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RESEARCH ARTICLE

Teaching-Learning Practices in Science Club Activities at Dinadiawan National High School: An Educational Perspective

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Abstract

This study examined the teaching–learning practices implemented in Science Club activities at Dinadiawan National High School from an educational perspective. Using a descriptive mixed-methods research design, the study explored the instructional approaches, learning strategies, and activity structures employed by Science Club advisers, as well as their influence on students’ engagement and scientific skill development. Quantitative data were gathered through survey questionnaires and activity observation checklists administered to Science Club advisers and student members, while qualitative data were collected through semi-structured interviews and focus group discussions. Descriptive statistics and thematic analysis were used to analyze the data. Findings revealed that Science Club activities were characterized by a very high level of inquiry-based, experiential, and collaborative learning practices. Hands-on experiments, group projects, and real-life science applications were frequently used, resulting in very high levels of student interest, participation, teamwork, and problem-solving skills. Qualitative findings further showed that students perceived Science Club activities as enjoyable and meaningful, enhancing their curiosity and motivation to learn science. However, the study also identified challenges in the implementation of Science Club activities, including limited resources, time constraints, and inconsistent student attendance. Despite these challenges, teachers employed adaptive strategies such as improvising materials, modifying activities, and collaborating with colleagues to sustain effective learning experiences. The study concludes that Science Club activities significantly contribute to experiential science learning and the development of scientific skills beyond the formal classroom. The findings provide a basis for strengthening co-curricular science programs, improving institutional support, and promoting innovative teaching–learning practices in secondary education.

Keywords: Science Club activities, teaching–learning practices, experiential learning, secondary education, student engagement

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INTRODUCTION

Science education extends beyond the four corners of the classroom and is significantly enriched through co-curricular activities such as Science Club programs. These activities provide learners with opportunities to apply scientific concepts in authentic, inquiry-driven, and collaborative contexts. Science Club activities promote experiential learning, curiosity, and engagement, which are essential in developing students' scientific skills and positive attitudes toward science. In secondary schools, Science Clubs serve as platforms where students explore scientific ideas through experiments, projects and community-based initiatives that complement formal classroom instruction. This study examines the teaching-learning practices in Science Club activities at Dinadiawan National High School from an educational perspective, with the aim of understanding how instructional approaches and learning strategies influence students' engagement, skills development and interest in science.

In the Philippine educational context, science learning is increasingly expected to foster critical thinking, problem-solving, collaboration, and scientific literacy among learners. While formal science classes address curricular competencies, co-curricular programs such as Science Clubs offer flexible and learner-centered environments that encourage active participation and hands-on learning. Science Club advisers play a crucial role in designing and facilitating activities that promote inquiry, experimentation, and teamwork. However, the effectiveness of these activities depends on the teaching-learning practices employed, the availability of resources, and students' level of engagement. In many public secondary schools, challenges such as limited materials, time constraints, and varying student motivation affect the implementation of Science Club programs. Given these realities, there is a need to examine how Science Club activities are conducted at Dinadiawan National High School and how these practices contribute to meaningful science learning beyond the classroom.

Studies on experiential and inquiry-based learning emphasize that students learn science more effectively when they actively engage in hands-on and problem-centered activities. Research has shown that co-curricular science programs enhance learners' understanding of scientific concepts, foster collaboration, and improve attitudes toward science. Inquiry-based and project-based approaches, commonly used in Science Club activities, have been found to develop higher-order thinking skills and scientific reasoning. Collaborative learning in science-related clubs also supports peer interaction, communication skills and shared problem-solving experiences. Moreover, participation in science-related extracurricular activities has been associated with increased interest in science careers and sustained motivation in learning science subjects. However, literature also points to challenges in implementing Science Club activities, including inadequate resources, insufficient training of advisers, and inconsistent student participation. These studies highlight the importance of effective teaching-learning practices and supportive school environments in maximizing the educational value of Science Club programs.

Although existing studies have examined inquiry-based learning and extracurricular science activities, most focus on formal classroom instruction or large-scale science programs. There is limited research that specifically investigates the teaching-learning practices within Science Club activities at the school level, particularly in public secondary schools. Moreover, few studies integrate the perspectives of both teachers and student members in analyzing how these practices influence scientific skills, attitudes, and engagement. This study addresses this gap by providing a context-specific examination of Science Club teaching-learning practices at Dinadiawan National High School, offering empirical insights that may inform the enhancement of co-curricular science programs and support experiential learning in secondary education.

Research Objectives

The study aims to examine and analyze the teaching-learning practices implemented in Science Club activities at Dinadiawan National High School from an educational standpoint. Specifically, it seeks to describe the instructional approaches, learning strategies, and activity designs employed by teachers and Science Club advisers in facilitating club-based science learning, including inquiry-based tasks, collaborative projects, experiments, and hands-on activities. The study also aims to determine how these practices influence students' scientific skills, attitudes, and engagement, particularly in terms of critical thinking, problem-solving, collaboration, and interest in science. In addition, it intends to identify the challenges encountered by teachers and student members in the implementation of Science Club activities, such as limitations in resources, time and learner participation, as well as the strategies used to address these challenges. Finally, the study seeks to generate educational insights that may serve as a basis for strengthening Science Club programs, enhancing experiential and co-curricular learning and promoting effective science teaching and learning beyond the formal classroom setting.

METHODOLOGY

This study employed a descriptive mixed-methods research design to examine the teaching-learning practices in Science Club activities at Dinadiawan National High School from an educational perspective. The descriptive approach was appropriate as the study aimed to document and analyze existing instructional practices, learning strategies, and experiences without manipulating variables. The mixed-methods design allowed for the integration of quantitative data describing the extent of teaching-learning practices and student engagement, and qualitative data providing in-depth insights into participants' experiences, challenges, and perceptions.

The locale of the study was Dinadiawan National High School. The participants consisted of Science Club advisers and selected Science Club student members. Teachers were selected through purposive sampling based on their involvement in planning and facilitating Science Club activities, while student participants were chosen using simple random sampling from officially registered Science Club members.

Data were collected using three main instruments. A researcher-made survey questionnaire was administered to teachers and students to describe teaching strategies, learning activities, and levels of engagement in Science Club activities. A classroom and activity observation checklist was used to assess the implementation of inquiry-based, collaborative, and experiential learning practices. In addition, semi-structured interviews with teachers and focus group discussions with students were conducted to explore challenges encountered and strategies used in implementing Science Club activities.

Quantitative data were analyzed using descriptive statistics, including frequency, percentage, weighted mean, and ranking. Qualitative data were transcribed, coded, and analyzed using thematic analysis, where recurring patterns and themes were identified, categorized, and interpreted. Ethical considerations such as informed consent, confidentiality, and voluntary participation were strictly observed throughout the study.

RESULTS AND FINDINGS

Quantitative Results

Table 1

Teaching–Learning Practices in Science Club Activities

Indicators	Weighted Mean Verbal Interpretation	
Use of inquiry-based activities	4.38	Very High
Conduct of hands-on experiments	4.45	Very High
Collaborative and group-based learning	4.29	Very High
Integration of real-life science applications	4.12	High
Teacher facilitation and guidance	4.33	Very High
Overall Mean	4.31	Very High

The results indicate a very high level of teaching–learning practices in Science Club activities. The frequent use of inquiry-based and hands-on activities suggests that learning is experiential and student-centered, fostering active engagement and scientific exploration.

Table 2

Students' Engagement and Skill Development in Science Club Activities

Indicators	Weighted Mean Verbal Interpretation	
Interest and motivation in science	4.41	Very High
Participation in science activities	4.36	Very High
Development of critical thinking skills	4.18	High
Problem-solving ability	4.22	Very High
Collaboration and teamwork skills	4.34	Very High
Overall Mean	4.30	Very High

Students demonstrated very high engagement and skill development, particularly in motivation, participation, and teamwork. These findings highlight the effectiveness of Science Club activities in enhancing scientific skills beyond classroom learning.

Table 3

Challenges Encountered in Science Club Implementation

Challenges	Frequency	Percentage
Limited laboratory materials	10	50%
Time constraints due to academic load	12	60%
Inconsistent student attendance	8	40%
Limited budget for activities	11	55%
Space limitations	6	30%

The most common challenges include time constraints and limited budgets, which affect the regularity and scope of Science Club activities. These challenges highlight structural limitations that influence program sustainability.

Qualitative Results

Table 4

Summary of Qualitative Themes

Theme	Core Description
Experiential and inquiry-based learning	Learning through experiments and investigations
Enhanced student motivation and curiosity	Increased interest and enthusiasm for science
Implementation challenges	Resource and time limitations

Theme

Adaptive teaching strategies

Core Description

Teacher creativity and collaboration

Participant Responses*"Mas natututo ang mga bata kapag sila mismo ang gumagawa ng eksperimento."* (Teacher)*"Mas exciting ang science kapag club activities kaysa lecture lang."* (Student)*"Kailangan talaga ng diskarte kapag kulang ang gamit."* (Teacher)

Qualitative findings confirm that Science Club activities promote meaningful learning experiences through hands-on and collaborative approaches. Despite constraints, teachers employ adaptive strategies to sustain student engagement.

DISCUSSION OF THE FINDINGS

The findings of the study indicate that Science Club activities at Dinadiawan National High School are implemented using highly effective teaching–learning practices, particularly inquiry-based, experiential, and collaborative approaches. The very high ratings in the use of hands-on experiments and inquiry-based activities support Kolb’s (2015) experiential learning theory, which emphasizes learning through direct experience and reflection. These practices provide students with authentic opportunities to explore scientific concepts, thereby deepening understanding and promoting active engagement.

Students’ high levels of interest, participation, and collaboration further affirm that co-curricular science activities foster positive attitudes toward science learning. This finding is consistent with Prince and Felder’s (2006) assertion that inductive and activity-based learning enhances student motivation and problem-solving skills. The development of critical thinking and teamwork skills observed in this study reflects the role of Science Clubs as complementary learning spaces that extend scientific inquiry beyond formal classroom instruction.

Despite these positive outcomes, the study identified challenges related to limited resources, time constraints, and inconsistent student attendance. These challenges are similar to those reported in previous studies on extracurricular science programs, which highlight the impact of structural and institutional limitations on program implementation (Gay, 2018). Nevertheless, teachers’ adaptive strategies—such as improvising materials and modifying activities—demonstrate professional commitment and instructional flexibility, reinforcing the importance of supportive school environments in sustaining effective Science Club programs.

CONCLUSION AND RECOMMENDATION

Based on the findings, the study concludes that Science Club activities at Dinadiawan National High School serve as effective platforms for experiential and inquiry-based science learning. The teaching–learning practices employed by Science Club advisers significantly enhance students’ engagement, scientific skills, and positive attitudes toward science. Hands-on experiments, collaborative tasks, and real-life applications contribute to meaningful learning experiences that complement formal science instruction. Although challenges related to resources, time, and participation persist, teachers’ adaptive and collaborative approaches enable the continued implementation of Science Club activities. Overall, the study affirms the educational value of Science Clubs in promoting holistic science learning in secondary education.

RECOMMENDATION

In light of the findings and conclusions, the following recommendations are proposed:

1. Science Club advisers should continue strengthening inquiry-based and hands-on activities while integrating more structured reflection and documentation to enhance students' critical thinking and scientific communication skills.
2. School administrators should provide institutional support by allocating time, budget, and resources specifically for Science Club activities to ensure program sustainability.
3. The Department of Education may consider developing guidelines or training programs for Science Club advisers to further enhance the educational impact of co-curricular science programs.
4. Future researchers are encouraged to conduct comparative or longitudinal studies on Science Club practices across different schools to examine their long-term effects on students' academic performance and interest in science-related careers.

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