



TikTok Application to the Students' Performance in Science

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Abstract:

This study dealt with the TikTok application's impact on student's academic performance in Science. The study focused on the Physics subject, specifically Science 10 for MELC 3-5. The study participants were the 40 students of Grade 10- Edelweiss enrolled in a secondary school for the school year 2022-2023. The researcher utilized a one-group pre-test and post-test research design using a researcher-made instrument for collecting data using pre-test and post-test scores. The researcher made videos from TikTok that were utilized as supplementary material to the respondents. The findings revealed that there was a significant difference in the pre-test and post-test scores of the students before and after the intervention. It signified that the researcher made TikTok videos utilized by the researcher influenced students' performance in Physics. With these results, the researcher recommended that teachers may conduct diagnostic tests (pre-tests and post-tests) to evaluate students' understanding of the topic and may utilize supplementary materials to enhance students' performance. DepEd and school administrators must consider other factors in improving student performance, like conducting training and workshops for the teachers on how to utilize technology in delivering the lessons. Teachers are encouraged to make innovations in their classroom using technology to promote effective teaching and learning processes.

Keywords: *Academic Performance, Physics, Science, TikTok, Videos.*

Introduction:

Science literacy was often distinguished to be of great significance because of its connection to industry and technology. In education, Science was one of the areas with high priority for development. It was a global and national concern that needed to be addressed. According to the recent news posted in Rappler last December 2021, the Philippines ranks last in 79 countries in reading comprehension, mathematics, and Science as indicated by the 2018 PISA result. This PISA 2018 result led to the urgency to look for possible interventions that may address the gaps in attaining quality primary education for all Filipinos. This study bridged the gap and attained quality education in science subjects. To help the teachers deal with the evolving global frameworks, they must possess the skills and competencies outlined in the PPST. If the necessary competencies and skills are not met, they will receive a variety of professional development interventions. The PPST assists in ensuring that parents and guardians know their children are receiving a solid foundational education from certified teachers whose skills are up to date with developments in the information age (Department of Education, 2018). Technology use in the classroom may also arouse student's interest to learn the concepts and lessons. Moreover, the use of ICT in the classroom can develop the higher order thinking skills of the students and problem-solving skills. Through this, students are equipped with 21st century skills that can make them become competitive in a global scope (UNESCO, 2021). Teachers could use application like TikTok application as an innovation in assessing students learning. Videos made through TikTok would be evidence or proof of students understanding of the topic.

Based on the study conducted by (Paloma Escamilla-Fajardo, 2021), the use of the TikTok application elevates student motivation, encourages an engaging learning environment, and promotes the development of skills such as



creativity and curiosity. Since the use of the TikTok application is suited to the expressive and creative content in corporal expression courses of the sports science bachelor's degree, TikTok is recommended to be introduced as a teaching-learning tool. However, based on the study conducted (Asghar, 2016), no significant direct effect was found between technology use and academic performance. The main reason why people engaged with TikTok was due to the self-satisfaction they can get from it in terms of skills, knowledge as well as feelings or emotions. It was reported that TikTok had positively influenced the mental health of the students and had encouraged students' creativity in their works. On the contrary, it was also revealed that TikTok affected the academic performance of the students since it impeded the time spend for studying (Herath, 2020). Another study conducted by Boyonsunthonchai (2020) has the potential to distract us in completing different tasks so that they can impact students learning. Adults are more likely to lose track of time on TikTok if they use the application throughout the day (Mekler, 2021).

According to Spence (2020), students pay more attention to their social media accounts than what is taught to them, impacting their ability to comprehend the latest information being taught to them (Catalunya, 2022). There is a 20% improvement in teaching when videos are incorporated into the lesson. In the study, students' preferred types of videos were discussed. Students prefer hand gestures to convey non-verbal information, for it helps them focus on essential concepts. According to the 2015 (Guidelines on the Establishment and Implementation of RPMS in DepEd) RPMS Guidelines, it is a systemic framework for managing, monitoring, and measuring performance and identifying organizational and human resource development requirements to support ongoing job improvement and personal development.

Objectives of the Study

1. The study aimed to determine whether the developed TikTok videos influenced students' performance in Science 10 in National High School. The following are the specific queries the study answered:
2. 1. What is the level of acceptability of TikTok video in terms of content, instructional, and technical quality?
3. What are the pre-test scores of Grades 10 – Edelweiss?
4. What are the post-test scores of Grade 10 – Edelweiss?
5. Is there a significant difference between the pre-test and post-test scores of Grade 10 – Edelweiss?

Materials and Methods:

The researcher focused on the development and field testing of the researcher made TikTok video for the Grade 10-Edelweiss. The researcher utilized the TikTok video in the lesson and analyzed if the TikTok video is effective or not in the performance of the students in Science. It is a type of quasi-experiment in which the outcome of interest is measured two times (Reichardt, 2019). The researcher used descriptive statistics to find the students' academic performance. For the significant differences, the researcher used inferential analysis.

In the methodology of the study, the researcher first plan and design the TikTok Video. The researcher utilized the ADDIE model. The researcher also checked on other educational TikTok videos that may help the researcher in making effective TikTok videos.

This model follows the basic phases discussed below:

1. **Analysis.** In this stage, the researcher determined the issues with the existing conditions and developed potential solutions especially in Science 10. Additionally, it searches and evaluates any appropriate learning theories.
2. **Design.** In this stage, the researcher decides to design a less than 2 minutes video. This researcher also considered the recommendation of Brame (2015) in her study entitled "Effective Educational Videos" the four effective practices such as signaling, segmenting, weeding and matching modality. This was supported by the cognitive load theory which emphasized that there are two channels for acquiring knowledge it is through visual channel and auditory processing channel.
3. **Development.** This phase is the actual creation of the end-product for the students. In the video recording, the researcher utilized her personal TikTok account. carefully selecting fonts, colors, and background music.
4. **Implementation.** In this phase, the researcher delivers your finished product to the target users. Moreover, modules or books you've used, video recording, background music front, colors, and size of text chosen to be part of the finished product- TikTok video.
5. **Evaluation.** This stage is considered the final stage, the presentation of the product or project under study and determined TikTok videos effectiveness and usefulness by testing and gathering user feedback. The researcher gathered, analyzed, organized, and used end users' feedback to develop the updated version of the product. This phase is repeated towards the next presentation until such time that the system provides all the feedback.

For the developmental phase of the video, the researcher modify of the video was using her personal TikTok application for video recording. The researcher video lasts only for less than 2 minutes per topic. The researcher used plain background and utilized learner's module in Science 10 as reference. The researcher used the PowerPoint presentation as a guide in delivering the information. The researcher utilized her cell phone and



made sure that she was presentable in making the video. In making the video, the researcher considered some theories and studies in making an effective video lesson. Revisions and taking the videos were done in making qualities videos. After the development stage, the TikTok videos were shown to experts for evaluation. In the evaluation of the developed TikTok video, the researcher utilized the evaluation rating sheet for non-print materials adapted from the Department of Education: Guidelines and Processes for LRMS Assessment and Evaluation to evaluate the Content Quality, Instructional Quality, and Technical Quality of TikTok Videos developed as a supplementary material in Physics 10.

In the designing phase, the researcher selects the topic on Science 10 in the second quarter. The selection of the topic will be based on the Most Essential Learning Competencies recommended by the Department of Education. The second quarter in Science 10 focused on Physics. Making of Table of Specification (TOS) were done as part of constructing test questions. It served as a clear visual mathematical computation based on Bloom's Revised Taxonomy for allocating fair distribution per topic.

Validity of Researcher-Made Test

After the researcher identified the items to be included in the pool of items based on the target MELCs, the researcher made test was subjected to content validity. The researcher used the content validity by Lawshe in validating the test questionnaire, wherein at least nine validators rated the instrument. The evaluators of the researcher made test were experts in Science and test construction. The list of validators was composed of nine Science teachers with Master's Degree in Science. Based on the result of the validity test, it showed that the instrument is essential. The item content validity index was computed by dividing the number of validators. The computed value of 1.00 means that items in the instrument are considered valid.

Test Analysis

For the test analysis was adapted from Samosa (2021). The following steps were taken.

1. Arrange test scores from highest to lowest. This ranking is based on the student's total score on the test.
2. Get one – third of the papers from the highest scores and other third from the lowest scores. These two extreme sets of examination papers are the criterion groups. The first is the upper group and the latter is the lower group. The middle group is not used in the analysis of test items.
3. Record separately the number of times each alternative was chosen by the students in both groups.
4. Add the number of correct answers to each item made by the combined upper and lower groups.
5. Compute the index of difficulty for each item, following the formula:

$$IDF = \left(\frac{NRC}{TS} \right) 100$$

Where: IDF = index of difficulty

NRC = number of students responding correctly to an item,

TS = total number of students in the upper and lower groups.

Table 1: Interpretation for Difficulty Index

Range	Difficulty index
20 & below	Very Difficult
21-40	Difficult
41-60	Average
61-80	Easy
81 & above	Very Easy

6. Compute the index of discrimination, based on the formula $IDN = \left(\frac{CU - CL}{NSG} \right)$

Where: IDN = index of discrimination

CU = number of correct responses of the upper group

CL= number of correct responses of the lower groups.

NSG = number of students per group

Table 2: Interpretation for Discrimination Index

Range	Difficulty index
.40 below	Very Good Item
.30-.39	Good Item
.20-.29	Fair Item
.09-.19	Poor item

In this study, items range from .30 – above were retained. Items with range from .20- .29 were refined for improvement while those, which were considered poor items, were rejected.

***Reliability of the Research Instrument***

The reliability of the instrument was tested for a dry run on the 30 students of Sagay National High School who weren't the actual participants of the study. The researcher conducted a reliability test using Kuder- Richardson Formula 21 to determine the internal consistency of the item scores. The coefficient alpha of the instrument garnered a 0.802, which was interpreted as good. It means that the research instrument was reliable.

On Preparation of Materials for Experimentation

In this phase, the researcher made the research instrument based on the Table of Specification on the Most Essential Learning Competencies suggested by the Department of Education.

On Performance in Science 10

For the performance test in Physics 10 the researcher developed a 20 -item test. The research instrument was subjected to a reliability and validity test. The test questionnaire includes the following MELCs:

1. Cite examples of practical applications of the different regions of EM waves, such as the use of radio waves in communications.
2. Explain the effects of EM radiation on living things and the environment.

Respondents of the Study

The emphasis of this research was to determine the influence of the developed TikTok videos on the performance of Grade 10 students in a National High School in Sagay City in Science subjects by incorporating videos from TikTok related to the topic in the second quarter.

The study participants were the Grade 10-Edelweiss of Sagay National High School, officially enrolled in School Year 2022-2023. The section was chosen because they were under the teaching load of the teacher.

Sampling Techniques

The total enumeration sampling was used in the study since the Grade 10- Edelweiss was under the teaching lead of the researcher. The class size was small, and it was manageable for the researcher to conduct the intervention; hence the decision was to take all.

Research Instrument

The researcher utilized eight researcher-made videos using the TikTok application as supplementary material for the lesson in Science 10 Physics in MELC 3-5. In making the video, the researcher utilized her personal TikTok account. Eight videos focus on the Most Essential Learning Competencies from 3-5. The researcher used mobile phones to make the videos and in editing the video. The purpose of the video is to supplement and strengthen students' understanding of the topic. The TikTok videos underwent revision and thorough editing for improvement. Suggestions and comments were taken and applied for the enhancement of the TikTok video. The researcher uploaded the video to her account and downloaded it to be utilized during her lesson. The researcher made TikTok videos that were also posted via the group chat of the respondents. The TikTok videos were evaluated by the experts using the Evaluation Rating Sheet for Non-Print materials adapted from the Department of Education: Guidelines and Processes for LRMDs Assessment and Evaluation to evaluate the Content Quality, Instructional Quality, and Technical Quality.

Moreover, the researcher-made research instrument was subjected to reliability and reliability test.

A. Developed TikTok Video

The TikTok videos made by the researcher were designed to improve the academic performance of Grade 10 - Edelweiss students in Sagay National High School for

S. Y. 2022- 2023 in Science subject specifically in Physics 10 for Most Essential Learning Competencies 3-5.

On Field testing and Data Gathering

After the researcher undertook the validity and reliability of the researcher-made test, the researcher reproduced the needed number of test questionnaires for the field testing.

A. Administering the Pretest

After reproduction of the researcher-made test, the test was conducted to the 40 students of Grade 10 -Edelweiss of Sagay National High School – Main Campus to determine their academic performance in Science before the intervention.

B. Administering the Intervention

In administering the intervention, the researcher discussed the lesson based on the selected topics found in MELCs. Before the end of the lesson, the researcher utilized the TikTok video in the topic. The researcher also posted the TikTok video on their group chat as supplementary material.

C. Post- Experiment

After discussing all the topics in the selected MELCs to the respondents, conduct of post-test were administered. Data from the pre-test and post-test were tallied, tabulated, evaluated, and interpreted based on the specific objectives and hypothesis presented in the study.

Data Gathering Procedure

First and foremost, an approval letter from the school principal to conduct the study was sought first. Before the conduct of the pre-test, TikTok videos were evaluated by three (3) experts. Upon approval, the researcher administered the pre-test to the respondents. The conduct of the pre-test and post-test before the beginning and the end of the second quarter respectively. The pre-test scores were gathered and analyzed. The conduct of intervention happened during the third to fifth week of the second quarter. The researcher used the developed TikTok videos during the delivery of the lessons under MELC 3-5. The post-test was administered before the end of the second quarter. Post-test scores were recorded and analyzed. The raw scores of the respondents were encoded and arranged using Microsoft Excel. The raw data were sent to the researcher's statistician for statistical treatment. Afterward, the results were analyzed, presented, and interpreted for conclusions and recommendations.

Data Analysis/ Statistical Treatment

The researcher employed the following statistical test to the questions in the study.

For problem 1, the researcher utilized the Learning Resources Management and Development System (LRMDS) of Department of Education to determine the level of the acceptability of the TikTok video.

For problem 2, the researcher employed the mean scores of the pre-test of Grade 10-Edelweiss before the intervention.

For problem 3, the researcher employed the mean scores of the post-test of Grade 10-Edelweiss after the intervention.

For problem 4, which determined the significant difference between scores, paired sample T-test was employed.

Results and Discussion

Table 3. Content Quality of Developed TikTok Video

Respondents	No. of Evaluators	Rate	Description
IT Experts	3	35.9	PASSED
Quality Assurance Specialist	2	34.7	PASSED
Teachers	5	36.1	PASSED
Students	10	35.4	PASSED
Total	20	35.5	PASSED

The developed TikTok video was evaluated by five (5) Science teachers, ten (10) Grade 10 students from Sagay National High School, three (3) Quality Assurance Specialist, and three (3) IT Experts using Evaluation Rating Sheet for Non-Print materials adapted from the Department of Education: Guidelines and Processes for LRMDS Assessment and Evaluation V1.0 to determine the quality of the developed TikTok video in terms of content, instruction, and technical aspects. The material must score at least 30 points out of a maximum 40 points to pass the criterion in Content Quality and Instruction Quality based on the evaluation sheet for Non-Print Materials. On the other hand, in Technical Quality, the material must score at least 39 points out of a maximum 52 points to pass the criterion. The results of the criteria were calculated using the Mean of the total scores.

Table 3 shows the overall result in terms of Content Quality. The results of the evaluation concluded that the TikTok video was rated as **"PASSED"** with the overall mean score of **35.5**.

The IT Experts rated it with the mean score of **35.9** with the description of **"PASSED"**. The Quality Assurance Specialist rated it with the mean score of **34.7** with the description of **"PASSED"**. The teachers rated it **"PASSED"**



with the mean score of 36.1 and the students rated it with the mean score of **35.4** with its corresponding description of **"PASSED"**. It simply means that the developed TikTok video quality in terms of Content is in accordance with Department of Education Learning Competencies for the subject and grade/year level it was intended. The content is accurate, relevant to real-life situations and the language used is appropriate to the target audience.

Table 4. Instructional Quality of Developed TikTok Video

Respondents	No. of Evaluators	Rate	Description
IT Experts	3	34.6	PASSED
Quality Assurance Specialist	2	34.3	PASSED
Teachers			
Students	5	34.8	PASSED
Total	10	34.8	PASSED
	20	34.6	PASSED

Table 4 shows the overall result in terms of Instruction Quality. The results of the evaluation concluded that the developed TikTok video was rated as **"PASSED"** with the overall mean score of **34.6**.

Table 5: Technical Quality of Developed TikTok Video

Respondents	No. of Evaluators	Rate	Description
IT Experts	3	41.7	PASSED
Quality Assurance Specialist	2	43.5	PASSED
Teachers			
Students	5	41.7	PASSED
Total	10	44.3	PASSED
	20	42.8	PASSED

IT Experts rated it with the mean score of **41.7** with the description of **"PASSED"**. The Quality Assurance Specialist rated it with the mean score of **43.5** with the description of "PASSED". The teachers rated it **"PASSED"** with the mean score of **41.7** and the students rated it with the mean score of **44.3** with its corresponding description of **"PASSED"**. With the result presented, it was concluded that the quality of animated story in terms of instruction showed that the learning objectives were well defined in its intended purpose. It also showed that graphics, colors, or sounds used are appropriate for instructional reasons. In addition, the level of difficulty was appropriately intended to its target audience and the animated video material was enjoyable, stimulating, challenging, and engaging.

Table 5 shows the overall results of the evaluation of the respondents in terms of Technical Quality. The results of the evaluation concluded that the TikTok as rated as "PASSED" with the overall mean score of **42.8**.

With the results of the data presented, it shows that the developed TikTok video was in accordance with the quality standards such as there was a complete synchronization of audio with the visuals. Music and sound effects are appropriate and effective for instructional purposes. Speech and narration (correct pacing, intonation, and pronunciation) is clear and can be easily understood. Screen displays (text) are uncluttered, easy to read, and aesthetically pleasing. The material can easily and independently be used.

**Table 6: Pre-test Score of the Respondents**

	Pre-test	Interpretation
Grade 10-Edelweiss	12.15	Did Not Meet Expectations

Table 6 reflects the pre-test scores of the Grade 10-Edelweiss. It reflects that the respondents garnered a mean score of **12.15** with a verbal description of **"Did Not Meet Expectations"** based on the grading system of the Department of Education.

This implied that the respondents of the study did not master the competencies in the pre-test. The results were somehow justifiable since students had not yet learned and mastered such competencies, and the test was conducted before the delivery of the lesson happened. The result of the study was supported by the findings of Futral and Comighud (2020), who stated that pre-test ratings changed are less than the Department of Education's 75% passing percentage as stated in DepEd Order No. 8 s. 2015 Policy Guidelines for K-12 Basic Education Classroom Assessment. The current findings from Togonon's study on SIMs, where the pre-test result was revealed, are identical to this discovery. Score that falls short of the established passing mark. Similar outcomes are also seen in Alboruto's (2017) study, where the pre-test scores averaged 48.25 percent, which is likewise under 75%.

Table 7: Post-Test Score of the Respondents

	Post-test	Interpretation
Grade 10-Edelweiss	15.90	Did Not Meet Expectations

Table 7 depicts the post-test scores of the Grade 10-Edelweiss. It indicates that respondents garnered a mean score of **15.90** with a verbal interpretation of **"Fairly Satisfactory"** based on the grading system of DepEd. This implied that the post-test scores of the respondents improved from **"Did Not Meet Expectations"** to **"Fairly Satisfactory."** It indicated that the students mastered some of the competencies in the post-test. Nevertheless, the students were able to attain the 75% passing score.

The result of the study was similar to Futral and Comighud (2020), who found that after the post-test, students' performance in Science improved and that the post-test ratings on the subjects might be categorized as "satisfactory." The data unambiguously show that it had met the DepEd standard requirement of 75%.

Table 8: Significant Difference between the Pre-test and Post-test of the Respondents

Groups	Mean	f-value	p-value	Interpretation
Experimental	15.90	50.95	0.000	Fairly Satisfactory

The result on the comparison between scores of the respondents shows a p-value of 0.000 with verbal interpretation that there is a significant difference between the test scores of the Grade 10-Edelweiss which is shown on table 8. The results implied that the developed TikTok video somehow influenced the academic performance of the students in learning the competencies in Physics 10, specifically on MELC 3-5 of the second quarter since there is an improvement in the pre-test and post-test scores.

Futral and Comighud (2020) that the utilization of strategic instructional materials enabled the students to deepen their knowledge and understanding of the identified least mastered concepts in Science. According to Catalunya (2022), videos help students to save time and focus on what's important and are useful in their physics class since they help them to understand difficult concepts. Hashem Almuslamani (2020) stated that the use of educational video has a positive and direct effect on students' participation in the classroom since it gives the students the motivation to participate actively by asking questions and passively by taking down notes.

Conclusions:

Based on the results and discussions, the following conclusions and recommendations were drawn from the study.

1. The developed TikTok video was considered valid in terms of content, instructional, and technical quality based on LRMDs evaluation tool for non-print materials.
2. The result showed that the pre-test score of Grade 10- Edelweiss did not meet the expectations and mastered the competencies. Hence, they did not reach the 75% requirement of the Department of Education. Moreover, the findings showed that the post-test scores of Grade 10- Edelweiss have improved after exposing them to the intervention and mastering some of the competencies in Physics Grade 10 in quarter 2, specifically in MELC 3-5. Hence, they were able to reach the 75% requirement of the Department of Education. Lastly, the developed TikTok videos can be considered helpful in improving the academic performance of the students in Physics.



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References

- Adel Al-Bataineh, M. T.-B. (2016). One-to-One Technology and its Effect on Student Academic. Journal of Educational Research, 378-380. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1117604.pdf>
- American Association for the Advancement of Science. (1989). Retrieved from Science for All American, Oxford University Press, New York: <http://www.project2061.org/publications/sfaa/online/sfaatoc.htm>.
- Asghar, T. R. (2016, October 3). Elsevier. Retrieved from sciencedirect.com: <https://www.sciencedirect.com/science/article/abs/pii/S0747563216304204>
- Badriya Abdul Jaffar, S. R. (2018). Living in a Moment: Impact of TikTok on Influencing Younger Generation into . Journal of Content, Community & Communication, 1.
- Boser, U. (2020, March 9). The Learning Agency Lab. Retrieved from The-learning-agency-lab.com: <https://www.the-learning-agency-lab.com/the-learning-curve/learning-by-doing/>
- Boyonsunthonchai S., A. R. (2020). The Impact of Different Mobile Phone Tasks on Gait Behaviour in Healthy Young Adults. Journal of Transport & Health, 19.
- Catalunya, U. O. (2022, March 16). phys.org. Retrieved from <https://phys.org/news/2022-03-videos-academic.html>
- Dann, C., & Richardson, T. (2015). Deepening understanding of "pedagogical outcomes" through video data collection: a catalyst for guided reflective learning conversations. International Journal of Pedagogies & Learning, 10(1), 62.
- Department of Education/Official Gazette. (2016). Retrieved from <https://www.officialgazette.gov.ph>.
- Devakumar, C. (2020). A Study to Analyze the Impact of TikTok App on Students Academics and Psychology. Journal of Emerging Technologies and Innovative Research, 1043.
- D'Souza, D. (2021, July 22). Investopedia. Retrieved from <https://www.investopedia.com/what-is-tiktok-4588933>
- Executive Order No. 80, s. 2012 | GOVPH - Official Gazette of the <https://www.officialgazette.gov.ph/2012/07/20/executive-order-no-80-s-2012/>
- Sinco, Marian & Futralan, Maria Chona & Comighud, Sheena Mae. (2020). Strategic Intervention Materials: A Tool in Improving Students' Academic Performance. 6. 1-22. 10.5281/zenodo.3870630.
- Geyser, W. (2021, June 11). Retrieved from influencermarketinghub: <https://influencermarketinghub.com/what-is-tiktok/>
- Guolin Lai, D. C. (2016). The effects of video tutorials as a supplement in enhancing students' statistics performance.
- Hashem Almuslamani, I. N. (2020). The Effect of Educational Videos on Increasing Student Classroom Participation: Action Research. Research Gate, 329.
- Hawas, F. S. (2021). Factors Affecting Students Academic Performance: A Case Study of Sohar University. Research Gate , 4624.



- Herath, P. (2020). Impact of TikTok on University Students' Academic Achievements- A Case Study of UvaWellasa University of Sri Lanka. *The American Journal of Humanities and Social Sciences Research*, 145.
- Hollebrands, K. (2020). How Can Teachers Use Technology in the Classroom:Ask the Expert Series. Retrieved from ced.ncsu/news: <https://ced.ncsu/news>
- Hornbuckle, M. (2022, January 25). Retrieved from <https://www.youscience.com/about-us/>.
- Importance of Science Education in Schools. (2021, August 18). Retrieved from academicpartnerships.uta.edu: <https://academicpartnerships.uta.edu/articles/education/importance-of-science-education.aspx>
- Latif, F. (2017). TELFest: An approach to encouraging the adaptation of technologies . *Research in Learning Technology*.
- Maguate, G. S., & Rabacal, J. S. Peer Mentoring for Academic Performance of Students in Science. *International Journal of Latest Research in Humanities and Social Science (IJLRHSS)*, 6(06), 183-189.
- Marklin, B. (2018, August 21). learning liftoff. Retrieved from <https://www.learningliftoff.com:https://www.learningliftoff.com/what-parents-should-know-about-the-tik-tok-musical-ly-app/>
- Mekler, A. (2021). The Effects of TikTok Use on College Student Learning . *Bridgewater State University*, 151.
- Mushtaq, M. (2018).Official Concepts and Definitions for Statistical Purposes. (2008, June 11). Retrieved from Philippine Statistics Authority: <http://nap.psa.gov.ph/glossary/terms/indicatorDetails.asp?strIndi=39331377>
- Ohoylan, J. G. D., & Maguate, G. (2023). TikTok: Undistressing Tool for Teachers. *International Journal of Latest Research in Humanities and Social Science (IJLRHSS)*, 6(07), 149-155.
- Owens, M. (2021). Examining the Relationship Between Race, Gender & STEM Program Enrollment. *Techniques*, 96(2), 39.
- Padmanabha Thiruganahalli Shivaraju, G. M. (2012). Evaluating the effectiveness of a pre-and post-test model of learning in a. *National Journal of Physiology, Pharmacy and Pharmacology*, 947. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1052549.pdf>: eric.ed.gov
- Paloma Escamilla-Fajardo, M. A.-C. (2021, June 28). Elsevier. *Journal of Hospitality, Leisure, Sport &Tourism Education*. Retrieved from [www.sciencedirect.com:https://www.sciencedirect.com/science/article/abs/pii/S1473837621000034](https://www.sciencedirect.com/science/article/abs/pii/S1473837621000034)
- Rosella Iodice, C. P. (2021, October 24). *Online Journal of Communication and Media Technologies* . Retrieved from [www. Online Journal of Communication and Media Technologies.com](http://www.onlinejournalofcommunicationandmediatechnologies.com).
- Samosa , R. (2021). FROM TEST VALIDITY TO CONSTRUCT VALIDITY & Back Theory and application in the Experimental Design in Science Action Researc. *Research Gate Journal*, 1–73.
- Science for All Americans. (n.d.). Retrieved from <http://www.project2061.org:http://www.project2061.org/publications/sfaa/online/Chap13.htm>
- Solomon, S. (2021). Incorporating Social Media into the Classroom: A Case Study on How Tiktok can be immersed into Classroom Pedagogy. *Master of Science in Education*, 5.
- Spence, A. B. (2020). Social Media Use While Listening to New Material Negatively Affects Short-Term Memory in College Students. *Physiology & Behavior*, 227.
- Techopedia. (2016, December 15). Retrieved from techopedia:



- Thomas, L. (2022, July 21). Quasi-Experimental Design Definition, Types, and Examples. Retrieved from Scribbr: <https://www.scribbr.com/methodology/quasi-experimental-design/> unicef.org. (n.d.). Retrieved from <https://www.unicef.org/education>.
- Walan, S. (2020, April 29). Journal of Science Education and Technology. Retrieved from link.springer.com: <https://link.springer.com/content/pdf/10.1007/s10956-020-09828-6.pdf>
- Yu, J. X. (2019). Research on TikTok Based on User-Centric Theory. Research Gate, 28-29.
- Zhang, Z., & de Guzman, R. (2016). An effective innovative intervention program (combining emotion-focused cognitive therapy and acupuncture) for the treatment of patients with depressive symptoms. Indian Journal of Positive Psychology, 7(1), 15.