

NUTRITIONAL STATUS TO ACADEMIC PERFORMANCE OF THE SCHOOL-AGED CHILDREN: A BASIS FOR INTER-COLLABORATIVE EXTENSION SERVICES PROGRAM

RYAN C. FONTANILLA, RN, LPT, MSN, MAEd-EM

Research Director, Medical Colleges of Northern Philippines and International School of Asia and the Pacific, Philippines. Email: mcnp.isap.rdc@gmail.com

FELONILA L. CATUIZA, Ph.D

Human Resource Management Officer/ Dean College of Education, Mallig Plains College Inc, Philippines.

ARTHURO B. NANO, Ph.D

Research Director, Mallig Plains College Inc, Philippines.

AURORA V ADAYA, Ph.D

Dean, Graduate School Mallig Plains College Inc, Philippines.

Abstract

As a consequence of this dynamic period of active growth and mental development in childhood, the nutritional requirements of this age group are greater than those of the preschool years. In order to sustain the approaching growth spurt, necessitating diets rich in both macronutrients and micronutrients, the nutritional requirements of this age group are greater than those of the preschool years. Due to the higher dietary requirements necessary to maintain this demand, malnutrition among people of this age range continues to be a significant public health problem in poor nations. It is for this reason that the primary purpose of this investigation is to evaluate the academic performance of the students at the Mallig Central Annex, in addition to their nutritional status and the factors associated with it, and to investigate the associations and effects between these variables. A sequential mixed method design was used among the parents or guardians of the 52 learners, and an interview session was also included to assess the challenges faced by the teachers in maintaining nutrition-related programs in the aforementioned academic community. This was done to facilitate the gathering of data, which was facilitated by the use of the sequential mixed method design. They were picked at random from the complete list of students registered at the school where they attend. In order to measure the various factors that were involved in this study, standard questionnaires were utilized. In order to make sense of the information that was acquired, descriptive statistics such as the frequency count and the percentage distribution were utilized, in addition to the mean and the standard deviation. The regression analysis was used to measure the associations between the variables as well as their effects. After conducting an analysis on the data obtained from the respondents, it was discovered that the students have a nutritional status that is within the usual range and that they are doing well in their academics. According to the findings of the study, learners' nutritional status has a considerable percentage of an effect on their academic performance. Because of this, nutritional status is an essential indication of the academic achievement of learners. Further research demonstrates that the socioeconomic position of the respondent, the status of food security and variety in the home, and the status of food diversity in the household are all significantly connected with and have an effect on the nutritional health of the individual.

Keywords: Academics: Gulayan sa Paaralan, School-based feeding program, engagement, nutritional status

INTRODUCTION

School age is a dynamic period of active growth and mental development in childhood, and the nutritional needs of this age group are greater than those of the preschool years. Malnutrition among this age group remains a significant public health problem in developing countries due to the increased nutrient needs to sustain the requirement. Rural areas have a higher proportion of undernourished school-aged children, particularly among agricultural households, and the Mallig Plain is one of the Region's agriculturally dependent areas. Agriculture workers and their families are among the most vulnerable due to various climatic factors. Undernutrition among school-aged children remains a public health concern in most ASEAN countries, and the prevalence is still higher in the Philippines, Myanmar, and Laos (World Health Organization, 2008).

In the DOST-2015 FNRI's Updating of the Nutritional Status of Filipino Children and Other Population Groups, 31.2% of school-aged children 5-10 years old were underweight, 31.1% were stunted, and 8.4% were wasting. The Department of Science and Technology-Food and Nutrition Research Institute (2020) found that 56% of schoolchildren in Cagayan and Isabela provinces were malnourished, with 21.2 underweight, 21.4 stunted, 7.4 thin, and 9.7 overweight and obese. The Mallig Central School Annex also had 59.62 percent of responders with normal nutritional status. Dietary inadequacy, food insecurity, unequal household food allocation, inappropriate food preparation and storage, and infectious infections make school-aged children vulnerable to malnutrition. Malnutrition delays physical and cognitive development, which leads to school dropout, late enrollment, high absenteeism, and poor performance. Given the limitations in the literature, this paper estimated school-aged children's nutritional status, identified major factors affecting it at Mallig Plains Central School-Annex, and examined its association with academic achievement.

This research can assist the school in planning and developing programs tailored to the needs of the vulnerable population, as well as the Mallig Plains College community extension services office in taking necessary actions and plans to assist the central school in sharing resources to expand the sustenance of the nutrition programs. Finally, this study can provide critical information on the factors influencing the nutritional status of school-aged children. Also, this will guide policymakers and stakeholders in developing policies and initiatives to improve the situation of Mallig Plain Central School-Annex, school-aged children.

RESEARCH METHODOLOGY

Sequential Explanatory Mixed Study Design was used to collect and analyze quantitative data in two phases. Qualitative data was obtained in the second phase and related to first-phase results. The panel of experts created a framework and plan of action and used a Delphi technique to verify it using data from the first phase. The strategy was crucial since it proposed a framework to sustain nutrition programs for learners. The Delphi technique was used to evaluate the framework to guide the action plan based on this study's results. This survey included 52 Mallig Central School Annex parents and guardians. To ensure population representation, respondents were selected using simple random sampling. Teacher

representatives, head teachers, and school principals were chosen for the qualitative design. The criteria for selecting interviewees were: past experience in school nutrition program implementation, willingness to participate, enough time for assessment and interview, and more than a year in practice. The framework was reviewed by five nutrition, health, and community extension professionals.

This study evaluated a school nutrition program using a standard questionnaire. The 4-point likert scale tool was based on the 2011 Department of Education Memorandum Order 43 series. Erlin Collin (2013)'s tool assessed respondents' eating habits. Gina Kennedy, Terri Ballard, and Marie Claude Dop (2013) developed a technique to quantify household dietary diversity. The respondents would recollect a 24-hour food intake and tick the item that best described their answer. There were 12 food groups and categories. The House Food Security Status and Academic Engagement were assessed using the Department of Science and Technology method. Nutritional status was examined using BMI and the latest general weighted average of students. A language expert verified all tools' vernacular translations. The researcher piloted the tool with 10 community members. A Cronbach's Alpha reliability test yielded 0.970, indicating that the tool may be utilized for data collection and measuring what the researcher intended. For the qualitative part, a semi-structured open-ended question assessed stakeholders' challenges in continuing the nutrition program and students' nutritional status. Stakeholders were interviewed in a focus group.

Researchers collected quantitative and qualitative data from respondents. The descriptive phase began with the researcher explaining the study's goals and obtaining consent. After consent, the researcher offered responders enough time to complete the tool. After collecting the responses, the researcher coded and processed the data using statistical methods. The research investigation also observed secrecy and anonymity.

Qualitative data was collected by inviting respondents to a face-to-face meeting to ask research study-related questions. The study's three phases—development, evaluation, and action plan—are most significant. The researcher developed a framework to guide inter-collaborative community extension services of the Graduate School Department in implementing the nutrition program and maintaining student nutritional status based on data. The framework and action plan were evaluated by nutrition health and community organizing specialists. The researcher created an action plan for Mallig Plain College's inter-collaborative extension services program using the framework. Consent forms and complete disclosure of the agreement assured ethical study conduct. Data was kept secret and correctly recorded to ensure research integrity.

In the analysis of the data gathered, the following statistical treatment of data were used: the descriptive statistics were used for the Body Mass Index, household dietary diversity, Household food security status, food diversity, eating habits, the nutrition related activities implementation and the academic performance of the respondents. The extent of which the different major variable affects the nutritional status and academic performance of the respondents, the Multiple Regression Analysis was performed. As to the qualitative part of this study, the thematic analysis and presentation was used in the presentation of the data, and upon

conceptualizing the framework, evaluation was done by the expert through the use of the Delphi method in which measure of variability such as the standard deviation was used in the analysis of the assessment and evaluation of the expert validators on the framework formulated based on the data gathered from the respondents.

RESULT AND DISCUSSION

Table 1: Mean Assessment on the extent of Implementation of Nutrition related Activities

Nutrition Related Activities	Mean	Description
1. Deworming	2.50	Often
2. Medical checkup	2.37	Sometimes
3. Dental checkup	2.38	Sometimes
4. Weight and height monitoring	2.87	Sometimes
5. Auditory screening	1.83	Sometimes
6. Visual screening	1.94	Sometimes
7. Food distribution	3.00	Often
8. Supplemental feeding	2.94	Often
9. Production of vegetable in the school	2.90	Often
10. Conduct vegetable monitoring	2.89	Often
11. Distribution of health flyers	2.87	Often
12. Conduct of health education sessions	2.96	Often
Category Mean	2.63	Often

The table shows that institutions often implement nutrition and other health-related activities that are only feasible in their schools as the main activity that is being subsidized by the government and with specific mandate and implementing guidelines is the school-based feeding program and food distribution among other pre-identified program in schools (Dep.Ed Order no. 031 s. 2021) to fulfill the Philippine Plan of Action o The Department of Education's annual plan includes vegetable gardening, making it one of the table's highest means (Dr. Reynaldo B. Inocian & Lory M. Nuneza, 2015). Some educational activities require specialized equipment and instruction. This is not an isolated case in the school; other institutions in the region are also experiencing such; they cannot implement such activities to their fullest because the teacher in charge of the activities has limited knowledge and the things and equipment to be used in the assessment process are not available in their school or community (Ana Maria L. Tabunda, Jose Ramon G. Albert, and Imelda Angeles-Agdeppa, undated).

Table 2: Distribution of the Respondents as to their Eating Habits

Statement (Score)	Frequency	Percentage
Very Good (64-84)	15	28.80
Good (43-63)	16	30.80
Fair (22-42)	21	40.40
Poor (0-21)	0	0.00
Total	52	100

The table above shows how eating habits affect schoolchildren's nutrition. 21 respondents (40.40%) have a decent eating habit, followed by 16 and 15 (30.80 and 28.80) with good and very good eating habits. School-aged children are less likely to like eating nutritious foods than selective eaters and healthy eaters. The data from the present study is not new to the literature because the learners are in an active stage and don't focus on their food to eat but on their activities, causing them to eat unhealthy food (Nesrienne G. Buyco et al., 2021). School-aged children are picky eaters and spend more time on leisure activities like watching TV and sports with friends (Pantea Stoian, Anca; Andronache, et al., 2018).

Table 3: Distribution of the Respondents as to their Household Dietary Diversity

Score	Frequency	Percentage
High (>6 Food Variation)	49	94.23
Medium (4-5 food Variation)	3	5.77
Low (<3 Food Variation)	0	0
Total	52	100

The above table shows the food diversity of the respondents, with 49 respondents (94.23%) having a high food diversity, 3 (5.77%) having a medium diversity, and no respondents having a low diversity. This suggests that the respondents, their children, and the whole household are eating and taking various foods and nutrients, as the literature suggests. This study also found that school-aged children in the Philippines have low food intake due to limited resources (Tsz-Ning Mak, Imelda Angeles-Agdeppa, Yvonne M. et al., 2019). However, a more recent study that specifically assessed the food diversity of school-aged children in rural areas found that food diversity is much higher in rural than urban areas, including Mallig Plains. The table also shows that respondents eat the most cereals, particularly rice. Mallig Plains is a rice-producing municipality with plenty of rice, and according to the literature, rice and cereals are the most commonly eaten food group by Filipino families (Philippine Nutrition facts and figures, 2022; Imelda Angeles-Agdeppa et al., 2021; Food and Nutrition Institute, 2022). The least food that respondents are not eating in their meal is organ meat because the supply and price of organ meat is increasing due to the very difficult logistics of meats and poultry products in the market (Cullen Mt. 2020, March 29) due to the health threat of the African Swine Flu (ASF) and Bird Flu in the Region and County (Department of Health Bulletin, 2022). Due to low meat, organ meat, and poultry intake, school-aged children in the region have a high prevalence of Iron Deficiency Anemia (Global Nutrition, 2022).

Table 4: Distribution of the Respondents as to their Food Security Status

Statement	Frequency	Percentage
Secured (5-6 scores)	19	36.5
Mild (3-4 scores)	4	7.7
Insecure (1-2 scores)	29	55.8
Total	52	100

The table above shows the food security status of the respondents. The majority, 29 respondents, or 55.8%, are insecure, followed by 19 or 36.5%, and 4 or 7.7% are mild. The data implies that their household has not had enough food to eat for the past six months, which

is consistent with the data showing that our region is the fifth in the country with the most households with food insecurity, due to unsoftening consumption due to limited resources, price increases of basic commodities, and pandemic aftereffects (The Philippine Food Monitoring, 2022). Further analysis shows that food security in the country is a major issue that needs to be addressed, but according to this study's data, despite the government's program, food insecurity in the region is increasing due to limited food availability, accessibility, utilization, and stability (Philippine Institute for Development Studies, 2018).

Table 5: Distribution of the Respondents as to their Nutritional Status based from their Body Mass Index

Statement	Frequency	Percentage
Obese	1	1.90
Overweight	2	3.85
Normal	31	59.62
Wasted	15	28.8
Severely Wasted	3	5.77
Total	52	100

The table above shows that 31 respondents (59.62%) had a normal Body Mass Index (BMI). Wasted, severely wasted, overweight, and obese replies follow the typical range. This suggests the government and schools are fighting malnutrition. The normal nutritional status is expected from this study because there is already a program implemented and supported by the government and school to address the Philippines Plan of Action 2017-2022 (PPAN) specifically the school-based feeding program and food distribution to eradicate malnutrition. However, the data on the table still shows a high number of deviations from the normal nutritional status. According to the table above, undernourished children are caused by eating habits, poor nutrition during pregnancy, and food security (Global Nutrition, 2022). In addition, literature showed that overweight and obese children are very prevalent in the country as data shows that over the last five years, there has been a consistent very rapid increase of 10.2% of over nourished children in the country, which is significantly associated with the following factors: carbonated drinks, sugar and syrup in the diet, the proliferation and advisability of soft drinks in the market, and the sedentary lifestyle (UNICEF).

Table 6: Distribution of the Respondents as to their Academic Engagement

Statement	Mean	Descriptions
Affective	3.73	Very Engaged
Behavioral	3.68	Very Engaged
Cognitive	3.67	Very Engaged
Categorical Mean	3.69	Very Engaged

The table above shows respondents' ratings of their children's academic engagement. The three domains of engagement— affective, behavioral, and cognitive— have extremely good mean assessments of 3.73, 3.68, and 3.67, respectively. Affective domain showed children's enthusiasm in school, behavioral element showed children's participation in classroom discussions and activities, and cognitive perspective showed students' effort to complete tasks.

The category mean is 3.69, which matches the study by Dr. Armando P. Delfino (2019). Because of their mandate that "no child left behind," the respondents' children are motivated in class and academic activities. This suggests that teachers are good at translating curricular knowledge into class activities, which engages students (Eleazar Cacapit De Jesus, 2019). Teachers, schools, and families that are supportive and approachable, as well as the teacher's subject matter and pedagogical perspective, may help students engage (Antonio Jr. T. Enerio, 2021).

Table 7: Distribution of the Respondents as to their Academic Performance

Statement	Frequency	Percentage
Excellent (96-100)	0	0
Very Good (91-95)	14	26.9
Good (86-90)	38	73.1
Fair (81-85)	0	0
Needs Improvement (80 and less than)	0	0
Total	52	100

The table above showed respondents' academic performance. 38 respondents (73.1%) were good performers, followed by 14 (26.9%) who were very good. No respondents were outstanding, fair, or needs improvement. The data shows that students perform well in school. The previous table illustrates that students are engaged in their academics, and this table supports that. The engagement and academic achievement tables above match. Literature supports the study's finding that student engagement affects academic achievement (Yousra Banoor Rajabalee, Frank Rennie, 2020). To elaborate, a good learning environment can increase student involvement, motivation, and academic success (Dr. Erick T. BALORAN, Jenny T. HERNAN, Janice S. TAOY, 2021).

Table 8: Effect of the Profile Variables, Extent of Implementation of Nutrition Related Activities and Factors affecting Nutritional to their Nutritional Status

Variables	Nutritional Status (BMI)		
	r- value (r)	r- value squared (r ²)	p-value
Profile Variables			
Age	0.84	0.71	0.70
Sex	0.36	0.13	0.10
Civil Status	0.13	0.02	0.65
Socio-economic Status	0.51	0.76	0.02*
Highest Educational Attainment	0.35	0.12	0.30
Occupation	0.37	0.14	0.22
Extent of Implementation of Nutrition Related Activities	0.05	0.02	0.73
Factors Associated with the Nutritional Status			
Eating Habits	0.84	0.31	0.70
House Food Security Status	0.56	0.61	0.04*
Household Dietary Diversity	0.13	0.20	0.03*

The table above demonstrates how variables affected respondents' nutritional status. The respondent profile is significant at 0.05 margin of error. Socioeconomic position affects 76%

of respondents' nutritional status. The current study found that agricultural schoolchildren's socioeconomic position was a substantial risk factor for underweight and stunting. The poorest quintiles had the most undernourished schoolchildren. Farming households have more stunted and underweight children, according to the study. The agricultural sector has the most malnourished youngsters, according to the research. Most of them were from the lowest socioeconomic quintiles and had little access to security or financial brokers, therefore socioeconomic capacities drove them. Economic circumstances determine whether households can buy food. In the Philippines, farming households with the lowest socioeconomic status had more underweight and stunted pupils (Food and Nutrition Research Institute. 2016a, 2015; Mahendra D., 2012; IFPRI, 2009).

Stunting was also higher in the poorest students. Chronic poverty stunted preschool-to-school-aged youngsters. A household's finances affect its capacity to eat well. Poor dietary habits and availability to important health services can also impair schoolchildren's linear growth (Mesfin F, Berhane Y, Worku A., 2015). Stunting, underweight, and wasting were more common in school-aged children from poverty-threshold households in India and the Philippines (Katoch O, Sharma A., 2016). A study found that agricultural families have more stunted children. Higher economic levels have lower stunting cases (Arimond M, Hawkes C, Ruel M, Sifri Z, Berti P, Leroy J et al., 2011). Thus, schoolchildren's weight for age is most affected by the household wealth index in farming homes. 61% also links food security to nutritional quality. This may be because a well-nourished child needs food security at home. Home food security affects a child's diet. Dietary diversity was substantially connected with school-aged children's optimal nutrition (N.P Ramsi, 2013; Kishwar A, Abdul, 2015). Food volatility harms children's nutrition in emerging nations (Ali D. et al., 2013 & Lawal B, Lawal F., 2010). The current study found that significant food insecurity among schoolchildren protected against underweight status. This study found that school-aged children from agricultural families were less likely to be underweight and stunted under extreme food insecurity. Several studies found the reverse association between undernutrition and food security. Gundersen (Gundersen C, Garasky S, Lohman B., 2009) found that children with more individual stressors gained weight, which increased their weight-for-height index. Food insecure children ate cheap, high-calorie foods without micronutrients. Schoolchildren from food-insecure households were more likely to be malnourished. Rice is the main food in lower-income children's diets, which are often insufficient in nutrients. Dietary diversity, which contributed 20% to the respondent's nutritional status, was also significant. A farming household's poor and acceptable borderline diet was substantially associated to stunting, suggesting socioeconomic issues. Chronically undernourished children grow shorter. Increased diet variety may reduce undernutrition (Shetty P., 2013). Diversity scores increased schoolchildren's heights. Insufficient food diversification was also linked to child undernutrition (Motbainor A, Alemayehu W, Kumie A., 2015). However, high dietary diversity scores reduced stunting in school-aged children of all ages (Rah J, Akhter N et al., 2010). In Nigeria, a child's nutritional status and daily meal count were linked. Snacks also helped kids gain weight and height (Lawal B, Lawal F., 2010). Poverty was linked to high calorie intake but low micronutrient intake, since the poorest quintiles had the lowest dietary diversity scores. Poor diets may reduce weight.

Table 9: Effect of the different Factors to Nutrition and Nutritional Status to their Academic Performance of the Respondents

Variables	Academic Performance		
	r- value (r)	r- value squared (r ²)	p-value
Profile Variables			
Age	0.57	0.32	0.76
Sex	0.35	0.12	0.10
Civil Status	0.12	0.01	0.69
Socio-economic Status	0.33	0.11	0.12
Highest Educational Attainment	0.35	0.12	0.30
Occupation	0.41	0.17	0.13
Extent of Implementation of the Nutrition Related Activities	0.30	0.09	0.30
Factors Associated with the Nutritional Status			
Eating Habits	0.27	0.07	0.16
Household Dietary Diversity	0.04	0.00	0.80
House Food Security Status	0.17	0.03	0.51
Nutritional Status	0.25	0.60	0.03*
Academic Engagement	0.03	0.01	0.81

According to the table, nutritional status is one of the linear regression variables that can affect academic performance by 60%. The study found that pupils who consume one to two meals of meat per week have a higher average than those who eat it five or more times per week. But one thing has been noted: those with high-nutrient diets outperform their classmates in all areas (e.g., class alertness, frequency of sickness, feeling after meals, and academic achievement) (Hunt, J. G., 2015). The study of Alcuizar, R. M., (2016); & Anderson, A. S., & Good, D. J., (2017) found that elementary-age children value academic performance as a resource for productive adulthood. Academic excellence for schools is also required. The individual's mind, body, and soul are integrated with the environment through optimal nourishment for children. Academic achievement is linked to adequate nutrition and wellbeing because academic and non-academic elements share power over a child. Acheron, A. (2019) found that proper eating affects children's academic performance. According to an author's study, kids' academic performance is affected by their diet and nutrition. College students' academic performance is also influenced by obesity and eating habits. Students' academic performance is predicted by BMI. Students do well academically when they're healthy. With better nutrition, students predicted better grades. The finding confirms that BMI predicts academic success, according to Magulod et al. Thus, healthy eating habits predict academic performance. This shows that youngsters can flourish academically if they eat well because the nutrients in their meals will power their bodies, making them more active and providing more cellular sustenance to digest classroom material.

Table 10: Cluster Themes on the Needs of the Stakeholders to Sustain the Implementation of Nutrition Related Program

Codes	Cluster Themes	Emergent Themes
No things available for the procedure	Limited Resources	Recalibration and Re-tooling
No calibrated materials		
Unaware of the processes	Limited skills Health	
Do not know how to do the procedures		

The chart represents the qualitative assessment of teachers' nutrition program implementation needs. The table's emerging theme is "recalibration and re-tooling" of the institution's faculty, who must be properly oriented on what to do and deliver when doing their responsibilities. This emergent theme was created because they had given a training prior to the program's implementation and needed to update their skills and training again on health trends related to students' nutritional needs. Though the faculty members received nutrition training and seminars before implementation, they are not allied health graduates, so they need more orientation and training to help the program succeed. Additionally, the institution's resources for program implementation must be examined. A need to find funding to finish the sets of needed resources or partner with other government organizations to provide more vivid health evaluation and intervention to students.

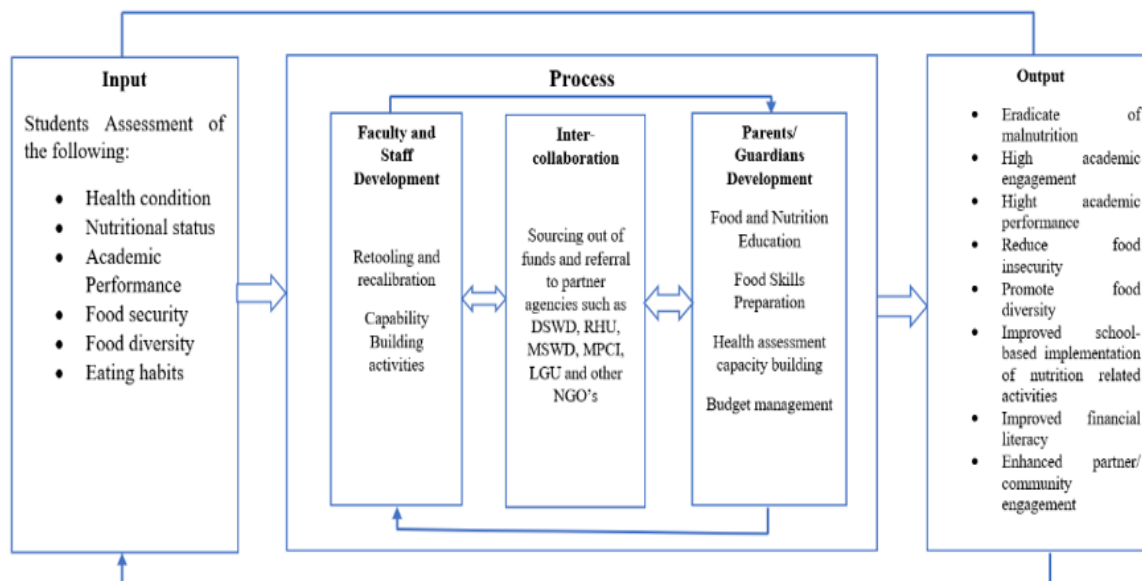


Figure 1: MPC (Malnutrition Prevention Cycle) Framework. Schematic Diagram of the framework based on the Result of the Study

This study's data reveals the variables' relationships in the framework above. The framework is called Malnutrition Prevention Cycle (MPC) Framework after the researcher's Master of Arts in Education institution. The MPC is the partner agency of the Mallig Central School Annex, which is why the framework is named after the school. This methodology assesses the learner's

health, nutritional status, eating habits, academic engagement and performance, food security, and food diversity. Whatever the assessment finding, the process or intervention must address the needs and gaps. The study's factors, validated to be important to learners' health, are input. In the first phase, the procedure includes a plan to handle the assessment outcome. This section links faculty and staff development, inter-collaboration to address needs and gaps, and parent and guardian capacity building. The framework also shows how process variables interact to produce output. The process's variables have distinct effects and relationships that affect the process's output and goals. The output demonstrates the process's goal of improving students' health and nutrition and academic achievement. This framework will also improve partner agency-Mallig Palin Colleges Inc. collaboration and Department of Education nutrition-related operations. After completing the processes, the goal is to create a holistic learner who focuses on their health (eating habits, food security, food diversity, etc.) to improve academic engagement and performance.

Table 11: Evaluation Matrix of the Proposed Community Extension Services Framework as Assessed by Experts

Identified Factors	SD	Interpretation
Assessment of the Students Health and Nutritional Status	0.85	Good
Assessment of the Academic Performance	0.32	Good
Faculty and Staff Development	0.35	Good
Inter-collaboration	0.54	Good
Parents/ guardians Development	0.95	Good
Eradication of Malnutrition	0.23	Good
High Academic Engagement and Performance	0.33	Good
Reduce food insecurity	0.84	Good
Promotion of food diversity	0.71	Good
Improves school's implementation of nutrition related activities	0.53	Good
Overall assessment on the Framework	0.26	Good

The table above shows the acceptance of the panel of experts in the different variables mapped out in the framework vis-à-vis their acceptance into the whole process and framework. Upon two sessions with the panel of experts, consensus was achieved and it is noted that all the variables were accepted as evident by the standard deviation less than 1 which means that the different variables are accepted and a vital component in the process flow. Also, the overall acceptability on the framework shows the same as the standard deviation is less than 1. As Rankin (1994) explains that the item is good and acceptable when it is less than 1 and needs revision the other way around. It is therefore an implication that the variables are valid to be incorporated in the framework vis-à-vis the whole framework.

Table 12: Crafted Inter-Collaborative Strategies for Community Extension Services Program

Title of the Program: Project DIET (Developing Inter-Collaborative Enhancement and Training): A Program to Enhance Learners Nutritional Status at Mallig Central School Annex

Duration of the Program: Year-round Activity

Rationale: The nutritional Status of the learners is an essential component for them to do their everyday living/ tasks including going to the school to learn and to assimilate all the lessons effectively for them to be prepared and for them to be equipped with necessary competencies to face the real battle field in life. Based from the result of this study, there were variables associated in the nutritional status of the learners but what is noted is that the nutritional status significantly affects the academic performance of the learners. In this note, the Mallig Central School Annex were noted to have a high percentage of malnutrition in their campus which then hinders the academic performance of the learners. This activity will promote collaboration among all the partner agencies to touch lives of the learner's thus promoting quality of life and a meaningful academic journey among the learners.

General Objective: This activity aims to promote and enhance nutritional status of the learners through inter-collaborative activities among the stakeholders and clearly be the main variable that may also enhance their academic performance.

Specific Objectives

- To have a baseline data on the health status of the learners
- To plan for the actions to fill in the gaps in the assessment process
- To Capacitate teachers and staff in the concept of nutrition
- To Capacitate parents and guardians in the concept of nutrition
- To enhance collaboration among the partner agencies
- To evaluate the success of the implemented programs

CONCLUSION

On the objective to assess the nutritional status of the learners at Mallig Central School Annex and its effect to their academic performance shows a very remarkable result. Upon analyzing the data collated from the respondents, it shows that the learners display a normal nutritional status and they exhibit a good performance in their academics. Also, it is noted in the study that nutritional status shows high significant percentage of effect to the academic performance of the learners thus nutritional status is a key indicator of the academic success of the learners. Further analysis also shows that the nutritional status significantly associated and affected by the respondent's socio-economic status, house food security status and household food diversity status.

RECOMMENDATIONS

In light of the findings and the conclusions presented in the previous parts of this paper, the following are hereby offered:

1. For the Mallig Plains College Community Extension Services Office to incorporate the framework formulated as a result of this investigation in their manual of operation to be used as the basis in crafting activities for the adopted community regarding strengthening the nutritional status of the learners.

2. The adoption and implementation of the program plan included in this paper to fully strengthen the implementation of the nutrition related activity of the adopted school of the graduate school program of Mallig Plains College Inc.
3. Re-tool and recalibrate the faculty and staff of the Mallig Central School Annex on the basic of the concept of nutrition and the basic assessment technique to precisely measure and strengthen the implementation of the program.
4. For the Mallig Plains College Inc. and the Mallig Central School Annex to come up with a capacity and building program for the parents and guardians to empower them to advocate proper nutrition.
5. For the Mallig Central School Annex to promote collaboration among the stakeholders and partner agencies to sustain the implementation of the nutrition program such as but not limited to the government and non-government organization, the Loca Government Unit, the Municipal Social Welfare and Development, the Mallig Plain Colleges Inc., the Rural Health Units and the like.
6. For the future researchers to use the framework as their basis in the assessing concept related to this study and to make necessary assessment of the usability of the framework offered from this study. Also, a wider perspective should also be done focusing on the other way to measure the nutritional perspective of the learners and to venture into a more sample. The comparison of the government and private schools are also highly encouraged as a next focus of the study.

References

1. Aceron, A. (2019, November). Nutritional Status and Its Impact on Academic Performance of Selected Grade 8 Students. In *Journal of Physics: Conference Series* (Vol. 1254, No. 1, p. 012013). IOP Publishing. Retrieved from <https://tinyurl.com/s8pm9ag> indexed by Scopus
2. Al Munnr Abubakar, Yunusa Abubakar, Jacob Dabo Itse (2017), students' engagement in relationship to academic performance, *Journal of Education and Social Sciences*, Vol. 8, Issue 1, (October) ISSN 2289-1552
3. Alcuizar, R. M. (2016). Determinants of low academic performance for pupils in upland barangays, Iligan City, Philippines. *International Journal of Physical Education, Sports and Health*. Retrieved from <https://tinyurl.com/ucndabj> indexed by Copernicus international
4. Ali D, Saha K, Nguyen P, Diressie M, Ruel, M, Menon P, Rawat R. 2013. Household food insecurity is associated with higher child undernutrition in Bangladesh, Ethiopia, and Vietnam, but the effect is not mediated by child dietary diversity. *The Journal of Nutrition* 143(12): 2015–2021
5. Amabelle C. Quendangan (2021) Region II (Cagayan Valley) Population Profile, https://www.uppi.upd.edu.ph/sites/default/files/students_corner/2021S1_D211_ACQ.pdf
6. Beredo, Aubrey Aceron (2019), Nutritional Status and Its Impact on Academic Performance of Selected Grade 8 Students, *Journal of Physics: Conference Series*, doi:10.1088/1742-6596/1254/1/012013.
7. Best C, Neufingerl N, Van Geel L, Van Den Briel T, Osendarp S. 2010. The Nutritional Status of School-Aged Children: Why Should We Care? *Food and Nutrition Bulletin* 31(3): 400– 417. doi:10.1177/156482651003100303
8. Best C, Neufingerl N, Van Geel L, Van Den Briel T, Osendarp S. 2010. The Nutritional Status of School-

- Aged Children: Why Should We Care? *Food and Nutrition Bulletin* 31(3): 400–417.
doi:10.1177/156482651003100303
9. Bhagowalia P, Headey D, Kadiyala S. 2012. Agriculture, Income, and Nutrition Linkages in India: Insights from a Nationally Representative Survey. IFPRI Discussion Paper 01195, July 2012.
 10. Biachew Asmare, Mekuanint Taddele, Sileshi Berihun and Fasil Wagnew (2018), Nutritional status and correlation with academic performance among primary school children, northwest Ethiopia, <https://doi.org/10.1186/s13104-018-3909-1>
 11. Capanzana M, Aguila D. 2020. Philippines Case Study: Government Policies on Nutrition Education. In: *Nutrition Education: Strategies for Improving Nutrition and Healthy Eating in Individuals and Communities*. Black MM, Delichatsios HK, Story MT eds. Karger Publishers.
 12. Capanzana M, Aguila D. 2020. Philippines Case Study: Government Policies on Nutrition Education. In: *Nutrition Education: Strategies for Improving Nutrition and Healthy Eating in Individuals and Communities*. Black MM, Delichatsios HK, Story MT eds. Karger Publishers.
 13. Capanzana M, Aguila D. 2020. Philippines Case Study: Government Policies on Nutrition Education. In: *Nutrition Education: Strategies for Improving Nutrition and Healthy Eating in Individuals and Communities*. Black MM, Delichatsios HK, Story MT eds. Karger Publishers.
 14. Casuso-Holgado et al. (2013), The association between academic engagement and achievement in health sciences students, *BMC Medical Education* 2013, 13:33 <http://www.biomedcentral.com/1472-6920/13/3>
 15. Cullen Mt. 2020 (March 29). COVID-19 and the risk to food supply chains: how to respond? Retrieved on 13 Aug 2021 from <http://www.fao.org/3/ca8388en/CA8388EN.pdf>
 16. Degarege D, Degarege A, Anmut A. 2015. Undernutrition and associated risk factors among school-age children in Addis Ababa, Ethiopia. *BMC Public Health* 15: 375. Retrieved from <https://doi.org/10.1186/s12889-015-1714-5>
 17. Dep.Ed Order no. 031 s. 2021, Operational Guidelines On The Implementation Of The School-Based Feeding Program, https://www.deped.gov.ph/wp-content/uploads/2021/08/DO_s2021_031.pdf
 18. Doumeizel, V (2019) Foresight review of food safety: feeding the world safely and sustainably [online] Lloyd's Register Foundation. Available at: <https://www.lrfoundation.org.uk/en/publications>
 19. Dr. Armando P. Delfino (2019), student engagement and academic performance of students of Partido state university
 20. Dr. Erick T. BALORAN, Jenny T. HERNAN, Janice S. TAOY (2021), Course satisfaction and student engagement in Online learning amid covid-19 pandemic: A structural equation model, *Turkish Online Journal of Distance Education-TOJDE* October 2021 ISSN 1302-6488 Volume: 22 Number: 4 Article 1
 21. https://quezoncity.gov.ph/wp-content/uploads/2021/01/Eco_Profile_2018_Chapter-3.pdf
 22. Huda, M., Sabani, N., Shahrill, M., Jasmi, K. A., Basiron, B., &Mustari, M. I. (2017). Empowering learning culture as student identity construction in higher education. In *Student Culture and Identity in Higher Education* (pp. 160-179). IGI Global.
 23. Huda, M., Sabani, N., Shahrill, M., Jasmi, K. A., Basiron, B., &Mustari, M. I. (2017). Empowering learning culture as student identity construction in higher education. In *Student Culture and Identity in Higher Education* (pp. 160-179). IGI Global.
 24. Hunt, J. G. (2015, October). Diet and Academic Performance. In *International Forum* (Vol. 18, No. 2). Retrieved from <https://tinyurl.com/qvyxkfp> indexed by International Scientific Indexing
 25. Imelda Angeles-Agdeppa et al (2021), Moderate and Severe Level of Food Insecurity Is Associated with High

- Calorie-Dense Food Consumption of Filipino Households, *Journal of Nutrition and Metabolism* Volume 2021, Article ID 5513409, 15 pages <https://doi.org/10.1155/2021/5513409>
26. Imelda Angeles-Agdeppa et al (2021), Moderate and Severe Level of Food Insecurity Is Associated with High Calorie-Dense Food Consumption of Filipino Households, *Journal of Nutrition and Metabolism* Volume 2021, Article ID 5513409, 15 pages <https://doi.org/10.1155/2021/5513409>
 27. Imelda Angeles-Agdeppa, Emilita Monville-Oro, Julian F. Gonsalves, Mario V. Capanzana (2019), Integrated school-based nutrition program improved the knowledge of mother and schoolchildren, *Matern Child Nutr.* 2019;15(S3): e12794. <https://doi.org/10.1111/mcn.12794>
 28. Index Mundi (2020). Philippines Age structure, https://www.indexmundi.com/philippines/age_structure.html
 29. Jacob Finau (2021). How Socioeconomic Status Affects Students, Liberal Studies Program, California State University, Chico, <https://scholarworks.calstate.edu/downloads/qv33s2864>
 30. Jose Ramon G. Albert, Michael Ralph M. Abrigo, Francis Mark A. Quimba, and Jana Flor V. Vizmanos (2020). Poverty, the Middle Class, and Income Distribution amid COVID-19, *Philippine Institute for Development Studies* (2022), <https://pidswebs.pids.gov.ph/CDN/PUBLICATIONS/pidsdps2022.pdf>
 31. Katoch O, Sharma A. 2016. Socioeconomic factors, living conditions, and child undernutrition among school-going children in rural areas of district Doda, Jammu & Kashmir, India: a preliminary study. *Indian Journal of Nutrition* 3(1): 1–7.
 32. Kim Leonard G. dela Luna and Maria Theresa M. Talavera (2021), Factors Affecting the Nutritional Status of School-aged Children Belonging to Farming Households in the Philippines, *Philippine Journal of Science* 150 (6B): 1627-1639, December 2021 ISSN 0031 - 7683 Date Received: 03 May 2021
 33. Kim Leonard G. dela Luna, Jeffrey M. Ostonal, Anna Teresa O. Orillo (2020), Dietary Diversity as a Component of Food Security among Households with Preschool Children in a Coastal Municipality in Batangas, Philippines, *Asia Pacific Journal of Multidisciplinary Research* Vol. 8 No.3, 63-75 August 2020 Part II P-ISSN 2350-7756 E-ISSN 2350-8442 www.apjmr.com, <http://www.apjmr.com/wp-content/uploads/2020/08/APJMR-2020.8.3.02.08.pdf>
 34. Lawal B, Lawal F. 2010. Determinants of nutritional status of children in farming households in Oyo State, Nigeria. *African Journal of Food, Agriculture, Nutrition and Development* 10(10)
 35. Lawal B, Lawal F. 2010. Determinants of nutritional status of children in farming households in Oyo State, Nigeria. *African Journal of Food, Agriculture, Nutrition and Development* 10(10)
 36. Lewallen, T. C., Hunt, H., Potts-Datema, W., Zaza, S., & Giles, W. (2015). The whole school, whole community, whole child model: A new approach for improving educational
 37. Mark Joseph M. Lu, Ramil L. Dacal (2020), Implementation of School-Based Feeding Program and Its Effect on the Physical Growth and Academic Performance, *Asian Journal of Multidisciplinary Studies* Vol. 3, No. 2, (2020) ISSN 2651-6691 (Print) ISSN 2651-6705 (Online)
 38. Mesfin F, Berhane Y, Worku A. 2015. Anemia among Primary School Children in Eastern Ethiopia. *PLOS ONE* 10(4): e0123615.
 39. Michalos, A. C. (2017). Education, happiness and wellbeing. In *Connecting the quality-of-life theory to health, well-being and education* (pp. 277-299). Springer, Cham.
 40. Motbainor A, Alemayehu W, Kumie A. 2015. Stunting is associated with food diversity while wasting with food insecurity among underfive children in East and West Gojjam Zones of Amhara Region, Ethiopia. *PLOS ONE* 10(8).
 41. Neal Nikko D. Espejo (2018), Difference in Academic Engagement among College Students as a function of Learning Environment, Presented at the DLSU Research Congress 2018, De La Salle University, Manila,

Philippines June 20 to 22, 2018

42. Nesrienne G. Buyco et.al (2021), Do school-based nutrition interventions improve the eating behavior of school-age children? *Nutr Res Pract.* 2022 Apr;16(2):217-232 <https://doi.org/10.4162/nrp.2022.16.2.217>
pISSN 1976-1457 · eISSN 2005-6168 <https://doi.org/10.4162/nrp.2022.16.2.217>
43. Nguyen P, Rasmi A, Ruel M, Saha K, Ali D, Tran L et al. 2013. Maternal and child dietary diversity are associated in Bangladesh, Vietnam, and Ethiopia. *The Journal of Nutrition* 143(7): 1176–1183
44. Om Raj Katoch and Aroon Sharma (2017), nutritional status and academic performance: a study on school-aged children in rural areas of Jammu & Kashmir, India
45. Ong M, Ong R, Reyes G, Sumpaico-Tanchanco L. 2020. Addressing the COVID-19 nutrition crisis in vulnerable communities: applying a primary care perspective. *Journal of Primary Care & Community Health* 11 (2150132720946951).
46. Pantea Stoian, Anca; Andronache, Liliana F.; Hainarosie, Razvan; Paduraru, Dan N.; Badiu, Cristinel D.; Arsene, Andreea; Mehedintu, Claudia; Ditu, Georgiana; Pituru, Silviu M.; Orlov, Cristina; Oros, Mihaela; and Nitipir, Cornelia (2018) "Dietary habits and lifestyle in school-aged children from Bucharest, Romania," *Journal of Mind and Medical Sciences: Vol. 5: Iss. 1, Article 14.* DOI: 10.22543/7674.51. P8592 Available at: <https://scholar.valpo.edu/jmms/vol5/iss1/14-01-41>
47. PSA (2013) The Educational Attainment of the Household Population (Results from the 2010 Census). <https://psa.gov.ph/content/educational-attainment-household-population-results-2010-census>
48. PSA (2022), Employment Rate in September 2022 is Estimated at 95.0 Percent. <https://psa.gov.ph/content/employment-rate-september-2022-estimated-950-percent#:~:text=Employment%20Rate%20in%20September%202022,95.0%20Percent%20%7C%20Philippine%20Statistics%20Authority>
49. Rah J, Akhter N, Semba R, De Pee S, Bloem M, Campbell A, Moench- Pfanner R et al. 2010. Low dietary diversity is a predictor of child stunting in rural Bangladesh. *European Journal of Clinical Nutrition* 64(12): 1393–1398
50. Rahimi-Ardabili, H., Reynolds, R., Vartanian, L. R., McLeod, L. V. D., & Zwar, N. (2018). A systematic review of the efficacy of interventions that aim to increase self-compassion on nutrition habits, eating behaviours, body weight and body image. *Mindfulness*, 9(2), 388-400.
51. Rathi, N., Riddell, L., & Worsley, A. (2017). Secondary school students' views of food and nutrition education in Kolkata, India. *Health Education*, 117(3), 310-322.
52. Ribeiro L, Rosário P, Núñez JC, Gaeta M and Fuentes S (2019), First-Year Students Background and Academic Achievement: The Mediating Role of Student Engagement. *Front. Psychol.* 10:2669. doi: 10.3389/fpsyg.2019.02669
53. Rosana D. Agujar, Wyllyn Villanueva, Roshela Santos (2020), school-based feeding program in Culiati high school and its impact on nutritional status and academic Performance of the severely wasted students: basis for developing a multi-way feeding program, *European Journal of Humanities and Educational Advancements (EJHEA)* Available Online at: <https://www.scholarzest.com> Vol. 1 No. 4, December 2020, ISSN: 2660-5589
54. Statistica(2021), Philippines: Age structure from 2011 to 2021 <https://www.statista.com/statistics/578779/age-structure-in-philippines/>
55. Statistica(2021), Philippines: Age structure from 2011 to 2021 [https://www.statista.com/statistics/578779/age-structure-in-philippines/The-Philippines-Food-Security-Monitoring-\(2022\)](https://www.statista.com/statistics/578779/age-structure-in-philippines/The-Philippines-Food-Security-Monitoring-(2022)), https://docs.wfp.org/api/documents/WFP0000145277/download/?_ga=2.8073586.1993053372.1673688044

1000586829.1663304913

56. The World Bank. 2020. Food security and COVID-19. Retrieved on 13 Aug 2021 from <https://www.worldbank.org/en/topic/agriculture/brief/food-security-and-covid-19>
57. Tsz-Ning Mak*, Imelda Angeles-Agdeppa , Yvonne M. Lenighan, Mario V. Capanzana and Ivan Montoliu (2019), Diet Diversity and Micronutrient Adequacy among Filipino School-Age Children, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6770711/pdf/nutrients-11-02197.pdf>
58. UNICEF Philippines (2021), Landscape Analysis For Childhood Overweight And Obesity: Philippines,
59. UNICEF Philippines (2021), UNICEF: Many children and adolescents in the Philippines are not growing up healthily, <https://www.unicef.org/philippines/press-releases/unicef-many-children-and-adolescents-philippines-are-not-growing-healthily>
60. United Nations International Children Educational Fund. 2013. Improving Child Nutrition: The Achievable Imperative for Global Progress. New York, NY: United Nations Children’s Fund
61. Update, Development Plan of the Philippines (2022). <https://pdp.neda.gov.ph/wp-content/uploads/2021/02/20210218-Pre-publication-copy-Updated-Philippine-Development-Plan-2017-2022.pdf>
62. World Bank on December of (2022). Philippines - Educational Attainment, At Least Completed Post-secondary, Population 25+, Female (cumulative). <https://tradingeconomics.com/philippines/educational-attainment-at-least-completed-post-secondary-population-25-female-percent-cumulative-wb-data.html>
63. World Health Organization. 2008. Children – schools and health; their nutrition and health in Kenya. p. 17–20. Retrieved from www.schoolsandhealth.org
64. Yousra Banoor Rajabalee, Yousra Banoor Rajabalee, Frank Rennie (2020), A study of the relationship between students’ engagement and their academic performances in an eLearning environment, E-Learning and Digital Media 2020, Vol. 17(1) 1–20 DOI: 10.1177/2042753019882567 journals.sagepub.com/home/ldm