

Educational Value of Science Memes: Its Implications to Teaching and Learning Among Junior High Schools

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Abstract

Memes are online cultural objects, typically images, videos, or text shared quickly and altered on social media sites, often with humor, satire, or commentary. Science memes stand out by incorporating scientific concepts, ideas, or experiences. This study aimed to investigate the educational value of Science memes and their implications for teaching and learning among junior high school Science teachers in Congressional District I of Batangas Province. Specifically, it examined the degree of integration of Science memes in instruction, their level of usefulness in enhancing learning engagement, conceptual understanding, knowledge retention, and real-world relevance, as well as the challenges encountered by teachers in their implementation. A mixed-method research design was employed, involving 165 public junior high school Science teachers selected through a Raosoft calculator with 95 % confidence level. Quantitative data were gathered through a researcher-made survey questionnaire, while qualitative data were obtained through interviews. Statistical tools such as weighted mean, composite mean, ranking, and Pearson Product-Moment Correlation Coefficient were used for data analysis, alongside thematic analysis for qualitative responses. Findings revealed that Science memes were moderately integrated in teaching but were perceived as highly useful in enhancing student engagement and simplifying complex scientific concepts. A significant positive relationship was found between the degree of integration and the level of usefulness of Science memes in instruction. However, challenges such as time constraints, limited digital skills, and risks of oversimplification were identified. The study concludes that Science memes are effective supplementary instructional tools that can improve teaching and learning outcomes when used appropriately. It recommends the development of enhancement materials and teacher training programs to maximize their pedagogical potential.

Keywords: Science memes, learning engagement, conceptual understanding, knowledge retention, meme-based instruction



Introduction

Science education is still among the most rigorous and challenging parts of schooling. Teachers are not only required to teach intricate and abstract scientific principles, but also to make learners involved and relate those concepts with everyday lives. Constrained educational resources, low learner motivation, and the increased presence of digital distractions further make it difficult to teach Science. Consequently, teachers always seek new and effective ways to make Science learning more engaging and relevant to junior high school students.

In relation to this, an insight from international large-scale assessments reveals the depth of the challenge. The Trends in International Mathematics and Science Study (TIMSS), conducted in 2019, administered assessments to a sample of learners in the Philippines in Mathematics and Science. The Philippines had an average of 249 in Science, far from the TIMSS scale midpoint of 500. Among 58 participating nations and six benchmark systems, the Philippines had the lowest average achievement, reflecting a significant gap in the basic Science and numeracy abilities of Filipino learners compared to learners of the same levels elsewhere in the world.

Likewise, the Program for International Student Assessment (PISA 2018) of the Organization for Economic Co-operation and Development (OECD) tested the capacity of 15-year-old learners to use their reading, Mathematics, and Science knowledge to answer real-life questions. In the scientific literacy field, the Philippines had a mean score of 357, significantly lower than the OECD average of 489, and stood second to the last among 79 countries involved. These shocking findings indicate systemic problems in the teaching and learning of Science and how learners are able to learn to comprehend, analyze, and apply scientific ideas in realistic contexts.

Moreover, in accordance with DM 168, S. 2024, National Achievement Test (NAT) analysis of results for grades level 6 (2022) and 10 & 12 (2023), in Division of Batangas, the mean percentage score of Grade 10 learners in Science, ranges from 31 to 35 for problem solving, information literacy and critical thinking. This suggests that, on average, learners are answering only about one-third of the test items correctly in these areas, indicating below-basic proficiency. Low scores indicates that learners might not have mastery of basic scientific concepts, limited data interpretation task exposure and inadequate use of inquiry-based or experiential learning in the classroom.

Given these academic challenges, the integration of engaging and culturally relevant teaching tools becomes vital. In today's digital era, Science memes have emerged as a popular online communication tool among youth. Memes, with their humorous and visual appeal, have the potential to capture attention and present complex ideas in simplified, relatable formats.

Memes are online cultural objects, typically images, videos, or text shared quickly and altered on social media sites, often with humor, satire, or commentary. In the context of education, memes can be considered instructional tools that blend visual communication with



simplified messages, making complex concepts more accessible and relatable to students. Following this line, memes in the new generation are digital images often overlaid with text that leverage the emotion, meaning, or humor of the original "meme" to express the creator's message. Science memes stand out by incorporating scientific concepts, ideas, or experiences. They blend scientific knowledge with humor, making complex topics more accessible and entertaining (Kelly, 2023).

The popularity of memes makes it an ideal vessel for enhancing and modernizing the classroom, which is especially pertinent with the association of memes with the younger generation, the GenAlpha, the predominant age in junior high school level.

In line with this, the Department of Education (DepEd) issued DepEd Order No. 21, s. 2019, which recognizes the use of Information and Communication Technology (ICT) as an effective medium for delivering curriculum content. This policy supports the use of creative digital materials such as educational Science memes, which can enhance learner's engagement, foster critical thinking, and improve concept retention in Science education.

Furthermore, in the contemporary era of distance learning, memes can significantly influence learners' learning effectiveness. Therefore, examining the role of memes within practical educational processes is highly important. Memes can be applied in various ways throughout the learning process, such as simplifying educational content to enhance memorization, supporting foreign language learning, and expressing students' responses to the current educational system. As a modern form of content delivery, memes function as visual carriers of learning material that can be adapted, modified, and recomposed by educators. At the same time, students have widely recognized and accepted memes as a familiar and engaging medium since their emergence (Walton, 2024).

As a Science teacher handling Grade 10 learners, the researcher has explored various strategies to make complex scientific concepts more relatable and engaging. One such strategy involved the use of Science meme that is humorous, image-based content that presents scientific ideas in a simple and creative way. These experiences inspired the conduct of this study to formally assess the educational value of Science memes in the teaching and learning process.

This research therefore, aimed to explore the role of Science memes in enhancing student engagement, comprehension, and retention of scientific concepts. The researcher also aimed to investigate how incorporating humor and digital culture into Science education can make complex ideas more accessible and relatable to students, particularly in a classroom setting. In addition, after comprehensive analysis of the effectiveness, the researcher hoped to understand its potential as a tool for increasing student motivation and participation in public junior high schools.

Through this research, the researcher aspired to uncover how Science memes can be integrated into teaching strategies, whether as supplementary learning tools or as a way to promote active student involvement in public junior high schools in Congressional District I of Batangas Province.



Specifically, this study sought to answer the following questions:

1. How may the degree of integration of Science memes in teaching be assessed by the teachers themselves with respect to enhancing teaching expertise, facilitating activity-based learning, reinforcing conceptual understanding and supporting assessment practice?
2. What is the level of usefulness of Science memes as assessed by the respondents in terms of learning engagement, understanding of scientific concepts, knowledge retention and real-world relevance?
3. Is there significant relationship between the assessment on the degree of integration of Science memes and on the level of usefulness in teaching and learning?
4. What are the challenges encountered by the teachers in integrating Science memes in instruction?
5. Based on the results of the study, what enhancement material may be proposed?

Methodology

Research Design

This study employed a mixed method design to comprehensively investigate the educational value of Science memes and their implications for teaching and learning among junior high school Science teachers. It was utilized to find and assess educational value of Science with regards to its usefulness and integration in the teaching and learning process through survey questionnaire. Moreover, it was used to determine the challenges in Science memes integration in the class through interview questions.

Participants

The participants of the study consisted of 165 Science junior high school teachers from public schools in Congressional District I of Batangas Province during the school year 2025–2026. A sampling technique through Raosoft calculator (confidence level of 95%), was employed to determine the number of respondents.

Research Instrument

Data were collected using a structured survey questionnaire and an interview guide. The instruments were reviewed and validated to ensure clarity and relevance. The instrument measured:

Survey Questionnaire (researcher-made, Likert scale) measured:

- Degree of integration of Science memes in teaching with respect to enhancing teaching expertise, facilitating activity-based learning, reinforcing conceptual understanding and supporting assessment practice
- Level of usefulness of Science memes in terms of learning engagement, understanding of scientific concepts, knowledge retention and real-world relevance

Interview Guide explored:

- Challenges encountered by the teachers in integrating Science memes in instruction

Data Collection Procedure

Permission was secured from the appropriate educational authorities prior to the conduct of the study. Data were gathered through multiple methods to ensure comprehensive collection, including the use of Google Forms for online responses, printed questionnaires for manual responses, and recorded interviews to capture qualitative insights.

Data Analysis

The study employed several statistical tools, namely frequency and weighted mean to describe response distributions, composite mean to determine overall assessments, ranking to identify the order of responses, and Pearson Product-Moment Correlation Coefficient (PPMCC) to examine the relationship between variables. Additionally, thematic analysis was utilized to interpret qualitative data obtained from the interviews. Throughout the research process, ethical considerations were strictly observed, ensuring confidentiality, anonymity, and voluntary participation of all respondents.

Results

Section 1: Degree of Integration of Science Memes in Teaching

Table 1.1 Enhancing Teaching Expertise

As a Science teacher, I . . .	Weighted Mean	Verbal Interpretation	Rank
1. incorporate Science memes into my lesson plans, specifically in the introduction of lesson.	3.25	Moderately Integrated	7
2. feel more confident when using digital tools like memes in teaching.	3.66	Highly Integrated	4
3. intentionally select memes that support my teaching goals.	3.20	Moderately Integrated	8
4. invest time in curating or creating educational memes that is parallel in my lesson.	3.18	Moderately Integrated	9
5. consider meme integration as part of 21st-century teaching having different learning modalities.	3.64	Highly Integrated	5

6.	can say that memes help me to present Science content in a more engaging way.	3.70	Highly Integrated	3
7.	can conclude that memes allow me to connect better with my students' learning styles.	3.74	Highly Integrated	2
8.	consider that using memes motivates me to explore new teaching strategies.	3.60	Highly Integrated	6
9.	can tell that Science memes help me simplify complex topics.	3.89	Highly Integrated	1
10.	am aware that integrating Science memes in teaching, enhance my professional teaching identity.	3.15	Moderately Integrated	10
Composite Mean		3.40	Moderately Integrated	

It can be gleaned from the table 1.1 that there is an overall weighted mean of 3.40, interpreted as Moderately Integrated, indicates that teachers generally acknowledge the relevance of memes as pedagogical tools that enhance engagement, understanding, and motivation in Science education. The statement on how Science memes help in simplifying complex topics, obtained the highest mean, weighted mean of 3.89 interpreted as Highly Integrated, suggesting that teachers value memes for their ability to make abstract or difficult Science concepts easier to understand. Meanwhile, enhancing professional teaching identity by integrating Science memes in teaching, received the lowest mean with a weighted mean of 3.15, Moderately Integrated, Rank 10. This suggests that while teachers recognize memes as useful tools, fewer associate them with professional identity or pedagogical competence.

Table 1.2 Facilitating Activity-Based Learning

As a Science teacher, I . . .	Weighted Mean	Verbal Interpretation	Rank
1. use memes as springboards for group discussions.	3.17	Moderately Integrated	10
2. design meme-based classroom activities.	3.20	Moderately Integrated	8
3. assigned meme creation as an activity to students in different learning modalities.	3.18	Moderately Integrated	9
4. can say that Science memes make my learning activities more interactive.	3.69	Highly Integrated	4
5. use memes to introduce or conclude class activities.	3.52	Highly Integrated	6
6. observed that meme-related tasks foster creativity among students.	3.72	Highly Integrated	3
7. consider that Science memes encourage student collaboration.	3.51	Highly Integrated	7
8. use memes as stimuli in inquiry-based	3.75	Highly	2

activities.		Integrated	
9. noticed that memes help establish an enjoyable classroom climate.	3.65	Highly Integrated	5
10. can conclude that memes stimulate critical thinking during Science activities.	3.78	Highly Integrated	1
Composite Mean	3.52	Highly Integrated	

The findings displayed in the table show that there is a composite mean of 3.52, indicates that the integration level generally falls as Highly Integrated. The highest-rated indicator is that, respondents concluded that memes stimulate critical thinking during Science activities, with a weighted mean of 3.78, which is considered highly integrated. However, the moderately integrated indicators, such as using Science memes as springboards for group discussions, with a weighted mean of 3.17, assigning meme creation as an activity, with a weighted mean of 3.18, and designing meme-based classroom activities, with a weighted mean of 3.20, reflect the partial application of the systematic steps. The moderate ratings suggest that while teachers recognize the benefits of memes, they may not yet consistently apply these structured steps in lesson design and evaluation, which limits deeper integration.

In sum, the findings affirm that Science memes play a valuable role in facilitating activity-based learning by enhancing inquiry, creativity, and interaction, though teachers' integration could be strengthened by adopting a more systematic and goal-oriented approach as proposed in existing literature.

Table 1.3 Reinforcing Conceptual Understanding

As a Science teacher, I . . .	Weighted Mean	Verbal Interpretation	Rank
1. help students grasp difficult Science concepts with the help of Science memes integration.	3.90	Highly Integrated	1
2. observed that Science memes connect Science topics with real-life scenarios.	3.24	Moderately Integrated	8
3. realized that Science memes allow the students to visualize abstract ideas.	3.89	Highly Integrated	2
4. reinforce prior knowledge through presenting Science memes.	3.70	Highly Integrated	6
5. noticed that students recall information better when it's meme-related.	3.78	Highly Integrated	4
6. have seen that Science memes serve as good review tool for key Science terms.	3.76	Highly Integrated	5
7. utilized Science memes as part of the lesson to check if students understand a concept.	3.67	Highly Integrated	7
8. can say that Science memes stimulate analytical thinking among learners.	3.20	Moderately Integrated	9
9. conclude that Science memes make students explain scientific concepts more clearly	3.21	Moderately Integrated	10

10. can tell that Science memes integration helps in concept-mapping or summarizing activities.	3.87	Highly Integrated	3
Composite Mean	3.62	Highly Integrated	

It can be deduced from Table 1.3, that the top-rated indicator, helping students grasp difficult Science concepts with the integration of Science memes, received a weighted mean of 3.90, suggesting that teachers perceive memes as effective tools for simplifying complex scientific ideas. Similarly, the statement that Science memes allow students to visualize abstract ideas ranked second with a weighted mean of 3.89, indicating that memes play a crucial role in providing visual and relatable representations of otherwise intangible or abstract scientific phenomena. Meanwhile, lower-ranked indicators, including that Science memes connect Science topics with real-life scenarios, which scored a weighted mean of 3.24, and that they stimulate analytical thinking among learners, with a weighted mean of 3.20, suggest that while memes are valuable for conceptual reinforcement, teachers perceive their potential for higher-order thinking, such as analysis and synthesis, as moderate.

Overall, the data demonstrate that science teachers perceive memes as highly effective for reinforcing conceptual understanding, particularly in making abstract and complex science concepts more accessible, memorable, and engaging.

Table 1.4 Supporting Assessment Practice

As a Science teacher, I . . .	Weighted Mean	Verbal Interpretation	Rank
1. use memes as part of my formative assessments.	3.89	Highly Integrated	2
2. let my students create memes as alternative assessment outputs.	3.31	Moderately Integrated	8
3. evaluate student-created memes based on Science content accuracy.	3.51	Highly Integrated	7
4. agree that meme-based assessments reflect students' depth of understanding.	3.80	Highly Integrated	5
5. use memes to assess misconceptions.	3.21	Moderately Integrated	9
6. include Science memes in my class quizzes or exit tasks.	3.85	Highly Integrated	3
7. use memes to assess communication and interpretation skills in teaching Science.	3.84	Highly Integrated	4
8. use rubrics to evaluate meme-related tasks.	3.74	Highly Integrated	6
9. utilize meme-based assessments to help diversify my evaluation strategies.	3.20	Moderately Integrated	10
10. let my students interpret memes as part of their performance tasks.	3.91	Highly Integrated	1
Composite Mean	3.63	Highly Integrated	

The results reflected in the table reveal that there is a composite mean of 3.63 which is interpreted as Highly Integrated. It can be gleaned from the table that the highest-rated statement, letting the students interpret memes as part of their performance tasks, with a weighted mean of 3.91, demonstrates that teachers recognize the value of meme interpretation as a means to assess students' conceptual understanding and interpretive thinking. The lowest-rated indicator, utilizing meme-based assessments to help diversify evaluation strategies, with a weighted mean of 3.20, implies that some teachers may still rely heavily on traditional testing methods and are gradually integrating meme-based assessments as supplementary rather than central tools.

Overall, the data indicate that teachers view the integration of science memes as a highly effective means of supporting assessment practices, particularly in formative evaluation and performance-based tasks. This reflects the educational value of science memes not only in enhancing conceptual understanding but also in diversifying assessment strategies, making evaluation more engaging, authentic, and aligned with students' digital learning preferences.

Section 2: Level of usefulness of Science memes

Table 2.1 Learning Engagement

As a Science teacher, I . . .	Weighted Mean	Verbal Interpretation	Rank
1. creating a positive learning atmosphere for the students.	3.72	Highly Useful	1
2. encouraging the students to participate in discussions.	3.54	Highly Useful	7
3. increasing students' interests in Science.	3.65	Highly Useful	4
4. reducing stress during learning difficult concepts.	3.68	Highly Useful	3
5. improving teacher-student connection.	3.21	Moderately Useful	9
6. motivating the students to explore the topics further.	3.56	Highly Useful	6
7. giving students eagerness to understand Science topic seen in social media.	3.59	Highly Useful	5
8. remembering key Science ideas.	3.70	Highly Useful	2
9. encouraging interaction with classmates.	3.25	Moderately Useful	8
10. enhancing the overall quality of Science instruction.	3.20	Moderately Useful	10
Composite Mean	3.51	Highly Useful	

It can be inferred from the table that the composite mean is 3.51, which is described as Highly Useful. The highest-rated statement, which is creating a positive learning atmosphere for the students, with a weighted mean of 3.72, highlights teachers' strong agreement that integrating memes contributes to

a classroom environment that is more relaxed, open, and conducive to learning. The lower-ranked indicators, such as improving teacher-student connection, encouraging interaction with classmates, and enhancing the overall quality of Science instruction, with weighted means of 3.21, 3.25, and 3.20 respectively, still fall under moderately useful but may imply that while memes boost engagement and motivation, teachers may view their role in fostering interpersonal relationships and instructional quality as supplementary rather than primary.

Overall, the data underscore that science memes are perceived as powerful tools for increasing learning engagement by creating a positive, enjoyable, and stress-free learning environment that promotes curiosity, memory retention, and active participation

Table 2.2 Understanding of Scientific Concepts

Science Memes is useful in . . .	Weighted Mean	Verbal Interpretation	Rank
Physics Concepts			
1. Newton's Laws of Motion	3.78	Highly Useful	8
2. Work, Energy, and Power	3.83	Highly Useful	5
3. Electricity & Magnetism	3.69	Highly Useful	10
Chemistry Concepts			
4. The Periodic Table	3.93	Highly Useful	1
5. Chemical Bonding (Ionic/Covalent/Metallic)	3.85	Highly Useful	4
6. Acids and Bases	3.51	Highly Useful	12
Biology Concepts			
7. Photosynthesis & Cellular Respiration	3.88	Highly Useful	3
8. DNA Replication & Protein Synthesis	3.90	Highly Useful	2
9. Homeostasis & Feedback Mechanisms	3.82	Highly Useful	6
Earth and Environmental Science Concepts			
10. Plate Tectonics & Earthquakes	3.80	Highly Useful	7
11. Climate Change (Carbon Cycle, Feedback Loops)	3.64	Highly Useful	11
12. Atmospheric Layers & Weather Systems	3.70	Highly Useful	9

The highest-rated items—The Periodic Table with a weighted mean of 3.93, DNA Replication and Protein Synthesis with 3.90, and Photosynthesis and Cellular Respiration with 3.88—suggest that these visual materials are most effective for topics involving complex structures and processes. Conversely, the lowest-rated areas, Acids and Bases with 3.51 and Climate Change with 3.64, though still highly useful, may require additional contextual or experiential learning strategies beyond visual aids.

Overall, these results affirm that Science Memes are valuable pedagogical tools for improving students' understanding of scientific concepts across Biology, Physics, and Chemistry.

Table 2.3 Knowledge Retention

As a Science teacher, I . . .	Weighted Mean	Verbal Interpretation	Rank
1. supporting conceptual learning rather than just memorization.	3.81	Highly Useful	3
2. expanding the knowledge of students after being exposed.	3.89	Highly Useful	1
3. retaining knowledge in students to build deeper understanding of complex topic.	3.78	Highly Useful	4
4. connecting the previous lesson to the current one.	3.68	Highly Useful	7
5. students' progress in learning higher-level science lessons without difficulty	3.70	Highly Useful	6
6. analyzing, hypothesizing, and evaluating based on prior learning of students.	3.76	Highly Useful	5
7. retaining the knowledge can be transferred within or across the curriculum.	3.60	Highly Useful	9
8. fostering interdisciplinary thinking.	3.65	Highly Useful	8
9. learn Science in social media platforms like Facebook (Science memes pages)	3.84	Highly Useful	2
10. encouraging students to innovate like SIP.	3.58	Highly Useful	10
Composite Mean	3.73	Highly Useful	

All items were rated as “Highly Useful”, with weighted means ranging from 3.58 to 3.89, and has a composite mean of 3.73, which signifies that teachers strongly perceive the role of Science Memes in improving students’ memory, understanding, and long-term recall of scientific concepts. The highest-rated item, which is expanding the knowledge of students after being exposed, with a weighted mean of 3.89 and ranked first, suggests that Science Memes help broaden students’ understanding by reinforcing what they have already learned and introducing related concepts. Meanwhile, the lowest-rated but still highly useful indicator, which is encouraging students to innovate like SIP, with a weighted mean of 3.58 and ranked tenth, suggests that while memes may not directly drive innovation, they stimulate creativity and curiosity, which are essential precursors to scientific inquiry.

Overall, the findings affirm that Science Memes significantly contribute to knowledge retention, conceptual understanding, and learner engagement.

Table 2.4 Real-World Relevance

As a Science teacher, I . . .	Weighted Mean	Verbal Interpretation	Rank
1. motivating students to learn how Science contributes to solving global challenges like pandemic.	3.77	Highly Useful	2
2. connecting classroom lessons to everyday experiences.	3.67	Highly Useful	5
3. making abstract or complex science concepts feel more relevant	3.65	Highly Useful	6
4. increasing awareness of real-world issues like climate change, health, or technology.	3.75	Highly Useful	3
5. showing how Science is applied in everyday decisions and societal challenges	3.70	Highly Useful	4
6. making students more interested in Science topics they see in the news or online.	3.80	Highly Useful	1
7. sparking curiosity about real-world Science careers and innovation	3.60	Highly Useful	7
8. showing the importance of Science in public health and safety.	3.55	Highly Useful	8
9. making Science feel more applicable to future careers or professions.	3.48	Moderately Useful	10
10. highlighting scientific discoveries that changed the world.	3.51	Highly Useful	9
Composite Mean	3.65	Highly Useful	

The weighted means range from 3.58 to 3.90, all verbally interpreted as “Highly Useful.” These results indicate that teachers perceive Science Memes as highly effective instructional tools in connecting scientific concepts to current events, global issues, and students’ daily experiences. Memes make Science more meaningful, contextualized, and engaging for learners living in a digital and media-saturated world.

The highest-rated indicator, “making students more interested in Science topics they see in the news or online,” which obtained a weighted mean of 3.80 and ranked first, reflects how Science Memes bridge the gap between digital culture and scientific awareness. Meanwhile, the lowest 3 indicators such as the importance of Science in public health and safety, highlighting scientific discoveries that changed the world and making Science feel more applicable to future careers or professions, ranked eighth, ninth, and tenth with weighted means of 3.55, 3.51, and 3.48, respectively. Although these items received slightly lower ratings, they still fall under the highly useful and moderately useful category. These results emphasize that Science Memes effectively contextualize the real-world applications and historical contributions of Science.

Section 3. Relationship between the Assessments on the Degree of Integration of Memes in Teaching and on their Level of Usefulness

Table 3.1 Relationship between the Degree of Science Memes Integration in Terms of Enhancing Teaching Expertise and the Level of Usefulness

Variables	r	p-value	Decision on Ho	Conclusion
Learning Engagement	0.63	0.000	Reject Ho	There is a significant positive relationship between the integration of Science memes in enhancing teaching expertise and their usefulness in learning engagement.
Understanding of Scientific Concepts	0.65	0.000	Reject Ho	There is a significant positive relationship between the integration of Science memes in enhancing teaching expertise and their usefulness in understanding scientific concepts.
Knowledge Retention	0.62	0.000	Reject Ho	There is a significant positive relationship between the integration of Science memes in enhancing teaching expertise and their usefulness in knowledge retention.
Real-World Relevance	0.64	0.000	Reject Ho	There is a significant positive relationship between the integration of Science memes in enhancing teaching expertise and their usefulness in real-world relevance.

Table 3.1 shows that there is a significant positive relationship between the integration of Science memes in enhancing teaching expertise and all aspects of usefulness, learning engagement, understanding of scientific concepts, knowledge retention, and real-world relevance. With correlation values ranging from 0.62 to 0.65 and all p-values at 0.000, the null hypothesis is rejected in all cases. This indicates that greater integration of Science memes is associated with higher perceived usefulness in teaching and learning.

Table 3.2 Relationship between the Degree of Science Memes Integration in Terms of Facilitating Activity-Based Learning and the Level of Usefulness

Variables	r	p-value	Decision on Ho	Conclusion
Learning Engagement	0.66	0.000	Reject Ho	There is a significant positive relationship between the integration of Science memes in facilitating activity-based learning and their usefulness in learning engagement.
Understanding of Scientific Concepts	0.67	0.000	Reject Ho	There is a significant positive relationship between the integration of Science memes in facilitating activity-based learning and their usefulness in understanding scientific concepts.
Knowledge Retention	0.64	0.000	Reject Ho	There is a significant positive relationship between the integration of Science memes in facilitating activity-based learning and their usefulness in knowledge retention.
Real-World Relevance	0.65	0.000	Reject Ho	There is a significant positive relationship between the integration of Science memes in facilitating activity-based learning and their usefulness in real-world relevance.

The table indicates a significant positive relationship between the integration of Science memes in facilitating activity-based learning and all dimensions of usefulness. With correlation values ranging from 0.64 to 0.67 and p-values of 0.000, the null hypothesis is rejected. This means that increased use of Science memes in activity-based learning is associated with higher levels of engagement, understanding, retention, and real-world relevance.

Table 3.3 Relationship Between the Degree of Integration in Terms of Reinforcing Conceptual Understanding and the Level of Usefulness

Variables	r	p-value	Decision on Ho	Conclusion
Learning Engagement	0.63	0.000	Reject Ho	There is a significant positive relationship between the integration of Science memes in reinforcing conceptual understanding and their usefulness in learning engagement.
Understanding of Scientific Concepts	0.68	0.000	Reject Ho	There is a significant positive relationship between the integration of Science memes in reinforcing conceptual understanding and their usefulness in understanding scientific concepts.
Knowledge Retention	0.66	0.000	Reject Ho	There is a significant positive relationship between the integration of Science memes in reinforcing conceptual understanding and their usefulness in knowledge retention.
Real-World Relevance	0.64	0.000	Reject Ho	There is a significant positive relationship between the integration of Science memes in reinforcing conceptual understanding and their usefulness in real-world relevance.

Table 3.3 shows a significant positive relationship between the integration of Science memes in reinforcing conceptual understanding and all areas of usefulness. With correlation values ranging from 0.63 to 0.68 and p-values of 0.000, the null hypothesis is rejected. This indicates that greater use of Science memes to reinforce concepts leads to higher engagement, better understanding, improved retention, and stronger real-world relevance.

Table 3.4 Relationship Between the Degree of Integration in Terms of Supporting Assessment Practice and the Level of Usefulness

Variables	r	p-value	Decision on Ho	Conclusion
Learning Engagement	0.65	0.000	Reject Ho	There is a significant positive relationship between the integration of Science memes in supporting assessment practice and their usefulness in learning engagement.
Understanding of Scientific Concepts	0.67	0.000	Reject Ho	There is a significant positive relationship between the integration of Science memes in supporting assessment practice and their usefulness in understanding scientific concepts.
Knowledge Retention	0.66	0.000	Reject Ho	There is a significant positive relationship between the integration of Science memes in supporting assessment practice and their usefulness in knowledge retention.
Real-World Relevance	0.64	0.000	Reject Ho	There is a significant positive relationship between the integration of Science memes in supporting assessment practice and their usefulness in real-world relevance.

Table 3.4 indicates a significant positive relationship between the integration of Science memes in supporting assessment practice and all dimensions of usefulness. With correlation values ranging from 0.64 to 0.67 and p-values of 0.000, the null hypothesis is rejected. This means that greater use of Science memes in assessment is associated with higher engagement, improved understanding, better retention, and stronger real-world relevance.

Section 4. Challenges Encountered by the teacher in Integrating Science Memes in Instruction.

Table 4.1 Responses of the Participants in the Interview with Corresponding Subthemes

The analysis sought to present a comprehensive understanding of the challenges experienced by teachers in the actual implementation of Science memes in instruction. By systematically organizing the responses into themes and subthemes, the study elucidates the recurring issues and underlying factors that affect the effective integration of this instructional approach



Participant	Key Ideas / Codes	Subthemes	Themes	Responses of Participants
Participant 1	Need for instructions, lack of skills in using memes	Lack of guidance on utilizing Science memes	Lack of Guidance in Meme Integration	<i>"I'm not really good at exploring multimedia instructional materials like Science memes. I still need guidance on preparing memes to be used for some of my lessons."</i>
Participant 2	Poor internet connection, lack of devices	Technical limitations in accessing memes	Technical Limitations	<i>"Since some sources of memes are online, it is difficult to disseminate them due to weak internet connection or lack of gadgets like cellphones."</i>
Participant 3	Difficulty choosing memes related to lesson	Difficulty selecting appropriate meme for topic	Difficulty in Selecting Appropriate Memes	<i>"It is hard to choose memes that are funny but still related to the lesson. Sometimes students focus only on the humor instead of the science concept."</i>
Participant 4	Time spent searching and creating memes	Time demands in curating memes	Time-Consuming Preparation	<i>"It can take extra time for teachers to look for or create memes that are accurate and suitable for the lesson."</i>
Participant 5	Verifying scientific accuracy	Time spent fact-checking memes	Time-Consuming Preparation	<i>"I spend extra time verifying the science behind each meme before using it so that students are not confused."</i>
Participant 6	Risk of misinterpretation, uncertainty in use	Lack of clear strategies for meme use	Lack of Guidance in Meme Integration	<i>"A meme might be misinterpreted by students, so I often hesitate to use it without clear guidance."</i>
Participant 7	Limited technical skills for meme creation	Difficulty creating educational memes	Time-Consuming Preparation	<i>"I'm not very tech-savvy, so creating my own memes takes longer than expected."</i>
Participant 8	Different student reactions to memes	Uncertainty in meme effectiveness	Difficulty in Selecting Appropriate Memes	<i>"Not all students relate to the memes I choose. What works for one class might not work for another."</i>
Participant 9	Balancing humor and educational content	Difficulty maintaining educational value	Difficulty in Selecting Appropriate Memes	<i>"Sometimes when the meme is too funny, the science content gets lost."</i>
Participant 10	Limited localized memes	Lack of localized science meme resources	Limited Availability of Curriculum-Aligned Memes	<i>"There aren't many localized memes that relate directly to the science topics I teach."</i>
Participant 11	Lack of educational meme collections	Absence of curated meme resources	Limited Availability of Curriculum-Aligned Memes	<i>"Most memes online focus on jokes rather than science content."</i>
Participant 12	Need for training and examples	Lack of professional development	Lack of Guidance in Meme Integration	<i>"There's little guidance on how to integrate memes meaningfully into teaching."</i>
Participant 13	Few subject-specific memes online	Limited science-specific meme materials	Limited Availability of Curriculum-Aligned Memes	<i>"I often have to create my own memes because there aren't enough good ones available online."</i>
Participant 14	Internet issues affecting access	Difficulty accessing online resources	Technical Limitations	<i>"Poor internet connection makes it difficult to access memes online during class."</i>
Participant 15	Difficulty aligning memes with curriculum standards	Lack of curriculum alignment	Limited Availability of Curriculum-Aligned Memes	<i>"It's difficult to match memes with lesson plans that follow strict curriculum standards."</i>

The analysis revealed several significant challenges that hinder the effective use of Science memes, including lack of guidance and training on how to integrate memes meaningfully, technical limitations such as poor internet connectivity and lack of devices, the time-consuming process of curating or creating memes suitable for lessons, difficulty in selecting appropriate memes that are both educational and engaging, and the limited availability of curriculum-aligned or localized memes. These themes underscore the complexities teachers face in leveraging digital and multimedia resources in classroom instruction, reflecting both pedagogical and practical constraints.

Overall, these findings suggested that professional development, technical support, curated meme repositories, and practical guidance are essential to maximize the pedagogical potential of Science memes.

Section 5: Proposed Enhancement Material on Utilizing Science Memes

Based on the results of the study, specifically from the challenges encountered and the surveyed topics wherein Science memes can be useful, enhancement materials are proposed to support teachers in integrating Science memes into classroom instruction. The findings revealed challenges such as lack of guidance, technical limitations, time-consuming preparation, difficulty in selecting appropriate memes, and limited availability of curriculum-aligned memes. To address these issues, a curated collection of Science memes, titled “Book of Science Memes,” is proposed. This repository is organized by topic, grade level, and curriculum standard, with each meme accompanied by a brief explanation of the scientific concept, suggested classroom use, and notes on cultural and age appropriateness. Additionally, a generated QR code is provided for each meme to allow easy access to digital copies.

Based on the result of Research Question 1, which showed that enhancing teaching expertise received the lowest rating. Teachers indicated that they needed more structured support and examples to effectively use memes in teaching. Another reason comes from Research Question 2, where learning engagement scored the lowest in terms of the level of usefulness. This indicates that while memes have potential, their impact on student engagement is not maximized without proper guidance and curated content.

These findings highlight the need for a structured, accessible, and curriculum-aligned resource. The Book of Science Memes addresses these gaps by providing teachers with ready-to-use, accurate, and engaging memes, reducing preparation time, supporting professional growth, and enhancing student engagement in Science lessons.

In addition, a teacher’s guide on using Science memes will be incorporated in the proposed curated source of Science memes. This material would provide step-by-step strategies for selecting, presenting, and integrating memes into lessons, including tips for balancing humor and scientific accuracy, recommendations on timing and frequency of use, and methods for monitoring student understanding to prevent misconceptions. The guide provides practical examples, enabling teachers to feel more confident in incorporating memes as instructional tools.

Collectively, this enhancement material aims to reduce time demands, provide clear guidance, ensure curriculum alignment, and improve the overall educational value of memes in junior high science classrooms. By implementing these resources, teachers can more effectively engage students and enhance learning outcomes while maintaining professionalism and instructional quality.

Discussion

The results demonstrate that while Science memes are only moderately integrated, they are perceived as highly useful, particularly in simplifying complex scientific concepts and increasing student engagement. This suggests that teachers recognize their value but may not yet be fully utilizing them in a systematic manner.

The high rating of memes in simplifying difficult topics indicates their alignment with cognitive and multimodal learning theories, where visual and textual elements enhance understanding and retention. Additionally, their ability to connect with students’ learning styles highlights their relevance in addressing diverse learners in a digital age.



The significant relationship between integration and usefulness implies that greater use of memes leads to more effective teaching outcomes. This supports the idea that meme-based instruction can enhance both cognitive and affective aspects of learning, including motivation and participation.

However, the identified challenges reveal important limitations. Time constraints and limited technical skills hinder teachers from fully integrating memes into their lessons. Moreover, the risk of oversimplification and cultural mismatch suggests that memes must be carefully selected and aligned with instructional objectives to avoid misconceptions.

These findings indicate that while Science memes are promising instructional tools, their effectiveness depends on proper training, thoughtful integration, and contextual relevance. Providing teachers with professional development opportunities and ready-made instructional materials may help maximize their potential in Science education.

Conclusion

In view of the results, the following conclusions are drawn to synthesize the implications of the research, offering a foundation for recommendations and future practice in Science education.

1. Science memes are moderately integrated into teaching strategies in terms of enhancing teaching expertise, reinforcing conceptual understanding and supporting assessment practice and highly integrated in facilitating activity-based learning.
2. Science memes are highly useful in students' learning engagement, understanding of scientific concepts, knowledge retention and real-world relevance.
3. There is a significant relationship between the degree of integration of Science memes in teaching and their perceived level of usefulness.
4. The study concludes that teachers encounter several challenges in integrating Science memes into instruction such as lack of guidance and training on how to select and use memes effectively, technical limitations such as poor internet connectivity and insufficient access to devices, and the time-consuming process of curating or creating memes suitable for lessons.
5. The proposed enhancement material includes a curated collection of science memes, titled "Book of Science Memes", organized by topic, grade level, and curriculum standard.

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