Spin It to Win It' Approach: Enhancing Student Engagement in Mathematics 8

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ABSTRACT

Maintaining student engagement in mathematics continues to be a significant challenge in many classrooms, as it directly influences learning outcomes and academic performance. This study sought to examine the effectiveness of a game-based instructional strategy, Spin It to Win It, in enhancing the level of students' engagement in Mathematics 8. This action research utilized a pre-experimental one-group pretest-posttest design. The participants were 35 Grade 8 students from a public secondary school in Ozamiz City, who were selected through purposive sampling based on their low levels of engagement and performance in mathematics. Performance-based assessment data were collected and subsequently analyzed using descriptive statistics and a dependent samples t-test. The results indicate that prior to the implementation of the strategy, all students were classified within the 'Did not meet expectations' category for engagement. After the intervention, a notable improvement was observed, with many students reaching higher performance levels, such as Outstanding. A statistically significant difference was found between the pretest and posttest scores, indicating that the strategy effectively enhanced student engagement. The study concludes that game-based strategies like Spin It to Win. It can significantly improve students' engagement in mathematics by promoting a more interactive and engaging learning environment. It is recommended that teachers incorporate similar strategies into their instruction to support and motivate learners, especially those struggling with low engagement.

keywords: classroom intervention, game-based instruction, instructional strategy, performance-based assessments, student engagement

CONTEXT AND RATIONALE

Mathematics is vital in developing critical thinking and problem-solving abilities that are essential for students' academic and professional achievement. However, engaging students in mathematics remains one of the most persistent challenges, particularly at the middle school level. Research has consistently shown that disengagement in mathematics leads to lower academic performance and reduced confidence in students, emphasizing the need for innovative teaching methods to address this issue.

Despite efforts to improve math education, many students, especially in middle school, find the subject disengaging, resulting in diminished motivation and lower academic achievement. Such disengagement can be associated with traditional instructional practices that are unable to sustain students' interest and accommodate their learning preferences. Particularly in eighth grade, where students are transitioning into higher-level mathematical concepts, maintaining their interest becomes even more critical.

In response to this issue, recent innovations in teaching practices have aimed to foster student engagement and motivation. The adoption of game-based learning (GBL) has gained attention as a potentially practical approach, integrating gamified elements into classroom activities to foster an engaging and interactive learning environment. Previous studies have emphasized the role of GBL in improving students' motivation, participation, and understanding, particularly in mathematics (Moon & Ke, 2020; Ramli et al., 2020). For example, the incorporation of rewards and challenges has proven to improve students' engagement and ability to approach mathematical problems with confidence.

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While game-based learning has shown promising results, its practical implementation in middle school mathematics classrooms remains underexplored. Eighth grade students, in particular, students often struggle with motivation and interest, and there is a need for targeted interventions that can address these challenges without compromising learning outcomes. Existing studies provide broad insights into GBL's benefits but lack specificity regarding its impact on middle school learners, particularly in enhancing both engagement and academic performance. Research confirms that GBL fosters positive attitudes, increased engagement, and enhanced performance in mathematics. Eighty-four percent of studies demonstrate the positive effects of GBL on motivation and learning (Vankúš, 2021). Cultivating a supportive and innovative environment can enhance student engagement and motivation, while promoting self-directed learning through game-based experiences. (Balaskas et al., 2023). Implementing the GBL activity in game form improved immediate learning outcomes for students with low prior knowledge (Portier-Charneau & Sanchiz, 2024). Moreover, technological advancements have supported GBL by enabling personalized learning experiences and fostering a more student-centered approach (Attard & Holmes, 2020).

The researcher observed a methodological gap in previous studies, noting the absence of comprehensive research designs in the integration of game-based learning (GBL) in middle school mathematics education. Given the research design we intend to adopt, we identified a lack of prior studies on the application of GBL for eighth-grade students struggling with motivation and engagement in mathematics. This study aims to introduce a new line of inquiry into research designs involving GBL supported strategies tailored for improving student involvement and comprehension. We aim to build upon game-based learning research by addressing the gaps with practical implementations for middle school learners and student-centered methodologies (Miles, 2017).

This study seeks to assess the effectiveness of a game based learning approach, speci cally the "Spin to Win It", in enhancing the motivation, participation, and academic achievement of Grade 8 students in mathematics. By addressing existing gaps in research, this study aims to give practical advice for educators and support the development of new teaching strategies that improve the quality of mathematics education.

Strategy

The "Spin to Win It" strategy is a gamified classroom approach designed to enhance student engagement and motivation through elements of reward, excitement, and unpredictability. This strategy involves students answering questions, with correct responses earning them the chance to spin a wheel for rewards. By integrating principles of Game-Based Learning (GBL), it taps into intrinsic motivational factors such as curiosity, challenge, and the anticipation of success. It effectively promotes autonomy, competence, and relatedness, fostering an interactive and enjoyable learning environment. If implemented wisely, the "Spin to Win It" approach would bring many positive effects on students' motivation and performance (Sidin, 2021). Research supports the effectiveness of gamified approaches like "Spin to Win It" in enhancing learning outcomes. Studies have shown that game-based learning increases student motivation, emotional involvement, and enjoyment in education (Hartt et al., 2020). Similarly, incorporating rewards within GBL frameworks enhances student engagement by introducing elements of unpredictability and challenge (Moon & Ke, 2020). Furthermore, gamification has been demonstrated to significantly improve student achievement in mathematics and other subjects (Ramli et al., 2020), underscoring its transformative potential in modern pedagogy.

"Spin to Win It" offers several advantages as a teaching strategy. It helps develop important skills like problem solving, teamwork, and critical thinking while reducing learning anxiety and increasing interest in mathematics (Chen et al., 2021; Caridade, 2024). Additionally, it can enhance self-efficacy and support students in cultivating a positive mindset toward academically demanding subjects (Ramli et al., 2020). However, potential disadvantages include the risk of overemphasizing extrinsic rewards, which could detract from intrinsic motivation, and the need to carefully manage time and classroom dynamics to ensure the strategy complements educational goals (Moon & Ke, 2020; Hartt et al., 2020).

Despite its limitations, the "Spin to Win It" strategy can be implemented effectively to maximize its benefits. Educators must design engaging questions aligned with lesson objectives and create a spinning wheel with rewards that motivate students while supporting learning outcomes. During implementation, students answer questions, and those with correct responses spin the wheel for rewards. Post-activity reflections are essential

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for reinforcing learning objectives and helping students connect their participation to academic achievements. By addressing disengagement and fostering a student centered learning environment, this strategy demonstrates the potential of gamified approaches to revolutionize traditional classroom dynamics.

Action Research Questions

This action research aimed to enhance students' engagement in Mathematics 8 in one of the secondary schools in Misamis Occidental during SY 2024-2025. Specifically, this study sought to answer the following questions:

1. What is the level of students' engagement in Mathematics 8 before the implementation of the spin it to win it?
2. What is the level of students' engagement in Mathematics 8 after the implementation of the spin it to win it?
3. Is there a significant difference in the level of students' engagement in Mathematics 8 before and after the implementation of the "spin it to win it" program?

ACTION RESEARCH METHODS

Research Design. The study employed a single-group pretest–posttest design, with students completing questionnaires before and after participating in immersive digital simulations. (Afrashtehfar et al., 2021). The single-group pretest-posttest design is appropriate for this study as it effectively measures changes in students' knowledge, attitudes, or skills before and after the intervention. This design is handy when random assignment is impractical, offering a simple yet robust method to evaluate the impact of immersive digital simulations exposure within a single cohort. By comparing pretest and posttest results, the design minimizes between-group variability and highlights the effect of the intervention on the same set of participants. While this approach is efficient and cost-effective, it has limitations, such as potential threats to internal validity due to external factors that may influence outcomes. Nevertheless, its suitability for exploring the initial effects of immersive digital simulation tools in education makes it a valuable choice for the study (Afrashtehfar et al., 2021).

Site. The research was conducted at the junior high school level, focusing on Grade 8 learners in a public secondary school in Ozamiz City, which is responsible for serving learners from Grade 7 to Grade 12.

Participants. The participants of the study were Grade 8 students of one section taught by the researcher. They were selected through purposive sampling using the following criteria: being enrolled as Grade 8 students for School Year 2024–2025, showing low academic performance, and being willing to join the study. The researcher confirmed that the criteria were met before conducting the survey. The study did not cover the other sections of the same grade level.

Instruments. The research utilized the following instruments to assess the effectiveness of the "Spin to Win It" strategy:

A. **Tests**. Developed by researchers, are used to determine the pretest and posttest scores of the participants. A "Proving Inequality of Triangles" test with 10 items, a "Proving Properties of Parallel Lines Cut by a Transversal" test with 10 items, and a "Determining the Conditions Under Which Lines and Segments Are Parallel or Perpendicular" test with 10 items will be administered. Additionally, a 10-item test titled "Applying Theorems on Triangle Inequalities" was utilized. A researcher developed survey on student engagement was also administered. To ensure that the instruments were valid and reliable, the researcher sought evaluations from five experts to review and re ne the test items. Furthermore, a pilot test was conducted, and the reliability of the instruments was determined using Cronbach's alpha, which yielded a value of 0.9, indicating excellent internal consistency. To assess the level of student engagement, a specific scale (referencing the table below) was employed.
B. **Lesson Plan**. Approximately four learning plans (LPs) were implemented, integrating the "Spin to Win It" strategy into the teaching process. These LPs were designed to incorporate specific gamified

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activities aligned with the strategy's principles, ensuring consistency and Alignment with the study's goals. To ensure the validity and effectiveness of these plans, they were reviewed and refined by experts, specifically the cooperating teacher and the chairman of the mathematics department.

Scores	Grade Equivalent	Description
34-40	90-100	Outstanding
31-33	85-89	Very Satisfactory
28-30	80-84	Satisfactory
24-27	75-79	Fairly Satisfactory
1-23	Below 75	Did Not Meet Expectation

Data Collection. The data collection process begins with securing permissions from the Schools Division Superintendent, the school principal, dean, cooperating teacher, and the involved teacher. Consent forms are distributed to parents, and assent forms are obtained from students. A pretest is conducted to establish baseline performance, followed by the implementation of the "Spin to Win It" intervention for one month. Subsequently, a posttest was conducted to assess improvements in both performance and engagement. The data are then tallied, analyzed statistically, interpreted, and reported to stakeholders to present the study's findings.

Ethical Consideration. In compliance with the ethical standards of the study, informed consent from the participants was obtained before administering the survey. In compliance with ethics, the researchers gave extensive orientation on the Data Privacy Act of 2012 to emphasize their dedication to protecting personal information and maintaining accountability in handling sensitive data. During the process, participants were well informed about the study's purpose, potential benefits, and the importance of their participation. The researchers also emphasized the confidentiality of all data gathered and ensured that participants' anonymity would be preserved throughout the study.

Data Analysis Plan. The researcher computed descriptive statistics using Minitab to determine the mean and standard deviations of students' performance levels before and after the intervention. The following statistical tools were utilized:

Mean and Standard Deviation: These will be used to identify the students' performance levels before and after the implementation of the "Spin to Win It" strategy.

T-Test: This will be employed to analyze the significant differences in students' performance levels before and after the implementation of the "Spin to Win It" strategy.

RESULTS AND DISCUSSION

By implementing the Spin It to Win It strategy in teaching Mathematics 8, the study effectively enhanced students' engagement and performance in the subject. The gamified method presented an enjoyable, engaging learning experience that made math more attractive and less daunting for learners. By examining, in great detail, the levels of student engagement prior to and following the intervention, the researcher determined a stark increase in students' participation level—from a status labeled as "Did Not Meet Expectations" to higher achievement levels like "Outstanding" and "Very Satisfactory." These results indicate the affirmative effect of adding game-based learning to math lessons and provide relevant insights for instructors seeking to increase student participation and performance in class.

Level of Student's Engagement in Mathematics 8 Before the Implementation of the Spin It to Win It

The level of student engagement in Mathematics 8 before the implementation of the Spin It to Win It strategy. The students' overall performance was described as "Did Not Meet Expectations," which was 100% of the responses (n = 35, 100.00%). None of the categories "Outstanding," "Very Satisfactory," "Satisfactory," or "Fairly Satisfactory," which all registered zero frequencies and percentages, had any students in them.

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This result highlights a notable concentration of low engagement levels among the pupils. The fact that the upper performance grades were completely unoccupied by students suggests a massive level of disengagement from the subject even before the intervention. Such a finding of the students' condition not being in the more qualitative categories might be because of reasons like a low level of motivation, ineffective instructional strategies, and a lack of learner' support. The results speak to the immediate need for the restructuring of classroom approaches innovatively and engagingly.

Student engagement must be prioritized both in educational policy and school practice, since it is important for providing students' academic success. By creating an environment that encourages and enhances engagement, schools can help students perform well and develop a more positive learning attitude (Alrajeh & Shindel, 2020). Additionally, responding to mathematics engagement at all levels of student achievement is valuable—not only for below-grade-level students, but also for average and high-achieving students. Providing meaningful engagement for all students can help to foster more inclusive and productive mathematics learning outcomes (Skilling & Martin,2021).

With this kind of information, it becomes a must for teachers and schools' administrative bodies to reflect on their methods and employ approaches that will encourage participants in the mathematical processes. The new use of educational gaming methods like Spin It to Win It may be a hopeful way of keeping students engaged. Moreover, workshops where teachers are trained on interactive methods and students participate through group tasks, discussions, and peer competition could serve as an alternative approach to addressing the previously mentioned gaps, thereby demonstrating an improvement in their math studies.

Table 1: Level of Student's Engagement in Mathematics 8 Before The Implementation of the Spin It To Win It

Performance	Frequency	Percentage
Did not meet expectations	35	100.00
Overall Performance	100.00 Did not Meet Expectations	

Note: Performance Scale: 34-40 (Outstanding); 31-33 (Very satisfactory); 28-30 (Satisfactory); 24-27(Fairly Satisfactory); 1-23 (Did not Meet Expectation)

Level of Student's Engagement in Mathematics 8 After the Implementation of the Spin It to Win It

The level of student engagement in Mathematics 8 after the implementation of Spin It to Win It was assessed. The overall performance fell into the "Did Not Meet Expectations" category, with 40.00% of students scoring in this range (n = 14, 40.00%). However, there was a massive uplift in the level of engagement in the other performance levels. The most significant percentage of students reached the "Outstanding" level (n = 12, 34.29%), which was followed by "Very Satisfactory" (n = 3, 8.57%), "Fairly Satisfactory" (n = 4, 11.43%), and "Satisfactory" (n = 2, 5.71%).

The distribution of the scores shows a positive change in student engagement as compared to pre-intervention data. Although a significant portion (40.00%) of students did not improve their performance level, the shift of students from lower to higher categories, notably the 34.29% who achieved "Outstanding", suggests that the Spin It to Win It strategy is likely effective. In brief, when it comes to gamification and interactive teaching, the students' interest can be engaged, and their engagement in mathematics can be augmented.

Gamified learning spaces have been found to enhance academic performance and instill more positive attitudes towards mathematics (Dincer & Doğanay, 2021). Game based learning also has a positive impact on students' knowledge, skills, motivation, and interest (Cahyani et al., 2023). Gamified mobile learning applications have been found to improve students' interest, motivation, and comprehension in mathematics (Zainuddin et al., 2022). Students were also noted to repeat game-based learning tasks with willingness in an attempt to enhance performance, demonstrating an increase in motivation and participation (González-Calvo et al., 2024). Interactivity and rewards contained in gamified activities have also been shown to considerably enhance engagement with math-related assignments (Andaya & Mabunga, 2023).

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Thus, it is evident that including game-based strategies in regular classroom activities can positively affect student motivation and performance. Teachers are strongly advised to continue employing Spin It to Win It and other interactive methods to maintain student attraction. The school administration may decide to introduce in-service training for teachers on new strategies that support active learning. In addition, they may need to give extra help to students who are still struggling, thereby ensuring that all students can bene t from the effort to enhance engagement.

Table 2: Level of Student's Engagement in Mathematics 8 After The Implementation of the Spin It to Win It

Performance	Frequency	Percentage
Outstanding	12	34.29
Very Satisfactory	3	8.57
Satisfactory	2	5.71
Fairly Satisfactory	4	11.43
Did not meet expectations	14	40.00
Overall Performance	35	100

Note: Performance Scale: 34-40 (Outstanding); 31-33 (Very satisfactory); 28-30 (Satisfactory); 24-27(Fairly Satisfactory); 1-23 (Did not Meet Expectation)

Significant Difference in The Student Level of Student's Engagement in Mathematics 8 Before and After the Implementation of the Spin It to Win It

There is a significant difference in the level of student engagement in Mathematics 8 before and after the implementation of the Spin It to Win It strategy. The findings indicate a very significant difference between the two periods, with a t-value of -11.83 and a p-value of 0.000 (***p <.001). The mean engagement score prior to intervention was M = 13.89, SD = 2.40, and after the intervention, it became M = 27.94, SD = 7.18.

The results clearly show a significant increase in students' level of engagement after the introduction of the gamified teaching approach. The rise in the mean score is an indication that the intervention was highly effective in improving students' motivation and involvement in Mathematics 8. The higher standard deviation in post-implementation scores is also an indication of a wider spread of student reactions, potentially due to differences in the level of acceptance of the strategy.

A quasi-experiment discovered that gamified learning environments significantly enhanced learners' engagement, academic achievement, and attitude towards mathematics when compared to a control group (Maryana et al., 2023). Likewise, 85% of the learners reported heightened interest in mathematics, with scores on average improving by 15% after exposure to gamified learning activities (Sitepu et al., 2023). Under a game based learning environment with real-world problem solving exercises, students exhibited enhanced math problem-solving abilities through engaging and collaborative game components (Ke et al., 2024). Gamified classroom environments that employed real time feedback and reward systems also led to increased motivation, increased engagement, and improved performance in math (Manrique López, 2025). Further, students from a flipped classroom with gamification indicated significant improvements in learning approaches, motivation, and mathematics achievement (Pehlivan & Arabacioglu, 2023).

These results suggest that incorporating engaging and interactive techniques, such as Spin It to Win It, into pedagogy has the potential to significantly motivate students towards math. It is suggested that school officials and curriculum designers take on and internalize such practices within other subjects and grades as well. Training and workshop sessions could be conducted to help teachers prepare and execute more gamified learning processes to sustain and extend this enhancement. In addition, students who persist in showing low engagement can be further assisted by individualized interventions or follow-up support activities that expand on the successful components of the approach.

Table 3: Significant Difference in The Student Level of Student's Engagement in Mathematics 8 Before and After The Implementation Of The Spin It To Win It

Variables	M	SD	*T* value	*P* value
Student's Engagement in Mathematics 8 Before the Implementation of The Spin It to Win It	13.89	2.40	-11.83	0.000
Student's Engagement in Mathematics 8 Before the Implementation of The Spin It to Win It	27.94	7.18		

Note: *** p < .001 (Highly Significant); **p≤0.01 (Highly Significant); *p<0.05 (Significant); p>0.05 (Not significant)

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

The study addressed the observed lack of engagement among Grade 8 students in Mathematics 8. Its primary purpose was to determine the effectiveness of a game- based instructional tool, Spin It to Win It, in enhancing students' level of engagement in mathematics. The study was conducted at the junior high school level, speci cally with Grade 8 students from a public secondary school in Ozamiz City. Participants were selected through purposive sampling based on their low engagement and performance in mathematics. A pre-experimental one group pretest-posttest design was employed to compare students' engagement levels before and after the implementation of the strategy. Data were collected using a performance-based assessment and analyzed using descriptive statistics and a t-test for dependent samples.

Conclusion

The study's results lead to the following conclusions:

1. Students in Math 8 displayed extremely low-level engagement, as evidenced by their work, with a significant number of them performing below expectations and failing to understand the lesson.
2. Student engagement visibly improves, and the level of performance escalates, with the majority of them shifting into improved categories, providing a better performance and understanding, as well as cooperation in mathematics.
3. Statistical results indicate a critical difference between pre- and post-implementation engagement, proving that the strategy is highly effective in boosting student involvement and performance.
4. The Spin It to Win It strategy creates a fun and interactive learning environment, enhancing student motivation and participation, as students are actively engaged in their learning. As a result, a better comprehension of mathematical concepts was achieved with the added element of enjoyment of the process.

Findings

The study revealed several key findings:

1. Prior to the use of the "Spin to Win It" strategy, students showed very low levels of engagement in Mathematics 8. All participants were classified under the lowest engagement category, highlighting a strong need for instructional innovation.
2. After the implementation of the gamified strategy, student engagement improved markedly. A noticeable shift was observed, with many students progressing to higher levels of engagement, including outstanding and satisfactory classifications.
3. The analysis of engagement levels prior to and following the intervention demonstrated a statistically significant improvement. This supports the effectiveness of the "Spin to Win It" strategy in enhancing student motivation and active participation in mathematics.

Recommendation

1. Teachers may integrate the Spin It to Win It strategy into their mathematics classes, particularly for topics where student engagement tends to be low. This can be achieved by incorporating the game into the lesson plan, thereby actively engaging students in the learning process.
2. School administrators can facilitate training sessions or workshops for teachers to enhance their competencies in effectively implementing game-based learning strategies. These sessions can focus on the best practices for using games in the classroom and how to maximize their educational value.
3. Educational institutions may create a collection of game based instructional tools tailored to various mathematics topics. Such resources should be tailored to accommodate diverse learning styles and foster active participation, thereby creating a more inclusive and engaging learning environment.
4. Teachers and administrators regularly conduct assessments to examine the efficacy of game-based learning strategies in fostering student engagement. These assessments will facilitate the identification of areas for improvement and enable teachers to modify their instructional practices as needed.
5. Teachers should be encouraged to collaborate to share best practices and develop new strategies that foster student engagement. This collaboration can take place through regular meetings, peer observations, and sharing resources to re ne teaching methods.
6. Future researchers may explore the implications of game based learning on other domains of student development, such as analytical and decision-making skills and retention of mathematical concepts.

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