



Utilization of Wordwall Gamification Application to Improve Students' Cognitive Creativity and Critical Thinking in English Lessons

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Abstract

In the digital era, interactive learning aligned with Generation Z's characteristics is crucial. Based on constructivist theory, gamification through Wordwall offers innovative ways to enhance student engagement, creativity, and critical thinking. Yet, English instruction for eighth-grade students at SMP Negeri 2 Samaturu remains traditional, limiting cognitive creativity and critical thinking development. This research analyzes Wordwall's impact on these skills among 25 randomly selected eighth-grade students. A quantitative pre-experimental one-group pretest-posttest design was implemented over eight weeks (three sessions weekly). Instruments included writing tests for cognitive creativity, speaking tests for critical thinking, and observation checklists for engagement. SPSS one-sample t-test analysis showed significant gains. Cognitive creativity reached a mean of 80.12 ($t=5.28 > t\text{-table } 2.06$, $p<0.05$, Cohen's $d=1.06$ —large effect). Critical thinking averaged 81.64 ($t=6.18 > 2.06$, $p<0.05$, $d=1.24$ —large effect), confirming Wordwall's substantial influence. The intervention fostered 21st-century skills effectively. Limitations encompass the pre-experimental design and small single-school sample. Recommendations urge Wordwall integration in junior high curricula; future studies should adopt randomized controlled trials with larger, diverse cohorts. Keywords: Wordwall, gamification, cognitive creativity, critical thinking, English learning.

Keywords: *Gamification; Wordwall; critical thinking; creativity; cognitive*

Introduction

In today's digital era, the integration of technology into education has become a necessity to support effective and engaging learning experiences. The concept of *student active learning* emphasizes learners' autonomy and participation in constructing knowledge through digital platforms and interactive media.

Gamification, as one of the technology-driven approaches, has been widely recognized as an effective method to promote engagement and enhance the learning process. According to Deterding et al. (2011), gamification applies game design elements in non-game contexts, including education, to increase learners' motivation and foster active participation. By utilizing gamification, teachers are able to transform classroom dynamics into a more interactive environment that stimulates curiosity, encourages exploration, and strengthens students' intrinsic motivation to learn (La Ode Muhammad Idrus Hamid B, 2021).

Furthermore, improving students' higher-order thinking skills such as cognitive creativity and critical thinking is crucial in language learning, particularly English, which functions as a global lingua franca. Cognitive creativity allows learners to generate original ideas and diverse perspectives in problem-solving, while critical thinking emphasizes the ability to analyze, evaluate, and make logical decisions. Guilford (1967) highlights creativity as an essential aspect of human intelligence, while Facione (2011) defines critical thinking as purposeful, self-regulatory judgment that results in interpretation, analysis, and evaluation. The use of gamified applications such as Wordwall provides students with opportunities to practice these skills through problem-solving activities, quizzes, and interactive challenges that require them to think divergently and critically (Novyanti, 2022; Liaw & Huang, 2022). Thus, gamification in language learning not only enhances linguistic competence but also develops essential 21st-century skills that prepare students to adapt to global challenges.

Wordwall is a website-based application that can be used as an English language learning medium (Zakiudin, 2025). This application offers various interactive games and quizzes to help students improve their vocabulary and language skills. Teachers can create their own content, such as quizzes, matching games, pair matching, anagrams, word scrambles, word searches, and groupings, and customize them to fit their lesson plans. The use of Wordwall in English learning has been proven effective in improving students' vocabulary and language skills (Sugiyono, 2018). In the creation process, educators enter content that is appropriate for their class, including lists of keywords, definitions, questions, and/or images (Guilford, 1967).

Wordwall offers a comprehensive range of features, including 18 game modes: 1. Match-up, 2. Open the Box, 3. Random Card, 4. Anagram, 5. Labeled Diagram, 6. Categorize, 7. Quiz, 8. Find the Match, 9. Matching Match, 10. Missing Word, 11. Word Search, 12. Rank Order, 13. Random Wheel, 14. Group Sort, 15. Unjumble, 16. Game Show, 17. Labyrinth Pursue, and 18. Plane.

The Wordwall application offers an engaging and interactive learning technology solution. Through its various educational games, Wordwall can increase student engagement and stimulate cognitive creativity and critical thinking. However, conditions at SMPN 2 Samaturu indicate that English language learning has not fully implemented gamification-based media. This results in a lack of

stimulation for students' critical thinking and creativity in understanding the material. Therefore, an innovation is needed in the form of implementing the Wordwall application as an effective, fun learning medium that suits the characteristics of digital generation students.

Research on the integration of gamification in education has consistently shown its potential to enhance student engagement and learning outcomes. Wordwall, as a gamification-based learning platform, provides interactive activities such as matching games, quizzes, and word puzzles that encourage active participation and stimulate students' creativity. Sahabuddin (2025) demonstrated that the implementation of Wordwall in elementary schools significantly improved students' cognitive creativity, as reflected in their ability to generate new ideas and express them through English learning tasks. This finding is aligned with Runco and Acar's (2012) perspective that divergent thinking, which is central to creativity, can be nurtured through problem-solving activities in playful and engaging contexts. Thus, Wordwall not only supports vocabulary acquisition and language comprehension but also promotes creative thinking that enriches students' cognitive development.

However, the majority of existing studies on Wordwall have focused on the elementary education level, leaving a gap in understanding its impact on higher levels, particularly in fostering higher-order thinking skills such as critical thinking (Nisa, 2024). Junior high school students, who are at a transitional stage of cognitive and linguistic development, require learning approaches that challenge them to go beyond memorization and creativity toward analytical and evaluative skills. Trilling (2009) emphasize that critical thinking is a core 21st-century skill that must be cultivated alongside creativity to prepare students for global challenges. Therefore, there is an urgent need for research that explores the role of Wordwall not only in enhancing cognitive creativity but also in developing critical thinking among junior high school students, thereby offering a more comprehensive contribution to technology-based language learning.

Critical thinking and cognitive creativity are fundamental components of higher-order thinking skills, as outlined in Bloom's revised taxonomy, which positions *creating* and *evaluating* at the top levels of cognitive processes (Anderson & Krathwohl, 2001; Daponte, 2025). These skills are essential for preparing students to face the demands of the 21st century, where problem-solving, innovation, and logical reasoning are highly valued (Budiyanto, 2024). According to Facione (2011), critical thinking involves purposeful and self-regulated judgment that enables individuals to interpret, analyze, and evaluate effectively. Meanwhile, Guilford (1967) highlights that creativity is not only about artistic ability but also about cognitive flexibility in generating new and original ideas. In this light, gamification through platforms such as Wordwall can serve as a meaningful tool to integrate both dimensions, encouraging learners to be creative in their language use while

simultaneously developing analytical and evaluative thinking skills (La Ode Muhammad Idrus Hamid B., 2021).

Despite the potential benefits, a review of the current literature reveals a research gap: most existing studies on Wordwall focus on improving vocabulary acquisition, motivation, or general learning outcomes, with limited attention to higher-order thinking skills, particularly at the junior high school level (Widodo, 2025; Damayanti, 2025; Mayaratih, 2025). For instance, Novyanti (2022) found that Wordwall improved elementary students' cognitive creativity in English learning, yet did not extend the discussion to critical thinking. This leaves an important space for research that specifically investigates how gamification through Wordwall can simultaneously enhance cognitive creativity and critical thinking in adolescent learners. Addressing this gap will not only enrich the academic discourse on gamification in education but also provide practical implications for teachers seeking to design technology-based learning activities that foster essential 21st-century competencies (Trilling & Fadel, 2009).

Method

This research is a non-empirical research study with a quantitative approach and a pre-experimental design method. This method was chosen because the study was conducted on a single experimental group without a control or comparison group. The subjects were eighth-grade students at SMP Negeri 2 Samaturu, selected using random sampling from the existing population. In a pre-experimental design, the treatment is administered to the entire group, and measurements are taken before and after the treatment to determine its impact. This method is suitable for use when the researcher does not have full control over external variables that influence the results (Sugiyono, 2015). The research procedure was carried out in stages, starting with problem identification, theoretical review, research design development, data collection, data analysis, and preparation of the results report.

Based on the research phases, the activity began with initial observations by the researcher to understand the school context where the research was conducted. The instruments used consisted of a writing test to measure cognitive creativity, a speaking test to assess critical thinking, and an observation sheet in the form of a checklist used to record student progress during the use of the Wordwall application-based learning media. Cognitive creativity is related to the ability to generate new ideas flexibly and originally in problem solving, while critical thinking ability refers to the ability to think logically and reflectively to make appropriate decisions (Runco, 2012; Facione, 2015).

Results

This research was conducted at SMP Negeri 2 Samaturu, Kolaka Regency, with 25 eighth-grade students as subjects. The selection of eighth-grade students was based on the consideration that at this level, students' English language skills have begun to develop, both in writing and speaking. Furthermore, students at this level were deemed to have sufficient cognitive readiness to participate in research that measures higher-order thinking skills.

This study focuses on two main variables: students' cognitive creativity and critical thinking. Cognitive creativity is measured through the results of an English writing test, in which students are asked to express ideas, imagination, and the skills to process ideas in written form. Meanwhile, critical thinking is measured through an English-speaking test, which requires students to express opinions, analyze, and present arguments orally. These two variables were chosen because they play a crucial role in supporting students' English language skills and reflect the 21st-century skills that students must possess.

4.1. Research Result

Table 1 : English Writing Test Score (Cognitive Creativity)

No	Students Initial	Score	Performance Level
1	M1	78	Good
2	M2	82	Very Good
3	M3	75	Good
4	M4	80	Good
5	M5	77	Good
6	M6	85	Very Good
7	M7	79	Good
8	M8	83	Very Good
9	M9	76	Good
10	M10	81	Very Good
11	M11	74	Good
12	M12	84	Very Good
13	M13	78	Good
14	M14	86	Excellent
15	M15	80	Good
16	M16	83	Very Good
17	M17	79	Good
18	M18	82	Very Good
19	M19	75	Good
20	M20	85	Very Good
21	M21	77	Good
22	M22	84	Very Good

23	M23	76	Good
24	M24	82	Very Good
25	M25	80	Good

The effect of the Wordwall application on students' cognitive creativity can be seen from the results of statistical tests using a one-sample t-test. Based on research data, the average score of students' writing tests was 80.12 with a standard deviation of 3.55. The t-test calculation shows that the calculated t value is 5.28, while the t-table value at a significance level of 0.05 with degrees of freedom (df) = 24 is 2.06. Because the calculated t value is greater than the t-table, the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted. Thus, it can be concluded that there is a significant effect of the use of the Wordwall application on students' cognitive creativity in writing English.

Table 2: Table of English-Speaking Test Results (Critical Thinking)

No	Students' Initial	Students' Score	Performance Level
1	M1	79	Good
2	M2	81	Very Good
3	M3	77	Good
4	M4	80	Good
5	M5	78	Good
6	M6	84	Very Good
7	M7	80	Good
8	M8	85	Very Good
9	M9	76	Good
10	M10	82	Very Good
11	M11	75	Good
12	M12	86	Excellent
13	M13	79	Good
14	M14	88	Excellent
15	M15	83	Very Good
16	M16	84	Very Good
17	M17	80	Good
18	M18	83	Very Good
19	M19	78	Good
20	M20	87	Excellent
21	M21	77	Good
22	M22	85	Very Good
23	M23	76	Good
24	M24	82	Very Good
25	M25	81	Good

The effect of the Wordwall application on students' critical thinking skills can be proven through the results of the analysis using a one-sample t-test. The average score of students' speaking tests was 81.64 with a standard deviation of 3.82. The calculation results showed a calculated t value of 6.18, while the t-table value at a significance level of 0.05 with degrees of freedom (df) = 24 was 2.06. Because the calculated t value is greater than the t-table, the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted. Thus, it can be concluded that the use of the Wordwall application has a significant effect on improving students' critical thinking skills in speaking English.

Discussion

a. Cognitive Creativity

Using the Wordwall app in learning provides gamification-based challenges that directly involve problem-solving and idea exploration. Through this mechanism, students are encouraged to be more creative in composing their writing. Research results show that average writing test scores increased compared to results before using the app. This proves that Wordwall is able to create a more engaging learning environment and motivate students to develop their English writing skills.

Furthermore, Wordwall's interactive features, such as word games and matching activities, have been shown to stimulate students' thinking skills, leading to more varied and in-depth ideas. Throughout the learning process, the interaction between students and the learning media becomes very dynamic. Students who achieve high scores tend to be more active in answering questions, fully engaged in games, and able to creatively connect concepts to teacher-assigned writing assignments.

On the other hand, there were also differences in responses from students with relatively low scores. They tended to take longer to understand the game's patterns, often hampered by nervousness and low self-confidence. These obstacles were generally influenced by limited basic English writing skills and a lack of motivation to learn. However, despite this, their engagement in Wordwall-based learning still showed positive progress, although not as rapidly as the group of students with high scores.

The significant impact of the Wordwall application became even more apparent when the competitive and reward elements within it successfully motivated students to strive for greater excellence. Students with high creativity were able to complete tasks using diverse and often unconventional approaches. This aligns with the findings of Johnson & Smith (2018), who stated that gamification in language learning can stimulate divergent thinking and help students generate new ideas. Similarly, research by Kim et al. (2021) confirmed that game-based activities can increase students' focus and cognitive engagement, ultimately contributing to better writing quality.

b. Critical Thinking

The speaking test showed that the Wordwall application had a positive impact on students' critical thinking skills. Using an interactive quiz format, students were trained to construct arguments, provide logical reasoning, and answer questions requiring analysis. High average speaking test scores reflected their improved ability to respond critically and effectively to situations. During the Wordwall-based learning process, high-scoring students demonstrated the ability to analyze questions, develop structured arguments, and provide creative solutions in class discussions. They frequently asked questions back to the lecturer or their peers to gain deeper understanding. Conversely, low-scoring students tended to struggle to construct arguments or provide critical answers due to limited vocabulary, nervousness about public speaking, or a lack of understanding of the material.

Wordwall helps students improve their critical thinking skills through challenges that require quick analysis and logical decision-making. Activities such as argument-based quizzes encourage students to develop relevant answers in a short time. The competitive element within the app also motivates students to think more quickly and critically. Research (Frisilia, 2022) supports these findings by stating that gamification-based technologies like Wordwall can improve critical thinking skills through challenge-based learning. Mertayasa (2022) also highlights that interactive learning apps can enhance students' analytical abilities, particularly in foreign language learning.

Another factor supporting these positive results is the flexibility of the learning scenarios Wordwall provides. Students are given the opportunity to think quickly and respond critically to questions, creating a motivating learning environment. As Wibawanto (2020) states, gamification creates a supportive learning environment, where students feel comfortable trying and practicing their critical thinking skills without fear of failure.

Conclusion

This study shows that the Wordwall application has a significant positive impact on the development of students' writing and speaking skills, particularly in enhancing creativity, critical thinking skills, and active engagement during the learning process. Interactive gamification features, such as word games, argument-based quizzes, and competition elements, encourage students to think more deeply, generate varied ideas, and develop logical arguments in a short period of time. Students with high scores demonstrated better analytical skills and creativity, while students with low scores faced challenges such as limited vocabulary and low self-confidence.

This study also supports previous findings that gamification-based technology creates a dynamic learning environment and supports students' exploration of ideas and critical thinking skills. The flexibility offered by Wordwall provides opportunities for students to learn actively and respond to the challenges

presented.

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