The Research Probe
Volume 5 Issue 1 June 2025
DOI: https://doi.org/10.53378/trp.180

Evaluation of TikTok as a mode of instruction in teaching science

[1]Kyla Gallardo, [2]Queenie Jane Cube, [2]Mary Ann Rea, [2]Vanessa Salva, [2]Rannabelle Silva & [3]Christian Mier Escriba

Abstract

This study investigated the influence of TikTok as a mode of instruction in teaching science. An experimental approach was employed to gather information on student engagement and knowledge retention levels. Data were collected through survey questionnaires, pre-tests, and post-tests administered to all forty-one (41) first-year Bachelor of Secondary Education major in Science students over five days. The results showed that students were highly engaged in learning through TikTok. Meanwhile, the knowledge retention level of students in the Traditional group remained satisfactory in both tests. However, the TikTok group's performance improved from a satisfactory to a very satisfactory level. This indicates a significant difference between the pre-test and post-test scores in the TikTok group. The study confirmed that using TikTok as a teaching modality enhances students' ability to recall information.

Keywords: *TikTok, mode of instruction, knowledge retention, engagement, science*

Article History:
***Received**: February 9, 2025* ***Revised**: April 19, 2025*
***Accepted**: May 11, 2025* ***Published online**: June 30, 2025*

Suggested Citation:
Gallardo, K., Cube, Q.J., Rea, M., Salva, V., Silva, R. & Escriba, C.M. (2025). Evaluation of TikTok as a mode of instruction in teaching science. *The Research Probe*, *5*(1), 147-165. https://doi.org/10.53378/trp.180

About the authors:
[1]Corresponding author. Bachelor of Secondary Education Major in Science, Laguna University. Email: kylagallardo2002@gmail.com
[2]Bachelor of Secondary Education Major in Science, Laguna University
[3]Research Advisor. Instructor, Laguna University

**This paper is a finalist at the 4th International Research Competition (IRC)-2024*

1. Introduction

As today's generation of students differs significantly from previous ones, so do their interests, behaviors, and learning preferences. One of the major challenges in modern education is addressing the declining attention span, reduced motivation, and evolving cognitive habits of digital-native learners. Traditional instructional methods often fail to capture the interest of students who are immersed in fast-paced, interactive digital environments. In response, educators and institutions have increasingly turned to technological innovations to reimagine the teaching and learning process.

Among these innovations, social media platforms have emerged as powerful tools for educational transformation. No longer limited to social interaction, platforms such as TikTok, YouTube, Facebook, and Instagram are now being explored for their pedagogical potential. Their visual appeal, user-friendly interfaces, real-time engagement capabilities, and widespread accessibility make them particularly attractive to students who are already deeply engaged with these platforms in their daily lives. Integrating social media into education helps bridge the gap between formal instruction and informal digital experiences, making learning more relatable, interactive, and dynamic.

In particular, short-form video platforms like TikTok offer educators a unique opportunity to deliver content in concise, visually engaging, and entertaining ways. Through creative video clips, demonstrations, challenges, and storytelling, complex scientific concepts can be simplified and presented in a format that resonates with learners. This approach not only enhances student engagement but also supports improved information retention by catering to multiple learning styles, visual, auditory, and kinesthetic. Furthermore, the participatory nature of social media encourages students to become co-creators of content, promoting a sense of ownership and fostering active learning. Thus, the use of social media in education is not merely a trend, it signifies a pedagogical shift that aligns with the changing needs and habits of contemporary learners. It promotes student-centered learning, collaboration, and accessibility, all of which are essential components of inclusive and effective educational environments.

This study, therefore, explores the potential of TikTok as an instructional tool, particularly in the teaching of science, and evaluates its impact on student engagement and knowledge retention compared to traditional teaching methods. It goes beyond the concept of making learning enjoyable to examine how such strategies influence students' ability to

retain information. In today's educational landscape, fun and engaging instruction is no longer a luxury but a necessity.

Several studies have indicated that TikTok, with its short-form videos, interactive features, and user-generated content, offers a novel and appealing means of delivering academic content, especially in subjects like science. Its concise and visually rich format may better suit the cognitive preferences of digital-native learners, potentially enhancing both engagement and retention. Given these possibilities, the present study aimed to investigate the effectiveness of TikTok as a mode of instruction in science education. Specifically, it sought to compare student engagement levels in a traditional classroom setting with those in a TikTok-based instructional environment. Additionally, it examined differences in knowledge retention between students taught through conventional methods and those who received TikTok-integrated instruction.

2. Literature review

2.1 Learning Engagement

With the emergence of a new generation of students, a paradigm shift in Philippine education has become increasingly evident. The integration of technology into teaching methods is now essential to address challenges such as declining attention spans and reduced student motivation. Among the technological tools shaping this shift, social media platforms, particularly TikTok, have played a significant role in transforming the educational experience. Given its widespread use among Filipino students, TikTok offers educators a unique opportunity to create content that resonates with learners (Lobo et al., 2022).

Several studies have demonstrated that TikTok significantly enhances student motivation and engagement, particularly in science subjects like chemistry. According to Joves (2023), chemistry-related TikTok videos not only spark interest but also encourage deeper exploration of topics, with experimental findings revealing increased curiosity and engagement. Similarly, Lobo et al. (2022) reported that students who regularly engaged with TikTok videos demonstrated higher levels of motivation and curiosity, benefiting from the platform's interactive and dynamic features that promote higher-order thinking.

The theoretical basis for TikTok's effectiveness in education can be anchored in dual coding theory, which posits that combining verbal and visual information enhances memory retention. In science disciplines, where content can often be abstract and complex, TikTok's

use of short videos, visual cues, and audio narration helps strengthen conceptual understanding and retention. This aligns with Garcia et al. (2022) that short-form video content complements students' current media habits, making learning more accessible and effective. As digital learning expands in the Philippines, addressing shortened attention spans through bite-sized educational content has become a strategic necessity. Hence, TikTok's format promotes sustained attention, active participation, and deeper learning.

Numerous researchers support TikTok's academic value. Salasac and Lobo (2022) confirmed that short, visually engaging TikTok videos significantly improve student engagement, especially in virtual learning settings. Their results reinforce Escamilla-Fajardo et al. (2021) that TikTok fosters collaborative learning by allowing students to interact with content and participate more actively in their learning. Njuguna (2022) also emphasized that incorporating social media into blended learning environments promotes both engagement and active learning, contributing to an interactive classroom atmosphere and addressing the issue of low student motivation.

TikTok's effectiveness extends beyond science. Quinto and Cho-oy (2022) reported a significant correlation between TikTok use and student engagement, with a study at City College of Angeles showing that around 90% of students believed TikTok positively influenced their academic performance. Susanto and Suparmi (2024) similarly highlighted students' positive perceptions of TikTok in English language learning, praising it as an enjoyable and creativity-enhancing tool that boosts classroom dynamics and participation.

In terms of content quality, Ngilangil (2022) found that students responded more to the educational value of TikTok videos than to music or production effects. This demonstrates that meaningful content, not just entertainment, is the key driver of student engagement. Salasac and Lobo (2022) affirmed that strategically using TikTok in classrooms increases both participation and engagement, making it especially useful for students with short attention spans who may struggle in traditional educational settings.

TikTok's multimedia features, integrating visuals, text, narration, and music, cater to learners' preferences for digestible, immersive, and engaging content. This format enhances cognitive engagement and supports improved learning outcomes. Teachers also benefit, as they can design more creative and effective lessons using the platform's tools. Beyond the classroom, TikTok has shown potential in extending learning. Smith and Francis (2022) noted that students often voluntarily access educational TikTok content outside class hours,

appreciating the platform's flexibility and accessibility across devices. Therefore, TikTok improves science communication skills by helping students present complex concepts in accessible ways. Leonard (2023) supports this, noting that TikTok enables science teachers to simplify abstract content and enrich instruction.

Martin Niera et al. (2023) added that TikTok is effective in disseminating science-related content to younger audiences, particularly through memes and vernacular language that make learning more relatable and entertaining. On the other hand, Aziz and Dali (2023) further demonstrated that TikTok's visually appealing short-form content captures and retains students' attention, making it particularly effective for introducing or clarifying complex topics. Meanwhile, in language classrooms, TikTok has also proven beneficial. Xiuwen and Razali (2021) found that the platform boosts interactivity and motivation through games and challenges, grounded in social constructivist theory. These insights are also relevant in science education, where interactive and collaborative strategies foster deeper learning.

The growing body of literature supports TikTok's potential as a valuable educational tool. Despite concerns from some educators, evidence consistently shows that its integration enhances student motivation, engagement, and learning outcomes, especially in contexts like science education where traditional methods may fall short.

2.2 Knowledge Retention

TikTok has increasingly been recognized as an effective tool for enhancing knowledge retention, particularly in science education. Udu et al. (2022) emphasized its alignment with the digital maturity of today's learners, highlighting the platform's potential to capture attention and facilitate deeper engagement with educational content, something traditional methods often struggle to achieve. Similarly, Lacey and Price (2023) demonstrated that TikTok's interactivity enhances both engagement and retention, particularly in medical education. Their study indicated that visually stimulating content resonates more with students, improving their understanding and recall of complex concepts. These findings are consistent with educational research advocating for interactive, student-centered approaches to foster long-term learning.

The effectiveness of TikTok as an educational tool is further supported by dual coding theory, which suggests that presenting content in both visual and verbal formats

strengthens memory formation. Mir et al. (2023) confirmed that TikTok's integration of visuals and text effectively supports retention through dual coding while Fiallos et al. (2021) also attributed higher test performance among TikTok users to the platform's use of both images and narration, affirming that students remember more when information is delivered multimodally.

The ability to replay short, focused videos also reinforces retention through repetition, a critical factor in subjects like science and math. Flores et al. (2024) found that students retained more after watching TikTok videos compared to reading textbooks, highlighting the impact of video repetition. Likewise, Waode (2024) emphasized that TikTok's social and repetitive content supports long-term vocabulary and terminology retention, particularly in disciplines like science, where mastery of technical language is essential.

Multiple studies affirm that TikTok not only improves retention but also meets students' evolving learning preferences. Sari et al. (2022) reported that 92.14% of students found TikTok content appealing, 87.97% experienced improved knowledge retention, 85.88% felt more motivated, and 86.56% said learning became more enjoyable. These findings underscore the platform's ability to present educational content in an engaging and digestible format. Mohottala et al. (2023) demonstrated similar outcomes in their "Phys-TikTok" intervention, where bite-sized, concept-focused videos significantly improved retention in an introductory physics course.

The platform's accessibility and user-friendly design further contribute to its educational value. Ngilangil (2022) noted that students easily access and create science-related content on TikTok, making learning more relatable by incorporating their own interests and experiences. Moreover, the platform supports science communication skill development by helping students present complex ideas in creative and understandable ways, an insight echoed by Smith and Francis (2022) and Leonard (2023).

TikTok's rise as a learning tool has also been linked to its flexibility and adaptability across disciplines. Opara et al. (2022) found that students exposed to TikTok videos retained more information than those who learned through traditional lectures, due to the platform's engaging delivery style that enhances cognitive processing. Benitez-Correa and Gonzalez-Torres (2025) similarly argued that TikTok's potential in science education should be maximized, especially as it caters to modern students' preferences for fast, stimulating content. Beyond improving cognitive outcomes, TikTok also supports affective and

behavioral engagement. Rubas et al. (2022) emphasized the importance of aligning education with global trends and student interests, pointing out that digital technologies like TikTok enhance academic performance. Escamilla-Fajardo et al. (2021) supported this by demonstrating that TikTok positively impacts both cognitive and affective domains, increasing student motivation and engagement in science learning.

The platform also encourages autonomy and creativity. Decenilla et al. (2022) integrated TikTok into a five-week history class and observed notable improvements in student comprehension and reflective thinking. Students reported that creating their own TikTok mini-lectures motivated them to study more seriously and made learning more enjoyable, suggesting the platform's role in promoting learner ownership.

TikTok's evolution into a legitimate educational tool became especially evident during the COVID-19 pandemic. Its micro-learning format gained popularity for teaching science and math, contributing to improved memory retention. The platform's introduction of a STEM feed further reflects its expanding role in educational spaces. The widespread appeal and positive outcomes associated with TikTok-based instruction are supported by large-scale analyses. Fiallos et al. (2021) conducted a content analysis of 1,495 videos under the #LearnOnTikTok hashtag and found that 17.5% were science-related. The diversity of content creators, including educators, professionals, and students, demonstrated the platform's capacity to serve as an informal yet impactful educational space.

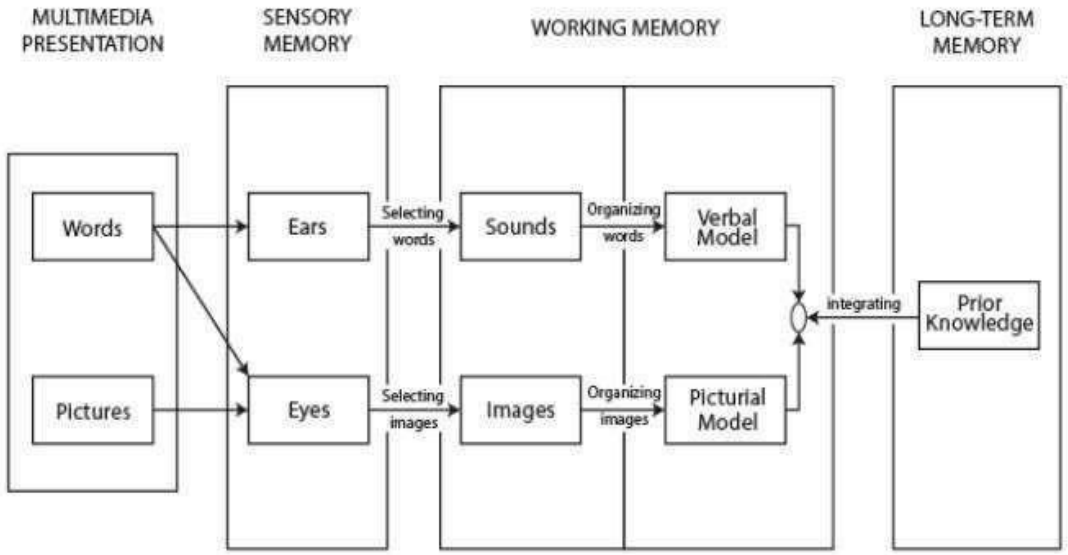
Student receptiveness to TikTok as a learning tool is increasing. Agoro and Akinoso (2020) observed that many students actively use the platform to supplement traditional study methods. This growing openness suggests that social media platforms, once considered distractions, are now being embraced for their educational value. In a related experiment, science educators found that student retention doubled when using TikTok-based strategies compared to traditional definition-based teaching—an outcome reinforcing TikTok's utility as a multimedia teaching aid (Conde-Caballero et al., 2024).

Extensive research supports TikTok's role in enhancing knowledge retention, particularly in science education. The platform's multimodal, accessible, and interactive design supports modern learning theories such as dual coding and social constructivism. As students increasingly seek fast, flexible, and engaging content, TikTok offers educators a practical, innovative tool to enrich science instruction and foster deeper, long-term learning.

2.3. Theoretical framework

Figure 1

Cognitive Theory of Multimedia Learning (Mayer, 2014)



This study is grounded in the Cognitive Theory of Multimedia Learning, originally developed by Richard Mayer in 1997. As a component of cognitivism, the theory emphasizes three key principles: (1) the multimedia principle, which posits that students learn more effectively when exposed to both images and words; (2) the limited capacity principle, which acknowledges that each sensory channel has a finite capacity for processing information; and (3) the active processing principle, which involves filtering, selecting, organizing, and integrating information based on prior knowledge. In essence, the human mind has a restricted capacity to process information, necessitating the construction of mental models to facilitate comprehension.

The learning process begins with sensory memory, where visual and auditory inputs are received and then transferred to working memory for active processing. Through this dynamic procedure, learners construct logical mental representations. A critical aspect of this process is the integration of new information with existing knowledge, which is essential for effective learning and long-term knowledge retention. In relation to this study, the use of multimedia, particularly TikTok, demonstrates significant potential as a transformative educational tool that enhances both student engagement and knowledge retention. Mayer's

principles of multimedia learning have been widely applied in various academic settings, especially in science education.

Recent research by Çeken and Taşkın (2022) supports this theoretical framework, indicating that students exposed to educational content via TikTok exhibited notable improvements in engagement and retention of scientific concepts. These findings reinforce the notion that incorporating technology such as TikTok into instructional practices can produce positive learning outcomes. By applying Mayer's multimedia learning theory, educators can design more effective and engaging lessons that resonate with today's learners. This alignment with Mayer's principles strengthens the argument that platforms like TikTok can significantly enhance student engagement and long-term memory retention.

This study assert that this type of learning is particularly beneficial in science subjects, where numerous advancements and complex concepts require clear and engaging explanations. As highlighted by previous studies, visually stimulating and exciting videos are crucial for helping students better comprehend instructional content. Through the use of attractive visuals and compelling narration, students are more likely to absorb information quickly, retain it longer, and develop a meaningful understanding. This method of instruction reduces cognitive load by simplifying complex material and making it more accessible and comprehensible.

According to the theory, multimedia learning occurs when students combine information from two or more media channels, transfer it from short-term to working memory, and integrate it with prior knowledge for deeper processing. This cognitive process enhances the likelihood that the information will be stored in long-term memory. As learners build mental representations using both verbal and visual inputs, their learning experience becomes richer and more enduring. Mayer's theory has been successfully applied in teaching Science, Mathematics, and Language Arts, yielding improved learning outcomes through well-designed multimedia instruction.

This study further argues that multimedia approach is especially effective for science learners, where clarity and engagement are essential due to the subject's complexity. Prior research emphasizes that engaging, visually rich videos significantly enhance comprehension and support memory retention. With straightforward and visually guided instruction, cognitive demands are reduced, making it easier for students to understand and retain complex concepts. Ultimately, the findings of this study align with the principles of

multimedia learning theory and support the claim that incorporating technology, particularly TikTok, as an instructional tool can positively influence students' motivation to learn and knowledge retention.

3. Methodology

This study employed an experimental research design to evaluate TikTok as a teaching method by analyzing student engagement and examining knowledge retention between TikTok-based and traditional teaching methods in science topics. This design was chosen to systematically conduct the intervention and gather relevant data appropriately.

The study was conducted at the Laguna Sports Complex, Brgy. Bubukal, Santa Cruz, Laguna, Philippines where first-year Bachelor of Secondary Education (BSED) Major in Science students participated. Participants were randomly selected as participants. A total of forty-one (41) students were divided into traditional and TikTok-based learning groups to avoid bias. This group was chosen as respondents because they were enrolled in a science course during the term, making them suitable for the study's objectives.

Data were collected using a survey questionnaire that measured student engagement and knowledge retention on a Likert scale ranging from 1 (Never) to 4 (Always). Pre-tests and post-tests, each consisting of 10 items, were administered to assess changes in students' knowledge retention. These instruments were reviewed and validated by research experts to ensure reliability and appropriateness.

The data collection process involved distributing 41 questionnaires and tests to the selected students, retrieving the completed responses after the lessons, and organizing and analyzing the data with the assistance of a statistics expert. The data gathering spanned five (5) days. Specifically, the pre-test and survey were administered on the first day, followed by a three-day intervention, and the post-test was conducted on the fifth day. This five-day period was designed to ensure the collection of accurate and relevant data.

All participants provided informed consent, acknowledging their understanding of the study's purpose, their right to withdraw at any time, and the confidentiality of their responses. No personal or identifying information was disclosed, and all data were used solely for research purposes, in accordance with Laguna University's ethical guidelines.

Statistical analysis included computing the mean to determine average levels of engagement and knowledge retention, assessing variability through standard deviation,

measuring the effect of TikTok-based instruction versus traditional methods using Cohen's d, and determining the statistical significance of the difference between the two groups using the p-value.

4. Results and Discussion

The results presented in table 1 reveal significant findings regarding the influence of TikTok as a mode of instruction in science education. Students who were taught using TikTok-based materials demonstrated a high level of engagement, with a mean score of 3.1641, which is interpreted as "Often" on the engagement scale. This result indicates that TikTok, as an instructional tool, effectively captured students' attention and sustained their interest in learning science concepts.

Table 1

Engagement level of students who use TikTok in learning

Engagement Level	Mean	Standard Deviation	Remarks
TikTok	3.1641	0.6554	Often

Legend: 3.26-4.00 = Always (4); 2.51-3.25 = Often (3); 1.76-2.50 = Rarely (2); 1.00-1.75 = Never (1)

This finding is consistent with the study conducted by Lobo et al. (2022), which affirmed that students' academic performance does not decline with the use of TikTok as an educational platform. On the contrary, the study showed that TikTok can be a valuable tool in educational settings, as students remain actively engaged while using the platform for academic purposes. Moreover, their consistent use of the application for learning-related tasks did not negatively impact their overall school performance.

These results underscore the potential of integrating social media, particularly TikTok, into classroom instruction to foster deeper student involvement, especially in subjects like science, which often require creative approaches to explain complex ideas. The platform's multimedia capabilities, short-form content, and familiarity to students make it an effective medium for delivering educational content in ways that align with learners' preferences and digital habits.

Table 2 presents data on the level of knowledge retention in both the Traditional and TikTok groups, as measured by pre-test and post-test scores. Due to the small sample size

and the presence of outliers, data points with a z-score of 2 or more, the median was used instead of the mean to ensure a more accurate and representative measure of central tendency. Using the mean in this context could have resulted in skewed interpretations due to extreme values, potentially inflating or misrepresenting the students' actual performance.

Table 2

Retention level of Traditional and TikTok Group

Traditional		**TikTok**	
Pre-Test	Post Test	Pre-Test	Post Test
5.0	5.0	5.0	8.0
(Satisfactory)	(Satisfactory)	(Satisfactory)	(Very Satisfactory)

Legend*:* 9.00-10.00 = Outstanding (O); 7.00-8.00 = Very Satisfactory (VS); 5.00 -6.00 = Satisfactory (S); 3.00-4.00 = Fair (F) 1.00-2.00 Needs improvement (NI)

In the traditional group, the pre-test median score was 5.00, which falls within the range interpreted as satisfactory. Following the traditional method of instruction, the post-test median also remained at 5.00, indicating no significant improvement and maintaining the same level of knowledge retention. In contrast, the TikTok group exhibited a substantial increase in post-test scores. The pre-test median score was likewise 5.00 (satisfactory), but after the TikTok-based instructional intervention, the post-test median rose to 8.00, which is interpreted as very satisfactory. This improvement suggests a meaningful gain in knowledge retention attributed to the use of TikTok as a teaching tool.

The comparison reveals that while the traditional teaching method resulted in consistent but stagnant performance, the TikTok-based approach had a clear and positive effect on learning outcomes. The minimal difference between pre-test and post-test scores in the traditional group implies limited instructional impact, whereas the significant improvement in the TikTok group underscores the effectiveness of multimedia and technology-enhanced learning in boosting students' ability to retain information.

This finding is supported by Solomon (2021), who concluded that students exposed to TikTok as an instructional platform exhibited enhanced abilities in acquiring and retaining academic content. The study emphasized that the visual, engaging, and bite-sized nature of TikTok videos aligns with students’ learning preferences and cognitive processing patterns. Moreover, Joves (2023) further affirmed these findings by concluding that the integration of

TikTok into classroom instruction significantly improved students' recall abilities. This was evidenced by higher post-test scores among students in the TikTok group compared to those in the traditional group.

The data reinforce the notion that innovative, tech-driven teaching strategies, such as those involving TikTok, can meaningfully contribute to improved knowledge retention, especially in subjects that benefit from visual and dynamic content delivery like science.

Table 3

Significant difference of the traditional and TikTok groups in terms of the pre-test and post-test

Parameters	P-value	Cohen D	Remarks
TikTok Pre-Test VS. TikTok Post Test	0.00011	1.9544	There is enough statistical evidence to show that the score of the students in the TikTok posttest is significantly higher than the TikTok pre-test with a d value of 1.95 which suggests that the difference between the means of the two groups is almost two standards deviations.
Traditional Pre-Test VS. Traditional Post Test	0.1137	Not Necessary	There is no enough statistical evidence to show that there is a significant difference between the score of the students in the Traditional posttest and Traditional pre-test.

The analysis in table 3 compares the pre-test and post-test scores of students in two instructional modes: TikTok and traditional methods. A t-test was used to determine the p-value and Cohen's d of the data. Cohen's d was used to identify the magnitude of the difference between the test results.

For the TikTok instruction group, the analysis reveals a highly significant difference between the pre-test and post-test scores, as indicated by the low p-value of 0.00011 and a large effect size with a Cohen's d value of 1.9544. This suggests that the increase in scores

from the pre-test to the post-test represents a substantial improvement in student knowledge retention. In comparison, the traditional instruction group shows a non-significant p-value of 0.1137, indicating insufficient evidence to conclude a significant difference between pre-test and post-test scores. Consequently, this lack of statistical significance suggests that traditional instruction may not have led to a significant improvement in students' knowledge retention.

These findings underscore the positive influence of TikTok as a mode of instruction in enhancing students' ability to retain information compared to traditional instructional methods. Moreover, this aligns with the findings of Ardiana and Ananda (2022), who examined the effectiveness of TikTok instruction compared to traditional methods. Students were divided into two groups: one receiving TikTok instruction and the other traditional classroom lectures. This study found a significant improvement in post-test scores among students exposed to TikTok instruction, highlighting its potential to enhance learning. This research provides empirical evidence supporting the efficacy of TikTok as an instructional tool, demonstrating its positive influence on learning compared to traditional methods. In addition, Joves (2023) reported similar findings, showing that after exposure to short-form videos, students exhibited significant improvements in post-test scores compared to the pre-test. Based on the clear difference between pre-test and post-test scores, TikTok is a useful platform for enhancing student learning.

5. Conclusion

This study aimed to evaluate the effectiveness of TikTok as a teaching tool in science education. Using a comparative experimental design, the research involved 41 first-year Bachelor of Secondary Education (BSED) Science students. Participants were divided into two groups: one received traditional instruction, while the other integrated TikTok into their learning process. Pre-tests and post-tests were administered to assess knowledge retention, and surveys were used to measure engagement levels.

Findings revealed that students were highly engaged when using TikTok for educational purposes, highlighting the platform's interactive features as beneficial to their learning experience. Regarding knowledge retention, both groups demonstrated satisfactory performance in the pre-test. However, the TikTok group showed a significant increase in post-test scores, indicating improved learning outcomes. Statistical analysis confirmed a

substantial difference between the pre-test and post-test scores within the TikTok group, suggesting the effectiveness of TikTok as a teaching modality. Therefore, this study provides strong evidence that TikTok can be a valuable tool in science education. Its integration into the learning process enhances student engagement and improves knowledge retention, ultimately leading to more effective and enjoyable learning experiences.

Based on the empirical evidence presented, the null hypothesis is rejected. This indicates a significant difference between the pre-test and post-test scores of students taught using TikTok. The results strongly suggest that TikTok is an effective tool for enhancing students' ability to recall and understand scientific concepts. The positive impact of TikTok integration underscores its potential as a valuable supplement to traditional teaching methods.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was not supported by any funding.

Institutional Review Board Statement

This study was conducted in accordance with the ethical guidelines set by Laguna University. The conduct of this study has been approved and given relative clearance(s) by Laguna University.

AI Declaration

The author declares the use of Artificial Intelligence (AI) in writing this paper. In particular, the author used, *Quillbot in searching appropriate literature, summarizing key points and paraphrasing ideas*. The author takes full responsibility in ensuring proper review and editing of contents generated using AI.

References

Agoro, A. A., & Akinoso, S. O. (2022). Undergraduate science education students' social media usage in Lagos State. *Nigerian Online Journal of Educational Sciences and Technology (NOJEST), 4*(1), 218–225. http://nojest.unilag.edu.ng/article/view/1687

Ardiana, E., & Ananda, A. (2022). The effect of using the TikTok application as a learning media on the activeness and learning outcomes of Class XI Social Sciences students in sociology subjects at SMA N 1 Ampek Angkek. *LANGGAM International Journal of Social Science Education Art and Culture, 1*(02), 22–29. https://doi.org/10.24036/langgam.v1i02.13

Aziz, H. A. A., & Dali, S. Z. M. (2023). More than just engaging? TikTok as an effective educational tool. *International Journal of Education Psychology and Counseling, 8*(52), 133–142. https://doi.org/10.35631/ijepc.852011box-embrace-tiktok

Benitez-Correa, C., & Gonzalez-Torres, P. (2025). Integrating TikTok in higher education: A case of English as a foreign language teacher education program. *Educational Process: International Journal*, 15, e2025135. https://doi.org/10.22521/edupij.2025.15.135

Çeken, B., & Taşkın, N. (2022). Multimedia learning principles in different learning environments: A systematic review. *Smart Learning Environments, 9*(1). https://doi.org/10.1186/s40561-022-00200-2

Conde-Caballero, D., Castillo-Sarmiento, C. A., Ballesteros-Yánez, I., & others. (2024). Microlearning through TikTok in higher education: An evaluation of uses and potentials. *Education and Information Technologies*, 29, 2365–2385. https://doi.org/10.1007/s10639-023-11904-4

Decenilla, S. A., Apolinario, R. C., Cuaton, Z. T., & Clarido, C. (2022). Improving student knowledge on selected history topics through TikTok platform as digital learning tool. *Journal of Digital Learning and Education, 2*(3), 134–149. http://doi.org/10.52562/jdle.v2i3.410

Escamilla-Fajardo, P., Alguacil, M., & López-Carril, S. (2021). Incorporating TikTok in higher education: Pedagogical perspectives from a corporal expression sport sciences course. *Journal of Hospitality, Leisure, Sport and Tourism Education, 28*, 100302. http://doi.org/10.1016/j.jhlste.2021.100302

Fiallos, A., Fiallos, C., & Figueroa, S. (2021). TikTok and education: Discovering knowledge through learning videos. *Eighth International Conference on eDemocracy & eGovernment (ICEDEG),* 172-176. https://doi.org/10.1109/icedeg52154.2021.9530988

Flores, F. A., Maguate, G., Moises, R., Ohoylan, J. G., & Alegre, A. (2024). TikTok application to the students' performance in science. *International Multidisciplinary Journal of Research for Innovation, Sustainability, and Excellence, 1(2),* 97-106.

Garcia, M. B., Juanatas, I. C., & Juanatas, R. A. (2022). TikTok as a knowledge source for programming learners: A new form of nano learning. *2022 10th International Conference on Information and Education Technology (ICIET).* https://doi.org/10.1109/ICIET55102.2022.9779004

Joves, N. N. C. (2023). SciTok and SciTube: Utilizing educational videos and short-flick experiments as lecture aids in the new normal learning set-up. *World Journal of Advanced Research and Reviews, 17*(1), 157–161. https://doi.org/10.30574/wjarr.2023.17.1.0007

Lacey, H., & Price, J. M. (2023). #MedEd—The 'TikTok' frontier of medical education. *The Clinical Teacher,* 20(5), e13636. https://doi.org/10.1111/tct.13636

Leonard, D. (2023). *Harnessing the educational potential of TikTok in science classes*. Edutopia. https://www.edutopia.org/article/harnessing-educational-potential-of-tiktok-science-class/

Lobo, J., Dimalanta, G., Bautista, C., Buan, E., & De Dios, D. A. (2022a). TikTok consumption and level of class engagement of performing arts students in the new normal: Destructive or beneficial? *American Journal of Education and Technology, 1*(1), 1–9. https://doi.org/10.54536/ajet.v1i1.305

Martin Neira, J. I., Trillo-Domínguez, M., & Olvera-Lobo, M.-D. (2023). From TV to TikTok: New audiovisual formats to communicate about science. *Comunicación y Sociedad,* e8441. https://doi.org/10.32870/cys.v2023.8441

Mir, K. J., Fatima, S. A., & Fatima, S. T. (2023). Impact of dual coding strategy to enhance students' retention of scientific concepts in middle schools. *Annals of Human and Social Sciences,* 4(4), 655–666. https://doi.org/10.35484/ahss.2023(4-IV)63

Mohottala, H., Maria, M. S., Jacob, R., Martinez, H., Karunaratne, R., Hart, M., Silva, C., & Downey, W. (2023). Learning introductory level physics with Phys-TikToks. *Creative Education, 14*(11), 2085–2095. https://doi.org/10.4236/ce.2023.141113

Ngilangil, K. M. (2022). TikTok on SNSU students: Engagement and influence. *International Journal of English Literature and Social Sciences, 7*(4), 150–155. https://doi.org/10.22161/ijels.74.22

Njuguna, A. (2022). Social media technologies and blended learning: Promoting interactivity and collaborative learning in educational emergencies. *EDULEARN Proceedings.* https://doi.org/10.21125/edulearn.2022.0952

Opara, E., Adalikwu, T. M. E., & Tolorunleke, C. A. (2025). The impact of TikTok's fast-paced content on attention span of students. *Preprints*. https://doi.org/10.20944/preprints202501.0269.v1

Quinto, J. B., & Cho-Oy, D. M. (2022). TeachTokerists in the Philippines: A Husserlian phenomenology. *Asia Social Issues, 16*(1), e258636. https://doi.org/10.48048/asi.2023.258636

Rubas, J. B., Palacio, J. M., Doblon, Q. M., Golez, C. M., Pening, A. J. G., Lugas, M. R. M., & Villanueva, J. C. (2022b). Digital technology experiences of BSED-Science students in a state university. *International Multidisciplinary Research Journal*, *4*(2). https://doi.org/10.54476/6061588

Salasac, C., & Lobo, J. (2022). The rise of TikTok during the pandemic: Association between TikTok consumption and students' engagement. *International Journal of Education, Science, Technology, and Engineering (IJESTE), 5*(2), 69–75. http://lamintang.org/journal/index.php/ijeste/article/view/422

Sari, A., Manurung, B., & Harsono, T. (2022). Student response to TikTok application as a science biology learning media for middle school students. *AISTEEL*. http://dx.doi.org/10.4108/eai.20-9-2022.2324519

Shaafi, N. F., Mohd Yusof, M. M., Mohammad Khalipah, N. N., & Mohd Hanif, N. (2023). Investigating TikTok as a learning tool for learning chemistry: A study among secondary school students in Malaysia. *Journal of Creative Practices in Language Learning and Teaching (CPLT),* 11(1), 15-37. https://ir.uitm.edu.my/id/eprint/81220/

Smith, D. P., & Francis, N. J. (2022). Engagement with video content in the blended classroom. *Essays in Biochemistry, 66*(1), 5–10. https://doi.org/10.1042/ebc20210055

Solomon, S. (2021). Incorporating social media into the classroom: A case study on how TikTok can be immersed into classroom pedagogy (Master's thesis). Dominican University. https://doi.org/10.33015/dominican.edu/2021.EDU.02

Susanto, A. K., & Suparmi. (2024). Exploring EFL students' perspectives: The role of TikTok in enhancing English language skills. *Journal of English for Academic and Specific Purposes*, 7(1), 55–64.

Udu, D. A., Nmadu, J., Uwaleke, C. C., Anudu, A. P., Okechineke, B. C., Attamah, P. C., Chukwuemeka, C. O., Nwalo, C. N., & Ogonna, O. C. (2022). Innovative pedagogy and improvement of students' knowledge retention in science education: Learning activity package instructional approach. *Pertanika Journal of Social Science & Humanities, 30*(3), 1404–1426. https://doi.org/10.47836/pjssh.30.3.25

Waode, W. H. (2024). Using TikTok as a media to enhancing speaking skills in English foreign language classroom: A lesson learned from ESP contexts. *Journal of Language and Literature Studies, 4*(2), 507–515. https://doi.org/10.36312/jolls.v4i2.1951

Xiuwen, Z., & Razali, A. B. (2021). An overview of the utilization of TikTok to improve oral English communication competence among EFL undergraduate students. *Universal Journal of Educational Research, 9*(7), 1439–1451. https://doi.org/10.13189/ujer.2021.090710