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Assessment of Proficiency and Competencies in Agriculture Among Intermediate Students of Public Schools in Santa Maria, Laguna

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Abstract

This study was conducted to assess the agricultural proficiency and competency of Grade 4 to Grade 6 learners in five selected public elementary schools in Santa Maria, Laguna. A total of 495 learners participated in the study with 163 from Grade 4, 170 from Grade 5, and 162 from Grade 6 selected through stratified and non-probability cluster sampling. Data were collected using an adapted and validated survey questionnaire with a modified Likert scale. Descriptive statistics summarized demographic data, while ANOVA and Spearman Rho tested relationships between variables. Results revealed that learners demonstrated moderate knowledge but high levels of skills, attitudes, and overall competency in crop and animal production. Significant differences in proficiency and competency were observed based on age, grade level, place of residence, parental education, and family income, while sex, household size, and distance from school showed no significant impact. Strong positive correlations were found between learners' knowledge, skills, attitudes, and agricultural competency, underscoring the importance of experiential learning and home support. Based on the findings, the study recommends enhancing practical agricultural instruction, improving teacher training, integrating farm-based exposure, and conducting further research to strengthen agricultural education within the EPP curriculum.

Keywords: Agricultural Proficiency, Competencies, Agriculture, Edukasyong Pantahanan at Pangkabuhayan (EPP)

Introduction

Nurturing an agricultural understanding in todays and tomorrow's youth can guide the society's progress in terms of economic, social, health, and environmental well-being. Agricultural education fosters appreciation towards these factors. As the foundation of learning, elementary education plays a critical role in developing agricultural literacy. A lack of exposure at this level may result in limited awareness of agriculture's importance in daily life and its role in achieving a sustainable future. This disconnect can lead to reduced interest in agricultural careers and poor understanding of sustainable farming practices, which are issues that extend beyond education and reaches the core of the society and its capacity to provide sustainable future. Further, agricultural literacy is a vital aspect of education, primarily in nations where agriculture is a dominant sector in the economy, such as the Philippines.

Some research highlighted the importance of integrating basic agricultural concepts into elementary curriculum. This helps ensure that students acquire a good of agriculture and its role in the society. In 2020, research-based tests were developed to measure agricultural literacy. These assessments were designed in accordance with the National Agricultural Literacy Outcomes (NALOs) to evaluate students' proficiency in understanding agricultural concepts. These evaluations have been recognized as reliable and valid tools (Longhurst *et al*., 2020) [39]. Moreover, it was found that elementary school students, at a young age, struggled to effectively express or illustrate their grasp of the fundamental ideas connected to agricultural production (Trexler, 2000) [56].

The Department of Agriculture (DA) suggested to include fundamental agricultural subjects in the curriculum of public schools to promote more Filipino students to be interested in pursuing a career in agriculture (Department of Agriculture, 2017) [18]. In response, the Department of Education (DepEd) has been studying to solidify the inclusion of agricultural subjects in the Philippine elementary curriculum. They acknowledge the significance of agricultural education in enhancing sustainable agriculture practices, food security concerns, and the development of students' skills and knowledge in agriculture.

The DepEd has crafted a K-12 Basic Education Curriculum that includes agriculture as part of the Edukasyong Pantahanan at Pangkabuhayan (EPP) and Technology and Livelihood Education (TLE) subject. The Philippine Department of Education's K–12 Basic Education Curriculum integrates agriculture within its TLE and EPP learning areas. Specifically, agriculture is included as part of the Agri-Fishery Arts component for Grades 4–6 and in TLE subjects like Agriculture/Fisheries in higher grade levels (Department of Education, (2016) [19]. However, the COVID-19 pandemic greatly affected the Philippine education system in 2019, triggering school's closures, and shifting to modular distance and online learning due to disruptions in the delivery of education.

The DepEd, through the Bureau of Curriculum Development (BCD), has recognized the most essential learning competencies (MELCs) for Key Stages 1-4 in response to the recent situation in the country related to COVID-19. MELCs encompass the knowledge, skills, and attitudes/values (KSAVs) that every student is expected to proficiently acquire in order to meet the prescribed content and performance standards for each quarter, grade level, or key stage. MELCs represent the primary learning competencies (LCs) within each subject and grade level that are essential for every student to grasp, comprehend, and employ across a range of different contexts. It also serves as the benchmark LCs that educators should prioritize when it comes to teaching and evaluating students. Additionally, to provide continuity in education, the issuance of the MELCs was not only a reaction to the ongoing pandemic but also a sustained effort to create resilient education systems (Department of Education, 2020) [20].

Teaching agricultural literacy is not only about farming facts but also about making children learn where their food originates from, how agriculture affects the environment, and how it relates to the society. This makes their learning more exciting and enhances their overall learning experience. Therefore, there is a gap in enhancing agricultural education in elementary schools that can be an effective means of improving the agricultural learning and filling the knowledge gap (Spielmaker & Leising, 2013) [52]. Others mentioned that certain studies highlighted the significance of agricultural literacy in the Philippines and enhancing agricultural education among elementary school children can produce beneficial effects (Cosby *et al*., 2022) [16].

The effectiveness of teaching agriculture to young learners can be significantly influenced by the proficiency of the teachers. Teachers are essential in helping students to learn more about agriculture especially in primary schools. Their teaching skills and knowledge directly affect the extent to which students learn and comprehend these concepts. However, different studies found that students demonstrated low level of agricultural literacy at primary school. According to Brandt, Forbes, and Keshwani (2017) [8], young students were unable to understand the diversity of agriculture. This was supported by Trexler, Hess, and Hayes (2013) [57], who suggested that agricultural literacy levels may not be age or developmentally appropriate. The aim of this study was to identify the level of proficiency and competencies of intermediate learners in learning agriculture.

In recent years, most studies have focused on how current circumstances have affected learners' performance in language, literacy, and numeracy. In contrast, the present study aims to assess learners' proficiency and competencies in agriculture. The increasing importance of understanding agriculture and its related issues underscores the need to explore this often-overlooked area of education. Thus, this study was conducted to determine the level of learners' proficiency and competencies in agriculture in five selected public elementary schools in Santa Maria, Laguna.

Methodology

This study utilized a descriptive-evaluative research design to assess the proficiency and competencies in agriculture of Grade 4 to Grade 6 learners in five selected public elementary schools in Santa Maria, Laguna. The study explored the relationship between learners' demographic profiles and their agricultural proficiency and competencies using quantitative analysis. A total of 495 learners were selected, with 163 from Grade 4, 170 from Grade 5, and 162 from Grade 6, coming from five high-performing schools: Adia Elementary School, Calangay Elementary School, J. Santiago Elementary School, Santa Maria Elementary School, and Talangka Elementary School. These schools were chosen based on their consolidated mean percentage scores (MPS) in EPP (Agriculture), as they represent models of high student performance.

Stratified sampling was applied to ensure proportional representation of each grade level, while non-probability cluster sampling based on barangay residence grouped learners into five clusters for contextual representation. The population was further stratified by school and grade level, and cluster assignments were based on geographical proximity among barangays.

Data were gathered using an adapted questionnaire consisting of multiple-choice questions and a modified five-point Likert scale. The instrument measured learners' demographic profiles, levels of proficiency in knowledge, skills, and attitudes, and their competency in basic agricultural areas such as crop and animal production. The questionnaire was validated by experts and the researcher's adviser. Secondary data, including DepEd's Most Essential Learning Competencies (MELCs) and School Form 1 (SF1), were used to support and contextualize the findings.

Prior to data collection, formal approval was secured from the Schools Division Superintendent, Public Schools District Supervisor, and school principals. Survey administration and data collection were conducted with the support of school officials. Completed questionnaires were retrieved, encoded, and submitted for statistical processing.

Data were presented in tabular form and analyzed using both descriptive and inferential statistics. Frequency, percentage, and mean were used to describe the demographic profile. Weighted mean and ranking were applied to determine learners' levels of proficiency and competency. Inferential tools such as ANOVA and Spearman Rho were used to identify relationships between demographic variables, proficiency levels, and agricultural competencies.

Results and Discussion

Demographic Profile of Respondents

Age

Table 1 presents the distribution of the learners according to age in public elementary schools in Santa Maria, Laguna. It shows that 169 out of 495 learners are mostly ten (10) years old or 34.1% of the respondents. Second is eleven (11) years old or 27.5%. Next is twelve (12) years old or 26.7%. Lastly, nine (9) years old or 11.7% of the respondents fall on this age.

According to the Commission on Higher Education (2017), students in Grade 4 are typically ages 9 and 10, 10 and 11 years old are in Grade 5, and 11-12 years old are in Grade 6. This confirms that most of the respondents fall within the expected age group for intermediate level in public elementary schools in the Philippines.

Table 1: Distribution of the learners according to age

Age (in years)	Frequency	Percentage
9	58	11.7
10	169	34.1
11	136	27.5
12	132	26.7
Total	**495**	**100%**

Sex

Table 2 presents the distribution of learners according to sex in public elementary schools in Santa Maria, Laguna. As shown in the table, 257 out of 495 learners, or 51.9%, are female. On the other hand, 238 learners, or 48.1%, are male.

Table 2: Distribution of the learners according to sex

Sex	Frequency	Percentage
Male	238	48.1
Female	257	51.9
Total	**495**	**100%**

Grade Level

Table 3 presents the distribution of the learners according to grade level in public elementary schools in Santa Maria, Laguna. It shows that 34.3% or 170 learners are in grade 5, followed by grade 4 with 163 or 32.9% of the learners. Lastly, 162 or 32.7% of the learners are grade 6 students. Intermediate learners (Grades 4 to 6) are the ideal group to assess agricultural proficiency and competencies. At this stage, agriculture related subjects are explicitly introduced and taught in the Philippine K - 12 curriculum. Agriculture is a core part of Edukasyong Pantahanan at Pangkabuhayan (EPP) subject for Grades 4 to 6, providing foundational competencies in agriculture.

This is supported by the Department of Agriculture's (2017) [18] initiatives to improve agriculture education in elementary schools in order to encourage children's interest in farming, as well as the Department of Education's curriculum guide, which states that agricultural topics are included in the EPP subjects.

Table 3: Distribution of the learners according to grade level

Grade Level	Frequency	Percentage
4	163	32.9
5	170	34.3
6	162	32.7
Total	**495**	**100%**

Place of Residence

Table 4 presents the distribution of the learners according to their place of residence in public elementary schools in Santa Maria, Laguna. As reflected in the table, the highest number of learners which is 189 out of 495, or 38.2% resides in Cluster 2, which includes barrios in nearby farmlands: Poblacion IV, Bagong Pook, Talangka, Adia, and Macasipac. Next, 115 learners, or 23.2%, live in Cluster 4, which comprises farmland areas such as Coralan, Masinao, Inayapan, Calangay, and Bagumbayan. Cluster 5 follows with 102 learners, or 20.6%, residing in upland barrios including J. Santiago, Paoo, Matalinting, J.P. Laurel, and Parang ng Buho. This is followed by Cluster 1, with 51 learners or 10.3%, who live near the town center such as Poblacion I, Poblacion II, Poblacion III, J.P. Rizal, and Cabuoan. Lastly, 35 learners, or 7.1%, reside in Cluster 3, which includes farmland areas such as Kayhacat, Cambuja, Bubucal, and Tungkod.

This residential clustering implies how agricultural education programs are delivered. The distribution of residence affects their competence and capacities by impacting their availability to educational materials, exposure to agricultural techniques, and opportunities for experiential learning. Carter (2016) [14] stated in his study that schools should be built by or near agricultural land to provide students a firsthand introduction to the tools, methods and practices of agriculture.

Table 4: Distribution of the learners according to their place of residence

Place of Residence	Frequency	Percentage
Cluster 1	51	10.3
Cluster 2	189	38.2
Cluster 3	35	7.1
Cluster 4	115	23.2
Cluster 5	102	20.6
Others	3	0.6
Total	**495**	**100%**

Distance of Residence to School

Table 5 presents the distribution of the student-respondents according to the distance of their residence to their school. As shown in the table, 390 out of 495 learners' household distance from school is 0.01-1.00 kilometers. It is followed by 1.01-2.00 kilometers distance of household to school with 66 or 13.3% of learners. Next, 26 or 5.3% of learners has a household distance from school of 2.01-3.00 kilometers. Lastly, learners whose household distance from school is 3.01-4.00 kilometers contributes to 13 or 2.6% of learners. The data shows that majority of the learners live within one kilometer of their school, with a less percentage of learners traveling farther distances.

This proximity implies that most students are less likely to suffer the negative effects associated with long distance of walk or travel such as absenteeism, fatigue, tardiness and reduced academic performance. Bammou *et al*. (2024) [3] emphasize how much travel time affects pupils' academic performance, demonstrating that higher tardiness, absenteeism, and poorer academic achievement are linked to longer travel.

Table 5: Distribution of the student-respondents according to the distance of their residence from the school

Distance (km)	Frequency	Percentage
0.01-1.00	390	78.8
1.01-2.00	66	13.3
2.01-3.00	26	5.3
3.01-4.00	13	2.6
Total	**495**	**100%**

Household Size

Table 6 presents the household size distribution of the learners in public elementary schools in Santa Maria, Laguna. It shows that 74.3% or 368 learners belong to a 4-6 household size, followed by a household size of 1-3 with 57 or 11.5% of learners. Third, 53 or 10.7% of learners belong to a household size of 7-9 members. Lastly, learners who belong to 10 and above household size contribute to 3.4% or 17 learners.

In this study, the majority of learners are members of household with 4 to 6 members, which is considered a medium - sized family. This type of household may provide a setting that balances the benefits of enough educational support, allowing students to engage in both concentrated theoretical learning and hands-on agricultural experience. Ene, E. I. (2021) [23] stated that family background, including family size and type has a positive impact on pupils' academic success. The implies that small families provide an atmosphere that encourages students to aim for higher academic achievement.

Table 6: Distribution of the learners according to household size

Household Size	Frequency	Percentage
1-3	57	11.5
4-6	368	74.3
7-9	53	10.7
10 and above	17	3.4
Total	**495**	**100%**

Educational Attainment of Parents/Guardian

Table 7 presents the distribution of the parents of the learners according to their highest educational attainment. In terms of the fathers' educational attainment, 156 or 31.5% are High School graduates, 119 or 24% are College graduates, 78 or 15.8% are High School undergraduates, 67 or 13.5% are Elementary graduates, 40 or 8.1% are College undergraduates, and 35 or 7.1% are Elementary undergraduates.

In terms of the mothers' educational attainment, 170 or 34.3% are College graduates, 169 or 34.1% are High School undergraduates, 53 or 10.7% are High School graduates, 40 or 8.1% are Elementary graduates and College undergraduates, and 23 or 4.6% are Elementary undergraduates. The distribution shows different parental education levels, wherein there is a high percentage of mothers that have college degrees while fathers are high school graduates. In accordance with this result, students can be subjected to varying levels of family support, resources and attitudes toward agriculture, which may have an impact to their proficiency and competency level.

Shoukat *et al*. (2013) [50] highlighted that parents with higher levels of education are more supportive to their children's academic progress. They are given access to current technologies and study resources.

Table 7: Distribution of the parents of the learners according to their highest educational attainment

Parent's Educational Attainment	Frequency	Percentage
Father		
Elementary Undergraduate	35	7.1
Elementary Graduate	67	13.5
High School Undergraduate	78	15.8
High School Graduate	156	31.5
College Undergraduate	40	8.1
College Graduate	119	24
Total	**495**	**100%**
Mother		
Elementary Undergraduate	23	4.6
Elementary Graduate	40	8.1
High School Undergraduate	169	34.1
High School Graduate	53	10.7
College Undergraduate	40	8.1
College Graduate	170	34.3
Total	**495**	**100%**

Primary and Other Source of Income of Parents/Guardian

Table 8 presents the distribution of the primary and other source of income of the parents in public elementary schools in Santa Maria, Laguna. The fathers' primary source of income revealed that 130 or 26.3% come from construction, building, and architectural field, 117 or 23.6% come from agricultural, forestry, and animal production field, 64 or 12.9% come from transportation, and delivery field, 53 or 10.7% come from business, food, and commercial field, 25 or 5.1% come from public service, and government, and OFW fields, 22 or 4.4% come from clerical, service, and factory field, and unemployed, 21 or 4.2% come from electrical, and mechanical field, and lastly, 16 or 3.2% come from communication, and security field.

In terms of the mothers' primary source of income, 184 or 37.2% are housewife, 117 or 23.6% come from business, food, and commercial field, 67 or 13.5% come from public service, and government field, 62 or 12.5% come from clerical, service, and factory filed, 24 or 4.8% are OFW, 16 or 3.2% come from beauty, fashion, and wellness field, 12 or 2.4% come from agricultural, forestry, and animal production, 11 or 2.2% come from communication and architectural fields, and lastly, 2 or 0.4% come from medical, and allied health field.

Based on the findings, the highest percentage of learners' fathers is the middle-income employees and their mothers are mostly housewives. This implies that their father can afford their financial needs, support an occasional school activity, enabling access to educational materials and possibly agricultural inputs since education in public schools in the Philippines are free and no tuition fee to pay. Likewise, a housewife mother may provide more time to support and supervise learners in their homework and even in home-based agricultural activities. The sort of education that children receive from their parents is determined by the parent's occupation. The parent's occupation has a significant impact on their children's education or academic performance at school (Shah & Hussain, 2021) [49].

Table 8: Distribution of the primary and other source of income of the parents

Parents' Primary and Other Source of Income	Frequency	Percentage
Father		
Agricultural, Forestry, and Animal Production	117	23.6
Business, Food, and Commercial	53	10.7
Clerical, Service, and Factory	22	4.4
Communication, and Security	16	3.2
Construction, Building, and Architectural	130	26.3
Electrical, and Mechanical	21	4.2
Overseas Filipino Worker (OFW)	25	5.1
Public Service and Government	25	5.1
Transportation, and Delivery	64	12.9

Unemployed	22	4.4
Total	**495**	**100%**
Mother		
Agricultural, Forestry, and Animal Production	12	2.4
Beauty, Fashion, and Wellness	16	3.2
Business, Food, and Commercial	117	23.6
Clerical, Service, and Factory	62	12.5
Communication, and Architectural	11	2.2
Housewife	184	37.2
Medical, and Allied Health	2	0.4
Overseas Filipino Worker (OFW)	24	4.8
Public Service and Government	67	13.5
Total	**495**	**100%**

Monthly Family Income

Table 9 presents the distribution of the learners according to monthly family income. It shows that 243 out of 495 learners come from a family with monthly income of 10,000-19,999, contributing 49.1% of the respondents. However, 80 or 16.2% of the learners fall under the monthly family income of 9,999 and below. Third, 63 or 12.7% of the learners fall under 30,000-39,999 monthly family income. It is followed by learners' monthly family income of 20,000-29,999 with 48 or 9.7% of respondents. Next, monthly family income of 50,000 and above has 36 or 7.3% of learners. Lastly, 25 or 5.1% of the learners belongs to a family with monthly income of 40,000-49,999.

Results indicate that the larger portion of respondents are belong to low-to lower-middle income households. One of the factors influencing students' proficiency and competencies is the socioeconomic status particularly family income. On the other hand, Ogweno *et al*. (2014) [43] stated that low family income earnings did not have a negative impact on students' performance in agriculture.

Table 9: Distribution of the learners according to monthly family income

Monthly Income (Php)	Frequency	Percentage
9,999 and below	80	16.2
10,000-19,999	243	49.1
20,000-29,999	48	9.7
30,000-39,999	63	12.7
40,000-49,999	25	5.1
50,000 and above	36	7.3
Total	**495**	**100%**

Level of Agricultural Proficiency of the Learners in Terms of Knowledge

Table 10 shows the learners' agricultural proficiency in terms of knowledge in public elementary schools in Santa Maria, Laguna. For Grade 4 learners' most essential learning competencies, the first rank is *EPP4AG-0d-6* with a mean of 6.88, interpreted as high. On the other hand, the last rank is *EPP4AG-0e-8* with a mean of 3.72, interpreted as low. Overall, the Grade 4 agricultural proficiency in terms of knowledge has a mean of 5.27, interpreted as moderate.

For Grade 5 learners' most essential learning competencies, the first rank is *EPP5AG-0g-15; EPP5AG-0h-16; and EPP5AG-0j-18* with a mean of 7.20, interpreted as high. The last rank is *EPP5AG-0c-6* with a mean of 3.72, interpreted as low. Overall, the Grade 5 agricultural proficiency in terms of knowledge has a mean of 6.29, interpreted as moderate.

On the other hand, the Grade 6 learners' most essential learning competencies' first rank is *E TLE6AG-0c-3; TLE6AG-0c-4; and TLE6AG-0d-5* with a mean of 5.80, interpreted as moderate. Last rank is *TLE6AG-0h-9* with a mean of 4.69, interpreted as moderate. Overall, the Grade 6 agricultural proficiency in terms of knowledge has a mean of 6.29, interpreted as moderate.

To sum it up, the overall weighted mean for the level of agricultural proficiency in terms of knowledge for Grade 4 to 6 is 5.62, with an interpretation of moderate. This suggests that even students understand the basics of agriculture, they still need to improve and sustain what they have learned.

A review of agricultural literacy studies indicates that although the concept has advanced to encompass a deeper understanding through both formal and informal educational experiences, many misconceptions persist. This underscores the urgent need for enhanced educational initiatives designed to provide students with a thorough grasp of agricultural principles. These types of activity are essential for encouraging interest in agricultural careers and preparing the next generation to handle issues associated with country's food security (Cosby *et al*., 2022) [16].

In addition, involving elementary school students in agriculture-related activities could help increase their knowledge and nurture high interest in the field, especially for those who may not have much exposure to agriculture outside of school (Fathima *et al*., 2016) [25]. The Iowa Agricultural Literacy Foundation (2018) [29] suggests that the more they educate students about the origins of food, how it is produced, and its sustainability, the better equipped they will be as decision-makers. Today, young people are eager to learn about the food they consume. Introducing basic agricultural concepts at an early age, such as how farmers produce healthy food and care for animals, provides a strong foundation for their understanding.

Table 10: Level of agricultural proficiency of the learners in terms of knowledge

Grade Level	Learning Competency Code	Number of Test Items	Mean Score	Rank	VI
4	1. EPP4AG-0a-1 and EPP4AG-0a-2	10	6.48	2	High
	2. EPP4AG-0d-6	10	6.88	1	High
	3. EPP4AG-0e-8	10	3.72	5	Low
	4. EPP4AG-0f-10	10	4.15	4	Low
	5. EPP4AG-0h-15; EPP4AG-0h-16; and EPP4AG-0h-17	10	6.33	3	Moderate
	Average		**5.51**		**Moderate**
5	1. EPP5AG-0b-4	10	7.03	2	High
	2. EPP5AG-0c-6	10	4.46	5	Low
	3. EPP5AG-0c-7	10	5.93	4	Moderate
	4. EPP5AG-0e-11	10	6.84	3	High
	5. EPP5AG-0g-15; EPP5AG-0h-16; and EPP5AG-0j-18	10	7.20	1	High
	Average		**6.29**		**Moderate**
6	1. TLE6AG-0a-1; TLE6AG-0b- 2	10	5.74	2	Moderate
	2. TLE6AG-0c-3; TLE6AG-0c-4; and TLE6AG-0d-5	10	5.80	1	Moderate
	3. TLE6AG-0e-6; TLE6AG-0g-8; and TLE6AG-0h-9	10	5.35	3	Moderate
	4. TLE6AG-0h-9	10	4.69	5	Moderate
	5. TLE6AG-0j-13	10	4.86	4	Moderate
	Average		**5.29**		**Moderate**
	Overall Mean		**5.62**		**Moderate**

Range	**Verbal Interpretation**
1.00-2.80	Very Low
2.81-4.60	Low
4.61-6.40	Moderate
6.41-8.20	High
8.21-10	Very High

Level of Proficiency of Grade 4 Students in Crop and Animal Production Skills

Table 11 depicts the level of proficiency of Grade 4 students in crop and animal production skills in public elementary schools in Santa Maria, Laguna. Students demonstrate a high level of skill in crop production. They can consistently water the plants every day (4.07), can remove weeds and cultivate the soil around the plants once a week (3.93), can remove weeds around the plants (3.80), can possess the ability to recognize the parts of ornamental plants that are suitable for planting (3.69), can properly and appropriately use various gardening tools such as a hoe, pickaxe, dibber, shovel, rake, fork, sickle, and crowbar (3.68), can assess whether ornamental plants are ready to be sold (3.54), and select seedlings that are ready for planting (3.44). However, students only show a moderate ability in selling ornamental plants (3.35) and in applying fertilizer to the plants which commonly perform once a month (3.31).

Learners demonstrate a high level of skill in animal production. They are able to choose animals that can be raised at home, such as chickens, rabbits, dogs, and cats (4.06), can properly carry out the correct way of feeding animals (3.96), can perform proper cleaning of the animals' cages or shelters (3.91), and are able to give medicine or vitamins to the animals (3.63).

Overall, the Grade 4 students' proficiency in crop production skills has a weighted mean of 3.65, interpreted as high. Likewise, the skills proficiency in crop production has a weighted mean of 3.65, also interpreted as high. In summary, the student's overall level of proficiency in crop and animal production skills has a mean of 3.77, interpreted as high.

This indicates that the students' high-level proficiency in crop production shows understanding and application of the lessons into practical skills. These students can apply the techniques to enhance crop yield and quality. Hence, a high-level proficiency in animal production among the students shows their capability to raise and take care of an animal.

Experiential learning in agriculture significantly contributes to the understanding of farming by students. Research has shown that students who have firsthand experience with agricultural work, like planting crops or domesticating animals, demonstrates higher knowledge of agriculture systems and greater capability of putting the knowledge in practice (K12 Academics, 2024) [34]. Associated research on agricultural proficiency for elementary school students, especially Grade 4, tends to emphasize the inclusion of agriculture education in early schooling to promote practical skills. Research shows that gardening experiences increase the practicality of farm knowledge. The experiences result in improved levels of proficiency enabling students to acquire technical skills and appreciate sustainable farm practices (Colbath & Morrish, 2010) [15]. Hence, it is essential to expose children in agriculture as first step in creating their knowledge and literacy in agriculture.

Table 11: Level of proficiency of Grade 4 students in crop and animal production skills

Area	S. No	Skills	Weighted Mean	Rank	VI
Crop Production	1	I possess the ability to recognize the parts of ornamental plants that are suitable for planting.	3.69	4	High
	2	I am able to prepare soil beds suitable for planting ornamental plants.	3.66	6	High
	3	I am able to select seedlings that are ready for planting.	3.44	8	High
	4	I can properly and appropriately use various gardening tools such as a hoe, pickaxe, dibber, shovel, rake, fork, sickle, and crowbar.	3.68	5	High
	5	I can consistently water the plants every day.	4.07	1	High
	6	I can apply fertilizer to the plants once a month.	3.31	10	Moderate
	7	I can remove weeds and cultivate the soil around the plants once a week.	3.93	2	High
	8	I can remove weeds around the plants.	3.80	3	High
	9	I can assess whether ornamental plants are ready to be sold.	3.54	7	High
	10	I am able to sell ornamental plants.	3.35	9	Moderate
		Average Weighted Mean	**3.65**		**High**
Animal Production	1	I am able to choose animals that can be raised at home, such as chickens, rabbits, dogs, and cats.	4.06	1	High
	2	I can properly carry out the correct way of feeding animals.	3.96	2	High
	3	I can perform proper cleaning of the animals' cages or shelters.	3.91	3	High
	4	I am able to give medicine or vitamins to the animals.	3.63	4	High
		Average Weighted Mean	**3.89**		**High**
Overall Weighted Mean			**3.77**		**High**

Level of Proficiency of the Grade 5 Students in Crop and Animal Production Skills

Table 12 indicates the level of proficiency of Grade 5 students in crop and animal production skills in public elementary schools in Santa Maria, Laguna. The results in terms of crop production is high, particularly in performing systematic watering of vegetable crops (4.06), considering and applying the correct safety measures when making organic fertilizer (3.59), properly and appropriately using various gardening tools such as a hand trowel, rake, shovel, and others (3.59), and demonstrating the correct method of soil cultivation or preparing garden plots (3.51). In considering the proper use of organic pesticides for pests and insects, such as mixing crushed chili, onion, and ginger with water for spraying, and performing the correct steps in preparing these organic pesticides and NIA (Natural Insect Attractants) to manage plant pests and insects (3.38), students are moderately skilled. Their ability to make an organic fertilizer using the proper procedures (3.06) and apply organic fertilizer to the soil using correct methods such as the side dressing method, foliar application method, basal application method, and broadcasting method (3.15) is moderate.

Concerning students' proficiency level in animal production, their capacity to perform the proper method of feeding animals (4.18), skill in identifying animals that can be raised, such as chickens, ducks, geese, quails, and fish (3.93), carrying out the proper cleaning of animal shelters or housing (3.80), and ability to compute the capital, expenses, and profit in animal or fish raising (3.42) are also high. However, in creating a checklist or inventory of tools and equipment needed to start raising animals or fish (3.40) and selecting animals that are ready for marketing or selling (3.35), learners are moderately skilled.

In summary, the Grade 5 students' skills proficiency in crop production has a weighted mean of 3.47, verbally interpreted as high. Likewise, the skills proficiency in animal production has a weighted mean of 3.68, verbally interpreted as high. Overall, the student's level of proficiency of skills for crop and animal production has a mean of 3.56, interpreted as high.

This highlights that students with high competency in crop production not only understand the academic aspects but can apply them into practical, skill-based applications directed towards improving both yield and quality. Experiential learning bridges theory and practice to enhance students' understanding (Askren & James, 2021). Through real-life experience, students go beyond textbooks and engage directly with the nature of farm practices. By direct interaction, it enables them to have deeper appreciation of farming processes and animal care.

Table 12: Level of proficiency of the Grade 5 students in crop and animal production skills

Area	S. No	Skills	Weighted Mean	Rank	VI
Crop Production	1	I can produce organic fertilizer using the proper procedures.	3.06	8	Moderate
	2	I am able to consider and apply the correct safety measures when making organic fertilizer.	3.59	2	High
	3	I can perform systematic watering of vegetable crops.	4.06	1	High
	4	I can properly and appropriately use various gardening tools such as a hand trowel, rake, shovel, and others.	3.59	2	High
	5	I demonstrate and perform the correct method of soil cultivation or preparing garden plots.	3.51	4	High
	6	I am able to apply organic fertilizer to the soil using correct methods such as the Side Dressing Method, Foliar Application Method, Basal Application Method, and Broadcasting Method.	3.15	7	Moderate
	7	I am able to consider the proper use of organic pesticides for pests and insects, such as mixing crushed chili, onion, and ginger with water for spraying, and using NIA (Natural Insect Attractants).	3.38	5	Moderate
	8	I can perform the correct steps in preparing organic pesticides and NIA (Natural Insect Attractants) to manage plant pests and insects.	3.38	5	Moderate
Average Weighted Mean			**3.47**		High
Animal Production	1	I can identify animals that can be raised, such as chickens, ducks, geese, quails, and fish.	3.93	2	High
	2	I can perform the proper method of feeding animals.	4.18	1	High
	3	I can carry out proper cleaning of animal shelters or housing.	3.80	3	High
	4	I can create a checklist or inventory of tools and equipment needed to start raising animals or fish.	3.40	5	Moderate
	5	I am able to select animals that are ready for marketing or selling.	3.35	6	Moderate
	6	I can compute the capital, expenses, and profit in animal or fish raising.	3.42	4	High
	Average Weighted Mean		**3.68**		High
	Overall Weighted Mean		**3.56**		**High**

Level of Proficiency of Grade 6 Students in Crop and Animal Production Skills

Table 13 outlines the level of proficiency of Grade 6 students in crop and animal production skills in public elementary schools in Santa Maria, Laguna. The Grade 6 learners' level of crop production skills is high, with a mean of 3.99, students can conduct survey to identify proper way of planting/propagating trees and fruit-bearing trees (budding, marcotting, grafting) and trees that are appropriate for orchard gardening based on location, climate, and market demands. Though, the last rank, with a mean of 3.75 and also interpreted as high is the learners' ability to conduct survey to identify types of orchard farms, prepare layout design of an orchard garden using the information gathered, and demonstrate the step-by-step procedure of propagating trees and fruit-bearing trees using budding.

Regarding students' animal production skills level of agricultural proficiency, their capabilities to use technology to conduct a survey to find out persons in the community whose occupation is animal (four-legged) raising, has a mean of 3.96, ranked first with a verbal interpretation of high. Lastly, tied at the last rank are their ability to manage marketing of animal raised, and compute the income earned from marketed products (Gross sale – Expenses = Income) with a mean of 3.35, interpreted as high.

In summary, the Grade 6 students' skills proficiency in crop production has a weighted mean of 3.86, verbally interpreted as high. Likewise, the skills proficiency in animal production has a weighted mean of 3.79, verbally interpreted as high. In summary, the proficiency level of students' skills in crop and animal production has a mean of 3.83, interpreted as high.

Grade 6 learners are found to be highly skilled in agricultural production of animals and crops, reflecting that they have a good understanding of important skills and concepts in both areas. This skill may as well reflect higher prioritization of agricultural education at this level in readiness for participation in agricultural activities later on.

The findings also point out the necessity of embracing technology into farming practices in order to facilitate increased productivity while making task easier and more effective. According to the study, the use of modern agricultural technology is becoming increasingly crucial to meet the growing global population's demand for food (Diiro & Sam, 2015; Fróna *et al*., 2019 [27]). Additionally, the emergence of social networking platforms has created new opportunities for sharing innovative farming methods (Yadav *et al*., 2023) [60].

Table 13: Level of proficiency of Grade 6 students in crop and animal production skills

Area	S. No	Skills	Weighted Mean	Rank	VI
Crop Production	1	Using technology, I can conduct survey to find out the elements to be observed in planting trees and fruit-bearing trees.	3.98	3	High
	2	Using technology, I can conduct survey to find out the market demands for fruits.	3.78	10	High
	3	Using technology, I can conduct survey to find out the famous orchard farms in the country.	3.86	7	High
	4	I can conduct survey to identify types of orchard farms	3.75	13	High
	5	I can conduct survey to identify trees appropriate for orchard gardening based on location, climate, and market demands.	3.99	1	High
	6	I can conduct survey to identify proper way of planting/propagating trees and fruit-bearing trees (budding, marcotting, grafting).	3.99	1	High
	7	I can conduct survey to identify sources of fruit-bearing trees.	3.93	6	High
	8	I can conduct survey to identify how to care for seedlings.	3.94	5	High
	9	I can prepare layout design of an orchard garden using the information gathered.	3.75	13	High
	10	I can able to compute the market price for seedling considering the expenses in growing them.	3.78	10	High
	11	I can demonstrate the step-by-step procedure of propagating trees and fruit-bearing trees using budding.	3.75	13	High
	12	I can demonstrate the step-by-step procedure of propagating trees and fruit-bearing trees using grafting	3.82	9	High
	13	I can demonstrate the step-by-step procedure of propagating trees and fruit-bearing trees using marcotting.	3.77	12	High
	14	I can properly use the pruning shear, budding knife, sprinklers, and garden scissor in plant propagation.	3.98	3	High
	15	I can perform systematic and scientific ways of caring orchard trees/ seedlings such as watering, cultivating, preparing, and applying organic fertilizer.	3.83	8	High
		Average Weighted Mean	**3.86**		**High**
Animal Production	1	Using technology, I can conduct survey to find out persons in the community whose occupation is animal (four-legged) raising.	3.96	1	High
	2	Using technology, I can conduct survey to find out kinds of four-legged animals being raised as means of livelihood	3.73	7	High
	3	Using technology, I can conduct survey to find out possible hazards that animal raising can cause to the people and community	3.74	6	High
	4	Using technology, I can conduct survey to find out ways to prevent hazards brought about by raising animals	3.77	5	High
	5	Using technology, I can conduct survey to find out market demands for animal products and byproducts	3.73	7	High
	6	Using technology, I can conduct survey to find out benefits that can be derived from animal raising	3.88	3	High
	7	Using technology, I can conduct survey to find out stories of successful entrepreneurs in animal raising.	3.91	2	High
	8	I can make plans for the family's animal raising project.	3.79	4	High
	9	I can manage marketing of animal raised.	3.69	9	High
	10	I can compute the income earned from marketed products (Gross sale – Expenses = Income)	3.69	9	High
		Average Weighted Mean	**3.79**		**High**
		Overall Weighted Mean	**3.83**		**High**

Extent of the Attitude of Grade 4 Learners Toward Crop and Animal Production

Table 14 presents the extent of attitude of the Grade 4 learners toward crop and animal production in public elementary schools in Santa Maria, Laguna. The Grade 4 learners have a high attitude towards crop production, with a mean of 4.28, interpreted as very high. They are eagerly participating in applying fertilizer to the plants and they highly enjoy preparing the soil beds for planting ornamental plants (4.11) and watering the plants every day (4.07). Students are highly interested in selecting seedlings that are ready to be planted (4.05) and actively participating when choosing parts of ornamental plants that can be planted (4.02). Learners highly enjoy planting ornamental plants (3.99) and highly value the importance of different gardening tools such as a hoe, pickaxe, dibber, shovel, rake, fork, sickle, and crowbar (3.94). They can highly maintain their enthusiasm in taking care of plants (3.93), enjoy and do not mind getting their hands dirty when cultivating the soil around the plants (3.89), and are not ashamed to sell ornamental plants instead, they enjoy it (3.76).

In terms of students' level of attitude towards animal production, the results show a very high level of positive attitude, with a mean of 4.22. Learners enjoy taking care of animals at home, such as chickens, rabbits, dogs, and cats. They also demonstrate a high positive attitude in taking responsibility to feed the animals (4.07) and consistently making an effort to clean the cages or shelters of the animals (4.07). Findings reveal that learners are highly interested and not afraid to give medicine or vitamins to the animals (3.91).

Overall, as reflected in the table, Grade 4 students' attitude towards crop production has a weighted mean of 4.00, verbally interpreted as high. Likewise, the attitude towards animal production has a weighted mean of 4.07, which is verbally interpreted as high. In summary, the student's level of proficiency in terms of attitude for crop and animal production has a mean of 4.04, which is interpreted as high.

The finding implies that the significant level of attitude towards crop and animal production of Grade 4 students presents strong interest and optimistic perspective on these subjects. Such favorable attitude can give rise to increased participation and motivation to learn more about agriculture during their continuous education.

There are numerous research studies discussing the advantages of integrating agricultural studies into school curricula, citing its contribution to building knowledge and increased understanding of nature. According to Bickel *et al*., (2014) [5], in order to make students continuously be involved in agricultural activities, the curriculum should be revised. This method may develop agricultural interest among learners in the future.

Table 14: Extent of the attitude of Grade 4 learners toward crop and animal production

Area	S. No	Attitude	Weighted Mean	Rank	VI
Crop Production	1	I actively participate when we choose parts of ornamental plants that can be planted.	4.02	5	High
	2	I enjoy preparing the soil beds for planting ornamental plants.	4.11	2	High
	3	I am interested in selecting seedlings that are ready to be planted.	4.05	4	High
	4	I maintain my enthusiasm in taking care of plants.	3.93	8	High
	5	I value the importance of different gardening tools such as a hoe, pickaxe, dibber, shovel, rake, fork, sickle, and crowbar.	3.94	7	High
	6	I find joy in planting ornamental plants.	3.99	6	High
	7	I find it enjoyable to water the plants every day.	4.07	3	High
	8	I eagerly participate in applying fertilizer to the plants.	4.28	1	Very High
	9	I enjoy and do not mind getting my hands dirty when cultivating the soil around the plants.	3.89	9	High
	10	I find selling ornamental plants enjoyable and I am not ashamed to do it.	3.76	10	High
Average Weighted Mean			**4.00**		**High**
Animal Production	1	I enjoy taking care of animals at home, such as chickens, rabbits, dogs, and cats.	4.22	1	Very High
	2	I am responsible and always ready to feed the animals.	4.07	2	High
	3	I consistently make an effort to clean the cages or shelters of the animals.	4.07	2	High
	4	I am interested and not afraid to give medicine or vitamins to the animals.	3.91	4	High
	Average Weighted Mean		**4.07**		High
	Overall Weighted Mean		**4.04**		**High**

Extent of the Attitude of Grade 5 Learners Toward Crop and Animal Production

Table 15 conveys the extent of attitude of the Grade 5 learners toward crop and animal production in elementary schools in Santa Maria, Laguna. In terms of students' attitude towards crop production, Grade 5 students have a high level of proficiency. They actively participate in the systematic watering of vegetable crops (4.18), value and apply what they have learned about the benefits of organic fertilizers for plants (4.04), interested in learning the proper use of organic pesticides for controlling pests and insects (4.01), always ready to listen and learn during their lessons about the correct steps in making organic pesticides for plant pest and insect control (3.99), always take part in performing the proper method of cultivating the soil or preparing garden plots (3.94), appreciate the uses of various tools they use in gardening (3.92), dedicate time and show interest in their lessons on the correct methods of applying fertilizer to the soil (3.92), and maintain their enthusiasm in activities such as making organic fertilizer (3.90).

The learners have high positive attitude towards animal production. They highly appreciate their lessons on the benefits of raising animals (4.09). Students are also giving high attention and interest during discussions about animals that can be raised, like chickens, ducks, geese, and quails (3.99). Likewise, they take initiative when practicing the proper feeding of animals at home (3.97), actively participate when cleaning area, cage, or shelter of the animals (3.90), and highly interested in creating a list of tools and equipment needed to start raising animals or fish (3.89).

Overall, as reflected in the table, Grade 5 students' attitude towards crop production has a weighted mean of 3.99, verbally interpreted as high. Likewise, the attitude towards animal production has a weighted mean of 3.98 with a verbal interpretation of high. In summary, the students' level of proficiency in terms of attitude for crop and animal production has a mean of 3.99 with an interpretation of high. This means that the high agricultural attitude among Grade 5 students in crop and animal production reflects a strong interest and favorable view of these topics. The excitement around agriculture promotes engagement and interest in learning more. With positive outlook, children can benefit from hand-on agricultural learning. For instance, incorporating agricultural concepts into the primary curriculum can foster a generation of young people who value sustainability (Taylor, 2023). Exposure to these topics at a young age may encourage interest in these topics and prepare students for future educational and career opportunities.

Table 15: Extent of the attitude of Grade 5 learners toward crop and animal production

Area	S. No	Attitude	Weighted Mean	Rank	VI
Crop Production	1	I value and apply what I have learned about the benefits of organic fertilizers for plants.	4.04	2	High
	2	I maintain my enthusiasm in activities such as making organic fertilizer.	3.90	8	High
	3	I actively participate in the systematic watering of vegetable crops.	4.18	1	High
	4	I appreciate the uses of various tools we use in gardening, such as the hand trowel, rake, and others.	3.92	6	High
	5	I always take part in performing the proper method of cultivating the soil or preparing garden plots.	3.94	5	High
	6	I dedicate time and show interest in our lessons on the correct methods of applying fertilizer to the soil.	3.92	6	High
	7	I am interested in learning the proper use of organic pesticides for controlling pests and insects.	4.01	3	High
	8	I am always ready to listen and learn during our lessons, especially about the correct steps in making organic pesticides for plant pest and insect control.	3.99	4	High
Average Weighted Mean			**3.99**		**High**
Animal Production	1	I appreciate our lessons on the benefits of raising animals such as chickens, ducks, geese, quails, and fish.	4.09	1	High
	2	I always listen attentively and show interest during discussions about animals that can be raised, like chickens, ducks, geese, and quails.	3.99	2	High
	3	I take initiative when we practice the proper feeding of animals at home.	3.97	3	High
	4	I actively participate when we clean the area, cage, or shelter of the animals.	3.90	4	High
	5	I am interested in creating a list of tools and equipment needed to start raising animals or fish.	3.89	5	High
	Average Weighted Mean		**3.98**		**High**
	Overall Weighted Mean		**3.99**		**High**

Extent of the Attitude of Grade 6 Learners Toward Crop and Animal Production

Table 16 presents the extent of attitude of the Grade 6 learners toward crop and animal production in public elementary schools in Santa Maria, Laguna.

Learners demonstrate a high level of attitude toward crop production. They fully appreciate conducting a survey to identify types of orchard farms (3.97), and are highly interested in calculating the market price for seedlings, considering the expenses associated with their cultivation (3.91). Lastly, they highly like preparing layout design for an orchard garden (3.88).

In terms of students' attitude level towards animal production, respondents also show a consistently high level of engagement in animal production activities, particularly in surveys using technology and market-related planning. Ranking first with a mean of 4.03, learners enjoy conducting a survey using technology to find out kinds of four-legged animals being raised as means of livelihood. Meanwhile, the lowest rank is their interest in making plans for the family's animal raising project, with a mean of 3.85 interpreted as high.

In summary, the Grade 6 students' attitude proficiency in crop production has a weighted mean of 4.06, verbally interpreted as high. Likewise, the attitude proficiency in animal production has a weighted mean of 3.94 which was verbally interpreted as high. In summary, the student's level of proficiency of attitude for crop and animal production has a mean of 4.00, interpreted as high. It relates to strong agricultural attitude towards crop and animal production by Grade 6 students, indicating their interest in and necessity to learn those subjects. The positive outlook also indicates that students will go deeper into agricultural subjects and enhance their knowledge through hands-on experience. It also indicates that imparting these principles at an early age can lead toa lifelong passion for agricultural opportunities.

Several studies pointed out that the inclusion of agricultural education in elementary curriculum not only improves academic achievement but also promotes a long-term appreciation of agricultural practices. Rank and Smalley (2017) [47] stated that students' perceptions about agriculture through early field experiences will strongly improve students' interest and positive attitudes towards agricultural education and practices.

Table 16: Extent of the attitude of Grade 6 learners toward crop and animal production

Area	S. No	Attitude	Weighted Mean	Rank	VI
Crop Production	1	I enjoy conducting survey to find out elements to be observed in planting trees and fruit-bearing trees.	4.24	2	Very High
	2	I enjoy conducting survey to find out market demands for fruits.	4.04	8	High
	3	I enjoy conducting survey to find out famous orchard farms in the country.	4.10	4	High
	4	I fully appreciate to conduct survey to identify types of orchard farms.	3.97	12	High
	5	I fully appreciate to conduct survey to identify trees appropriate for orchard gardening based on location, climate, and market demands.	4.09	6	High
	6	I fully appreciate to conduct survey to identify proper way of planting/propagating trees and fruit-bearing trees (budding, marcotting, grafting)	4.18	3	High
	7	I fully appreciate to conduct survey to identify sources of fruit-bearing trees.	4.25	1	Very High
	8	I fully appreciate to conduct survey to identify how to care for seedlings.	4.10	4	High
	9	I like preparing layout design of an orchard garden.	3.88	15	High
	10	I am interested in calculating the market price for seedlings, considering the expenses associated with their cultivation.	3.91	14	High
	11	I feel enthusiastic when doing the step-by-step demonstration of the processes involved in propagating trees and fruit-bearing trees using budding.	3.98	11	High

	12	I feel enthusiastic when doing the step-by-step demonstration of the processes involved in propagating trees and fruit-bearing trees using grafting.	4.03	9	High
	13	I feel enthusiastic when doing the step-by-step demonstration of the processes involved in propagating trees and fruit-bearing trees using marcotting.	3.96	13	High
	14	I am interested to learn the proper using of pruning shear, budding knife, sprinklers, and garden scissor in plant propagation.	4.02	10	High
	15	I like engaging in any activities on systematic and scientific ways of caring orchard trees/ seedlings such as watering, cultivating, preparing, and applying organic fertilizer.	4.09	6	High
		Weighted Mean	**4.06**		**High**
Animal Production	1	Using technology, I enjoy conducting a survey to find out persons in the community whose occupation is animal (four-legged) raising.	3.99	3	High
	2	Using technology, I enjoy conducting a survey to find out kinds of four-legged animals being raised as means of livelihood.	4.03	1	High
	3	Using technology, I enjoy conducting a survey to find out possible hazards that animal raising can cause to the people and community.	3.92	6	High
	4	Using technology, I enjoy conducting a survey to find out ways to prevent hazards brought about by raising animals.	4.02	2	High
	5	Using technology, I enjoy conducting a survey to find out market demands for animal products and byproducts.	3.99	3	High
	6	Using technology, I enjoy conducting a survey to find out benefits that can be derived from animal raising.	3.91	7	High
	7	Using technology, I enjoy conducting a survey to find out stories of successfule ntrepreneurs in animal raising.	3.94	5	High
	8	I am interested in making plans for the family's animal raising project.	3.85	10	High
	9	I am willing to learn and practice on how to manage marketing of animal raised.	3.88	8	High
	10	I like computing income earned from marketed products.	3.87	9	High
		Weighted Mean	**3.94**		**High**
		Overall Weighted Mean	**4.00**		**High**

Competency Level of Grade 4 Learners in Agriculture

Table 17 presents the Grade 4 learners' agricultural competency for crop and animal production in public elementary schools in Santa Maria, Laguna. In terms of students' competency level in crop production, it is evident that the learners are highly competent in the learning competencies; practicing systematic care and maintenance of plant (4.02), demonstrating skills and knowledge in planting ornamental plants as a source of income (3.94), plants according to correct procedures (3.85), prepares soil/ garden plot for planting (3.84), prepares seedlings or planting materials for propagation and planting (3.84), discusses the benefits of planting ornamental plants for the family and the community (3.83), shows the proper method of propagating/planting ornamental plants (3.83), and selects the appropriate plants to grow (3.76), and carries out proper harvesting/marketing of ornamental plants (3.76). However, the lowest rank, with a mean of 3.72, learners can highly perform activities such as watering, soil cultivation, fertilizer application, preparation of organic fertilizer, and others.

Regarding the competent level of Grade 4 learners in animal production, findings show that they are highly competent in the learning competencies: discussing the benefits of raising animals at home (4.06), identifying animals that can be raised at home (4.03), providing appropriate shelter or housing for the animals (3.98), demonstrating proper animal care practices (3.92), performing the proper feeding and cleaning of animal shelters (3.86), and enumerating the proper methods of animal care (3.76).

Overall, as reflected in the table, Grade 4 student's agricultural competency on crop production has a weighted mean of 3.84 with a verbal interpretation of high. Likewise, the agricultural competency on animal production has a weighted mean of 3.93 with a verbal interpretation of high. In summary, the level of agricultural proficiency of the students in crop and animal production has a mean of 3.89, with an interpretation of high.

The high-level agricultural competency in crop and animal production of students demonstrates their thorough knowledge of farming methods, sustainable agriculture, and scientific principles that guide both industries. This suggests a readiness to contribute to the agricultural industry by addressing emerging challenges and promoting efficiency and sustainability in food production systems. According to the study, by equipping students with knowledge about farming techniques early on, they can foster a generation that values food production and environmental stewardship while enhancing their academic engagement across disciplines (Brandt *et al*., 2016) [9].

Table 17: Competency level of Grade 4 learners in agriculture

Area	S. No	Competencies	Weighted Mean	Rank	VI
Crop Production	1	Demonstrates skills and knowledge in planting ornamental plants as a source of income.	3.94	2	High
	2	Discusses the benefits of planting ornamental plants for the family and the community.	3.83	6	High
	3	Shows the proper method of propagating/planting ornamental plants.	3.83	6	High
	4	Selects the appropriate plants to grow.	3.76	8	High
	5	Prepares soil/ garden plot for planting.	3.84	4	High
	6	Prepares seedlings or planting materials for propagation and planting.	3.84	4	High
	7	Plants according to correct procedures.	3.85	3	High
	8	Practices systematic care and maintenance of plants.	4.02	1	High
	9	Performs activities such as watering, soil cultivation, fertilizer application, preparation of organic fertilizer, and others.	3.72	10	High
	10	Carries out proper harvesting/marketing of ornamental plants.	3.76	8	High
Weighted Mean			**3.84**		**High**
Animal Production	1	Discusses the benefits of raising animals at home.	4.06	1	High
	2	Identifies animals that can be raised at home.	4.03	2	High
	3	Enumerates the proper methods of animal care.	3.76	6	High
	4	Demonstrates proper animal care practices.	3.92	4	High
	5	Provides appropriate shelter or housing for the animals.	3.98	3	High
	6	Performs proper feeding and cleaning of animal shelters.	3.86	5	High
		Weighted Mean	**3.93**		**High**
		Overall Weighted Mean	**3.89**		**High**

Competency Level of Grade 5 Learners in Agriculture

Table 18 presents the Grade 5 learners' agricultural competency for crop and animal production in public elementary schools in Santa Maria, Laguna.The respondents show a high level of competency in crop production. It reveals that the learners are highly competent in the learning competencies: performing proper watering (3.84), following proper procedures and safety precautions in making organic fertilizer (3.69), conducting soil cultivation (3.65), applying organic fertilizer (3.64), practicing systematic care and maintenance of vegetable crops (3.62), discussing the importance and process of making organic fertilizer (3.45), practicing systematic pest and insect control in plants (3.38), and producing organic fertilizer (3.32).

In terms of animal production, the competency level of Grade 5 learners is also high in the following competencies: identifying animals that can be raised, such as chickens, ducks, geese, quails, or tilapia (3.62); computes the capital, expenses, and profit (3.49); explaining the benefits of raising two-legged animals and fish (3.48); preparing a list of tools and equipment needed to start raising animals or fish (3.44); and marketing the raised animals or fish (3.49).

Overall, as reflected in the table, Grade 5 student's agricultural competency on crop production has a weighted mean of 3.57, verbally interpreted as high. Likewise, the agricultural competency on animal production has a weighted mean of 3.48, verbally interpreted as high. In summary, the agricultural proficiency level of the students in animal and crop production has a mean of 3.53, interpreted as high.

The high- level agricultural proficiency of Grade 5 pupils shows that their basic knowledge of fundamental farming principles and practical skills are appropriate for their age. They are able to exhibit practical knowledge of growing crops, selecting and caring animals, showing an early understanding of the significance of agriculture in everyday life.

In addition, it is crucial that school-aged children receive formal education to develop agricultural literacy in order to address the knowledge gap, comprehend the scope and impact of agriculture's production processes, overcome negative perceptions and stereotypes, and promote workforce participation (Cosby *et al*., 2022 & Burrows *et al*., 2020) [16, 11].

Table 18: Competency level of Grade 5 learners in agriculture

Area	S. No	Competencies	Weighted Mean	Rank	VI
Crop Production	1	Produces organic fertilizer.	3.32	8	Moderate
	2	Discusses the importance and process of making organic fertilizer.	3.45	6	High
	3	Follows proper procedures and safety precautions in making organic fertilizer.	3.69	2	High
	4	Practices systematic care and maintenance of vegetable crops.	3.62	5	High
	5	Performs proper watering.	3.84	1	High
	6	Conducts soil cultivation.	3.65	3	High
	7	Applies organic fertilizer.	3.64	4	High
	8	Practices systematic pest and insect control in plants.	3.38	7	Moderate
		Weighted Mean	**3.57**		**High**
Animal Production	1	Explains the benefits of raising two-legged animals and fish.	3.48	3	High
	2	Identifies animals that can be raised, such as chickens, ducks, geese, quails, or tilapia	3.62	1	High
	3	Prepares a list of tools and equipment needed to start raising animals or fish.	3.44	4	High
	4	Markets the raised animals or fish.	3.38	5	Moderate
	5	Computes the capital, expenses, and profit.	3.49	2	High
		Weighted Mean	**3.48**		**High**
		Overall Weighted Mean	**3.53**		**High**

Competency Level of Grade 6 Learners in Agriculture

Table 19 contains data on the agricultural competencies of Grade 6 students in crop and animal production in public elementary schools in Santa Maria, Laguna. The respondents demonstrate a high level of competency in crop production. Findings reveal that Grade 6 learners reached the high competent level in all learning competencies: discussing the importance of planting and propagating trees and fruit-bearing trees and marketing seedlings (4.04); conducting survey to find out proper way of planting/propagating trees and fruit-bearing trees (budding, marcotting, grafting) (3.99); finding out sources of fruit-bearing trees (3.98); identifying the appropriate tools and equipment in plant propagation and their uses (3.98); performing systematic and scientific ways of caring orchard trees/ seedlings such as watering, cultivating, preparing, and applying organic fertilizer (3.97); conducting of survey to find out trees appropriate for orchard gardening based on location, climate, and market demands (3.6); using technology in conducting survey to find out elements to be observed in planting trees and fruit-bearing trees (3.92); finding out how to care for seedlings (3.92); demonstrating scientific ways of propagating fruit-bearing trees (3.92); preparing layout design of an orchard garden (3.91); conducting a survey to identify types of orchard farms (3.90); propagating trees and fruit-bearing trees using scientific processes (3.89); using technology in the conduct of survey to find out famous orchard farms in the country (3.85), and finding out market demands for fruits (3.81).

Regarding the competent level of Grade 6 learners in animal production, findings show that they are highly competent in all learning competencies: conducting survey to find out persons in the community whose occupation is animal (four-legged) raising (4.08); plans for the family's animal raising project (3.98); conducting survey to find out kinds of four-legged animals being raised as means of livelihood (3.93); finding out benefits that can be derived from animal raising (3.92); managing marketing of animal (3.88); finding out ways to prevent hazards brought about by raising animals (3.85), and possible hazards that animal raising can cause to the people and community (3.83); finding out market demands for animal products and byproducts (3.73); computing the income earned from marketed products (Gross Sale – Expenses = Net income) (3.72), and lastly conducting survey to find out stories of successful entrepreneurs in animal raising (3.66).

In summary, the Grade 6 students' agricultural competency in crop production has a weighted mean of 3.93, verbally interpreted as high. Likewise, the agricultural competency in animal production has a weighted mean of 3.86, verbally interpreted as high. In summary, the student's level of agricultural competency for crop and animal production has a mean of 3.90, interpreted as high.

This indicates that grade 6 students with strong agricultural competency show a strong ability to apply fundamental knowledge of both crop cultivation and animal husbandry. This level of competence indicates that they are well-prepared to engage in more intricate agricultural tasks, building a solid base for future academic and practical development in the field.

Research indicates that while younger students (grades 3-5) have foundational knowledge, it is the sixth graders who demonstrate deeper comprehension of agricultural practices and concepts. This difference is attributed to their advanced cognitive abilities and more extensive educational experiences (Cosby *et al.*, 2022) [16]. This indicates the importance of integrating agricultural education at earlier stages to build a strong foundation for future learning.

Table 19: Competency level of Grade 6 learners in agriculture

Area	S. No	Competencies	Weighted Mean	Rank	VI
Crop Production	1	Discusses the importance of planting and propagating trees and fruit-bearing trees and marketing seedlings.	4.04	1	High
	2	Uses technology in the conduct of survey to find out elements to be observed in planting trees and fruit-bearing trees.	3.92	7	High
	3	Uses technology in the conduct of survey to find out market demands for fruits.	3.81	14	High
	4	Uses technology in the conduct of survey to find out famous orchard farms in the country.	3.85	13	High
	5	Conduct of survey to identify types of orchard farms.	3.90	11	High
	6	Conduct of survey to find out trees appropriate for orchard gardening based on location, climate, and market demands.	3.96	6	High
	7	Conduct of survey to find out proper way of planting/propagating trees and fruit-bearing trees (budding, marcotting, grafting)	3.99	2	High
	8	Conduct of survey to find out sources of fruit-bearing trees.	3.98	3	High
	9	Conduct of survey to find out how to care for seedlings.	3.92	7	High
	10	Prepares layout design of an orchard garden.	3.91	10	High
	11	Propagates trees and fruit-bearing trees using scientific processes.	3.89	12	High
	12	Identifies the appropriate tools and equipment in plant propagation and their uses.	3.98	3	High
	13	Demonstrates scientific ways of propagating fruit-bearing trees.	3.92	7	High
	14	Performs systematic and scientific ways of caring orchard trees/ seedlings such as watering, cultivating, preparing, and applying organic fertilizer.	3.97	5	High
		Weighted Mean	**3.93**		**High**
Animal Production	1	Conducts survey to find out persons in the community whose occupation is animal (four-legged) raising.	4.08	1	High
	2	Conducts survey to find out kinds of four-legged animals being raised as means of livelihood.	3.93	3	High
	3	Conducts survey to find out possible hazards that animal raising can cause to the people and community.	3.83	7	High
	4	Conducts survey to find out ways to prevent hazards brought about by raising animals.	3.85	6	High
	5	Conducts survey to find out market demands for animal products and byproducts.	3.73	8	High
	6	Conducts survey to find out benefits that can be derived from animal raising.	3.92	4	High
	7	Conducts survey to find out stories of successful entrepreneurs in animal raising.	3.66	10	High
	8	Plans for the family's animal raising project.	3.98	2	High
	9	Manages marketing of animal.	3.88	5	High
	10	Computes the income earned from marketed products (Gross Sale – Expenses = Net income).	3.72	9	High
		Weighted Mean	**3.86**		**High**
		Overall Weighted Mean	**3.90**		**High**

Difference in the Level of Agricultural Proficiency and Competency of Learners in Agriculture According to Age

Table 20 displays the significance of the difference of the learners' level of agricultural proficiency and competency when they are grouped according to their age. A one-way ANOVA revealed that there is a statistically significant difference on learners' level of agricultural proficiency in terms of knowledge between at least two groups (F (3, 491) = [3.534], p = .015). The Tukey's HSD Test for multiple comparisons found that the mean value of learner's knowledge is significantly different between ages 11 and 12 (p = .020, 95% C.I. = .0655, 1.1037). The knowledge of ages 11 and 12 differs significantly, with age 11 students performing higher, as indicated by the ANOVA post hoc results. Students aged eleven are likely to show greater understanding than twelve- years-olds. This is due to variations in attentiveness, interest, or memory. Further research is needed to explore the underlying factors.

In addition, there is a statistically significant difference on learners' level of competency in Agriculture relative to basic crop competency between at least two groups (F (3, 491) = [3.534], p = .015). Post-hoc indicates that the mean value of basic crop competency significantly differs between 10 and 12 years of age (p = .022, 95% C.I. = .0274, .5137). The agricultural skills of 12-year-old students are higher, indicating higher proficiency in agricultural skills than ten-year-old, likely due to increased exposure, cognitive development, and experience. This suggests that learning in this domain improves with age.

On the other hand, there is no statistically significant difference on mean scores for level of agricultural proficiency and level of competency, specifically for crop production skills (p=.065); animal production skill (p=.447); crop production attitude (p=.447); animal production attitude (p=.534); and Animal Production Competency (p=.267).

As per research, children about age 11 years are mostly in a position of acquiring more first-hand experience concerning agricultural practices and may gain more extensive knowledge as compared to slightly older peers. This is mainly because they engage in a higher level of practical activity and learning from experience (Brune *et al*., 2020) [10]. Since there is a younger individual (age 11) wider participation in diverse agricultural activities, older children (age 12) might have more cognitive flexibility, enabling them to grasp and integrate more complex agricultural principles (Brune *et al*., 2020, & Mercado & Osbahr, 2023) [10, 42].

Table 20: Difference in the level of agricultural proficiency and competency of learners in agriculture according to age

	F-computed	p-value	Interpretation
Agricultural Proficiency			
Knowledge	3.535	0.015	Significant
Crop Production Skills	2.421	0.065	Not Significant
Animal Production Skills	0.888	0.447	Not Significant
Attitude Towards Crop Production	0.731	0.534	Not Significant
Attitude Towards Animal Production	2.041	0.107	Not Significant
Agricultural Competency			
Crop Production	3.396	0.018	Significant
Animal Production	1.319	0.267	Not Significant

Difference in the Level of Agricultural Proficiency and Competency of Learners in Agriculture According to Sex

Table 21 details the significance of the difference of the learners' level of agricultural proficiency and competency according to sex. There is no statistically significant difference in mean scores for level of agricultural proficiency and level of competency based on the learners' sex, specifically for knowledge (p=.309); crop production skills (p=.640); animal production skill (p=.606); crop production attitude (p=.266); animal production attitude (p=.263); Crop Production Competency (p=.432); and Animal Production Competency (p=.338). This indicates that regardless of gender, the level of agricultural proficiency and level of competency of learners depends on the knowledge they gain and application of the basic agricultural skills.

According to the study of Darko *et al*. (2016), both men and female can achieve similar productivity levels when provided equal access to resources and opportunities. Both genders generally exhibit a positive attitude towards learning agricultural science.

Table 21: Difference in the level of agricultural proficiency and competency of learners in agriculture according to sex

	F- computed	p-value	Interpretation
Agricultura Proficiency			
Knowledge	1.039	0.309	Not Significant
Crop Production Skills	0.220	0.640	Not Significant
Animal Production Skills	0.267	0.606	Not Significant
Attitude Towards Crop Production	1.239	0.266	Not Significant
Attitude Towards Animal Production	1.254	0.263	Not Significant
Agricultural Competency			
Crop Production	0.618	0.432	Not Significant
Animal Production	0.920	0.338	Not Significant

Difference in the Level of Agricultural Proficiency and Competency of Learners in Agriculture in terms of Grade Level

Table 22 presents the significance of the difference of the learners' level of agricultural proficiency and competency when they grouped according to their grade level. A one-way ANOVA indicates a significant difference in agricultural knowledge between groups (F (2,492) = 22.517, p = .000). Tukey's HSD test indicates significant differences between grades 4 and 5 (p =.000, 95% CI = -1.4308, -.6098) and grades 5 and 6 (p =.000, 95% CI =.5981, 1.4140). The results indicate that Grade 5 students possess a high level of understanding in the key areas of agriculture. This indicates that the instructional approaches and learning activities employed at this level are effective in imparting students with relevant agricultural knowledge.

In addition, this suggests that grade 5 is a critical stage for agricultural learning, possibly due to curricular focus or developmental readiness, while the decline in grade 6 may indicate reduced interest or retention, emphasizing the need for targeted reinforcement.

Consequently, one-way ANOVA reveals a significant difference in agricultural competency in crop production skills among groups (F(2, 492) = 8.879, p = .000). Post-hoc analysis shows a significant difference between grades 5 and 6 (p = .000, 95% CI = -.6116, -.1733). This suggests that

Grade 5 offers an actual chance for students who are involved with crop production principles, either due to a strong focus on the learning objectives and hands-on learning activities. In Grade 6, students may begin to study a broader range of academic topics, allowing them to use their basic agricultural knowledge in more complex and broader context.

The results also show that there is a significant difference in crop production competency among groups (F(2, 492) = 8.716, p = .000). Post-hoc analysis shows significant differences between grades 4 and 5 (p = .008, 95% CI = .0557, .4708) and grades 5 and 6 (p = .000, 95% CI = -.5622, -.1465). This implies that introducing agricultural concepts in early Grade 4 may be worthwhile in establishing foundational knowledge in agriculture. The good performance during Grade 6 can be the result of the beneficial effect of continued learning process and high opportunities for experiential learnings.

Similarly, it reveals a significant difference in animal production competency among groups (F(2, 492) = 13.315, p = .000). Post-hoc analysis shows significant differences between grades 4 and 5 (p = .000, 95% CI = .2308, .6731) and grades 5 and 6 (p = .000, 95% CI = -.5978, -.1547). The results specify that Grade 5 learners represent a transitional stage where basic agricultural knowledge continues to develop. The high performance of learners from Grade 4 and 6 highlights eagerness to learn agricultural topics and the better effect of continued growth, real experience, and more advanced learning opportunities.

On contrary, there is no statistically significant difference in mean scores for level of agricultural proficiency in terms of animal production skills, crop production attitude, and animal production attitude, specifically for animal production skills (p=.087); crop production attitude (p=.747); and animal production attitude (p=.357).

Studies have shown that fourth graders benefit significantly from interactive and hands-on agricultural education programs. For instance, Athens, (2012) [2] stated that fourth-grade level, students are typically in a developmental stage where they are eager to explore and understand the world around them.

Table 22: Difference in the level of agricultural proficiency and competency of learners in agriculture in terms of grade level

	F-computed	p-value	Interpretation
Agricultural Proficiency			
Knowledge	22.517	0.000	Significant
Crop Production Skills	8.879	0.000	Significant
Animal Production Skills	2.457	0.087	Not Significant
Attitude Towards Crop Production	0.292	0.747	Not Significant
Attitude Towards Animal Production	1.031	0.357	Not Significant
Agricultural Competency			
Crop Production	8.716	0.000	Significant
Animal Production	13.315	0.000	Significant

Difference in the Level of Agricultural Proficiency and Competency of Learners in Agriculture in terms of Place of Residence

Table 23 depicts the significance of the difference in the learners' level of agricultural proficiency and competency when they grouped according to their place of residence.

The study found a significant difference in learners' agricultural proficiency related to knowledge across clusters (F (5,489) = 3.156, p=.008). Post-hoc analysis shows that students in lowland areas, including residential zones and farmlands, have significantly higher proficiency than those in upland areas. This disparity is likely due to greater access to structured agricultural education and hands-on learning opportunities in lowland regions, while upland students face limited exposure to modern agricultural practices.

The study also found a significant difference in learners' agricultural proficiency in crop production skills across clusters (F (5,489) = 9.176, p=.000). Post-hoc analysis indicates that students near the town center (Cluster 1 which comprised of Poblacion I, Poblacion II, Poblacion III, J.P. Rizal and Cabuoan) and nearby farmlands (Cluster 2 which comprise of Poblacion IV, Bagong Pook, Talangka, Adia, and Macasipac) includes scored higher in proficiency due to probable high access to learning and education opportunities. In contrast, students from areas of farmland (Cluster 4 which includes Coralan, Masinao, Inayapan, Calangay, and Bagumbayan; Cluster 3, which compose of Kayhacat, Cambuja, Bubucal, and Tungkod) depend on conventional farming methods, while learners in upland barrios (Cluster 5 which includes J. Santiago, Paoo, Matalinting, J.P. Laurel, and Parang ng Buho) experience limited educational facilities and exposure to advanced agricultural techniques, which result in moderate proficiency.

In terms of learners' level of agricultural proficiency relative to animal production skills, the study identified a significant difference in learners' agricultural proficiency in animal production skills across clusters (F (5,489) = 7.363, p= .000). Post-hoc analysis shows that students in or near the town center, with access to both formal education and farming exposure, have higher proficiency. However, students in farmland areas have fewer educational resources since their direct involvement in livestock management contributes to higher scores than upland students, who have limited access to both formal training and modern animal production techniques.

In terms of learners' level of agricultural proficiency relative to attitudes toward crop production, there is a significant difference between at least two groups (F (5, 489) = [7.363], p = .000). Also, there is a significant difference in learners' attitudes toward animal production across clusters (F (5,489) = 7.363, p =.000). Post-hoc analysis reveals that students that are closed to town center and farmland hold more favorable attitudes towards crop and animal production through both formal instructions and hands-on activities. Students in farmland that are exposed in planting and caring animals tend to have less interest while students in upland areas frequently exhibit good appreciation of agriculture.

The study identified a significant difference in learners' crop production competency across different clusters (F (5,489) = 6.476, p= .000). In terms of learners' level of agricultural competency relative to animal production, the study found a significant difference in learners' animal production competency across groups (F (5, 489) = 5.421, p= .000). Post-hoc analysis reveals that students living in close proximity to the town center and farmlands are more competent due to their exposure to education and practical experience. Students in distant farmland and upland locations are recorded lower competency based on a presumed limited hands-on experience. On the other hand, upland learners tend to have more favorable attitudes toward crop and animal production, which are influenced by the cultural significance of livestock in their barrios.

Studies show that lowlands tend to have improved access to farming resources. Ruelos *et al*., (2017) [48] asserted that this exposure enables a wider variety of crops as well as agricultural practices, resulting in more advanced agricultural knowledge for the residents and expose them to various agricultural methods. In contrast, Baron (2024) [4] stated that upland farming is less intensive and can be limited to fewer crops, restricting the scope of knowledge among the residents.

Table 23: Difference in the level of agricultural proficiency and competency of learners in agriculture in terms of place of residence

	F- computed	p-value	Interpretation
Agricultural Proficiency			
Knowledge	3.156	0.008	Significant
Crop Production Skills	9.176	0.000	Significant
Animal Production Skills	9.701	0.000	Significant
Attitude Towards Crop Production	7.363	0.000	Significant
Attitude Towards Animal Production	8.723	0.000	Significant
Agricultural Competency			
Crop Production	6.476	0.000	Significant
Animal Production	5.421	0.000	Significant

Difference in the Level of Agricultural Proficiency and Competency of Learners in Agriculture Based on the Distance of Their House from School

Table 24 presents the difference in the level of agricultural proficiency and level of competency in terms of learners' household distance from school in public elementary schools in Santa Maria, Laguna. The results revealed that there is no statistically significant difference in agricultural proficiency and competency according to learners' household distance from school (p = >.05 for all variables). This indicates that distance to school does not directly affect agricultural knowledge, skills and attitudes of the learners. Rather, competency and proficiency are influenced by both formal instructions and actual experience, which can be gained inside and outside the classroom.

Numerous studies stated that the effectiveness of agricultural education is heavily influenced by the quality of instruction rather than the physical distance from the school. Studies show that well-structured programs, regardless of location, can lead to similar levels of knowledge among students. For instance, effective teaching methods and engagement in hands-on activities are critical for learning outcomes, which can be achieved both in school gardens and home gardening projects (Okiror *et al*., 2024) [44].

Table 24: Difference in the level of agricultural proficiency and competency of the learners in agriculture based on the distance of their house from school

	F-computed	p-value	Interpretation
Agricultural Proficiency			
Knowledge	1.133	0.335	Not Significant
Crop Production Skills	0.838	0.474	Not Significant
Animal Production Skills	1.455	0.226	Not Significant
Attitude Towards Crop Production	0.149	0.930	Not Significant
Attitude Towards Animal Production	0.445	0.721	Not Significant
Agricultural Competency			
Crop Production	0.415	0.742	Not Significant
Animal Production	1.631	0.181	Not Significant

Difference in the Level of Agricultural Proficiency and Competency of Learners in Agriculture in terms of Household Size

Table 25 shows the difference in the level of agricultural proficiency and level of competency in terms of learners' household size in selected public elementary schools in Santa Maria, Laguna. Household size shows no statistically significant effect on agricultural proficiency and competency (p > .05 for all factors). This suggests that factors such as personal motivation, educational access, and exposure to agricultural practices may have a greater influence than family size.

Other literature suggests that various family factors, including structure and parental involvement, have a more substantial impact on academic performance than family size itself. For instance, a study analyzing multiple family-related influences concluded that socioeconomic status and parental engagement are more decisive factors affecting students' academic success (Xing, 2023) [59].

Table 25: Difference in the level of agricultural proficiency and competency of Learners in agriculture in terms of household size

	F-computed	p-value	Interpretation
Agricultural Proficiency			
Knowledge	1.257	0.288	Not Significant
Crop Production Skills	0.243	0.866	Not Significant
Animal Production Skills	0.708	0.548	Not Significant
Attitude Towards Crop Production	0.704	0.550	Not Significant
Attitude Towards Animal Production	1.799	0.146	Not Significant
Agricultural Competency			
Crop Production	1.789	0.148	Not Significant
Animal Production	1.228	0.299	Not Significant

Difference in the Level of Agricultural Proficiency and Competency of Learners According to their Fathers' Educational Attainment

Table 26 highlights the significance of the difference in the level of agricultural proficiency and competency when they are grouped according to their fathers' educational attainment. A significant difference was found in learners' agricultural proficiency in crop production skills across at least two groups based on fathers' educational attainment ($F (5, 489) = 5.285$, $p = .000$). Post-hoc analysis reveals that students whose fathers completed elementary, high school, or college have significantly higher mean scores compared to those whose fathers did not finish these educational levels. This suggests that higher paternal education may contribute to better academic support, resource accessibility, and focus on the development of skills, which enhance students' proficiency in crop production.

With regard to students' level of agricultural proficiency relative to animal production skills, significant difference was found among at least two groups based on fathers' educational attainment ($F (5, 489) = 5.285$, $p = .000$). Post-hoc analysis shows that learners whose fathers are elementary, high school, or college graduates have a significantly higher mean value compared to those who did not finish high school. This finding implies that higher paternal education provides greater educational support and resource access, enhancing students' skills.

In terms of learners' level of agricultural proficiency relative to crop production attitude, it differs significantly across at least two groups (F (5, 489) = 2.551, p = .027). Post-hoc analysis reveals that students whose fathers completed high school, or college have significantly higher scores compared to those whose fathers did not finish elementary, high school, or college. This implies that higher paternal education promotes a more encouraging learning environment, which has a positive impact on students' attitudes towards crop production.

Learners' level of attitude towards animal production differs significantly across at least two groups (F (5, 489) = 3.343, p = .006). Post-hoc analysis indicates that learners whose fathers finished elementary, high school, or college scored significantly higher scores compared to those whose fathers did not finish elementary or high school. This implies that higher educational attainment of the father is related with a greater support and encouragement, resulting in more positive attitudes.

In relation to the learners' level of agricultural competency relative to crop production, significant difference shows across at least two groups (F (5, 489) = 3.650, p = .003). Post-hoc analysis reveals that students whose fathers completed elementary, high school, or college have significantly higher competency scores compared to those whose fathers did not finish elementary or high school.

When it comes to the learners' level of agricultural competency relative to animal production, there is a significant difference among at least two groups (F (5, 489) = [2.405] p = .036). Post-hoc indicates that students whose fathers graduated or went to college show higher competency in animal production compared to those whose fathers did not finish high school, due to greater access to knowledge and learning opportunities.

High positive attention and different types of father participation have been linked to improved child development outcomes (Yoon *et al*., 2021) [61]. Furthermore, children's academic achievement and self-esteem have been found to be predicted by the educational level of their parents, especially fathers. The fathers' interest in their children's academic performance was found to be a strong predictor of academic success (Flouri, 2006) [26].

Table 26: Difference in the level of agricultural proficiency and competency of learners according to their fathers' educational attainment

	F- computed	p-value	Interpretation
Agricultural Proficiency			
Knowledge	1.818	0.108	Not Significant
Crop Production Skills	5.285	0.000	Significant
Animal Production Skills	7.514	0.000	Significant
Attitude Towards Crop Production	2.551	0.027	Significant
Attitude Towards Animal Production	3.343	0.006	Significant
Agricultural Competency			
Crop Production	3.650	0.003	Significant
Animal Production	2.405	0.036	Significant

Difference in the Level of Agricultural Proficiency and Competency of Learners According to their Mothers' Educational Attainment

Table 27 presents the significance of the difference in the level of agricultural proficiency and competency when they are grouped according to their mothers' educational attainment. The result shows that there is a statistically significant difference in learners' level of agricultural proficiency relative to knowledge between at least two groups (F (5, 489) = [3.771], p = .002). Post-hoc shows that students whose mothers completed some or all of high school or college tend to have higher agricultural knowledge, as higher maternal education often enhances access to academic support and learning resources at home. In contrast, students whose mothers only completed or partially attended elementary school may have less exposure to educational encouragement, which can limit their agricultural knowledge.

In terms of students' crop production skills, there is a significant difference between 2 or more groups. (F (5, 489) = [4.459], p = .001). The result shows that students whose mothers have some college education generally show higher agricultural crop production skills, as these mothers may provide more academic encouragement and access to learning resources. In comparison, students whose mothers only attended or graduated from elementary and high school may have fewer opportunities for skill development in crop production due to less exposure to advanced educational support.

In relation to the students' animal production skills (F (5, 489) = [4.694], p = .000), there is a significant difference between mother's educational attainment. Students whose mothers attained some college education tend to exhibit greater proficiency in agricultural animal production skills, likely due to the enhanced academic support and resource access that often accompany higher maternal education. Conversely, students whose mothers completed only elementary or high school may have more restricted exposure to advanced learning opportunities in animal production, given the comparatively limited educational resources available at home.

When it comes to the students' crop production attitude (F (5, 489) = [3.756], p = .002), the result reflects that students whose mothers attained a college undergraduate or graduate degree tend to exhibit a more positive attitude toward agricultural crop production compared to those whose mothers only completed elementary or high school. This difference can be attributed to the greater access to information, resources, and encouragement for higher education, which often influences their perceptions and involvement in agricultural practices.

On the contrary, the results in the students' animal production attitude (F (5, 489) = [4.148], p = .005) indicate that students whose mothers holding a college undergraduate or graduate degree exhibit a significantly more positive attitude toward agricultural animal production compared to their peers whose mothers completed only elementary or high school. This disparity may be attributed to a greater access to knowledge and resources associated with higher educational attainment, which fosters increased confidence and engagement in animal husbandry practices.

Regarding students' agricultural crop production competency ($F(5, 489) = [3.375]$, $p = .005$), students are notably higher when their mothers attained a college undergraduate or graduate degree compared to those whose mothers completed only elementary or high school. This phenomenon can be attributed to the enhanced educational background of these mothers, which likely provides them with the knowledge and skills necessary to impart effective agricultural practices and promote a deeper understanding of crop production in their children.

In terms of students' agricultural animal production competency ($F(5, 489) = [2.422]$, $p = .035$), students exhibit significantly greater competency in animal production when their mothers are college graduates compared to those whose mothers completed only elementary or high school. This increased competency may be linked to the advanced educational resources and knowledge that college-educated mothers can provide, fostering a more profound understanding of animal husbandry practices and enhancing their children's skills in this domain.

The present study revealed that mothers with higher educational levels tend to foster more positive attitudes towards agriculture in their children. This aligns with the findings of Onanuga *et al*., (2021) [45] that this attitude is attributed to mother's ability to provide better educational resources and experiences related to agricultural practices, which can enhance children's understanding and appreciation of the field.

Table 27: Difference in the level of agricultural proficiency and competency of learners according to their mothers' educational attainment

	F-computed	p-value	Interpretation
Agricultural Proficiency			
Knowledge	3.771	0.002	Significant
Crop Production Skills	4.459	0.001	Significant
Animal Production Skills	4.694	0.000	Significant
Attitude Towards Crop Production	3.756	0.002	Significant
Attitude Towards Animal Production	4.148	0.001	Significant
Agricultural Competency			
Crop Production	3.370	0.005	Significant
Animal Production	2.422	0.035	Significant

Difference in the Level of Agricultural Proficiency and Competency of Learners According to the Occupation of their Father

Table 28 details the significance of the difference in the level of agricultural proficiency and competency in terms of fathers' occupation. There is a statistically significant difference in learners' level of agricultural proficiency relative to knowledge between at least two groups ($F(9, 485) = [2.098]$, $p = .028$). Post-hoc shows that the mean value of agricultural proficiency in terms of student's knowledge is significantly different between their father's job related to agricultural, forestry, and animal production (m=5.537, p= .025, 95% C.I. = -1.5267, -1.029); construction and building (m=5.511, p= .020, 95% C.I. = -1.5464, -.1353); business, food, and commercial (m=5.127, p= .002, 95% C.I. = -2.0085, -.4407); public service and government (m=5.378, p= .037, 95% C.I. = -1.8878, -.0602); and unemployed (m=5.375, p= .043, 95% C.I. = -1.9215, -.0325) to the OFW (m=6.352).

This suggests that students with OFW fathers have higher mean scores in farm knowledge, probably due to increased financial support, which allows them access to better educational resources and enrichment activities. In contrast to farmer's fathers, who may engage in more practical, experience learning, OFW families may purchase supplementary academic materials to reinforce formal knowledge. At the same time, those with construction workers or jobless fathers may have economic constraints that limit their access to complex learning resources. Those with fathers working as business owners or government employees may have moderate access to resources, but the focus on non-agricultural professions may reduce direct engagement with agricultural education.

Similarly, based on students' agricultural proficiency in knowledge, there is also a significant difference between the father's job related to clerical, service, and factory (m=6.231, p= .008, 95% C.I. = .2850, 1.9239); transportation and delivery (m=5.961, p= .007, 95% C.I. = .2343, 1.4344); and electrical and mechanical (m=6.024, p= .035, 95% C.I. = .0634, 1.7295) to the Business, food, and commercial (m=5.127).

The findings indicate that students whose fathers' jobs are aligned with clerical, factory, transportation, electrical, or mechanical can achieve higher mean scores in terms of knowledge in agriculture because these occupations can help to develop technical and problem-solving skills, which can be applied to a better understanding and attainment of agricultural objectives. On the other hand, students with business-oriented fathers can be exposed to more managerial or entrepreneurial skills that may also contribute to learning agriculture in other ways. On contrary, there is no statistically significant difference in mean scores for level of agricultural proficiency and level of competency based on the learners' fathers' occupation, specifically for crop production skills (p=.870); animal production skill (p=.660); crop production attitude (p=.351); animal production attitude (p=.158); Crop Production Competency (p=.102); and Animal Production Competency (p=.479). Faisal (2014) [24] found in his research that parents' socio-economic status particularly occupation, influence children's education. Study shows that parents with high profile jobs are more likely to identify their children's concern to give a possible solution. They also assist kids with their schoolwork by offering the required resources for learning. It is possible since a prominent occupation links with income level. Parents in prestigious occupations have greater income stability, making it easier for them to provide suitable educational opportunities for their children.

Table 28: Difference in the level of agricultural proficiency and competency of learners according to the occupation of their father

	F- computed	p-value	Interpretation
Agricultural Proficiency			
Knowledge	2.098	0.028	Significant
Crop Production Skills	0.507	0.870	Not Significant
Animal Production Skills	0.753	0.660	Not Significant
Attitude Towards Crop Production	1.114	0.351	Not Significant
Attitude Towards Animal Production	1.465	0.158	Not Significant
Agricultural Competency			
Crop Production	1.638	0.102	Not Significant
Animal Production	0.953	0.479	Not Significant

Difference in the Level of Agricultural Proficiency and Competency of Learners According to the Occupation of their Mother

Table 29 presents the significance of the difference in the level of agricultural proficiency and competency of the learners in terms of their mothers' occupation. There is no statistically significant difference in mean scores for level of agricultural proficiency and level of competency based on the learners' mother's job. Specifically for knowledge (p=.922); crop production skills (p=.198); animal production skill (p=.495); crop production attitude (p=.358); animal production attitude (p=.419); crop production competency (p=.744); and animal production competency (p=.545). The findings indicate that the skills of learners in fundamental agriculture may not be influenced by the mother's occupation. Instead, their agricultural ability would be affected more by other factors such as their school environment, their availability of resources, or their interest. Thus, in terms of agricultural proficiency, pupils achieve at equal levels regardless of the mother's work.

In addition, the context in which children are raised plays a crucial role in shaping their interests. For instance, the University of Edinburgh (2025) [58], highlights children growing up in agricultural communities may naturally develop an affinity for farming activities regardless of their mother's occupation.

Table 29: Difference in the level of agricultural proficiency and competency of learners according to the occupation of their mother

	F- computed	p-value	Interpretation
Agricultural Proficiency			
Knowledge	0.398	0.922	Not Significant
Crop Production Skills	1.390	0.198	Not Significant
Animal Production Skills	0.926	0.495	Not Significant
Attitude Towards Crop Production	1.105	0.358	Not Significant
Attitude Towards Animal Production	1.021	0.419	Not Significant
Agricultural Competency			
Crop Production	0.640	0.744	Not Significant
Animal Production	0.867	0.545	Not Significant

Difference in the Level of Agricultural Proficiency and Competency of Learners in terms of their Family's Monthly Income

Table 30 depicts the significance of the difference in the level of agricultural proficiency and competency of the learners in terms of family's monthly income. The results show that there is a statistically significant difference in learners' level of agricultural proficiency relative to knowledge between at least two groups (F (5, 489) = [3.001], p = .011). Post-hoc shows that the mean value of agricultural proficiency in terms of student's agricultural knowledge is significantly different between the family's monthly income. Learners from households with monthly income of Php.10,000-19,999, Php.40,000-49,999, and Php.50,000 and above exhibit higher mean scores in agricultural knowledge than those who belong to families earning less than Php.30,000. This trend indicates that higher income levels may allow increased access to instructional materials and experiential activities to improved agricultural knowledge among the students.

In the students' crop production skills (F (5, 489) = [5.139], p = .000), the result indicates that students from families with a monthly income of Php.10,000-19,999, Php.30,000-39,999, Php.40,000-49,999, and Php.50,000 and above exhibit notably higher mean scores in crop production skills compared to those families earning below Php.9,999. Additionally, learners that belong to families with an income of Php.30,000-39,999 and Php.50,000 and above indicate higher proficiency level than Php.10,000-19,999 and Php.20,000-29,999 income families. These results imply that good financial aspects can give better access to agricultural knowledge resources and practical experiences, in enhancing students' crop production skills.

In terms of students' animal production skills (F (5, 489) = [5.420], p = .000), students from families with a monthly income of Php.10,000-19,999, Php.30,000-39,999, Php.40,000-49,999, and Php.50,000 and above exhibit greater proficiency in animal production skills compared to those from families earning less than Php.9,999. Notably, students from families with an income of Php.30,000-39,999 and Php.50,000 and above income brackets outperform those with an income of Php.10,000-19,999 and Php.20,000-29,999 ranges. These findings imply that higher family income may provide greater access to learning resources and hands-on experiences, thereby supporting students' development of skills in animal production.

When it comes to the students' attitude towards crop production (F (5, 489) = [7.417], p = .000), higher family income is usually related to having a more positive attitude among students toward crop production. In particular, families that have a monthly income of Php.30,000-39,999, Php.40,000-49,999, and Php.50,000 have a higher mean score in their attitude towards this field, possibly because they have better access to resources, education, and support. In contrast, those from families with a lower monthly income (Php.10,000-19,999 and Php.9,999 and below) may have less opportunities or encounter economic limitations affecting their perception and interest in crop production.

With regards to the students' attitude towards animal production (F (5, 489) = [5.760], p = .000), the result shows that learners from families with a lower monthly income (Php 9,999 and below, Php 10,000-19,999, and Php 20,000-29,999) tend to have a less positive attitude towards animal production compared to those students who come from families with an income of Php 50,000 and above. Additionally, students from families with a monthly income of Php 30,000-39,999 demonstrate a more positive attitude compared to those whose families earn Php 9,999 and below or Php 20,000-29,999. Interestingly, students with a family income of Php 20,000-29,999 score lower in their agricultural attitude compared to those whose income is Php 10,000-19,999 and Php 40,000-49,999 income brackets.

In line with the students' crop production competency (F (5, 489) = [5.314], p = .000), students from families with a monthly income of Php.30,000 and above tend to exhibit higher competency in agricultural crop production compared to those from families earning Php.19,999 and below. This difference can be associated to greater access to quality education, resources and support provided by the higher-income families. In contrast, learners from lower-income families may encounter limitations that hinder their skill development and overall competency in this subject.

In terms of learners' competency in animal production (F (5, 489) = [6.294], p = .000), results assume that students from families with a monthly income of Php.30,000 and above typically shows higher competency in animal production compared to learners from families earning Php.19,999 and below. The difference can be attributed to the easier access to practical experiences, educational resources, and nurturing environments that higher-income families can offer. On the other hand, learners from households with lower-income often face financial constraints that may limit their skills development in animal production.

According to the study of Jimoh *et al*. (2017) [33], there was a positive relationship between the income of parents and the interest of children in pursuing careers in agriculture. That is, learners from lower-income households indicated that they have less interest in agriculture than those learners from higher-income families. Higher household incomes usually have better access to resources that promote ease in accessing resources and education, implying a direct correlation between income levels and children's developmental opportunities (Bliznashka *et al*., 2023) [6].

Table 30: Difference in the level of agricultural proficiency and competency of learners in terms of their family's monthly income

	F - computed	p-value	Interpretation
Agricultural Proficiency			
Knowledge	3.001	0.011	Significant
Crop Production Skills	5.139	0.000	Significant
Animal Production Skills	5.420	0.000	Significant
Attitude Towards Crop Production	7.417	0.000	Significant
Attitude Towards Animal Production	5.760	0.000	Significant
Agricultural Competency			
Crop Production	5.314	0.000	Significant
Animal Production	6.294	0.000	Significant

Relationship of the Learners' Level of Agricultural Proficiency and their Level of Competency in Agriculture

As reflected in Table 31, Spearman Rho correlation was computed to assess the relationship between the level of student's level of agricultural proficiency and level of agricultural competency of public elementary schools in Santa Maria, Laguna. In terms of knowledge, results show that it has a significant relationship between students' agricultural competency. Specifically, it shows a positive correlation in crop production competency (r=.143, p=.000), and animal production competency (r=.099, p=.000). This indicates that as the agricultural knowledge of the students increases, their ability to attain the most essential competencies in agriculture as part of Edukasyong Pantahanan at Pangkabuhayan (EPP) also increases. The knowledge serves as a foundation of their ability to understand plant and animal growth.

When it comes to the skills, it reveals that there is a significant relationship between student's agricultural skills and agricultural competency. Thus, it has a substantial positive correlation. Particularly, students' crop production skills have a significant relationship with crop production competency (r=.630, p=.000), and animal production competency (r=.554, p=.000). Likewise, animal production skills have a significant relationship with crop production competency (r=.604, p=.000), and animal production competency (r=.556, p=.000). The result implies that a high students' skills who work with crops and animals, translate into an increase competency in agricultural competency, which is important for translating theoretical knowledge into practical applications.

Lastly, the results on the students' attitude towards crop and animal production competency show a significant relationship between them. Specifically, students' crop production attitude has a significant relationship with crop production competency (r=.655, p=.000), and animal production competency (r=.559, p=.000). Consequently, animal production attitude has a significant relationship with crop production competency (r=.671, p=.000), and animal production competency (r=.623, p=.000). This means that a student's attitude towards agriculture, which reflects their interest, and motivation, is closely correlated to their competency in crop and animal production. Strong positive agricultural attitude enables continuous learning and adaptation, which is both necessary for reaching competency in agriculture.

According to the study conducted by Lilian *et al*., (2024) [38], learners who have a positive attitude in agriculture are more likely to engage actively and perform better academically. In addition, students who recognize the practical applications of agricultural knowledge tend to have a more favorable attitude, enhancing their motivation to learn (Isahac, 2024) [30].

Table 31: Relationship of the learner's level of agricultural proficiency and level of competency in agriculture

Agricultural Proficiency	Agricultural Competency	r value	p-value	Interpretation
Knowledge	Crop Production	0.143	0.001	Significant
	Animal Production	0.099	0.027	Significant
Crop Skills	Crop Production	0.630	0.000	Significant
	Animal Production	0.554	0.000	Significant
Animal Skills	Crop Production	0.604	0.000	Significant
	Animal Production	0.556	0.000	Significant
Attitude Towards Crop Production	Crop Production	0.655	0.000	Significant
	Animal Production	0.559	0.000	Significant
Attitude Towards Animal Production	Crop Production	0.671	0.000	Significant
	Animal Production	0.623	0.000	Significant

Conclusion

The study concluded that the demographic profile of learners, who were primarily 10 years old, had a balanced gender distribution, lived near their schools, and came from medium sized, lower to middle income households, shaped their agricultural learning outcomes. Most fathers were high school graduates working in construction, while mothers were mostly housewives or college graduates.

Learners demonstrated moderate knowledge, high skills, and a very positive attitude toward agriculture, resulting in a high level of competency in crop and animal production. Significant differences in agricultural proficiency and competency were found when grouped by age, grade level, place of residence, family income, and parents' educational attainment. Eleven-year-olds performed better in knowledge, while twelve-year-olds showed higher competency. Grade 5 learners had stronger skills and understanding. Students near the town center or farms outperformed others, while upland students had more positive attitudes toward animal production.

No significant differences were found based on sex, household size, or distance from school. Fathers' occupations affected learners' knowledge, while mothers' employment showed no significant influence. Higher family income and parental education were linked to better agricultural proficiency and competency. These findings underscore the interconnected roles of knowledge, skills, and attitudes in developing learners' agricultural competencies and highlight the importance of contextual and socio-economic factors in shaping educational outcomes in agriculture.

Recommendation

Based on the study's findings and conclusions, it is recommended that targeted and practical instructional strategies be strengthened to enhance learners' agricultural knowledge, skills, and attitudes. Curriculum developers should incorporate more experiential and hands-on activities to bridge the gap between theory and real-world application in agriculture. Farm exposure programs, especially for students residing near urban centers, should be integrated to reinforce positive attitudes and sustain interest in agriculture. Schools may implement monitoring systems to track student outcomes and use the data to inform curriculum adjustments. Learners' positive attitudes and emerging skills in agriculture can be further supported through focused training in agri-based projects and entrepreneurship. Additionally, regular in-service training for teachers and policy support aimed at improving access to resources, instructional quality, and curriculum-industry alignment should be prioritized to ensure the continued relevance and effectiveness of agricultural education in the EPP program.

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