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Exploring the Development of Nano Vlog-Based Supplementary Materials to Improve Cognitive Level in Elementary Agriculture VI

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Abstract

The goal of this study is to explore the use of teacher-made nano vlogs—short, focused video blogs—as supplementary learning materials to improve the cognitive level of the Grade VI learners at San Ramon Elementary School – Calamba City in Technology and Livelihood Education (TLE) VI - Agriculture and Fishery Arts.

Additionally, it aims to investigate the impact of nano vlog-based materials on learner's cognitive engagement and improving comprehension and increasing knowledge retention. Rooted in the theories of constructivist learning, multimedia learning and cognitive load, the research places nano vlogs within the broader context of evolving teaching strategies that utilize visual and auditory elements to improve knowledge retention. Moreover, it utilized a quantitative experimental pretest-posttest control group design, and it involved two groups: an experimental group receiving the intervention (innovative nano vlogs designed to reinforce agricultural concepts) and a control group receiving traditional instructional methods. Both groups initially completed a pretest to establish a baseline cognitive level, the experimental group received the nano vlog intervention, while the control group continued with traditional instruction. A post-test was administered to both groups, enabling a comparison of cognitive gains.

Findings indicate that the developed nano vlogs were high-quality resources that have the potential to enhance traditional instruction. The nano vlogs were rated as "Very Satisfactory" ($\bar{x}$ =3.86) across all evaluation criteria, demonstrating their alignment with curriculum standards, the accuracy and engagement of their content, and their technical and mechanical quality. The analysis of interrater agreement using Fleiss' Kappa revealed "Overall Quality" exhibited only slight agreement (Kappa = .036, $p < .01$), despite the agreement being statistically significant. Both the control and experimental groups showed statistically significant improvement in posttest scores, with the experimental group (mean difference = 12.05, $t = 20.145$, $p < .01$), which used the nano vlogs, showing slightly higher overall performance while the control group (mean difference = 9.81, $t = 16.67$, $p < .01$).

In summary, this research contributes to the understanding of technology integration in education, specifically the use of nano vlogs in Agriculture and Fishery Arts. The developed nano vlogs and research insights provide valuable resources for educators, curriculum developers, and policymakers seeking to enhance the quality of Technology and Livelihood Education VI instruction and promote learners' cognitive development in this field.

Keywords: *nano-vlog, Technology and Livelihood Education, Agriculture and Fishery Arts, supplementary learning materials, innovation, quantitative research*

Online ISSN: 3082-5121
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Volume 2 Issue 5 (2026)

I. INTRODUCTION

In the digital era, the integration of technology in education has revolutionized teaching and learning. One such innovation is the use of nano vlogs—short, engaging video blogs—as supplementary learning tools. This study explores the impact of teacher-made nano vlogs on learner engagement and comprehension, particularly in challenging subjects like elementary agriculture. By breaking down complex information into brief, digestible segments, nano vlogs address the challenges of short attention spans and cater to diverse learning styles.

In the Philippines, Technology and Livelihood Education (TLE), particularly in Agriculture and Fishery Arts (AFA), is a crucial part of the Revised K-12 curriculum. Mandated by Department Order No. 31, series of 2012, and supported by Republic Act No. 8485 and Republic Act No. 10647, the TLE curriculum aims to equip learners with practical skills for self-reliance and sustainable livelihoods. The Revised K-12 Curriculum further emphasizes this by focusing on producing lifelong learners who are workforce-ready and equipped with 21st-century skills. The Grade 6 TLE curriculum integrates various fields, including ICT, AFA, Family and Consumer Science, and Industrial Arts, to develop technical and entrepreneurial competencies.

To address the dynamic learning needs of Grade 6 learners in TLE-AFA, this study developed nano vlog-based learning media covering key competencies in fishery arts. These vlogs were designed to provide concise, engaging, and visually rich content on topics such as fish anatomy, fish raising requirements, and common fish diseases.

Integrating nano vlogs into TLE 6—Agriculture and Fishery Arts presented a promising approach to enhancing learner engagement and comprehension. These brief; one-to-three-minute videos provide a visually dynamic platform to explain complex concepts (Smith, 2021). By leveraging multimedia, teachers can supplement traditional methods with interactive content that caters to various learning styles. This allows learners to revisit topics at their own pace, reinforcing their understanding. Additionally, vlogs can effectively demonstrate practical skills, such as fish care or harvesting, through step-by-step visual instructions (Johnson, 2021).

The flexibility of nano vlogs also benefits educators, who can easily create and distribute up-to-date content using various devices. This is particularly important in a field like agriculture and fishery, where new technologies and methodologies constantly emerge (Tan, 2021). Furthermore, presenting real-life scenarios in vlogs encourages learners to develop problem-solving and critical thinking skills by analyzing and discussing solutions to agricultural and fishery challenges (Dizon & Reyes, 2020). The use of digital platforms for distribution ensures that high-quality educational resources are accessible to all learners.

Grounded in multimedia learning and cognitive load theories, this research investigated how these digital tools can enhance knowledge retention and understanding compared to traditional instructional methods. This study provided empirical evidence for the application of nano vlogs in modern education, contributing to the ongoing discussion about pedagogical innovation and the role of technology in shaping educational experiences.

Moreover, this study was anchored in the constructivist theory of learning, which posits that learners actively build their own understanding by engaging with their environment and experiences. Applied to Technology and Livelihood Education (TLE) 6 - Agriculture and Fishery Arts, teacher-made nano vlogs can provide dynamic, real-world examples that encourage learners to construct their own knowledge of complex concepts (Cruz, 2023).

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https://journals.aloysianpublications.com
Volume 2 Issue 5 (2026)

Additionally, this research was guided by Cognitive Load Theory (CLT), which focuses on managing the mental effort required for learning. Nano vlogs were an effective tool for reducing extraneous cognitive load, which was the mental effort wasted on poorly designed instructional materials. By presenting information in a concise and engaging format, these vlogs free up learners' cognitive resources to focus on essential concepts (Germane cognitive load) and facilitate the transfer of knowledge to long-term memory (Sweller, 2006). The use of multimedia learning principles also supports this approach, as presenting information through both visual and auditory channels enhances comprehension and retention (Mayer, 2009).

The integration of nano vlogs also promotes equitable and inclusive learning, as they can be designed with features like captions and audio descriptions to cater to diverse learning needs (Taylor, 2022). This approach not only makes learning more accessible but also encourages collaborative learning through project-based content creation, fostering critical thinking and communication skills (Johnson & Johnson, 2014).

This study evaluated the effectiveness of teacher-made nano vlogs—brief, focused video clips—as supplementary learning materials for Grade 6 learners in Technology and Livelihood Education (TLE) - Agriculture and Fishery Arts. Conducted at San Ramon Elementary School, the research aimed to determine if these digital tools can enhance cognitive engagement, comprehension, and knowledge retention. Specifically, it addressed the following questions: (1) What is the assessment of the developed nano vlog-based supplementary learning materials in TLE 6 – Agriculture and Fishery Arts based on DepEd LRMDS Assessment and Evaluation in terms of a) Content Quality; b) Instructional Quality; c) Technical Quality; and d) Mechanics? (2) What is the level of agreement of evaluation on the developed nano vlog-based supplementary learning materials in TLE 6 – Agriculture and Fishery Arts? (3) What are the pretest scores for both the control and experimental groups? (4) What are the posttest results for both the control and experimental groups? (5) Is there a significant difference between the pre-test and post-test scores of the controlled and experimental groups after the intervention? (6) Is there a significant difference in the post-test scores between the control and experimental groups?

Based on these questions, the study posits the following null hypotheses: (1) There is no significant level of agreement on the evaluation of the developed nano vlog-based supplementary learning materials in TLE 6 – Agriculture and Fishery Arts. (2) There is no significant difference in cognitive level between traditional instruction (control group) and nano-vlog-based supplementary material (experimental group). (3) There is no significant difference in the post-test scores between the control and experimental groups.

The findings of this research were expected to contribute valuable insights for educators, curriculum developers, and policymakers on the integration of modern technology in education, particularly for promoting cognitive development in the vital discipline of TLE-Agriculture and Fishery Arts.

II. MATERIALS and METHODS

Part of Materials and Methods includes but not limited to research design, participants, instrument, procedure, and data analysis.

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Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 5 (2026)

Research Design

This study employed a quantitative pretest-posttest control group design to determine the effectiveness of nano-vlog-based supplementary materials in improving the cognitive levels of Grade 6 learners in TLE 6 – Agriculture and Fishery Arts.

Participants

This quantitative study assessed the impact of nano-vlog supplementary materials on the cognitive abilities of 84 Grade 6 learners in TLE-Agriculture and Fishery Arts at San Ramon Elementary School-Calamba City. Using total enumeration from two heterogeneous classrooms, the learners were divided equally into an experimental group (N=42) that used the nano-vlogs and a control group (N=42) that received standard instruction. This experimental design allowed for a direct comparison to measure the materials' effect.

Table 1. Distribution of Population Sample

Group	Male	Female	Total
Control (Grade 6-Maaasahan)	23	19	42
Experimental (Grade 6-Makatarungan)	23	19	42
Total	**46**	**38**	**84**

Instruments

This study used a pretest-posttest design to evaluate the effectiveness of 40 nano-vlog supplementary materials on the cognitive levels of Grade 6 learners in TLE – Agriculture and Fishery Arts. A 50-item multiple-choice test, aligned with the K-12 curriculum, was administered to control and experimental groups before and after the intervention. The test was validated by subject matter experts, pilot-tested, and demonstrated excellent internal consistency (Cronbach's Alpha = 0.90). The nano-vlogs were also formally validated by the School Learning Resources Team. For the experimental group, the vlogs were distributed online via social media and offline on OTG flash drives to ensure full accessibility.

Procedure

A 50-item multiple-choice pretest/posttest, aligned with the TLE 6 curriculum and a Table of Specification, was developed to measure learning outcomes in Agriculture and Fishery Arts. The instrument was validated by TLE experts and pilot-tested with 44 learners to ensure clarity and reliability, which was confirmed using Cronbach's Alpha. Additionally, supplementary nano vlogs were created and validated by the school's Learning Resources team. After securing administrative approval and informed consent, 84 Grade 6 learners were divided into a control group (42) and an experimental group (42). A pretest was administered to establish a baseline. The control group received traditional instruction, while the experimental group used nano vlogs. A posttest was then conducted to evaluate the intervention's effectiveness. The collected data was statistically analyzed to compare the learning outcomes of both groups, with the entire procedure outlined in a flowchart for clarity.

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https://journals.aloysianpublications.com
Volume 2 Issue 5 (2026)

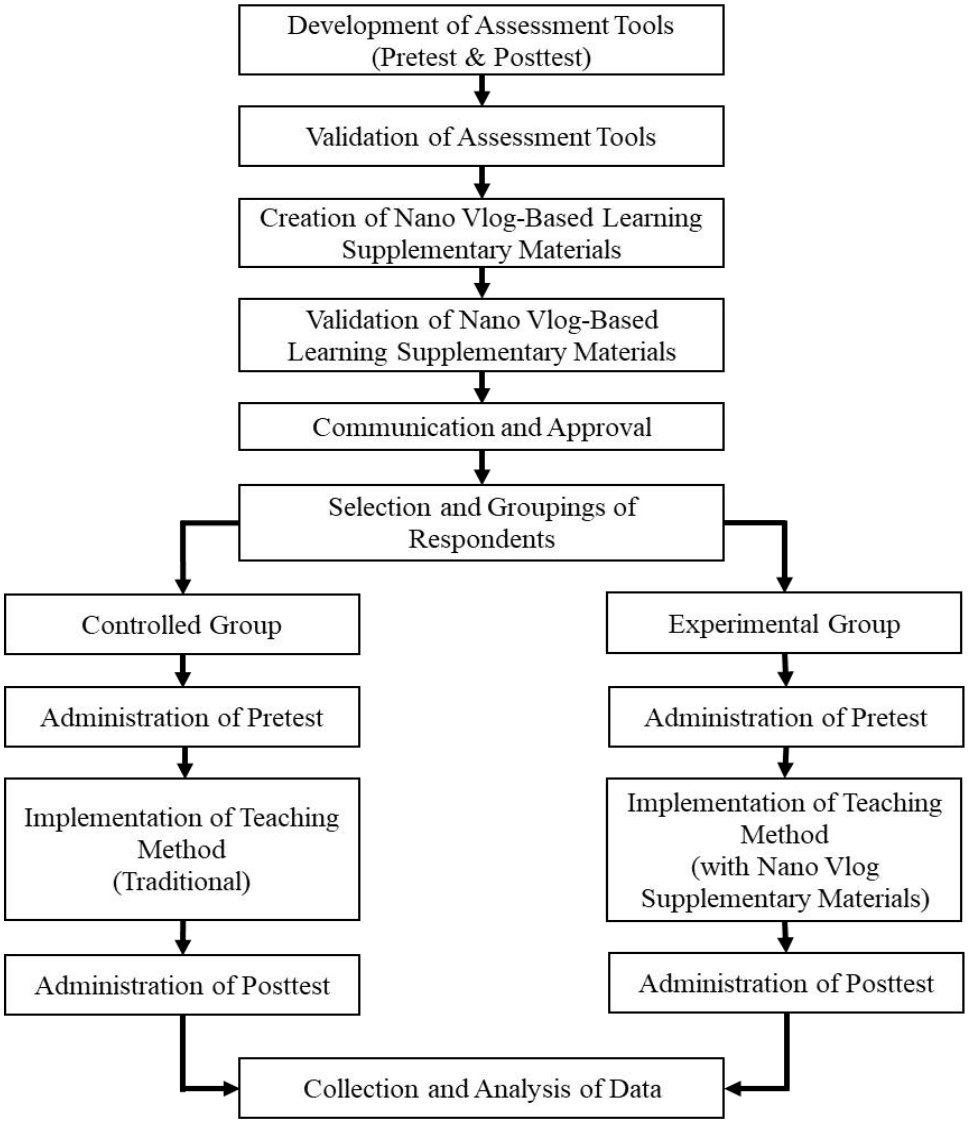

Figure 1. Data Collection Flowchart

Data Analysis

The study's quantitative data was analyzed using the Statistical Package for the Social Sciences (SPSS). The following statistical tests were employed:

1. **Weighted Mean:** Calculated to accurately measure and compare the cognitive levels of the control and experimental groups, accounting for the varying importance of different scores.
2. **Fleiss' Kappa:** Applied to determine the inter-rater reliability of the nano-vlog supplementary learning materials, ensuring consensus among the evaluators from the school's Learning Resources (LR) team.
3. **Two-tailed T-Test:** Conducted to identify any significant difference in outcomes between the groups following the integration of nano-vlog materials in TLE 6 - Agriculture and Fishery Arts, which was central to testing the study's hypothesis.

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 5 (2026)

III. RESULTS

The quantitative findings of this research are summarized below. The results are presented in a series of figures and tables, which illustrate the data in detail.

Table 2a. Content Quality of Nano-Vlog Based Supplementary Learning Materials

Indicators	Mean Rating	Descriptive Rating
1. Content is consistent with topics/skills found in the DepEd Learning Competencies for the subject and grade/year level it was intended.	4.00	Very Satisfactory
2. Concepts developed contribute to enrichment, reinforcement, or mastery of the identified learning objectives.	3.40	Very Satisfactory
3. Content is accurate.	3.60	Very Satisfactory
4. Content is up-to-date.	4.00	Very Satisfactory
5. Content is logically developed and organized.	3.60	Very Satisfactory
6. Content is free from cultural, gender, racial, or ethnic bias.	4.00	Very Satisfactory
7. Content stimulates and promotes critical thinking.	3.20	Satisfactory
8. Content is relevant to real-life situations.	3.00	Satisfactory
9. Language (including vocabulary) is appropriate to the target user level.	4.00	Very Satisfactory
10. Content promotes positive values that support formative growth.	4.00	Very Satisfactory
Overall	**3.68**	**Very Satisfactory**

Legend:

Range of Mean	*Descriptive Rating*
3.25 – 4.00	Very Satisfactory
2.50 – 3.24	Satisfactory
1.75 – 2.49	Poor
1.00 – 1.74	Not Satisfactory

Table 2b. Instructional Quality of Nano-Vlog Based Supplementary Learning Materials

Indicators	Mean Rating	Descriptive Rating
1. Purpose of the material is well defined.	4.00	Very Satisfactory
2. Material achieves its defined purpose.	4.00	Very Satisfactory
3. Learning objectives are clearly stated and measurable.	4.00	Very Satisfactory
4. Level of difficulty is appropriate for the intended target user.	4.00	Very Satisfactory
5. Graphics / colors / sounds are used for appropriate instructional reasons.	3.60	Very Satisfactory
6. Material is enjoyable, stimulating, challenging, and engaging.	3.80	Very Satisfactory
7. Material effectively stimulates creativity of target user.	3.80	Very Satisfactory
8. Feedback on target user's responses is effectively employed.	4.00	Very Satisfactory
9. Target user can control the rate and sequence of presentation and review.	4.00	Very Satisfactory
10. Instruction is integrated with target user's previous experience.	4.00	Very Satisfactory
Overall	**3.92**	**Very Satisfactory**

Legend:

Range of Mean	*Descriptive Rating*
3.25 – 4.00	Very Satisfactory
2.50 – 3.24	Satisfactory
1.75 – 2.49	Poor
1.00 – 1.74	Not Satisfactory

Online ISSN: 3082-5121
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https://journals.aloysianpublications.com
Volume 2 Issue 5 (2026)

Table 2c. Technical Quality of Nano-Vlog Based Supplementary Learning Materials

Indicators	Mean Rating	Descriptive Rating
1. Audio enhances understanding of the concept.	3.80	Very Satisfactory
2. Speech and narration (correct pacing, intonation, and pronunciation) is clear and can be easily understood.	3.20	Satisfactory
3. There is complete synchronization of audio with the visuals.	3.80	Very Satisfactory
4. Music and sound effects are appropriate and effective for instructional purposes.	4.00	Very Satisfactory
5. Screen displays (text) are uncluttered, easy to read, and aesthetically pleasing.	4.00	Very Satisfactory
6. Visual presentations (non-text) are clear and easy to interpret.	3.60	Very Satisfactory
7. Visuals sustain interest and do not distract user's attention.	4.00	Very Satisfactory
8. Visuals provide accurate representation of the concept discussed.	4.00	Very Satisfactory
9. The user support materials are effective.	4.00	Very Satisfactory
10. The design allows the target user to navigate freely through the material.	3.40	Very Satisfactory
11. The material can easily and independently be used.	4.00	Very Satisfactory
12. The material will run using minimum system requirements.	4.00	Very Satisfactory
13. The program is free from technical problems.	4.00	Very Satisfactory
Overall	**3.83**	**Very Satisfactory**

Legend:

Range of Mean	*Descriptive Rating*
3.25 – 4.00	Very Satisfactory
2.50 – 3.24	Satisfactory
1.75 – 2.49	Poor
1.00 – 1.74	Not Satisfactory

Table 2d. Mechanics of Nano-Vlog Based Supplementary Learning Materials

Indicators	Mean Rating	Descriptive Rating
1. Conceptual errors.	4.00	Errors not present
2. Factual errors.	4.00	Errors not present
3. Grammatical and / or typographical errors.	4.00	Errors not present
4. Other errors (i.e., computational errors, obsolete information, errors in the visuals, etc.).	4.00	Errors not present
Overall	**4.00**	**Errors not present**

Legend:

Range of Mean	*Descriptive Rating*
3.25 – 4.00	Errors not present
2.50 – 3.24	Present but very minor & must be fixed
1.75 – 2.49	Present & requires major redevelopment
1.00 – 1.74	Do not evaluate further

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 5 (2026)

Table 2e. Summary Evaluation of Nano-Vlog Based Supplementary Learning Materials

Quality Parameters	Mean Rating	Descriptive Rating
1. Content Quality	3.68	Very Satisfactory
2. Instructional Quality	3.92	Very Satisfactory
3. Technical Quality	3.83	Very Satisfactory
4. Mechanics	4.00	Errors Not Present
Overall Quality	**3.86**	**Very Satisfactory**

Legend:

Range of Mean	*Description for Parameters*	
3.25 – 4.00	Very Satisfactory	Errors Not Present
2.50 – 3.24	Satisfactory	Present but very minor & must be fixed
1.75 – 2.49	Poor	Present & requires major redevelopment
1.00 – 1.74	Not Satisfactory	Do not evaluate further

Table 3. Fleiss Kappa Multirater Agreement of the Nano-Vlog Based Supplementary Learning Materials in TLE 6

Indicators	Kappa Value	Z	Sig.	Decision
1. Content Quality	.494	4.945**	p<.01	Reject HO_1
2. Instructional Quality	.341	1.517*	p<.05	Reject HO_1
3. Technical Quality	.343	3.916**	p<.01	Reject HO_1
4. Mechanics	-	-	-	-
Overall	**.036**	**2.946****	**p<.01**	**Reject HO_1**

Legend:

** significant at .01 level
* significant at .05 level

Table 4. Pretest Result of the Control and Experimental Group

Learning Competencies	Control Group		Experimental Group	
	Mean Pretest Score	DR	Mean Pretest Score	DR
1. Discuss fishery arts and its branches/fields	91.33	O	96.00	O
2. Discuss the importance and benefits in fish raising	82.62	S	79.67	FS
3. Explain the legal basis and agencies in fish raising	81.62	S	81.19	S
4. Discuss the successful fish raisers in the community and characteristics	70.57	DNME	69.81	DNME
5. Discuss the requirements for natural fish raising	69.38	DMNE	71.64	DNME
6. Discuss the anatomy of fish	71.19	DMNE	78.52	FS
7. Discuss the diseases, causes, sign and symptoms, preventions, and control measures of fish diseases	68.74	DMNE	68.05	DNME
8. Perform the procedure for natural fish raising with safety precautions	71.10	DMNE	68.17	DNME
9. Perform the procedure for natural fish raising with safety precautions	78.95	FS	75.52	FS
10. Perform selling of fishes with safety precautions	86.88	VS	75.52	FS
Overall	**77.24**	**FS**	**76.41**	**FS**

Legend:

Percentile Score	Descriptive Rating (DR)
90-100	Outstanding (O)
85-89	Very Satisfactory (VS)
80-84	Satisfactory (S)
75-79	Fairly Satisfactory (FS)
Below 75	Did Not Meet Expectation (DNME)

Table 5. Posttest Result of the Control and Experimental Group

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 5 (2026)

Learning Competencies	Control Group		Experimental Group	
	Mean Posttest Score	DR	Mean Posttest Score	DR
1. Discuss fishery arts and its branches/fields	100.00	O	100.00	O
2. Discuss the importance and benefits in fish raising	88.00	VS	91.50	O
3. Explain the legal basis and agencies in fish raising	87.40	VS	90.95	O
4. Discuss the successful fish raisers in the community and characteristics	73.24	DNME	76.16	FS
5. Discuss the requirements for natural fish raising	79.93	FS	82.57	S
6. Discuss the anatomy of fish	95.07	O	93.76	O
7. Discuss the diseases, causes, sign and symptoms, preventions, and control measures of fish diseases	79.57	FS	80.81	FS
8. Perform the procedure for natural fish raising with safety precautions	76.14	FS	79.29	FS
9. Perform the procedure for natural fish raising with safety precautions	86.29	VS	88.57	VS
10. Perform selling of fishes with safety precautions	100.00	O	97.00	O
Overall	**86.56**	**VS**	**88.12**	**VS**

Legend:

Percentile Score	Descriptive Rating (DR)
90-100	Outstanding (O)
85-89	Very Satisfactory (VS)
80-84	Satisfactory (S)
75-79	Fairly Satisfactory (FS)
Below 75	Did Not Meet Expectation (DNME)

Table 6. T-test Result on the Differences between the Pretest Scores and Posttest Scores

Groups	Mean Difference	t-value computed	Significance	Decision
Control Group	9.81	16.67**	$p < .01$	Reject HO_2
Experimental Group	12.05	20.15**	$p < .01$	Reject HO_2

Legend:

** significant at .01 level
* significant at .05 level

Table 7. T-test Result on the Difference of the post-test scores between the control and experimental

Groups	Post test Mean	t-value computed	Significance	Decision
Control Group	82.21	1.732	$p > .05$	Accept HO_3
Experimental Group	84.50			

Legend:

** significant at .01 level
* significant at .05 level

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 5 (2026)

IV. DISCUSSION

This section discusses the study's results, interpreting the data collected to address the research problems and providing evidence.

1. On the assessment of the developed nano vlog-based supplementary learning materials in TLE 6 – Agriculture and Fishery Arts based on DepEd LRMDS Assessment and Evaluation in terms of:

a) Content Quality

The comprehensive evaluation results, meticulously detailed in Table 2a, affirmed that the nano-vlog supplementary materials possess a "Very Satisfactory" level of content quality (overall $\bar{x}$=3.68), demonstrating significant strengths in curriculum alignment, accuracy, up-to-dateness, and freedom from bias. These high ratings confirm the materials are reliable, structurally sound, and inclusive resources aligned with culturally responsive teaching principles (Gay, 2018). However, the materials earned lower, though still "Satisfactory," scores for stimulating critical thinking ($\bar{x}$=3.20) and demonstrating real-life relevance ($\bar{x}$=3.00). This suggests that while effective for information delivery, there is an opportunity for pedagogical enhancement. In line with constructivist learning theories (Jonassen, 1991), future development should focus on integrating prompts for analysis and problem-solving, while explicitly linking content to real-world applications. Such improvements would transition the materials from being primarily informative to being truly transformative, thereby deepening cognitive engagement and perceived relevance for learners.

b) Instructional Quality

Table 2b presents compelling evidence of the "Very Satisfactory" perceived instructional quality of the developed nano-vlog based supplementary learning materials, indicated by a high overall mean score of 3.92. The assessment revealed perfect scores ($\bar{x}$=4.00) for foundational instructional criteria, including clarity of purpose, objective achievement, explicit learning objectives, and appropriate difficulty, consistent with established pedagogical principles. Equally impressive were perfect scores for interactive and adaptive features, such as feedback quality, learner control over pacing, and effective interleaving with prior knowledge, highlighting a robust learner-centric design. Other significant indicators, including the effective use of multimedia ($\bar{x}$ = 3.60), learner engagement ($\bar{x}$ = 3.80), and creativity stimulation ($\bar{x}$ = 3.80), also remained "Very Satisfactory," supported by multimedia learning theories and contemporary research on effective short-form educational content. Collectively, these findings underscore the nano-vlogs' strong instructional design and positive learner perceptions, suggesting their significant potential as valuable and impactful educational tools.

c) Technical Quality

Table 2c, the technical quality of the nano-vlog-based supplementary learning materials was overwhelmingly perceived as "Very Satisfactory," evidenced by an overall mean score of 3.83. This robust assessment stemmed from consistently high ratings across numerous indicators, with several achieving perfect scores ($\bar{x}$=4.00), including the appropriateness of music/sound effects, clarity of screen displays and visuals, accurate visual representation, effective user support, ease of independent use, minimal system requirements, and technical reliability. While

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 5 (2026)

audio enhancement, audio-visual synchronization, and navigation design also received "Very Satisfactory" ratings, speech and narration quality, at $\bar{x}$=3.20, presented a minor area for potential refinement, though still deemed "Satisfactory." These findings strongly align with Mayer's Cognitive Theory of Multimedia Learning, demonstrating effective audio-visual integration and adherence to the coherence principle through clear, non-distracting visuals. Furthermore, the materials' ease of independent use supports learner autonomy, consistent with principles of self-directed learning (Knowles et al., 2015), collectively indicating that the technical design of these nano-vlogs is highly conducive to effective learning.

d) Mechanics

Based on Table 2d, the evaluation of nano-vlog based supplementary learning materials revealed exceptional mechanical accuracy, with all categories—including conceptual, factual, grammatical, typographical, and other error types—receiving a mean score of 4.00, indicating a complete absence of errors. This paramount level of accuracy is crucial for pedagogical effectiveness, as error-free materials prevent misconceptions and facilitate efficient, correct knowledge acquisition (Metromath, n.d.). Consistent with Mayer's (2014) Cognitive Theory of Multimedia Learning, the absence of errors minimizes cognitive load, enabling learners to construct robust and accurate understandings. Moreover, this meticulous attention to detail enhances the materials' credibility, professionalism, and learner engagement (Hollis, 2016). Such uniformly high ratings strongly suggest the implementation of rigorous development, review, and quality assurance processes, representing a significant accomplishment in instructional material design.

e) Summary

Presented in Table 2e, the evaluation of nano-vlog based supplementary learning materials yielded an unequivocally positive assessment, with all four key parameters achieving a "Very Satisfactory" rating ($\bar{x}$=3.25-4.00) and an overall mean score of 3.86. This convincing endorsement highlights the materials' exceptional quality across crucial dimensions: Content Quality ($\bar{x}$ = 3.68) confirmed the accuracy and relevance of information, while the high Instructional Quality ($\bar{x}$ = 3.92) indicated expert design that significantly facilitates learning, aligning with Mayer's Cognitive Theory of Multimedia Learning by optimizing cognitive processing. Furthermore, strong Technical Quality ($\bar{x}$ = 3.83) attested to professional production values and accessibility, and a perfect score in Mechanics ($\bar{x}$ = 4.00) ensured an error-free experience, enhancing credibility and allowing learners to focus without distraction. Cumulatively, these findings established the nano-vlogs as a valuable, high-quality resource with significant potential to effectively supplement traditional instruction and reinforce concepts. Future research should investigate their direct impact on learner outcomes (like test performance and motivation) and identify specific design features that contribute most to their observed effectiveness.

The nano-vlog based supplementary learning materials were rated as "Very Satisfactory" overall, demonstrating high quality across content, instructional design, technical aspects, and mechanical accuracy. The materials align well with curriculum standards, present accurate and engaging content, and are free from errors. It can be concluded that nano-vlog based supplementary learning materials are effective and valuable resources for TLE 6 – Agriculture and Fishery Arts, showing potential to enhance traditional instruction. It is recommended that

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 5 (2026)

future development efforts focus on explicitly fostering critical thinking skills and strengthening the connection of content to real-life situations to maximize learner engagement and the materials' transformative potential.

2. **On the level of agreement of evaluation on the developed nano vlog-based supplementary learning materials in TLE 6 – Agriculture and Fishery Arts**.

Table 3 shows the comprehensive result for the nano-vlog based instructional materials developed for the TLE–Agriculture and Fishery Arts curriculum in Grade 6 across a multiple evaluator. The inter-rater reliability regarding the quality of nano-vlog based instructional materials for the TLE–Agriculture and Fishery Arts curriculum was assessed using Fleiss' Kappa with multiple evaluators. Results revealed varying degrees of agreement across quality indicators, though all were statistically significant ($p<.01$ or $p<.05$), indicating agreement beyond random chance. Specifically, Content Quality achieved moderate agreement (Kappa = .494, $p<.01$), while Instructional Quality (Kappa = .341, $p<.05$) and Technical Quality (Kappa = .343, $p<.01$) both showed fair agreement based on Landis and Koch guidelines. However, the assessment of Overall Quality exhibited only slight agreement (Kappa = .036, $p<.01$). This lower consensus for overall quality, despite its statistical significance, suggests challenges stemming from the inherent subjective nature of holistic evaluation and potential variability in how evaluators weighed different component qualities when formulating their final judgment. The varying strength of agreement across indicators, therefore, highlights the need for clearer, more standardized definitions of evaluation criteria, particularly for synthesizing component scores into an overall quality assessment, to enhance future inter-rater reliability regarding such educational materials.

3. **On the results of the pre-test for the two participant groups, the Control and Experimental Group.**

Table 4 compares the mean pretest scores of both groups across ten different learning competencies in TLE 6 – AFA. The pretest assessed the initial knowledge of both control and experimental groups establishing a crucial baseline for the study. Overall, both cohorts demonstrated a strong comparability, with the control group achieving a mean pretest score of 77.24 and the experimental group 76.41, both categorized as "Fairly Satisfactory." While overall performance was similar, a granular analysis revealed variations in specific competencies; both groups excelled in foundational concepts like "Discuss fishery arts and its branches/fields" (rated "Outstanding"), but showed significantly lower proficiency in technical areas such as "Discuss the requirements for natural fish raising" and "Discuss diseases, causes, sign and symptoms, preventions, and control measures of fish diseases" (consistently rated "Did Not Meet Expectations"). This established similarity in initial knowledge is critical for the study's integrity, minimizing potential confounding variables and allowing for a more accurate attribution of any post-intervention learning gains to the distinct teaching strategies employed.

4. **On the results of the post-test for the two participant groups, the Control and Experimental Group.**

Based on Table 5, the posttest data revealed that the experimental group, which used Nano-Vlog supplementary materials, achieved a marginally higher overall mean score (88.12) than the control group (86.56), suggesting a modest positive impact of the intervention. This

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Volume 2 Issue 5 (2026)

aligns with Mayer's (2014) Cognitive Theory of Multimedia Learning, which suggested that dual-channel presentation enhances understanding. The vlogs proved most effective for conceptual competencies, such as "discussing the importance" and "explaining the legal basis" of fish raising, where the experimental group demonstrated notably higher performance. However, the intervention's effectiveness was topic-dependent; for foundational knowledge or skills where traditional methods were already effective, such as "selling fish," both groups excelled, showing minimal added value from the vlogs. Critically, both groups struggled with complex topics like "fish diseases," indicating that passive supplementary materials alone are insufficient for mastering intricate subjects and that a blended approach incorporating more interactive or hands-on strategies is likely necessary. This suggests that while Nano-Vlogs are a promising tool for enhancing conceptual understanding, their application must be strategically targeted, and they should complement, rather than replace, other pedagogical methods for teaching complex procedural skills.

5. **On the significant difference between the pre-test and post-test scores of the control and experimental groups after the intervention.**

The data derived from Table 6 presenting t-test results on the differences between pretest and posttest scores, revealed a statistically significant improvement in scores for both the control and experimental groups. The statistically significant improvement in posttest scores for both the control ($t=16.67$, $p<.01$) and experimental ($t=20.145$, $p<.01$) groups confirmed that learning occurred, leading to the rejection of the null hypothesis. While the control group's progress may be attributed to a testing effect, the experimental group's larger mean difference suggests the intervention was effective. These findings align with established learning theories; from a constructivist perspective, the intervention likely fostered active knowledge construction, while Cognitive Load Theory suggests its design optimized cognitive resources by reducing extraneous load. If applicable, Multimedia Learning Theory would further explain this success through the effective integration of words and pictures. The enduring relevance of these frameworks is demonstrated in contemporary research on personalized and adaptive online learning, which similarly aims to create structured, cognitively efficient, and engaging educational experiences, underscoring the intervention's alignment with proven pedagogical principles.

6. **On the significant difference in the post-test scores between the control and experimental groups.**

Based on the data in Table 7, the analysis revealed no statistically significant difference in post-test performance between the Experimental Group ($\bar{x}=84.50$) and the Control Group ($\bar{x}=82.21$), as the t-test result ($t=1.732$, $p > .05$) led to the acceptance of the null hypothesis ($H0_3$). This outcome can be interpreted through key learning theories. From a Cognitive Load Theory perspective, while the nano vlogs were designed for brevity, their format may not have aligned with the specific cognitive processes required by the post-test, potentially failing to foster the necessary schema for improved performance. Furthermore, viewed through a constructivist lens, the non-significant result suggests the nano vlogs may have been a passive learning experience, not sufficiently prompting the active engagement and knowledge integration required for deeper learning. Therefore, the intervention with nano-vlogs resulted in a promising increase in the cognitive learning levels of Grade 6 learners. This positive outcome serves as a strong foundation for future studies to explore the full potential of this innovative teaching method.

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Volume 2 Issue 5 (2026)

V. CONCLUSIONS

This section summarizes the key findings of the study investigating the effectiveness of teacher-made nano-vlogs based supplementary resources in Technology and Livelihood Education 6 – Agriculture and Fishery Arts for Grade 6 learners at San Ramon Elementary School.

1. The evaluation concluded that the nano-vlog based supplementary learning materials were of "Very Satisfactory" quality overall. The materials were well-aligned with the curriculum, accurate, and well-organized. Instructionally, they are clear, purposeful, and engaging. Technically, they are sound, easy to use, and free of errors;

2. The evaluators demonstrated a reasonable level of consensus regarding the Content Quality of the nano-vlogs. However, there was only fair agreement on Instructional and Technical Quality, and very little agreement on the Overall Quality. While the statistically significant p-values indicate that the agreement observed was not due to chance, the practical strength of the agreement, as indicated by the Kappa values, varied considerably across the different quality indicators. Specifically, evaluations of the overall quality of the nano-vlogs showed only a slight agreement;

3. The study concluded that, at the outset, the control and experimental groups possessed a comparable baseline understanding of TLE 6-AFA. This similarity is crucial for accurately assessing the impact of any subsequent interventions, ensuring that observed differences in post-test performance can be attributed to the interventions rather than pre-existing knowledge disparities;

4. The use of Nano-Vlog based supplementary learning materials had a positive impact on learners' understanding and skills in fisheries, especially for conceptual understanding and visualization tasks. However, for complex procedural skills and highly localized knowledge, the supplementary materials alone were not sufficient;

5. Data suggests that the change in scores from pretest to posttest was not due to chance but rather reflects a real change. While both groups improved, the experimental group's slightly larger mean difference suggests a potentially greater impact from the experimental intervention. Overall, there was a strong effect, with scores increasing significantly from pretest to posttest in both groups;

6. The data from the T-test suggests that while the experimental group performed numerically better on the post-test, this difference was not statistically significant at the .05 alpha level. Therefore, based on this analysis alone, we cannot confidently conclude that the developed nano vlog-based supplementary materials significantly improved the cognitive level in TLE 6-AFA as measured by this post-test.

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VI. RECOMMENDATIONS

Building upon the findings and conclusions of this study, the following recommendations were made. These suggestions aim to guide future policy, inform professional practice, direct subsequent research and leverage the knowledge gained from this investigation.

1. It is recommended that future development efforts for nano-vlog supplementary learning materials include prioritizing the development of critical thinking skills and strengthening real-life connections. This aims to enhance learner engagement and the transformative potential of the materials, encouraging practical application and higher-order thinking. To significantly improve the technical quality and optimize learner understanding, crucial changes are needed: slowing narration for easier processing, using a natural and engaging AI voice for better attention, and ensuring quick, seamless page transitions for a smooth viewing experience. Additionally, integrating nano-vlog based materials into wider distribution aligned with the revised K-12 curriculum is also recommended;

2. It is recommended further investigations be conducted to identify the factors contributing to the lower agreement, particularly concerning the evaluation of overall quality. This could involve a qualitative analysis of rater feedback, discussions among raters to understand their evaluation processes, and a review and potential refinement of the evaluation criteria and rubric used. A clearer, more standardized definition of "overall quality" and more explicit guidance on how to synthesize the component scores may improve inter-rater reliability in future evaluations of similar supplementary learning materials;

3. The findings suggest that instructional efforts should focus on enhancing learners' understanding of the technical aspects of TLE 6-AFA, particularly regarding natural fish raising and fish disease management. Targeted interventions and support in these areas could help ensure more comprehensive learning outcomes for all learners;

4. Further research should explore the specific design elements of effective Nano-Vlogs and investigate how these materials can be better integrated with other instructional strategies. It is recommended that future interventions include more interactive teaching methods, hands-on practice, and detailed, scaffolded instruction, especially for complex procedural topics;

5. Future research could explore the specific elements of the intervention that contributed to the experimental group's improvement. Additionally, it may be beneficial to investigate the long-term effects of the intervention and to examine whether similar results can be achieved with different populations or in different settings;

6. Future research could pursue several directions: increasing the sample size to enhance statistical power, refining the nano-vlog materials based on qualitative feedback, or extending the study duration to observe potential cumulative effects. Furthermore, exploring assessment methods beyond the current post-test could provide a more comprehensive understanding of the cognitive impact.

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