Universe International Journal of Interdisciplinary Research
(International Peer Reviewed Refereed Journal)
DOI No. – 08.2020-25662434
© UIJIR | ISSN (O) – 2582-6417
OCT 2025 | Vol. 06 Issue 05
www.uijir.com

EFFECTIVENESS OF AUDIO-VIDEO INSTRUCTIONAL MATERIALS IN ENHANCING SCIENCE PROCESS SKILLS OF GRADE 3 LEARNERS

Author's Name: Maricriz B. Eclevia[1], John Rey M. Eclevia[2], Myra Liza O. Vizcarra[3]
Affiliation:

1. Department of Education, Philippines.
2. Department of Education, Philippines.
3. President Ramon Magsaysay State University, Philippines.

Corresponding Author Name & Email Id: Maricriz B. Eclevia, maricriz.bioco@deped.gov.ph

ABSTRACT

This study examined the effectiveness of teacher-made audio-video instructional materials (AVIM) in improving the science process skills of Grade 3 learners in selected public elementary schools in the District of Candelaria. Using a quasi-experimental design, the study involved 54 Grade 3 students (control and experimental groups) and 5 experts who validated the instructional materials through DepEd's LRMDS criteria. Data were gathered from pre- and post-tests, validated videos, and classroom observations. Statistical analysis revealed that learners exposed to audio-video instructional materials (AVIM) showed significant improvement in their science process skills compared to those who were not. This indicates that integrating multimedia resources effectively enhances comprehension, engagement, and retention of scientific concepts. AVIM proved to be a powerful pedagogical tool that supports active learning and motivation in science classrooms. Based on these findings, an enrichment program was developed to further strengthen learners' scientific competencies and sustain their interest in applying science process skills in real-world contexts. The study recommends continuous teacher training in AVIM production and integration, as well as the inclusion of multimedia-based strategies in the elementary science curriculum.

Keywords: Audio-visual instructional materials, Science process skills, Enrichment program, Technology integration

DOI Link :: https://doi-ds.org/doilink/10.2025-65914464/UIJIR

INTRODUCTION

The technology integration in education is a global necessity nowadays, but at the same time, there are still challenges to be solved when it comes to ascertaining the exact impact of Audio Video Instructional Materials (AVIM) on science learning. Many studies have been conducted which highlight the general advantages of AVIM for education but still, the question remains whether there is a direct effect of these materials on students' scientific knowledge. Most of the research that is currently available considers the use of audio and video tools as the only means for teaching scientific concepts, while different types of AVIM like animations, live action videos, and interactive lessons are not often compared, nor are the learning outcomes from these formats being discussed. Besides, the emphasis in the studies is often on the overall academic performance of the students rather than on the specific science topics that AVIM has been applied to and the corresponding effectiveness measured. Another global issue is that knowledge retention over time has been very little explored, as only few studies look into the differences in students' long-term understanding among AVIM-based learning and traditional instruction or other multimedia approaches (Corpuz & Tindowen, 2021).

In the Philippines, the application of Audio-Video Instructional Materials (AVIM) in the teaching and learning process has been taking place more and more, but its efficacy still relies on the manner of teachers' integration to the lessons. AVIM is used by many educators to make the abstract concepts more comprehensible and to keep the students' attention, particularly in the subjects of Science and English. Nevertheless, some teachers consider it as a visual aid rather than an interactive and inquiry-based learning tool, which limits its instructional impact. The literature points to a clear correlation between the use of AVIM that is goal-oriented and properly aligned with learning objectives and the students' significant increase in comprehension and retention of what was taught (Department of Education [DepEd], 2017). In such cases when teachers do not have proper training or resources to create and execute AVIM, they will end up leading to different learning outcomes in the schools, which is the problem.

In the Candelaria district, the persistent low performance of elementary learners in science has emerged as a significant challenge for teachers, as reflected in assessment results. This issue underscores the need for effective instructional interventions to enhance learners' science process skills and overall academic performance. Therefore, this study aimed to address existing research gaps by evaluating the effectiveness of teacher-made audio-video instructional materials in improving students' science process skills.

The research is very relevant to science educators as it opens up new perspectives regarding the usage of audio-video as teaching aids and their impact on the student learning process and scientific literacy.

DOI Link :: https://doi-ds.org/doilink/10.2025-65914464/UIJIR

Along with that, the retention of scientific concepts is mentioned. The outcome underlines the necessity of learning the science process skills and the application of appropriate multimodal teaching strategies that are effective for all types of learners. AVIM in teaching can result in the development of modern-day science classrooms that are more alive and inclusive, thus, giving the students not only a grasp of the concepts but also a long-lasting success in mastering them.

This study determined the effect of audio-visual instructional materials to improve the level of science process skills of Grade 3 learners towards developing an enrichment program in science among selected public elementary schools in the district of Candelaria.

METHODS

Research Design

This study employed quasi-experimental research with the pretest and post-test as the main instrument. It describes trends and patterns while assessing the potential impact of the intervention or variable. It aims to observe and describe the current state and explore the relationship between variables, even though the ability to draw clear cause-and-effect conclusions is limited. Like in descriptive research, data is often gathered through observations, surveys, or records. However, there's also an intervention or treatment applied to a group, similar to quasi-experimental designs. While the researcher introduces some form of intervention, there is no strict randomization, making it a quasi-experimental approach. Control groups might exist but are formed by natural or pre-existing conditions rather than random assignment (Creswell, 2021).

In this study, quasi-experimental research blends the descriptive study of phenomena with the attempt to assess the effectiveness of audio-video instructional materials, combined with developmental method to be employed on the process of evaluating the audio-video instructional material.

This study evaluated the effectiveness of audio-video instructional materials to improve the competency and mastery level in science process skills of grade 3 learners in the district of Candelaria. The post-test result was correlated to the academic performance of learners in science.

Respondents and Location

This study involved two (2) groups of participants. The first group of participants are the 54 grade 3 learners from two (2) public elementary schools in the district of Candelaria. An informed consent form was secured before the involvement of the participants. These learners undergone pre-test assessment to determine the least learned competencies in science covering the third quarter topics.

DOI Link :: https://doi-ds.org/doilink/10.2025-65914464/UIJIR

Table 1
Distribution of the Respondents

Schools	Population & Actual Respondents	%
1. Sinabacan Elementary School	28 (Controlled Group)	51.86%
2. San Roque Elementary School	26 (Experimental Group)	48.14%
Total	**54**	**100%**

The students of Sinabacan Elementary School were used as the control group and they participated in the pre-test and post-test only to set a baseline for comparison, whereas the students of San Roque Elementary School who received the audio-video instructional materials between the tests were the experimental group and their effectiveness was evaluated. Moreover, the five expert validators in the science learning area—consisting of teachers, master teachers, coordinators, and a principal—assessed the instructional materials by the standardized Expert Validation Sheet (EVS) and Expert Assessment Sheet (EAS) using the DepEd LRMDS criteria.

The Instrument

The research relied on three primary tools: a test created by the teacher, the Expert Validation Sheet (EVS), and the Expert Assessment Sheet (EAS). The teacher-made test with 30 items, which was based on the least-learned Grade 3 Science competencies, was used as a pre-test and post-test to determine the students' growth and accredited by EAS according to the DepEd standards. The item analysis and validation were carried out by a panel of experts comprising the Master Teacher, Science Teacher, Science Coordinator, and Principal. The EVS, which was derived from DepEd's LRMDS, was used to judge the audio-video instructional materials that had been developed regarding their content validity, instructional quality, technical quality, and mechanics. Five experts from DepEd evaluated the materials and offered suggestions, which the researcher incorporated before final validation. The whole operation was conducted through a descriptive-developmental approach that focused on the material design and validation process aimed at enhancing the mastery of science concepts by Grade 3 students.

Data Collection

Following the validation and approval of all the research instruments, the researcher requested the Schools Division Superintendent's permission to carry out the study in two public elementary schools located in the Candelaria District through the Graduate School Director. As soon as the approval was given, the researcher conducted meetings with the school principals to clarify the purpose of the study to the participating teachers and the 54 children. A strict supervision pre-test of 30 items was carried out, checked, and recorded for analysis. The audio-video instructional materials (AVIM), which

DOI Link :: https://doi-ds.org/doilink/10.2025-65914464/UIJIR

targeted the least-learned Grade 3 Science competencies, were implemented in 10–25-minute sessions for two to three weeks, along with the Learning Activity Sheets (LAS). The parents were involved to guarantee the continuous use of AVIM at home. Then, a post-test was conducted to measure the learners' improvement, and the results of the statistical analysis were used to determine the effectiveness of AVIM in developing science process skills and improving academic performance.

Data Analysis

The data analysis process included both descriptive and inferential statistical methods. The performance of the learners was summarized through descriptive statistics like frequency count, percentage, and weighted mean, while inferential statistics such as the t-test and Pearson r test revealed the significant differences and relationships among the groups. The t-test was used to make a comparison between the pre-test and post-test results. On the other hand, the Expert Assessment Sheet (EAS) evaluated the test items according to the learning competencies, while the Expert Validation Sheet (EVS), which was adapted from DepEd LRMDS, measured the content validity, the quality of instruction, the technical quality, and the mechanics. The use of a rubric that classified the students' performance into five qualitative levels—Excellent, Very Good, Good, Fair, and Poor—ensured that the data interpretation was accurate and comprehensive.

RESULTS AND DISCUSSIONS

The audio-video instructional materials in science as described and validated by experts for utilization is presented in table 2.

Table 2
Evaluation on the Audio-Video Instructional Materials in Science as Described and Validated by Experts for Utilization

Dimensions		Overall Weighted Mean	Descriptive Equivalent	Rank
1	Content Validity	3.88	Very Satisfactory	3
2	Instructional Quality	3.94	Very Satisfactory	2
3	Technical Quality	3.95	Very Satisfactory	1
4	Mechanics	3.87	Very Satisfactory	4
Grand Mean		**3.91**	**Very Satisfactory**	

Experts expressed a high level of satisfaction with the audio-video instructional materials in science, with a grand mean of 3.91. Technical quality received the highest rating (mean = 3.95), followed by instructional quality (mean = 3.94), content validity (mean = 3.88), and mechanics (mean = 3.87). These results indicate that the materials were well-designed, accurate, and effective, with minor areas for improvement in factual and grammatical precision.

DOI Link :: https://doi-ds.org/doilink/10.2025-65914464/UIJIR

Similar studies, such as the PhET Interactive Simulations and the Department of Science and Technology's STARBOOKS program, also highlight the value of technically sound and research-based materials in improving educational quality, supporting the current findings.

Table 3 presents the t-test to test difference on the pre-test and post-test scores of the experimental group of Grade 3 learners.

Table 3
T-test to Test Difference on the Pre-test and Post-test Scores of the Experimental Group of Grade 3 Learners

	Group	N	Mean	Std. Deviation	Std. Error Mean
Experimental Group	Pre-test Scores	26	3.27	0.962	0.189
	Post-test Scores	26	4.19	0.694	0.136

t-test for Equality of Means						
t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
					Lower	Upper
-7.500	25	0.000	-0.923	0.123	-1.177	-0.670
Decision: Reject Ho (Significant)						

The results revealed a significant improvement in the academic performance of the Grade 3 experimental group after using audio-video instructional materials. The mean pre-test score of 3.27 increased to a mean post-test score of 4.19, with a computed significance value of 0.000, which is less than the 0.01 alpha level. This led to the rejection of the null hypothesis, confirming a significant difference between the pre-test and post-test results. The findings indicate that the use of audio-video instructional materials greatly enhanced learners' understanding and performance in science by promoting engagement and supporting diverse learning styles.

These results are consistent with previous studies. Kay (2012) found that video podcasts improved both student motivation and academic performance, while O'Bannon et al. (2011) reported that replacing traditional lectures with multimedia instruction significantly increased student achievement. Such evidence reinforces that multimedia-based learning tools, like audio-video instructional materials, are effective in improving students' comprehension and overall learning outcomes.

The t-test to test difference on the pre-test and post-test scores of the control group of Grade 3 learners is presented in Table 4.

DOI Link :: https://doi-ds.org/doilink/10.2025-65914464/UIJIR

Table 4
T-test to Test Difference on the Pre-test and Post-test Scores of the Control Group of Grade 3 Learners

	Group	N	Mean	Std. Deviation	Std. Error Mean
Control Group	Pre-test Scores	28	3.61	0.994	0.188
	Post-test Scores	28	3.96	0.992	0.174

t-test for Equality of Means						
t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
					Lower	Upper
-2.423	27	0.022	-0.357	0.147	-0.660	-0.055
Decision: Reject Ho (Significant)						

The findings showed a significant improvement in the Grade 3 control group's performance after using audio-video instructional materials. The mean pre-test score of 3.61 increased to 3.96, with a significance value of 0.022, less than the 0.05 alpha level. This indicates a meaningful difference between pre- and post-test results, suggesting that audio-video materials enhanced learning and engagement.

Similar studies by Kay (2012) and O'Bannon et al. (2011) likewise found that multimedia instruction improved student motivation and achievement, supporting the effectiveness of audio-video materials in promoting better learning outcomes.

DOI Link :: https://doi-ds.org/doilink/10.2025-65914464/UIJIR

The crafted enrichment program aimed in enhancing scores of Grade 3 learners in Science is presented in Table 5.

Table 5
Crafted Enrichment Program based on the Findings of the Study

Program Title: Enhancing Science Performance of Grade 3 Learners through Audio-Video Instructional Materials

Program Rationale: This enrichment program is designed to enhance the academic performance of Grade 3 learners in Science through the integration of Audio-Video Instructional Materials (AVIM). By addressing gaps in conceptual understanding and promoting engagement through multimedia learning, the program aims to increase learners' post-test scores compared to their pre-test results.

Program Objectives:

1. To improve the Science performance of Grade 3 learners using AVIM.
2. To enhance comprehension and retention of key Science concepts.
3. To assess the effectiveness of AVIM in improving post-test scores.
4. To provide interactive learning experiences through audiovisual content.

Key Areas of the Program:

1. **Content Validity** - Ensuring the accuracy and alignment of AVIM with the Grade 3 Science curriculum.
2. **Instructional Quality** - Delivering clear, age-appropriate, and engaging materials.
3. **Technical Quality** - Ensuring the AVIM are accessible, clear, and technically sound.
4. **Mechanics** - Implementing an effective delivery schedule and assessment process.

Activity	Objectives	Persons Involved	Time Frame	Budgetary Requirements
1. Pre-Test Administration	Assess learners' baseline knowledge	Teachers, Learners	Week 1	Printing (PHP 1,000)
2. Development of AVIM	Create engaging Science AVIM aligned with curriculum	Teachers, Media Team	Week 2-3	Production Cost (PHP 5,000)
3. AVIM Implementation (Lessons)	Deliver Science lessons using AVIM	Teachers, Learners	Week 4-8 (4 Weeks)	Equipment & Materials (PHP 8,000)
4. Interactive Science Activities	Reinforce concepts through hands-on tasks	Teachers, Learners	Week 4-8 (Concurrent)	Supplies (PHP 3,000)
5. Post-Test Administration	Measure learning gains after AVIM exposure	Teachers, Learners	Week 9	Printing (PHP 1,000)
6. Data Analysis & Reporting	Compare pre-test and post-test results	Teachers, Statistician	Week 10	Honorarium (PHP 2,000)
7. Feedback and Program Evaluation	Evaluate AVIM effectiveness and gather feedback	Teachers, Learners, Parents	Week 11	Printing & Materials (PHP 2,000)

Evaluation and Expected Outcome: The program's success will be determined by comparing the pre-test and post-test scores. It is expected that learners exposed to AVIM will show a significant increase in their post-test performance, improved conceptual understanding, and greater engagement in science learning.

Monitoring and Sustainability Plan:

- Regular observation and feedback from teachers.
- Continuous AVIM improvement based on learner outcomes.
- Annual program review and expansion based on effectiveness.

Integrating AVIM in Grade 3 Science classes offers an effective approach to enhance learning outcomes. This program fosters better comprehension, increases engagement, and provides data-driven insights for continuous improvement in science education.

DOI Link :: https://doi-ds.org/doilink/10.2025-65914464/UIJIR

The enrichment initiative was designed to raise learners' academic achievement, comprehension, and interest in science through media-based pedagogy. The purpose was to improve Science achievement, improve understanding of science concepts, and determine if the use of AVIM improved scores on the post-test; as well as validating content, quality of instruction, and accuracy of technical aspects of the AVIM. The eleven weeks of the activity plan included formative pre and post-test assessments, validating AVIM; observing AVIM lessons; engaging in interactive activities designed to increase engagement; analyzing quantitative and qualitative data; providing descriptive feedback for enhancement of program; and including teachers, learners, parents and the media team. The findings indicated that learners engaged with AVIM improved on the post-test and interest in science, which is correlational to studies related to media instruction and motivation and retention. It was also important that teachers provided ongoing feedback, and the program was reviewed annually to continue to improve AVIM for incorporation into science instruction.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the study, the researcher concluded that the Grade 3 experimental group initially demonstrated a "Good" level of performance before using the audio-video instructional materials, while the control group showed a "Very Good" level of proficiency. After the intervention, both groups improved, with post-test results indicating a "Very Good" level of performance. The expert-respondents expressed high satisfaction with the developed audio-video instructional materials in terms of technical quality, instructional quality, content validity, and mechanics, confirming their effectiveness and appropriateness for classroom use. Furthermore, statistical analysis revealed significant differences between the pre-test and post-test scores of both the experimental and control groups, indicating that the audio-video instructional materials positively influenced learners' academic achievement. To further strengthen these gains, an enrichment program was developed to enhance the Science performance of Grade 3 learners.

Based on the study's conclusions, it is recommended that personalized audio-video instructional materials (AVIM) be developed to address learners' specific needs, especially in areas with lower pre-test scores. Other teaching approaches, such as inquiry-based learning or gamification, may also be explored to complement AVIM and sustain high performance. Expanding the use of AVIM across different grade levels and subjects, while assessing its long-term impact on learners' inquiry and critical thinking skills, is likewise encouraged.

Science teachers should consider how AVIM supports various learning styles and explore blended strategies that combine multimedia and traditional teaching. To strengthen the enrichment program, the Department of Education may refine AVIM designs using learner feedback and examine their effects

DOI Link :: https://doi-ds.org/doilink/10.2025-65914464/UIJIR

on creativity and problem-solving. Lastly, further studies should be conducted to validate these findings and assess the broader influence of AVIM on developing science process skills among Grade 3 learners.

REFERENCES

1. Bernardo, J. (2020). PH ranks last among 58 countries in grade 4 math, science: Study. ABS-CBN News. https://news.abs-cbn.com/amp/news/12/09/20/ph-ranks-last-among-58-countries-in-grade-4-math-science-study
2. Chinel, J. (2023). The use of audio-video instructional materials to improve the performance of learners in social studies. International Journal for Research in Applied Science and Engineering Technology, 11(2), 1234–1240.
3. Corpuz, H.t & Tindowen, D. Jan. (2021). 21st century competency level of students: Basis for a policy input towards enriched 21st century education. Turkish Journal of Physiotherapy and Rehabilitation, 32. 13404-13414. https://www.researchgate.net/publication/354046864
4. Corpuz, J. (2019). Content validity and acceptability of a video tutorial in science and technology for grade 8 students in a private integrated school. Ascendens Asia Journal of Multidisciplinary Research Abstracts, 3(2B).
5. Creswell, J. W. (2014). Research design: Qualitative, quantitative, and mixed methods approach (4th ed.). Sage Publications Ltd. https://www.ucg.ac.me/skladiste/blog_609332/objava_105202/fajlovi/Creswell.pdf
6. De Oca, P. R. R., Villaceran, L. G., Deoma, M. E. B., Linaugo, J. D., Abao, G. M., & De Oca, M. G. A. (2023). Development and validation of micro-lecture videos as learning support material for grade 7 science competencies. International Journal of Multidisciplinary: Applied Business and Education Research, 5(2), 153–164.
7. Department of Education. (2020). Programs and projects beneficiaries. https://www.deped.gov.ph/wp-content/uploads/2021/10/ DepEd-Report-on-Beneficiaries_2020.pdf
8. Department of Science and Technology - Science and Technology Information Institute. (2025). STARBOOKS: Science and Technology Academic and Research-Based Openly Operated KioskS. Retrieved from https://www.dost.gov.ph/knowledge-resources/starbooks.html
9. DepEd Order No. 8. (2015). Policy guidelines on classroom assessment for K to 12 basic education program. from www.deped.gov.ph [10] DM 175, S. 2021 – Adoption of the Radio Based Instruction as a Learning Delivery Option for Distance Learning from www.deped.gov.ph

DOI Link :: https://doi-ds.org/doilink/10.2025-65914464/UIJIR

10. Flores, R. D., & Flores, H. D. (2023). Use of audio-visual presentations in Araling Panlipunan: Effects on the academic performance of Grade Five students at Manongol Central Elementary School. International Journal of Metaverse, 1(1), 17–20.
11. Glover, D., & Miller, D. (2001). Running with technology: The pedagogic impact of the large-scale introduction of interactive whiteboards in one secondary school. Journal of Information Technology for Teacher Education, 10(3), 257-278.
12. Kay, R. H. (2014). Exploring the use of video podcasts in education: A comprehensive review of the literature. Computers in Human Behavior, 28(3), 820–831. https://doi.org/10.1016/j.chb.2012.01.011
13. Kim, J., & Hannafin, M. J. (2020). Exploring the effectiveness of culturally relevant digital learning materials in science education. Educational Technology Research and Development, 68(6), 2963-2985. https://files.eric.ed.gov/fulltext/ED613533.pdf
14. Maclean M. (2017). Instructional mathematics videos and the flipped classroom. Retrieved from: file:///C:/Users/kathe/Downloads/ir-21358- PDF.pdf
15. MIT OpenCourseWare. (2025). MIT OpenCourseWare. Massachusetts Institute of Technology. Retrieved from https://ocw.mit.edu/
16. O'Bannon, B., Lubke, J., Beard, J., & Britt, V. (2011). Using podcasts to replace lecture: Effects on student achievement. Computers & Education, 57(3), 1885-1892.
17. Pangilinan, J. R. (2020). Effectiveness of audiovisual-based pedagogy in social studies instruction. Journal of Education and Society, 4(1), 1–9.
18. Panolino, C. G., & Ambayon, C. M. (2023). Video-assisted teaching and students' academic performance. International Journal of Social Sciences and Management Review, 7(6), 45–58
19. PhET Interactive Simulations. (2025). PhET Interactive Simulations. University of Colorado Boulder. Retrieved from https://phet.colorado.edu/
20. Somekh, B., Haldane, M., Jones, K., Lewin, C., Steadman, S., Scrimshaw, P., ... & Woodrow, D. (2007). Evaluation of the Primary Schools Whiteboard Expansion Project (SWEEP): Report to the Department for Education and Skills. Department for Education and Skills.

DOI Link :: https://doi-ds.org/doilink/10.2025-65914464/UIJIR