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Evaluation of TikTok as a Mode of Instruction in Teaching Science

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ABSTRACT:

This study investigated the influence of TikTok as a mode of instruction in teaching science. An experimental approach was administered to gather information about the engagement level and knowledge retention levels of the students. To collect data, survey questionnaires, pre-tests, and post-tests—after the intervention—were conducted on all forty-one (41) first year BSED Science students of Laguna University for five days. Based on the results, students are highly engaged in learning using TikTok. On the other hand, the knowledge retention level of students in the Traditional group was satisfactory in both tests conducted. However, the TikTok group increased from a satisfactory to a very satisfactory level. Due to this, the findings revealed a significant difference between the pre-test and post-test in the TikTok group. In conclusion, the study confirmed that there is an improvement in the student's ability to recall information by using TikTok as a modality of teaching.

Keywords: TikTok[1], mode of instruction[2], knowledge retention[3] , engagement[4] , Science[5].

Introduction:

In recent years, the rapid advancement of technology has revolutionized traditional teaching methods, transforming how knowledge is disseminated and acquired. Social media platforms have emerged as powerful tools for sharing information, engaging with a broad audience, and fostering educational experiences. One such platform that has gained immense popularity among young individuals is TikTok. Initially recognized for its entertaining and short-form video content, TikTok has expanded its horizons to encompass various educational content, including Science- related topics.

The global reach of TikTok has witnessed an unprecedented surge in users, particularly among young learners. This exponential growth indicates a significant shift in how individuals consume content and highlights the potential of TikTok as an educational tool. TikTok's famous social media platform became popular among Filipino students because of its short video content (Ngilangil, K.M., 2022). It is not just for entertainment; it can also be integrated with academic purposes such as comprehending Science instruction. Many students have conflicts in learning Science because of some complex concepts (Sari, A., 2022).

However, in the realm of science education, it is crucial to evaluate whether TikTok's bite-sized videos can effectively deliver accurate and Comprehensive scientific information while maintaining engagement and understanding. While some concerns regarding the accuracy and quality of science content on TikTok have been raised, it is essential to note that several educators and Science communicators have joined the platform, actively sharing informative and reliable content.

Methodology:

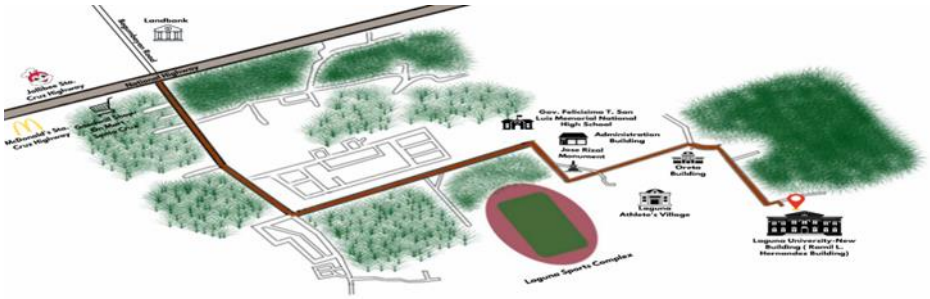
Research Design

The researchers utilized an experimental research design to evaluate TikTok as a mode of instruction by seeking the respondents' engagement level and knowledge retention level. In this study, TikTok serves as the independent's variable while student engagement and knowledge retention represent the dependent variable.

According to Bevans (2023), Experimental research design systematically plans procedures to examine relationships between variables. Researchers manipulate one or more independent variables to observe their effects on dependent variables, aiming to establish cause-and-effect relationships. This design is essential for ensuring the validity and reliability of research findings, enabling researchers to draw meaningful conclusions about causal links between variables

Research Locale

The study took place at the Laguna Sports Complex in Brgy. Bubukal, Santa Cruz, Laguna, particularly in the Ramil L. Hernandez building at Laguna University. Researchers selected this location to gather data from first-year science students during the first half of the 2023-2024 academic year.



Population and Sampling Design

In his study, the research participants involved 41 first-year college students enrolled in the Bachelor of Secondary Education Major in Science program at Laguna University- College of Education. The researchers used the random sampling method to collect information and select students form the Traditional and TikTok groups.

Research Instruments

The data for this study was gathered through a survey questionnaire, which consisted of two parts. Part one utilized a Likert scale to assess the engagement levels of first-year Bacheor of Secondary Education (BSEd) students major in Science. This section included ten (10) statements, employing a one to four (1-4) scale denoted as follows: one (1) for “Never”, two (2) for “Rarely”, three (3) for “Often” and four (4) for “Always”. This scale serves as a guide for researchers to analyze the results obtained during the data collection process.

Part Two comprised a pre-test and post-test, each consisting of ten (10) multiple choice questions designed to evaluate students’ knowledge retention before and after the interventions.

Before distribution, the questionnaires will undergo validation by a qualified research instrument validator.

Data Gathering Procedure

In this section it shows the process of how the data in this study was gathered.

1. The researchers ensure that the data collection methods were valid and reliable.

2. Researchers sought the expertise of a professional in the field to the research instruments—survey questionnaire and test questionnaires to be used.

3. After the validation from the validators, the researchers wrote a formal request letter to acquire the required authorizations. The letter was addressed to the Program Chair and Dean of the College of Education in order to request permission to conduct the study with first-year BSED-Science students.

4. After the letter was approved, the researchers divided the class into 2 group—traditional and TikTok group—wherein TikTok group experienced the intervention.

5. Dissemination of the questionnaires was given to the forty-one (41) students of Bachelor of Secondary Education Major in Science under the College of Education program.

6. Questionnaire was consisted of two parts. Part one was focused on assessing the engagement level used the Likert scale, one (1) for "Never," two (2) for "Rarely," three (3) for "Often," and four (4) for "Always." Part two questionnaire used the Pre and Post Test to measure the knowledge retention of the students before and after the intervention.

7. The data collection process spanned five days. On the first day, participants answered the survey questionnaire and completed a pre-test. The intervention was conducted on the second, third, and fourth days. Finally, the post-test questionnaire was administered on the fifth day.

8. Afterward, the researchers consulted a statistician for data analysis and enlisted the assistance of an editor to review the paper for grammatical errors, spelling issues, and overall clarity.

Management and Treatment of Data

In this study, Statistical treatment of data is necessary to utilize the information in the most effective possible way. Moreover, the researchers will utilize the following statistical tools based on the research problems:

1.Mean

The researchers will get the mean of each question in the statement of the problems number one (1), two (2) and three (3). The mean helps the researchers to understand the typical value in a set of data, making it easier to compare different groups or situations.

$$\bar{x} = \frac{\Sigma x}{n}$$

where:

x = mean

x = Science laboratory, tools, and equipment's quality, availability, and functionality

n = total number of x-variable

2.Standard Deviation

The standard deviation summarizes the typical difference between the average and the data values and helps the researchers measure variability.

$$SD = \sqrt{\frac{\Sigma (xi - x)^2}{n - 1}}$$

where:

SD= standard deviation

n = sample size

xi = values of the x-variable in a sample

$\bar{x}$ = sample mean

3.Cohen's d

Cohen's d is a standardized effect size for measuring the difference between two group means.

$$d = \frac{M_1 - M_2}{s}$$

Where:

M1= is the mean of the first group.

M2= is the mean of the second group.

s = is the pooled standard deviation of the two group

Cohen's d will be calculated to provide a measurement of the effect size for the changes of pre-test and post test scores from the traditional and TikTok group. Here's the general interpretation of Cohen's d values:

0.2: Small effect size

0.5: Medium effect size

0.8: Large effect size

4.P- value

P-Value or the probability value is the determining factor on a null hypothesis for the probability of an assumed result to be true and being accepted or rejected and acceptance of the alternate result in case of rejection of assumed result.

$$z = \frac{\hat{p} - p0}{\sqrt{\frac{p0\ (1 - p0)}{n}}}$$

Where:

z = represents the number of standard deviations a specific value

$\hat{P}$ = Sample proportion

pO = Assumed population proportion in the null hypothesis in the null hypothesis

n = Sample size

The paired-samples t-test will be used to compare pre-test and post test scores of traditional and TikTok. This will help us determine if there is a statistically significant difference between pre-test and posttest.

Furthermore, the null hypothesis posits that "There is no significant difference between the Pre-test and Post test." The researchers will calculate the d value and p-value to determine whether to accept or reject the hypothesis.

Results

This chapter outlines the outcomes from statistical analysis, in interpreting the gathered data. The details of the data collected through content analysis of the sample are presented here as the study's results. The data analysis approach has been explained in the methodology chapter.

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)

The study reveals significant findings regarding the influence of TikTok as a mode of instruction in science education. Students using TikTok exhibited a high engagement level, reflected in a mean score of 3.1641, which is interpreted as often, indicating that the platform captured students' interest in learning science concepts.

The result of this data was proven by the study of Lobo, etc,. which asserted that the students' learning did not declined as per usage of TikTok. Moreover, students are highly engaged in using TikTok for learning, which does not negatively affect school 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)

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, the median was used to determine the verbal interpretation of the data instead of utilizing the mean score. This was applied because the data set has outliers and a z-score of 2 or more, and it will affect the mean score, resulting to a higher result and uncommon data.

Furthermore, in the Traditional group, the pre-test median score is 5.00, indicating a satisfactory level of knowledge. After the traditional teaching method was used, the post-test median remained the same, maintaining its level as satisfactory.

On the other hand, the TikTok group demonstrated a notable improvement in post-test scores, rising from a satisfactory level of 5.00 to a very satisfactory level of 8.00 after the intervention.

Overall, the interpretation of the two test results in the traditional approach was satisfactory. There are only minor differences in the students' scores in taking the two tests. On the other hand, the applied intervention clearly showed influence as it increased the students' scores from pre-test to post-test. It reveals the positive impact of the intervention on the students' knowledge retention.

Concerning this, Solomon (2021), also found that students who experienced TikTok usage in the classroom as a mode of instruction is effective in the process of effectively acquiring and retaining information. Additionally, the findings are proven by Joves (2023), concluding that TikTok integration increases the student's ability to recall information, given that post-test scores of traditional groups are lower than the TikTok group.

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 post test 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 standard deviations.
Traditional Pre-Test VS. Traditional Post Test	0.1137	Not Necessary	There is not enough statistical evidence to show that there is a significant difference between the score of the students in the Traditional post test and Traditional pre-test.

The analysis compares students' pre-test and post-test scores 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 how much the test results differed from each other.

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 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, the lack of statistical significance suggests that traditional instruction may not have led to significant improvement in students' knowledge retention.

Overall, these findings underscore the positive influence of TikTok as a mode of instruction in enhancing the 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 receiving traditional classroom lectures. This study found a significant improvement in post-test scores among students exposed to TikTok instruction, highlighting its potential to enhance students' learning. This study underscores the efficacy of TikTok utilized as a mode of instruction, providing empirical evidence for its positive influence in learning compared to traditional instructional methods.

In addition, another study from Joves (2023) had the same findings which claimed that after the exposure to short-form videos, the students showed a significant improvement in the test scores compared to the pre-test conducted. Given the obvious difference between the pre-test and post-test scores, Joves (2023) concluded that the platform is useful for the students' learning.

Conclusion

The following conclusions are drawn based on the study's various findings in order to address the problem's stated requirements.

The hypothesis was rejected, implying that there is a significant correlation between the level of science laboratory, tools, and equipment's quality, availability, and functionality and students' hands-on learning. This implies that when schools have fully equipped science laboratories, students performed well and received quality science education in terms of hands-on learning. It also revealed that hypothesis was rejected indicating that there is a significant correlation between the level of science laboratory, tools, and equipment's quality, availability, and functionality and students' academic engagement. The result infers that the students were engaged academically if schools' science laboratories are quality and fully equipped.

Recommendation

Based on the findings and conclusions drawn from the study "Evaluation of TikTok as a Mode of Instruction in Teaching Science," the following recommendations are presented.

1. Schools should explore the use of TikTok as a mode of instruction across various subjects where visual and concise content can enhance understanding. By incorporating this platform, educators can foster dynamic teaching methods that engage students in multiple disciplines.

2. Additionally, school administrators should implement comprehensive professional development programs to equip educators with the necessary skills to effectively use TikTok in their teaching. These programs should focus on enhancing digital literacy and provide educators with strategies for maximizing student engagement through interactive content.

3. Future researchers should conduct studies to assess the long-term impacts of using TikTok as a mode of instruction on student learning outcomes and engagement. Research should explore its effectiveness across various subjects, age groups, and learning environments, focusing on academic performance and student motivation. Collaborating with educators will ensure that studies are relevant and practical for classroom implementation.

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List all the material used from various sources for making this project proposal

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