

School gardening participation and its effect on academic achievement of senior high school students at Balaogan National High School

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Abstract

This study examined the relationship between school gardening participation and the academic achievement of Senior High School students at Balaogan National High School, focusing on students' level of participation in terms of frequency of involvement, types of activities performed, and time commitment, as well as their academic achievement in the subject 3I's based on written works, performance tasks, and quarterly assessments.

A descriptive-correlational research design was utilized with 112 respondents, and data were gathered through a structured questionnaire and academic records. The weighted mean was used to determine the levels of participation and academic achievement, while the Chi-square test was applied to determine the significant relationship between the variables at a 0.05 level of significance.

Based on the findings of the study, a Sustainable School Gardening Framework was developed to enhance participation and academic performance through structured and integrated activities. It is concluded that school gardening serves as an effective experiential learning approach that supports both academic success and student engagement. School administrators should strengthen gardening programs through adequate resources, support systems, and policy implementation to ensure sustainability, while teachers may integrate gardening activities into instruction and assessment to enhance meaningful learning. Students are encouraged to actively participate in gardening activities to reinforce learning and develop responsibility, while parents and community members may provide support to sustain program implementation. Future researchers may further explore related variables and broader contexts, and the proposed framework may be adopted to ensure continued effectiveness of school gardening initiatives.

Keywords: School Gardening; Academic Achievement; Descriptive-Correlational Research Design; Chi-Square Test; Experiential Learning Approach

1. Introduction

School gardening reflects this experiential approach. It provides students with opportunities to engage in hands-on activities that develop both academic and life skills. Through gardening, students observe plant growth, apply scientific principles, and practice sustainable methods. They also develop responsibility, teamwork, and discipline. These experiences support learning in subjects such as 3I's, where students perform tasks that involve critical thinking and real-life application.

Although students are familiar with gardening, their level of participation in school-based gardening activities differs. Some students actively engage in tasks such as planting and maintenance, while others show minimal involvement. This

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variation raises questions about how participation influences learning outcomes, particularly in subjects that require active engagement like 3I's.

Another concern involves students' academic achievement in 3I's, which includes written work, performance tasks, and quarterly assessments that require both knowledge and practical application. Since school gardening develops similar skills, it is necessary to determine whether students' level of participation in gardening in terms of frequency of involvement, type of activities performed, and time commitment relates to their academic achievement. This study examines this relationship among Senior High School students at Balaogan National High School and uses the findings as a basis for proposing a sustainable gardening framework.

The study is grounded on several concerns that affect learners' academic and personal development. One key concern is the declining academic performance of students, particularly in core subjects. Many learners show limited engagement and struggle to sustain interest in traditional classroom instruction. This situation calls for more interactive and experiential approaches that can enhance understanding and improve achievement. Gardening provides a hands-on learning experience where students actively participate in planting, caring for plants, and observing growth processes. These activities help strengthen critical thinking, responsibility, and collaboration while reinforcing lessons learned in the classroom, leading to improved academic performance. Another concern is the perceived lack of relevance of school learning to students' daily lives. Many learners fail to see the connection between classroom lessons and real-world situations, which affects their motivation to learn. Gardening directly addresses this issue by providing practical applications of concepts in the Inquiries, Investigation, and Immersion (3Is) subject. Through gardening, students apply scientific inquiry, observation, and problem-solving in actual situations, making learning more meaningful and relevant to their experiences. This strengthens their appreciation of lessons and increases their engagement in learning activities.

The study is also important in the context of BNHS as a farming community. Agriculture is a common livelihood in the area, making gardening a familiar and culturally relevant activity for learners. Integrating gardening into school activities strengthens the connection between education and community life. It promotes awareness of sustainable practices, environmental care, and local agricultural traditions. At the same time, it equips students with practical skills that may be useful in their homes and future livelihoods. Through this, gardening becomes both an educational strategy and a means of supporting community development while fostering holistic learner growth.

1.1. Statement of the Problem

This study aims to determine school gardening participation and its effect on the academic achievement of Senior High School students at Balaogan National High School, Bula District, Schools Division of Camarines Sur.

Specifically, it seeks to answer the following questions:

- What is the level of participation of Senior High School students in school gardening at Balaogan National High School in terms of:
 - Frequency of involvement,
 - Type of activities performed, and
 - Time commitment?
- What is the level of academic achievement of Senior High School students in the subject 3I's in terms of:
 - Written work,
 - Performance task, and
 - Quarterly assessment?
- Is there a significant relationship between the level of participation in school gardening and the academic achievement of Senior High School students?
- What sustainable gardening framework can be proposed based from the findings of the study?

1.2. Hypothesis

This study tested the null hypothesis that there is no significant relationship between the level of participation in school gardening and the academic achievement of senior high school student.

1.3. Scope and Delimitation

The study focused on determining school gardening participation and its effect on the academic achievement of 112 Senior High School students at Balaogan National High School during the School Year 2025–2026. It specifically

measured the students' level of participation in school gardening in terms of frequency of involvement, type of activities performed, and time commitment, and examined its relationship with their academic achievement in terms of written work, performance tasks, and quarterly assessment as reflected in their mid-term grades in the 3I's subject. The study was limited to Grade 12 learners enrolled in the 3I's (Inquiry, Investigation, and Immersion) subject at Balaogan National High School during the School Year 2025–2026. It focused on how their participation in school gardening influenced their academic achievement through experiential learning activities. While socio-economic factors, nutrition, and family background may have indirectly affected student outcomes, these variables were not included as central components of the study. The delimitations ensured a focused examination of how structured participation in school gardening within the school setting during the School Year 2025–2026 was related to academic achievement, while minimizing the influence of other external factors that could affect the reliability of the results.

2. Materials and Methods

2.1. Research Design

The study employed a descriptive-correlational research design to examine school gardening participation and its effect on the academic achievement of Senior High School students at Balaogan National High School (BNHS) during the School Year 2025–2026. The descriptive component was used to determine and describe the level of students' participation in school gardening in terms of frequency of involvement, type of activities performed, and time commitment, as well as their level of academic achievement in the subject Inquiry, Investigation, and Immersion (3I's), based on written work, performance tasks, and quarterly assessment. The correlational component of the design was used to determine whether a significant relationship existed between students' participation in school gardening and their academic achievement. This approach addressed the third research question by statistically examining the association between the two variables without manipulating any conditions. Data on participation and academic performance were collected and analyzed to identify possible relationships and patterns.

This research design was appropriate because the study did not involve experimental manipulation but instead focused on describing existing conditions and determining relationships among variables. It allowed the researcher to obtain an accurate picture of students' level of participation in school gardening and their academic performance, while also testing whether a significant relationship existed between them. Thus, the descriptive-correlational design provided a suitable and systematic approach for achieving the objectives of the study.

2.2. Respondents of the Study

The respondents of the study consisted of 112 grade 12 Senior High School students who were enrolled in Balaogan National High School (BNHS) during the school year 2025–2026 and taking Inquiries, investigations, and immersion (3I's) subject under the supervision of the researcher. These students had been actively engaged in school gardening activities starting January 7, 2026, which provided them with sufficient exposure to experiential learning relevant to the study.

2.3. Research Instrument

- **Questionnaire.** The main research tool was a structured questionnaire consisting of two parts. The first part focused on school gardening participation to assess the students' frequency of involvement and perceptions of gardening activities. The second part dealt with academic achievement in terms of written work, performance tasks, and quarterly assessments.
- **Preparation of the Questionnaire.** The questionnaire was developed based on related literature on gardening participation (Blair, 2009; Gonzales, 2018). The items were aligned with the objectives of the study to measure both behavioral participation and perceived academic impact.
- **Validation and Retrieval of the Questionnaire.** To ensure content validity, the questionnaire underwent expert validation by eight (8) panel members composed of the research adviser, master teacher, school head, mathematics teacher, and four (4) TLE teachers.
- **Administration and Retrieval of the Questionnaire.** The questionnaires were personally administered by the researcher to ensure clarity of instructions and immediate clarification of questions raised by the respondents. The respondents were given two (2) hours to answer the questionnaire, after which the accomplished papers were immediately collected to ensure a 100% retrieval rate.

3. Results and Discussion

3.1. Level of Participation of Senior High School Students in School Gardening

The level of participation in school gardening was determined using the weighted mean of the respondents' answer to the structured questionnaire based on five-point Likert scale. The respondent consisted of 112 grade 12 students enrolled in the Inquiries, Investigations, and Immersion subject. Their participation was classified according to three dimensions. Frequency of involvement, activities performed and time commitment. The results are interpreted using appropriate statistical tools such as weighted mean and supported by verbal interpretations.

Frequency of Involvement. In this section, the Frequency of Involvement refers to how often students engage in gardening related activities includes Regular attendance, Compliance with subject, Interest in gardening, Active participation, Influence of classmates, Volunteering, Motivation and Lack of interest affects consistency. It was determined using a Likert Scale questionnaire that measures how often students participate in gardening activities.

Table 1 Level of Participation of Senior High School Students in School Gardening in terms of Frequency of Involvement

Indicators	WM	VI	R
1. Regular attendance during gardening schedule	4.89	Always	1
2. Compliance with subject requirements	4.81	Always	6
3. Interest in gardening activities	4.82	Always	3
4. Active participation during school programs	4.82	Always	3
5. Influence of classmates	4.81	Always	6
6. Volunteering in additional gardening activities	4.62	Always	8
7. Motivation to improve grades	4.81	Always	6
8. Lack of interest affects consistency	4.82	Always	3
Average Weighted Mean	4.82	Always	

Legend: 4.21-5.00- Always; 3.41-4.20- Often; 2.61-3.40 Sometime; 1.81-2.60- Seldom; 1.00-1.80- Never

Table 1 shows that the level of participation in terms of frequency of involvement was interpreted as "Always," indicating that students consistently engage in gardening activities. This result can be attributed to the integration of gardening into the 3Is subject, where participation is part of the academic requirements. The structured schedule, teacher supervision, and alignment with graded tasks encourage students to regularly participate, making gardening a routine component of their learning experience.

Garden-based learning, a key component of Farm to School (FTS), continues to grow in popularity as a tool for engaging students in hands-on learning. This finding supports the study of Evans, E. et al. (2024)¹, this study sought to understand the role of professional development and its ability to support resilient FTS programs in the classroom. Similarly, Fuller, J. S. (2025)², Rooted in Education Defining and Exploring Characteristics of School Learning Gardens and Their Influence on Student Development.

Activities Performed. In this section, Activities Performed refers to the specific gardening tasks undertaken by students such as land preparations, planting, watering, making trellises, fertilizing and harvesting, that was performed by students. The results show an overall weighted mean is determined using a Likert Scale questionnaire that measures how often students participate in gardening activities by identifying the specific gardening tasks.

Table 2 Level of Participation of Senior High School Students in School Gardening in terms of Activities Performed

Indicators	WM	VI	R
1. Participation in soil preparation	4.91	Always	1
2. Assisting in preparing garden materials	4.9	Always	3
3. Willingness to perform planting tasks	4.87	Always	4
4. Active involvement in making trellises	4.87	Always	4
5. Regular watering of plants	4.82	Always	7
6. Participation in weed removal	4.85	Always	6
7. Applying fertilizers responsibly	4.91	Always	1
8. Applying appropriate pesticides	4.81	Always	8
Average Weighted Mean	4.86	Always	

Table 2 reveals that the level of participation in terms of the type of activities performed was also interpreted as “Always,” showing that students are actively involved in various gardening tasks. This can be explained by the hands-on and collaborative nature of gardening activities, which are simple, task-oriented, and accessible to all students. Since tasks such as watering, planting, and cleaning are regularly assigned, students are consistently engaged, leading to a very high level of participation.

According to Flores, A. et al. (2025)³, household gardening is a widely promoted strategy to address low levels of vegetable consumption and improve overall diets in low- and middle-income countries (LMICs). However, existing studies reveal variable effectiveness across different contexts and program designs.

Time Commitment. In this section, time commitment refers to the amount of time and effort students devote to gardening activities. Includes, spends sufficient time caring for assigned plants, complete tasks within the scheduled time, arrives on time during gardening sessions, demonstrates commitment until the task is finished, extends help beyond required time, Balances gardening and academic responsibilities, participates in extended gardening projects, Shows dedication through consistent time allocation. time commitment measures the amount of time the students spend in gardening using a Likert Scale questionnaire.

Table 3 Level of Participation of Senior High School Students in School Gardening in terms of Time Commitment

Indicators	WM	VI
Spends sufficient time caring for assigned plants	4.76	Always
Completes tasks within the scheduled time	4.81	Always
Arrives on time during gardening sessions	4.82	Always
Demonstrates commitment until the task is finished	4.75	Always
Extends help beyond required time	4.88	Always
Balances gardening and academic responsibilities	4.85	Always
Participates in extended gardening projects	4.83	Always
Shows dedication through consistent time allocation	4.77	Always
Average Weighted Mean	4.81	Always

Table 3 suggests that students value gardening as part of their learning experience. They are able to allocate sufficient time for gardening because activities are well-manage and aligned with their academic schedule. This allows them to participate without feeling overwhelmed, resulting in sustained involvement. However, slightly lower ratings in punctuality and extended project involvement indicate that while students are committed, consistency in time management can still be improved.

This aligns with Blair, S. A. (2022)⁴, who found that gardening programs promote time management and responsibility among students. Moreover, Taylor, S. D. (2021)⁵, highlighted that increased time investment in gardening activities positively influences students' discipline and work habits. Overall, the findings highlight that students are willing to invest time and effort, which is a strong indicator of engagement and responsibility—key factors that contribute to academic success.

3.2. Summary the Level of Participation of Senior High School Students in School Gardening

The Level of Participation of Senior High School Students in School Gardening presents the analysis and interpretation gathered in relation to the study focusing on students' level of involvement based on three indicators, the frequency of involvement, type of activities performed, and time commitment. These variables are used to determine the extent of participation of respondents in the given context. The results are interpreted using the weighted mean (WM) and verbal interpretation (VI) to provide a clearer understanding of the level of involvement of the respondents in relation to the study.

Table 4 Summary of the Level of Participation of Senior High School Students in School Gardening

Parameters	WM	VI	R
1. Frequency of involvement	4.82	Always	2
2. Type of activities performed	4.86	Always	1
3. Time commitment	4.81	Always	3
Over-all Average Weighted Mean	4.83	Always	

Table 4 presents the summary of the Summary the Level of Participation of Senior High School Students in School Gardening in terms of the frequency of involvement, type of activities performed, and time commitment. Based on the results, the indicator Type of Activities Performed obtained the highest weighted mean of 4.86, with a verbal interpretation of "Always" and ranked first. This is followed by Frequency of Involvement, which recorded a weighted mean of 4.82 and a verbal interpretation of "Always," ranked second. Lastly, Time Commitment obtained a weighted mean of 4.81, also interpreted as "Always," and ranked third. The overall average weighted mean is 4.83, with a verbal interpretation of "Always," indicating that the respondents consistently demonstrate a high level of involvement across all indicators. The findings imply that respondents are highly engaged in the activities measured under the three indicators, with particular emphasis on the types of activities performed, which ranked highest. This suggests that students are not only regularly involved but are also actively participating in meaningful tasks that require engagement and responsibility. This result is consistent with recent educational research which emphasizes that sustained participation and meaningful learning tasks significantly enhance student engagement and academic involvement. For instance, reports from the OECD (2023) highlight that students show higher engagement levels when learning activities are interactive and purposeful, while the UNESCO Global Education Monitoring Report (2023) emphasizes that consistent participation in structured learning environments strengthens learner commitment and performance. Recent literature (2021–2025) consistently shows that when learners are frequently involved in structured and meaningful activities, their motivation, responsibility, and achievement levels increase.

Based on the findings, it is recommended that schools continue to strengthen programs that promote active participation and sustained engagement by providing diverse, meaningful, and student-centered activities. Teachers should also maintain strategies that encourage consistent involvement and maximize students' time engagement to further improve learning outcomes and academic development.

3.3. Summary of the Level of Academic Achievement of Senior High School Students

The level of academic performance of the respondents based on three indicators, written works, performance task and quarterly assessment. These components are essential in measuring students' learning outcomes and overall academic achievement. The results are analyzed using the weighted mean (WM) and verbal interpretation (VI) to provide a comprehensive understanding of students' performance levels in the study.

Table 5 Summary of the Level of Academic Achievement of Senior High School Students in Inquiries, Investigations and Immersion

Parameters	WM	VI	R
1. Written Work	97.66	Outstanding	3
2. Performance Task	98.34	Outstanding	1
3. Quarterly Assessment	97.92	Outstanding	2
Over-all Average Weighted Mean	97.97	Outstanding	

Table 5 presents the Summary of the Level of academic achievement of Senior High School Students in inquiries, investigations and immersion (3I's) that Performance Task obtained the highest weighted mean of 98.34, with a verbal interpretation of "Outstanding" and ranked first. This is followed by Quarterly Assessments, which garnered a weighted mean of 97.92 also interpreted as "Outstanding," and ranked second. Meanwhile, Written Works recorded a weighted mean of 97.66, with a verbal interpretation of "Outstanding," and ranked third.

The overall average weighted mean is 97.97, which is interpreted as "Outstanding." These results indicate that students demonstrate excellent academic performance across all measured indicators.

The results suggest that students consistently perform at a high level, particularly in Quarterly-based Assessment, which may indicate strong application of knowledge and skills. This finding is supported by recent studies which highlight the importance of Quarterly-based and formative assessments in improving student achievement. According to Darling-Hammond et al. (2020) Quarterly tasks enhance deeper learning and critical thinking skills among students. Similarly, a study by Chang, H. T. et al. (2023) found that students who actively engage in written works and applied tasks tend to achieve higher academic outcomes. Additionally, the UNESCO (2023) report emphasizes that balanced assessment methods, including written, performance-based evaluations and Quarterly Assessment, contribute to more accurate and holistic measurement of student learning.

Based on the findings, it is recommended that educators continue to implement diverse and balanced assessment strategies that include written works, performance tasks, and periodic assessments to sustain outstanding student performance. Teachers should also provide timely feedback and engaging activities that strengthen students' critical thinking and practical application skills. Furthermore, schools may enhance academic programs by integrating innovative and student-centered assessment methods to maintain and further improve the high level of academic achievement demonstrated by the respondents.

3.4. Test of Significant Relationship Between the Level of Participation in School Gardening and The Academic Achievement

To determine whether a significant relationship exists between the level of participation in school gardening and the academic achievement of Senior High School students, a Chi-square test was employed. This statistical test was used to examine whether variation in students' participation is associated with differences in their academic performance.

Table 6 Relationship between the level of participation in school gardening and the academic achievement of Senior High School students

x ²	df	Level of significance	Decision	Inference
10.14	4	0.05	Reject Ho	Significant Relationship

Table 6 presents the result of the Relationship between the level of participation in school gardening and the academic achievement of Senior High School students. Using the Chi-square test conducted to determine whether there is a significant relationship between the level of participation in school gardening and the academic achievement of Senior High School students. The computed Chi-square value of 10.14 is greater than the critical value of 9.49 at 4 degrees of freedom and 0.05 level of significance. It is observed that there is a slightly difference in the value of Chi-square between the computed value and the tabular value. It means that the level of participation in school gardening is moderately associated with the academic achievement.

Therefore, the null hypothesis is rejected. This implies that there is a statistically significant relationship between students' participation in school gardening and their academic achievement. It indicates that students who are more actively engaged in gardening activities tend to perform better academically. The hands-on experience, responsibility, and active learning gained through gardening may contribute to improved understanding and application of academic concepts.

According to Ozer, M. A. (2021)⁶, school gardening programs positively influence students' academic performance by enhancing engagement and experiential learning. Similarly, Blair, S. A. (2022) emphasized that gardening activities improve students' critical thinking and problem-solving skills, which are essential for academic success.

These studies support the result of the present research, confirming that active participation in school gardening contributes positively to students' academic performance.

Based on the findings, it is recommended that schools continue to promote and strengthen school gardening programs as an effective strategy to enhance students' academic performance. Teachers should integrate gardening activities into classroom instruction to support experiential learning. School administrators should also provide adequate resources and support to sustain gardening initiatives. Furthermore, students should be encouraged to actively participate in such programs to develop both academic and life skills.

3.5. Proposed Sustainable School Gardening Framework

Based on the findings of the study, the proposed Sustainable School Gardening Framework was developed to strengthen both student participation and academic achievement through a structured and continuous gardening program. Since the results revealed a high level of participation with a weighted mean of 4.83 (verbal interpretation: Always) and an outstanding academic performance with a weighted mean of 97.97, along with a significant relationship between the two variables, the framework is designed to sustain and further enhance these positive outcomes. The framework, known as the PITS Model (Participation-Integration-Time Management-Sustainability), emphasizes four key components. Participation focuses on the active and consistent involvement of students in gardening activities through regular schedules, assigned roles such as planting and watering, and the promotion of teamwork and collaboration, reflecting the high level of involvement identified in the findings. Integration highlights the connection between gardening and academic learning by using gardening activities as bases for written outputs, performance tasks, and assessment items, which supports the observed outstanding academic performance. Time Management ensures that students balance gardening responsibilities with academic requirements through scheduled activities, monitoring of participation hours, and alignment with lesson plans, addressing the need for proper time allocation. Sustainability emphasizes the long-term implementation of the program through school support in terms of materials and budget, the use of eco-friendly practices such as composting and recycling, and the involvement of parents and the community, ensuring continuity beyond the study. The framework follows a flow from Participation to Integration, supported by Time Management, leading to Sustainability, which ultimately contributes to improved academic achievement.

4. Conclusion

Based on the findings of the study, the following conclusions were drawn.

- Senior High School students are actively and consistently engaged in school gardening activities, demonstrating strong participation across all indicators
- Students exhibit an outstanding level of academic performance, indicating effective learning and mastery of competencies in the subject 3I's.
- There is a significant relationship between school gardening participation and academic achievement, suggesting that active involvement in gardening contributes positively to students' academic success.
- A well-structured and sustainable gardening program can serve as an effective educational tool in promoting both student engagement and academic excellence.

Compliance with ethical standards

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Disclosure of conflict of interest

I declare that I have no conflicts of interest related to this research. I have no personal or financial relationships that could influence my work.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study

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