learning

The application of interactive gamification in educational settings demonstrates notable advancements in enhancing student learning experiences, as depicted in Table 2. It illustrates the success rates of various gamification stages, presented through percentage values indicating student engagement and comprehension at each phase. The average values reflect the overall effectiveness of gamification implementation, suggesting that integrating interactive elements significantly boosts student participation and interest in the learning process. These metrics are pivotal in assessing the tangible impact of gamification on educational outcomes, providing a clear depiction of its benefits in fostering a more engaging learning environment.

Table 2. The integration of gamification in the literary learning to improve students' engagement

Groups	Sum of Squares (SS)	df	Mean Square (MS)	F statistic	Sig. (p-value)
Between Groups	85.24	1	85.24	4.524	0.038
Within Groups	960.75	98	9.80	-	-
Total	1046.00	99	-	-	-

Table 2 reveals the relationship between interactive gamification and students' engagement in literary learning. By analyzing variance among different groups, the study underscores the effectiveness of gamified learning tools in increasing student interest and participation in literary studies. This statistical approach lends scientific rigor to the assessment of gamification strategies in educational settings.

These findings also indicate a notable influence, with a significance level of 0.038 and an F-value of 4.524, demonstrating that gamification positively affects student engagement. This study aligns with previous research which also confirmed the beneficial impacts of gamification on enhancing student involvement in learning (Bernal Cerza et al., 2023; Feng et al., 2024; Su, 2016). Such consistency adds credence to the argument that gamification is a powerful tool for improving educational outcomes in literature classes.

Enhancing student engagement through gamification has led to the improvement of various critical and creative skills. These include analyzing themes, characters, symbolism, and intertextual relationships within literary texts. Students engaged in gamification activities are also more adept at creating story adaptations, writing poetry, or devising new scenarios based on their readings. Moreover, discussions about symbolic meanings in literature and the interpretation of ironies or metaphors have become more profound. Continuous reflection during these activities further aids in developing students' analytical and problem-solving skills, indicating that gamification is not only about engaging students but also enhancing their

intellectual capabilities. The comparative analysis through statistical bar graphs between experimental and control is shown in Figure 2.

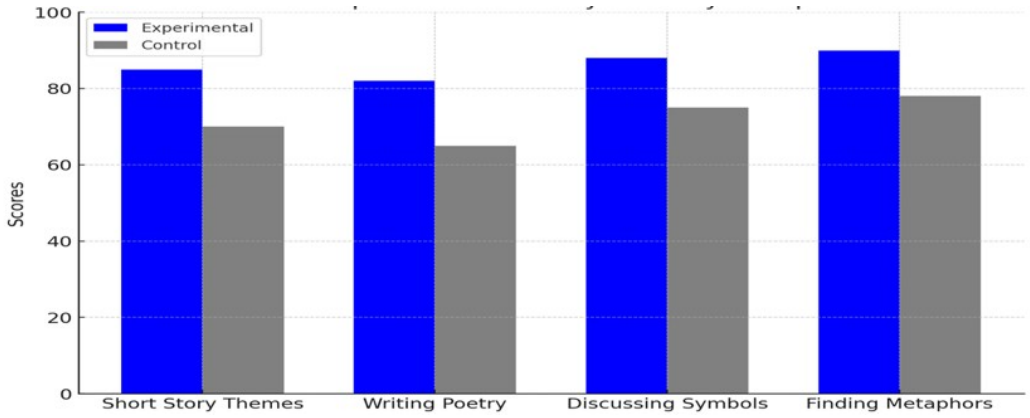


Figure 2. Average score of students' engagement in gamification (experimental) and conventional (group) classes

Figure 2 highlights the efficacy of gamification in literary education. The experimental group, which utilized gamified learning processes, showed superior abilities in analyzing themes, symbols, and metaphors in literary texts compared to the control group. This divergence underscores the value of interactive learning environments in fostering a deeper understanding of literature. Such findings advocate for the integration of gamification strategies to enhance the analytical capabilities of students in understanding complex literary concepts.

Previous studies affirm that student engagement is strongly correlated with cognitive development (Claravall, 2021), creativity (Gamarra et al., 2022; Pàmies-Vilà et al., 2022), and collaborative skills (Hong et al., 2014; Sinha et al., 2015). Gamification harnesses these aspects by creating an interactive learning environment that motivates and engages students more effectively than traditional methods. The theoretical underpinnings of these findings support the notion that active learning through gamification not only makes the learning process enjoyable but also enriches students' educational experiences by fostering critical thinking and collaborative skills (Najjar & Salhab, 2022).

The positive attitudes towards literary works are closely linked to the level of student engagement in the learning process (Claravall, 2021; Junker & Jacquemin, 2017; van Schooten & de Glopper, 2006). This study suggests that gamification significantly enhances this engagement, thereby fostering a more positive outlook towards literature among students. Given these outcomes, it is recommended that educational institutions consider adopting gamification strategies to boost student involvement and enjoyment in literary studies. Such an approach is likely to transform traditional literary education into a more dynamic and appealing subject area, thereby increasing student participation and enthusiasm in exploring literary landscapes.

The role of gamification in increasing students' literary comprehension

In examining the impact of gamification on literary comprehension, both an experimental group employing gamification strategies and a control group adhering to traditional teaching methods were assessed. Table 3 shows that pre-test scores were 60% for the experimental group and 62% for the control group, suggesting similar levels of initial comprehension. Following the intervention, the post-test results showed a significant improvement in the experimental group, with scores rising to 85%, while the control group improved marginally to 67%. The effect size, which quantifies the difference in means relative to the variability of the sample, stood at 0.8 for the experimental group and 0.2 for the control group, indicating a substantial impact of gamification on enhancing literary comprehension.

Table 3 and 4 presents the ANCOVA results for assessing the impact of interactive gamification on literary comprehension among students. The significance value in the corrected model is 0.001 with an F-value of 6.82, indicating a statistically significant effect of the gamification learning model on students'

comprehension of literary concepts. The significant influence of the group factor, which differentiates between gamification and traditional teaching methods, is evidenced by a significance value of 0.001 and an F-value of 13.64. This result supports the conclusion that gamification markedly enhances literary comprehension. Furthermore, the pre-test scores, used as a covariate to adjust for initial differences in comprehension levels, also show significant effects with a p-value of 0.011 and an F-value of 6.82. It underscores the importance of considering initial student performance in assessing the impacts of educational interventions.

Table 3. Table of average pre-test, post-test, and effect size on literary comprehension

Treatment Class	Pre-test Average (%)	Post-test Average (%)	Effect Size
Experimental	60	85	0.8
Control	62	67	0.2

Table 4. Summary of ANCOVA literary comprehension results

Source	Type III Sum of Squares	df	Mean Square	F-Value	Significance (p-value)
Corrected Model	180	3	60	6.82	0.001
Intercept	220	1	220	25.00	<0.001
Group	120	1	120	13.64	0.001
Pre-test	60	1	60	6.82	0.011
Error	710	76	9.34		
Total	1100	80			
Corrected Total	890	79			

Table 3 and 4 also convincingly demonstrate that the gamification model applied in the study significantly improves students' understanding of literary texts. The results affirm that interactive gamification has a substantial impact on enhancing literary comprehension at a significance level of 0.05, with pre-test scores effectively serving as a covariate to balance initial disparities. The robust significance values, particularly the model's overall p-value of 0.001, confirm that the gamification approach significantly boosts students' engagement and comprehension in literary studies.

The statistical analysis detailed in Table 4 provides compelling evidence that the integration of interactive gamification significantly enhances literary comprehension, a finding that aligns well with contemporary educational research. Previous studies have demonstrated similar improvements in literary analysis skills when gamification techniques are applied (Adare-Tasiwoopa ápi & Silva, 2023; Ansar & George, 2023; Sato et al., 2024). These studies highlight that gamification not only engages students more deeply but also facilitates a more profound understanding of complex literary themes and devices. This effect is particularly pronounced in the analysis of narratives and poetry, where students must navigate between abstract concepts and concrete details. The significant p-value of 0.001 in the corrected model emphasizes the robust impact of gamification, underscoring its effectiveness as an educational tool that transcends traditional learning paradigms by transforming passive learning into an interactive and dynamic process.

The role of initial competency, as adjusted for by the pre-test covariate in the ANCOVA results, is crucial for interpreting the effectiveness of gamification. This adjustment ensures that the improvements are due to the instructional method itself rather than baseline student abilities. Previous studies support this approach, indicating that initial student performance can heavily influence the outcomes of innovative teaching strategies. They suggest that students with lower initial scores benefit most from gamified approaches, as these strategies provide motivational boosts and learning scaffolds that are absent in conventional educational settings (Cahyani, 2016; Gamarra et al., 2022; Pàmies-Vilà et al., 2022; Scott & Dalton, 2021). The F-value of 6.82 for the pre-test covariate in our study reinforces this point, indicating that controlling for initial differences is essential for accurately measuring the instructional impact of gamification on literary comprehension.

Further analysis and comparison with traditional teaching methods, as shown by the group effect in the ANCOVA, reveal that gamification significantly outperforms conventional methods in fostering literary comprehension. This result is in line with previous studies that gamification leads to higher retention rates and better application of literary concepts among students (Jarrah et al., 2024; Matyakhan et al., 2024; Menchaca et al., 2019; Putz & Treiblmaier, 2019; Strousopoulos et al., 2024). The distinct advantage of gamification lies in its ability to make learning literature not only more engaging but also more applicable and relatable to students. This engagement is crucial in literature education, where comprehension is deeply tied to personal connection and contextual understanding. With a significant F-value of 13.64 for the group variable, our results align with the broader academic consensus that gamification is not merely a supplemental educational tool but a necessary evolution in teaching methodologies to meet the needs of modern learners.

DISCUSSION

The implementation of interactive gamification in literary learning has significant implications for modern educational practices. This finding is consisten with other studies which demonstrated that integration of gamified elements in literature classes not only enhances student engagement but also leads to higher retention of literary concepts (Jarrah et al., 2024; Matyakhan et al., 2024; Menchaca et al., 2019). These findings underscore the critical role of innovative educational strategies in adapting to the changing needs of learners. Gamification transforms traditional literary studies into interactive and dynamic sessions, making dense and complex texts more accessible and enjoyable for students (Forrest et al., 2020; Najjar & Salhab, 2022; Pacheco et al., 2020; Yang & Kang, 2021). This approach aligns well with the cognitive and behavioral expectations of the digital age, where students are increasingly seeking learning experiences that are both engaging and informative.

The effectiveness of interactive gamification in literary learning can be attributed to its ability to cater to various learning styles simultaneously. It supports evidence from previous studies that gamification leverages the natural human propensity for play and competition, integrating these elements into the learning process (Arnab et al., 2016; Landers & Landers, 2014; Liu et al., 2024). This strategy structurally supports the learning of complex literary themes by breaking them down into manageable tasks and challenges that stimulate cognitive engagement. By providing immediate feedback and rewards, gamification creates a learning environment that encourages students to explore and experiment with literary concepts, leading to a deeper understanding through active participation rather than passive reception (Claravall, 2021; Elsayary, 2023).

The role of gamification in improving students' engagement in literary learning carries profound implications for educational outcomes. In accordance with this result, previous studies have demonstrated that engaging students through gamification leads to a marked increase in classroom participation and interest in the subject matter (Dubois & Kelamcherry, 2023; Zairon et al., 2023). This engagement is crucial, as it directly influences students' overall academic performance and their attitude towards literature. Gamification effectively addresses common educational challenges by making learning more appealing and relevant to students, potentially reducing dropout rates and improving academic success across broader curricular activities (Hellberg, 2023; Landers & Landers, 2014).

The gamification involves the application of game design elements in non-game contexts, which naturally elevates interest and motivation. Previous studies have found that gamification meets students' psychological needs for autonomy, competence, and relatedness, thereby enhancing their engagement (Rahmi et al., 2025; Sawarkar et al., 2024). This structured engagement not only makes literary learning more enjoyable but also fosters a positive learning environment that encourages continuous participation and intellectual curiosity.

The implications of using gamification to increase literary comprehension are vast and multifaceted. Recent scholarly works highlighted that gamification strategies significantly improve the depth of literary analysis and interpretation skills among students (Menchaca et al., 2019). This enhancement in comprehension is crucial for developing critical thinking and analytical skills, which are highly valued in academic and professional contexts. Gamification, therefore, not only improves immediate educational outcomes but also prepares students for future challenges by equipping them with essential analytical abilities.

The effectiveness of gamification in increasing literary comprehension lies in its ability to immerse students in the content fully. It is in line with the previous studies which found that gamification creates a rich, interactive context that mirrors complex real-world scenarios, allowing students to apply literary theories and concepts in varied and practical settings (Najjar & Salhab, 2022; Wang et al., 2024; Zeng et al., 2024). This application helps solidify understanding and facilitates the transfer of knowledge to different situations, enhancing overall comprehension. The interactive nature of gamification also supports diverse learning styles and speeds, accommodating individual student needs and leading to more personalized and effective learning outcomes.

However, while gamification has shown positive outcomes in terms of improving students' skills and teaching effectiveness, there are challenges in integrating it with professional and higher education (Dah et al., 2024; Pallathadka & Pallathadka, 2023). Eventhough the use of game elements such as narrative and cognitive challenges has been found to provoke student engagement in gamified learning activities, there is a need for ongoing research and further exploration in the field of education to address the shortcomings in integrating gamification with professional and higher education (Feng et al., 2024). There is a gap between theory and practice in the study of gamification, and it is reasonable that studies on the implementation guidelines of gamified designs in literary comprehension need to be provoked.

CONCLUSION

This study underscores the transformative potential of gamification in education, where traditional passive learning shifts to active engagement through interactive and motivational strategies. The strength of this research lies in its innovative methodological approach, incorporating contemporary gamification techniques into literary studies. This not only renews the pedagogical perspective but also broadens the educational discourse by introducing dynamic variables and methods that address the cognitive needs of the modern learner. Scientifically, this contribution enriches the academic field by offering empirical evidence of gamification's effectiveness, providing a robust framework for further exploration in educational technologies.

Despite its strengths, the research has limitations that necessitate further investigation. One significant constraint is the potential variability in the gamification's effectiveness across different demographic and cultural contexts, which was not fully explored in this study. Additionally, the long-term retention of literary comprehension through gamification remains uncertain. Future research should address these limitations by incorporating a broader and more diverse sample size, and by examining the sustained impact of gamification over longer periods. Such studies would provide a more comprehensive understanding of the scalable benefits and potential global applicability of gamification in literary education, ensuring its effectiveness across various educational settings and populations.

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AUTHOR CONTRIBUTIONS STATEMENT

Najihah Abd Wahid: conceptualization, methodology, formal analysis, writing – original draft (lead). **Farhan**: writing – review and editing**,** data curation, formal analysis (supporting). **Mualim Wijaya**: writing – original draft, writing – review and editing (supporting).

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

AI USE DECLARATION

The authors used artificial intelligence tools to assist with the formatting and layout of this manuscript. AI was not used to generate the substantive content, conceptualization, data, analysis, or conclusions of the research, all of which remain the sole responsibility of the authors.

INFORMED CONSENT

Not applicable – this study did not involve direct human participants. Data consisted solely of publicly accessible documents, platform policies, and governance materials.

ETHICAL APPROVAL

This research did not involve human or animal subjects; it analyzed publicly available documentary records concerning machine co-authorship, and therefore no institutional review board approval was required. Where research does involve human subjects, the authors affirm that such research would be conducted in full compliance with all relevant national regulations and institutional policies, in accordance with the tenets of the Declaration of Helsinki, and would be approved by the authors' institutional review board or equivalent committee.

DATA AVAILABILITY

The corpus/data analyzed in this study are available from the corresponding author upon reasonable request.

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