

Maximizing Educational Memes for Engagement (M.E.M.E.) to Enhance Science Performance Among Grade 8 Junior High School Students

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ABSTRACT

This study investigated the impact of Maximizing Educational Memes for Engagement (M.E.M.E.) on the science performance and engagement of Grade 8 Junior high school students. Conducted at Central Philippine University Junior High School during the 4th grading period of the academic year 2024–2025, the research involved 64 students divided into two groups; the experimental group, which utilized M.E.M.E. as an instructional strategy and the control group that followed traditional lecture-based methods. The study aimed to assess the effects of M.E.M.E. on student engagement, compare pretest and posttest scores between both

groups, and evaluate any statistically significant differences in performance. Data were collected through pretests and posttests, alongside a structured Likert-scale questionnaire that measured levels of engagement. Results indicated that the experimental group experienced a significant increase in academic performance, with mean scores increasing from 26.79 to 37.21, while negligible changes were observed in the control group. Statistical analysis confirmed the effectiveness of M.E.M.E. in enhancing student engagement, with an overall mean engagement score of 4.20, categorized as "Highly Engaged". The findings underscore the potential of meme-based instruction to foster a more dynamic and relatable learning environment, enhancing both motivation and academic performance in science education. This study advocates for the integration of innovative teaching strategies like M.E.M.E. to improve student engagement and comprehension in science, highlighting the importance of connecting educational content with the interests of contemporary learners.

Keywords: *M.E.M.E., science education, student engagement, academic performance, Grade 8 students, meme-based instruction*

INTRODUCTION

The poor performance of Filipino students in Science has been a perennial concern in the Philippine education system. International assessment scores, such as the Programme for International Student Assessment (PISA), Trends in International Mathematics and Science Study (TIMSS), and the National Achievement Test (NAT) reflect the struggle of Filipino students with Science proficiency. In the 2018 PISA report, the Philippines ranked 78 among the countries participating, and despite the improvement in ranking in 2022 (77 out of 81 participating countries), Science scores were still lower than the international mean, from 356 to 355. These scores highlight the need for innovative and interactive teaching strategies that can engage students' learning and interest in Science.

One promising approach is the integration of memes in educational settings. Initially proposed by Richard Dawkins (1976) as a cultural transmission theory, memes have been an accepted means of online communication for students. Moraes (2021) proposed memes as an effective education tool, as they engage young people, summarize ideas, and enhance interactive learning. Meme-based learning is observed to enhance student engagement and comprehension, performance, and attitude towards Science courses such as Biology (Carlos & Delocado, 2024).

Given the limitations of traditional teaching approaches to address the diversified needs of the learners of the 21st century, the present research aimed to explore the effectiveness of using memes as an educational tool for Science education.

More specifically, this study attempted to confirm whether learning from memes can increase student interest and comprehension, and improve overall academic performance in Science. Utilizing humor and popular culture iconography, memes can potentially serve as a bridge between traditional teaching approaches and digital culture of the Generation Z learner. The present research also aimed to illustrate how memes in teaching Science can contribute to a student-centered and student-interactive learning environment.

Objectives

This study aimed to determine the impact of Maximizing Educational Memes for Engagement (M.E.M.E.) on the Science performance of Grade 8 junior high school students. Specifically, it answered the following questions:

1. What is the impact of M.E.M.E. on students' engagement in Science?
2. How did the two groups, the control group and experimental group of Grade 8 students, perform respectively in the pretest and posttest?
3. Is there a statistically significant difference between the test scores of the control group and the experimental group before and after using M.E.M.E.?

Significance of the Study

The result of the study will benefit the following:

The students. The results of the study, when utilized in learning strategies of students such as the inclusion of instructional memes will enhance student motivation, engagement, and science learning. The use of familiar, humorous themes will likely to make complex scientific concepts easier for students to digest. The goal of this approach is to help the children develop the skills they needed (like critical thinking, problem-solving, academic success) to succeed in science and other professions.

Student Teachers. This study will help undergraduate teachers learn the potential effectiveness of innovative teaching methods such as educational memes. This knowledge will help student instructors to do flexible pedagogical practices that meet the expectations of 21st-century learners and facilitate their future learning environment.

Teachers. The study's conclusions will enable teachers to consider new approaches to create a stimulating and lively learning environment. Educators can use the findings of this study to develop successful and engaging scientific curricula, remedying common controversies in performance and engagement.

Science Department Heads. The results of this study will assist heads of science departments in evaluating the effectiveness of their current methods of instruction and exploring new approaches to facilitate learning in science.

School Heads. The results of this study can provide the school administrators a guide in the creation of initiatives and regulations that promote effective and interesting teaching methods. Decisions on incorporating contemporary, student-centered methods into the curriculum, especially in scientific education, can be based on these results.

Future Researchers. The results of this study will encourage future researchers who wish to investigate the function of MEME in educational technology and science pedagogy. This project will support further research in creative strategies for raising academic achievement and student engagement to facilitate ongoing improvements in classroom practices.

LITERATURE REVIEW AND METHODOLOGY

Related Studies/Model

Innovative Approach to Science Teaching

Science education needs to be innovative to enhance the quality of learning outcomes and experiences. To make it effective, it requires innovative strategies in teaching to enhance content mastery, engagement, and critical thinking by students. Innovations should include the implementation of new goals,

subject matter, teaching strategies, and cooperative learning opportunities for both students and instructors (Kondrashev et al. (2024). As technology is changing the course of the modern world, Science education should be innovative if it aims to increase pupil engagement and success in scholarship.

The Role of Laughter and Digital Tools in Learning

Scientific classes show great opportunities for student performance and participation improvement through humor in teaching strategies. Humor fosters emotional, cognitive, and behavioral involvement in a relaxing and cheerful learning environment. Hackathorn et al. (2011) indicated that using humor in the classroom greatly increases the retention and understanding of the students at the knowledge and comprehension level of Bloom's taxonomy. Humor would work when appropriate to the goals of instruction and facilitate higher-order cognitive skills such as critical thinking and creative problem solving. Humor paired with technology, such as memes, movies, and animated graphics, enhances the pedagogical value of the comedy. Berk (2021) affirms that humor enhances engagement, attention and retention; thus, well-planned humor can be employed to create an encouraging learning environment that facilitates active engagement and reduces anxiety and tension. This is resonated by Erdoğan and Çakıroğlu (2021) who believed that humor creates a positive classroom environment, encourages students to be actively engaged, and develops a relationship between the students and their instructors.

Meme as Education: Tool for Engagement

Memes have proven to be promising in boosting student engagement, understanding, and retention when used as an instructional resource.

A study was conducted by Subbiramaniyan (2024) to evaluate the effect of memes on first-year medical students' anatomy education. The data show that the experimental group, using memes in revision sessions, had post-test scores much higher than the control group, which indicates that memes have the ability to keep the attention of students and to explain difficult concepts.

In the poll that accompanied it, students' greater interest in the material, better memorization, and greater involvement were all highlighted. These results showed that memes can make challenging information more accessible and engaging.

Olalekan et al. (2024) also conducted a study on the impact of culturally appropriate memes in university lectures in different countries. Their four-week intervention investigated the impact of learning from memes on motivation and engagement in 60 university students. It was discovered that memes in classrooms can have a significant impact on the engagement and comprehension of students.

Subbiramaniyan et al. (2021) also explored how memes promoted participation and peer interaction in an online renal physiology course during the COVID-19 pandemic. Their study found that memes contributed to better retention, improved conceptual understanding, and a more positive learning environment, especially among students who created memes during the pandemic.

Memes were said to increase student interest and simplify complex subjects while also serving as a tool for receiving feedback. The interactive features of the project, such as peer voting and discussions, encouraged group learning and fostered a sense of community in virtual classrooms. These results suggest that memes can effectively supplement both online and traditional teaching methodologies.

Carlos and Delocado (2024) found that meme-infused lessons in biology significantly improved non-STEM senior high school students' post-test scores and attitudes toward learning. Their study concluded that integrating memes into teaching enhances academic achievement, engagement, and self-efficacy among Generation Z learners, supporting the effectiveness of memes in science education.

Science in the High School Students' Learning Preferences and Engagement

Understanding students' most preferred ways of learning can enhance their engagement in science education, especially in the implementation of trendy ways of learning such as employing memes.

Memes are basically images that are often funny. Aloni et al. (2024) established that they can effectively replace the visual learning preference of students and increase motivation to learn science subjects. Using humor in teaching practices may help engage adolescent learners significantly, especially in science instruction.

Humor positively influences emotional, behavioral, and cognitive engagement, making it an important tool for building a supportive learning environment (Erdoğan & Çakıroğlu, 2021). With a carefully planned use of humor, teachers can break difficult ideas into easier-to-grasp ideas, reduce students' anxiety levels, and improve students' focus and memory.

The use of memes as a teaching tool to inject humor, interactivity, and accessibility makes science ideas easy to understand and encourages active participation of students in learning difficult scientific ideas. This allows a closing of gaps in more traditional teaching approaches, hence encouraging junior high school students to have an even keener interest and success in science as science education molds itself to suit the needs of 21st-century learners.

Scope of the Study

This study was about Maximizing Educational Memes for Engagement (M.E.M.E.) for the Science performance of Grade 8 Junior high school students. The activity was based on the Grade 8 curriculum and the standards set by the Department of Education, Philippines.

The study focused on Grade 8 students, with a total population of 64 composed of 51 girls and 17 boys, aged approximately 13–15 years old, during the 4th grading period of Academic Year (A.Y.) 2024–2025.

The proposed action plan, titled Maximizing Educational Memes for Engagement, involved two groups, a control group and an experimental group, that were both given a test. The control group received the traditional lecture without M.E.M.E., while the experimental group used M.E.M.E. as part of the instruction. The performance of both groups in the test was then compared.

The study was conducted at Central Philippine University Junior High School from March 2025 to April 2025. Materials required for the activity were purchased or sourced locally within the City of Iloilo.

To ensure reliability and validity, the study had three validators: two cooperating teachers who taught science in junior high school and the Science Program Head Adviser of the student researcher. These experts carefully reviewed and approved the activities to be implemented. This process ensured the overall quality and integrity of all teaching resources used in the study, as well as their compatibility and suitability for the students' learning levels.

Proposed Intervention and Strategies

This action research introduced Maximizing Educational Memes for Engagement (M.E.M.E.), an innovative intervention designed to enhance student engagement and achievement in science. By integrating memes, humor, and relatable content, this method aimed to make complex science concepts more interesting and memorable. The approach was expected to foster a more dynamic learning environment, ultimately improving students' performance and motivation in science. The objectives of this intervention aligned with findings from Subbiramaniyan et al. (2022), which indicated that using memes in teaching increased student engagement, simplified difficult concepts, and strengthened memory retention of scientific principles.

At the beginning of the study, two sections of eighth-grade students were randomly assigned to either the control or experimental group through a coin toss—heads for the control group and tails for the experimental group. This random selection ensured fairness and minimized bias in group characteristics.

M.E.M.E. was incorporated in the lesson plans, PowerPoint presentations, and educational resources for the experimental group. During the third and fourth quarters of AY 2024–2025, selected Science 8 topics used memes to introduce or reinforce key scientific ideas in an engaging and accessible manner. Additionally, students in the experimental group created their own science-related memes as a creative way to express their understanding. Beyond fostering creativity, Subbiramaniyan et al. (2022) highlighted that memes enhanced collaborative learning by facilitating meaningful student interactions. Memes also served as formative assessment tools and reinforcement for learning. Students created memes summarizing key concepts, which were then shared and discussed in class. This approach not only encouraged critical thinking but also provided teachers with an entertaining yet effective way to assess students' understanding. Furthermore, memes were used in class discussions and review activities as engaging starters to help students recall scientific concepts. Research by Subbiramaniyan et al. (2022) supported this, noting that such activities enhanced concept retention and increased student participation.

Meanwhile, the control group received instruction using traditional teaching methods, without the inclusion of memes. Both groups followed the same curriculum, ensuring that any differences in performance could be attributed to the use of memes in the experimental group.

The study employed a quasi-experimental quantitative design to evaluate the impact of the M.E.M.E. intervention on students' engagement and academic performance in Science. Both the experimental and control groups completed a pretest to determine baseline academic performance. The experimental group received Science instruction integrated with the M.E.M.E. approach, while the control

group followed the standard curriculum. After the instructional period, both groups took a posttest to measure changes in academic performance.

The study followed a structured eight-week timeline. During the first two weeks, students in the experimental group were introduced to the concept of using memes as a learning tool. From the third to the sixth week, the experimental group actively created and shared memes as part of their science lessons. In the final two weeks, both the experimental and control groups took a posttest to assess the impact of the intervention on the science performance of the experimental group.

To assess student engagement, which was the first research objective, a structured Likert-scale questionnaire was developed and administered to the experimental group. The questionnaire contained two sections: the first section, "How Engaged Are You in Science?" measured behavioral and emotional engagement such as enjoyment, participation, and focus. The second section, "How Does M.E.M.E. Help You Learn?" assessed cognitive engagement including understanding, retention, and academic performance. Both sections utilized a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), with items specifically designed to capture engagement outcomes related to the M.E.M.E.-based instructional approach. Content validity of the questionnaire was ensured through review by a panel of three experts in Science education and instructional design. Their feedback was used to refine each item's clarity, relevance, and alignment with the study's objectives. Additionally, a pilot test was conducted with 15 Grade 8 students from a non-participating section, which resulted in minor revisions to improve clarity and internal consistency. Reliability analysis using Cronbach's alpha on the pilot data yielded a coefficient of $\alpha = 0.881$, indicating high internal consistency and strong reliability of the instrument.

The study used the t-test to compare test scores between the experimental and control groups to analyze the data. These data were coded, tabulated, and subjected to statistical analysis, including computations of the mean and standard deviation. This approach helped determine whether the M.E.M.E. intervention significantly improved students' science performance by identifying any notable differences in average test results.

RESULTS AND DISCUSSIONS

Data Collection and Analysis

Table 1 reveals that the students are highly engaged with the M.E.M.E. approach in learning science as shown by the overall mean score of 4.20 (SD = 0.423) across all items. The highest-rated statements were "*M.E.M.E. makes Science more fun and interesting*" and "*M.E.M.E. makes me more curious about science outside of school,*" that both yielded a mean of 4.32. This suggests that students generally perceive M.E.M.E. as a positive and engaging tool in science education.

The results show that M.E.M.E. significantly improved students' classroom engagement. Students reported greater interest, focus, and willingness to participate in discussions. This supports the findings of Erdoğan and Çakıroğlu (2021), that emphasized that humor and digital tools foster a more active, relaxed, and engaging learning environment by encouraging emotional and behavioral involvement.

In terms of academic achievement, students agreed that M.E.M.E. helped them understand topics better and perform well on tests. This agrees with Subbiramaniyan (2021), whose study found that using memes in instruction led to improved comprehension and retention, especially in complex subjects. The positive response from students indicates that meme-based instruction can enhance both engagement and learning outcomes in science.

Table 1
Students' Level of Engagement in M.E.M.E. in Learning Science

Statements	sd	Mean	Description
<i>How Engaged Are You in Science?</i>			
1. M.E.M.E. makes Science more fun and interesting.	.589	4.32	<i>Highly Engaged</i>
2. M.E.M.E. helps me join class discussions more.	.729	4.21	<i>Highly Engaged</i>
3. I want to do Science activities more when M.E.M.E. is used.	.819	4.24	<i>Highly Engaged</i>
4. M.E.M.E. helps me stay focused in class.	.821	3.85	<i>Highly Engaged</i>
5. I enjoy Science more when M.E.M.E. is part of the lesson.	.727	4.32	<i>Highly Engaged</i>
<i>How Does M.E.M.E. Help You Learn?</i>			
6. M.E.M.E. helps me understand Science topics better.	.712	4.09	<i>Highly Engaged</i>
7. I do better on science tests when M.E.M.E. is used in lessons.	.702	4.15	<i>Highly Engaged</i>
8. M.E.M.E. makes me more curious about science outside of school.	.589	4.32	<i>Highly Engaged</i>
9. I remember Science lessons more when M.E.M.E. is used.	.676	4.29	<i>Highly Engaged</i>
Mean	.423	4.20	<i>Highly Engaged</i>

Legend: Poorly Engaged (1.00 – 2.33), Moderately Engaged (2.34 – 3.66), Highly Engaged (3.67 – 5.00)

The data in Table 2, on the other hand, reveal that the traditional lecture-discussion method produced only minimal changes in students' performance in science. Although there was a slight increase in the number of students who performed from "High" to "Very high" level, but the overall mean score moved marginally only from 31.15 to 31.38, still within the "Average" range. This suggests that while the method maintains a baseline level of learning, it does not significantly elevate student's achievement over a short instructional period.

Traditional teaching approaches, which rely heavily on teacher talk and passive student listening, may not fully address the diverse learning styles and engagement needs of modern students. As emphasized by Kondrashev et al. (2024), science education in the 21st century requires innovation in teaching strategies to improve students' mastery and engagement. The slight improvement observed in the study underscores the constraints of conventional methods in achieving higher cognitive engagement and performance gains.

Moreover, Erdoğan and Çakıroğlu (2021) highlight that methods lacking interactivity and emotional connection may reduce student participation and retention. The traditional format, while structured, may fail to stimulate curiosity, active involvement, or motivation—factors essential for higher academic outcomes in science education.

Table 2
Performance of Students in Science under the Control Group Before and After the Use of Traditional Lecture-Discussion

Before the Use of Traditional Lecture-Discussion Method			After the Use of Traditional Lecture-Discussion Method		
	f	%		f	%
Poor	5	14.7	Poor	7	20.6
Average	22	64.7	Average	16	47.1
High	7	20.6	High	10	29.4
Very High	-	-	Very High	1	2.9
Total	34	100.0	Total	34	100.0
Mean = 31.15 (Average) sd = 6.505			Mean = 31.38 (Average) sd = 9.835		

Legend: Very Poor (0 – 12), Poor (13 – 24), Average (25 – 36), High (37 – 48), Very high (49 – 60)

The distribution of scores of students in the experimental group before and after implementing the M.E.M.E. method is shown in Table 3. Before the intervention, less than half of the students scored Average (44.1%) in their performance, closely followed by those with Poor (41.2%) performance, and only few had High (14.7%) performance. None of them scored Very High. After using M.E.M.E. as a teaching strategy, there was a notable improvement in the students' performance: the number of students in the High category increased to 55.9%, one student (2.9%) reached the Very High level, and none were no longer found in the Poor range. The mean score significantly improved from 26.79 (Average) to 37.21 (High), indicating a positive shift in academic performance.

The mean score noticeably increased by 10.42 points (from 26.79 to 37.21), and the reduction in standard deviation (from 7.973 to 5.645) indicates that students performed better overall and became more clustered around a higher mean, suggesting a more consistent learning improvement among the experimental group.

The engagement facilitated by humor, relatability, and peer interaction through memes likely helped students grasp challenging concepts more effectively, supporting the theories of Moraes (2021) and Subbiramaniyan et al. (2022) on meme-based science education.

Table 3
Performance of Students in Science under the Experimental Group Before and After the Use of M.E.M.E. Method

Before the Use of M.E.M.E Method	f	%	After the Use of M.E.M.E Method	f	%
Poor	14	41.2	Poor	-	-
Average	15	44.1	Average	14	41.2
High	5	14.7	High	19	55.9
Very High	-	-	Very High	1	2.9
Total	34	100.0	Total	34	100.0
Mean = 26.79 (Average)	sd = 7.973		Mean = 37.21 (High)	sd = 5.645	

Legend: Very Poor (0 – 12), Poor (13 – 24), Average (25 – 36), High (37 – 48), Very high (49 – 60)

Table 4 shows that the control group, that was taught using the traditional lecture-discussion approach, showed no significant difference between their pre-test and post-test scores. Although the mean score slightly increased from 31.15 to 31.38, the increase was very minimal (only 0.23 points) and statistically insignificant ($p = 0.896 > 0.05$).

In addition, the increase in standard deviation from 6.505 to 9.835 suggests greater variability in student scores after the intervention. This signifies that not all students responded similarly to the traditional method; some improved, some regressed, and some remained the same.

This implies that the traditional method was insufficient to significantly elevate or stabilize the academic performance of the students. Without engaging relatable strategies like M.E.M.E., students may have difficulty maintaining interest and deep comprehension, which could explain the negligible difference in the results.

Table 4
Difference in the Performance of Students in Science belong to the Control Group Before and After the Use of Lecture-Discussion Method

Control Group	Performance in Science using Traditional Lecture-Discussion Method					
	N	Mean	sd	df	t-value	p-value
Before	34	31.15	6.505	33	.131	.896
After	34	31.38	9.835			

(Not significant at .05)

Table 5 reveals that the experimental group's performance improved significantly after using M.E.M.E. The mean difference of 10.42 points is highly statistically significant ($p = 0.000 < 0.05$). The increase was not random; rather, it was a direct result of the intervention, as indicated by the high t-value (9.984).

The decrease in standard deviation from 7.973 to 5.565 implies that not only did the average performance increase, but individual disparities among students' scores were minimized, demonstrating that M.E.M.E. was effective across a wide range of learners.

This evident improvement supports earlier research by Carlos and Delocado (2024) and Hackathorn et al. (2012), that found humor and engagement foster higher-order thinking skills and better academic performance. It also reveals the effectiveness of humor, visual storytelling, and peer collaboration in improving focus, retention, and understanding.

Table 5
Difference in the Performance of Students in Science Belonging to the Experimental Group Before and After the Use of M.E.M.E. Method

Experimental Group	Performance in Science using M.E.M.E. Method					
	N	Mean	sd	df	t-value	p-value
Before	34	26.79	7.973	33	9.984*	.000
After	34	37.21	5.565			

*Significant at .05 ($p < .05$)

Strategies Implemented

1. The teacher-researcher administered a 50-item multiple-choice pre-test to both the control and experimental groups. This assessment aimed to measure the students' initial understanding of Biodiversity and its Protection and Conservation before implementing the intervention. The test was aligned with the K to 12 Science Curriculum for Grade 8 and covered various levels of knowledge on biodiversity concepts.
2. To ensure fairness, two full sections were randomly assigned to either the experimental or control group through a coin toss. The experimental group received lessons with meme integration, while the control group was under the traditional lecture-based approach. The same teacher handled both groups to maintain instructional consistency.
3. After the pre-test, the experimental group was introduced to meme-based learning as an instructional strategy to make science concepts more engaging and relatable. The intervention

lasted for four weeks, with one lesson every two weeks, covering *Lesson 1: Biodiversity and Lesson 2: Biodiversity: Protection and Conservation*.

4. The teacher-researcher applied memes as a teaching tool to improve student engagement and conceptual understanding. The strategy included the following steps:
 - a. The teacher-researcher introduced the lesson using subject-related memes relevant to the topic.
 - b. Students analyzed the memes and discussed how they relate to biodiversity concepts.
 - c. A PowerPoint presentation incorporating memes was used to support lesson discussions.
 - d. Students were encouraged to reflect on and interpret the meaning of memes in connection to real-world biodiversity issues.
 - e. As an application activity, students created their own memes summarizing their understanding of the lessons.
5. The control group was given a traditional instruction method, which consisted of:
 - a. Direct lecture-based discussions of the lesson topics.
 - b. Teacher-led explanations without the use of memes or digital media.
 - c. A standard written summary activity instead of meme creation.
 - d. Question-and-answer discussions without visual or humor-based learning aids.
6. After completing the two lessons, a post-test was given to both groups using the same 50-item multiple-choice test as in the pre-test.
7. All student scores were recorded and analyzed using statistical software to determine whether the experimental group showed significant improvements in learning outcomes.

Proposed Solutions

This study was conducted to investigate the impact of Maximizing Educational Memes for Engagement (M.E.M.E.) on the science performance and engagement of Grade 8 students. The intervention was developed in response to the observed lack of student participation and interest in science classes often taught using traditional, lecture-based methods. To address this issue, the teacher-researcher utilized a strategy that integrated educational memes in the delivery of science lessons.

The M.E.M.E. strategy was designed to help students engage more actively in classroom discussions, improve understanding of scientific concepts, and retain information more effectively. This approach involved presenting science content using memes that were both topic-relevant and aligned with the Grade 8 K to 12 Science Curriculum. The strategy was carried out through several steps, including meme analysis, meme-supported presentations, and meme creation activities that allowed students to express their comprehension creatively.

This method provided an opportunity for students to connect humor and visuals with real-world science issues, particularly biodiversity and its conservation. It also supported differentiated learning by

catering to the interests and digital orientation of 21st-century learners. The memes used in instruction not only captured students' attention but also served as tools for reflection, peer discussion, and content application. Based on the result of the intervention implemented, therefore, it is proposed that science educators integrate meme-based strategies in regular instruction to foster deeper engagement and improve academic performance of students.

CONCLUSIONS

Outcomes

1. The use of M.E.M.E. in science lessons led to high levels of student engagement and improved academic achievement.
2. The traditional lecture-discussion method had little impact on the improvement of students' academic performance.
3. Students in the experimental group showed notable improvement in their science performance after the use of M.E.M.E. as an instructional strategy.
4. There was no significant change in the academic performance of students in the control group following traditional instruction.
5. The use of M.E.M.E. in teaching science led to a statistically significant improvement in students' learning outcomes compared to traditional methods.

Implications

Educational memes play a vital role in science teaching and in the learning process. Memes serve as a digital instructional tool that combines humor, visuals, and relevant content to help students efficiently understand concepts. They can enhance student engagement, promote critical thinking, increase interest in lessons, improve memory retention, and foster better classroom participation. Memes can be especially beneficial for junior high school learners as they relate to their daily digital experiences and simplify complex science topics to a more comprehensible and meaningful ideas. M.E.M.E. is an important strategy in science education because it provides students with a creative and engaging approach to learning that supports both motivation and academic performance.

Teaching science effectively requires strategies that connect with the students' interests and communication styles. Memes, as used in this study, help bridge the gap between content and learner by presenting information in a humorous, visual, and relatable way. According to Berk (2021), humor enhances attention and retention, while Erdoğan and Çakıroğlu (2021) emphasized that humor and digital tools foster a more engaging and less anxious learning environment.

The researchers' study on the use of M.E.M.E. among Grade 8 students stressed the importance of assessment of the level of student engagement and science performance before and after the intervention to

measure the effectiveness of the strategy. The study found a significant improvement in students' performance and engagement after the use of memes in instruction. This indicates that meme-based learning is more effective than traditional teaching methods, especially in making lessons more enjoyable, interactive, and meaningful.

Furthermore, student responses showed that science lessons became more interesting, easier to understand, and allowed them to express ideas creatively and confidently. As Carlos and Delocado (2024) found, meme-infused instruction leads to better academic achievement and improved student attitudes; thus, the use of memes in science teaching is an effective tool in helping students retain knowledge, participate actively in discussions, and perform better in assessments.

Teachers can explore various creative strategies, such as meme creation and analysis, to inspire students and improve classroom learning using techniques that blend humor, relevance, and technology.

Further Recommendations

Meme-based learning offers a creative and engaging approach to enhance students' understanding of science concepts. Successful implementation, however, requires consideration of several factors. Based on the findings and insights, the following recommendations are proposed for students, science teachers, school administration, curriculum planners, and future researchers:

1. It is highly recommended that students create memes suited to their grade level, using simple visuals for elementary, creative summaries for middle school, and complex topic synthesis for high school to strengthen understanding and collaboration.
2. Science teachers are encouraged to use memes as informal assessment tools to check student comprehension in an enjoyable and relatable way. They should also utilize planning guides and participate in professional development training for better integration of memes into lessons.
3. School administrators should ensure access to the necessary technology, including reliable internet connection, devices, and meme-making software. They should also provide digital literacy training to promote responsible and effective use of meme among teachers and students.
4. Curriculum planners are advised to integrate meme-based strategies, specifically in science subjects to boost student engagement and creativity. Furthermore, it is recommended that the effectiveness of meme-based learning be tested across different science topics and in both private and public school settings to validate and refine its use.
- 5., it is strongly recommended to future researchers to conduct long-term studies comparing meme-based instruction with traditional methods to assess impacts on student achievement and motivation. Research should also explore differences between student-created and teacher-provided memes across various science education contexts.

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